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Coast Guard Polar Icebreaker Modernization: Background and Issues for Congress

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Summary

The Coast Guard's FY2013 budget initiated a new project for the design and construction of a new polar icebreaker, but the timing and execution of this project have become uncertain. The project received $7.609 million in FY2013, $2.0 million in FY2014, and no funding in FY2015. The Coast Guard's proposed FY2016 budget requests $4 million to continue initial acquisition activities for the ship. A new polar icebreaker might cost roughly $900 million to $1.1 billion.

Coast Guard polar icebreakers perform a variety of missions supporting U.S. interests in polar regions. The Coast Guard's two existing heavy polar icebreakers—*Polar Star* and *Polar Sea*—have exceeded their originally intended 30-year service lives. *Polar Star* was placed in caretaker status on July 1, 2006. Congress in FY2009 and FY2010 provided funding to repair it and return it to service for an additional 7 to 10 years of service; the repair work was completed and the ship was reactivated on December 14, 2012. On June 25, 2010, the Coast Guard announced that *Polar Sea* had suffered an unexpected engine casualty; the ship was unavailable for operation after that. The Coast Guard placed *Polar Sea* in commissioned, inactive status on October 14, 2011.

The Coast Guard's third polar icebreaker—*Healy*—entered service in 2000. Compared to *Polar Star* and *Polar Sea*, *Healy* has less icebreaking capability (it is considered a medium polar icebreaker), but more capability for supporting scientific research. The ship is used primarily for supporting scientific research in the Arctic.

With the reactivation of *Polar Star* in 2012, the operational U.S. polar icebreaking fleet consists of one heavy polar icebreaker (*Polar Star*) and one medium polar icebreaker (*Healy*).

The Coast Guard's strategy document for the Arctic region, released on May 21, 2013, states that "The United States must have adequate icebreaking capability to support research that advances fundamental understanding of the region and its evolution," and that "The Nation must also make a strategic investment in icebreaking capability to enable access to the high latitudes over the long-term."

The Department of Homeland Security (DHS) approved a Mission Need Statement (MNS) for the polar icebreaker recapitalization project in June 2013. The MNS states: "This Mission Need Statement (MNS) establishes the need for polar icebreaker capabilities provided by the Coast Guard, to ensure that it can meet current and future mission requirements in the polar regions.... Current requirements and future projections based upon cutter demand modeling, as detailed in the HLMAR [High Latitude Mission Analysis Report], indicate the Coast Guard will need to expand its icebreaking capacity, potentially requiring a fleet of up to six icebreakers (3 heavy and 3 medium) to adequately meet mission demands in the high latitudes.... "

A central issue for polar icebreaker modernization is whether, when, and how to fund the procurement of a new polar icebreaker. Beginning with the Coast Guard's FY2014 budget submission, the timing and execution of this project have become uncertain. The Coast Guard states that "in order to fully fund subsequent phases of this program, the Coast Guard believes that a 'whole-of-government' approach will be necessary. Obtaining a new, heavy polar icebreaker that meets Coast Guard requirements will depend upon supplementary financing from other agencies whose activities also rely upon the nation possessing a robust, Arctic-capable surface fleet."

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Introduction

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The issue for Congress is whether to approve, reject, or modify Coast Guard plans for sustaining and modernizing its polar icebreaking fleet. Congressional decisions on this issue could affect Coast Guard funding requirements, the Coast Guard's ability to perform its polar missions, and the U.S. shipbuilding industrial base.

Background

Missions of U.S. Polar Icebreakers

U.S. polar ice operations support 9 of the Coast Guard's 11 statutory missions.[1] The roles of U.S. polar icebreakers can be summarized as follows:

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

Operations to support National Science Foundation (NSF) research activities in the Arctic and Antarctic have accounted in the past for a significant portion of U.S. polar icebreaker operations.[2] Supporting NSF research in the Antarctic has included performing an annual mission, called Operation Deep Freeze, to break through the Antarctic ice so as to resupply McMurdo Station, the

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

[2] This passage, beginning with "The roles of…", originated in an earlier iteration of this CRS report and was later transferred by GAO with minor changes to Government Accountability Office, *Coast Guard[:]Efforts to Identify Arctic Requirements Are Ongoing, but More Communication about Agency Planning Efforts Would Be Beneficial*, GAO-10-870, September 2010, p. 53.

large U.S. Antarctic research station located on the shore of McMurdo Sound, near the Ross Ice Shelf.

Although polar ice is diminishing due to climate change, observers generally expect that this development will not eliminate the need for U.S. polar icebreakers, and in some respects might increase mission demands for them. Even with the diminishment of polar ice, there are still significant ice-covered areas in the polar regions. Diminishment of polar ice could lead in coming years to increased commercial ship, cruise ship, and naval surface ship operations, as well as increased exploration for oil and other resources, in the Arctic—activities that could require increased levels of support from polar icebreakers.[3] Changing ice conditions in Antarctic waters have made the McMurdo resupply mission more challenging since 2000.[4] An April 18, 2011, press report states that the Commandant of the Coast Guard at the time, Admiral Robert Papp,

> sees plenty of reasons the United States will need polar icebreakers for the "foreseeable future," despite speculation that thinning ice in the Arctic could make the icebreakers replaceable with other ice-hardened ships, the admiral said last week….
>
> "I don't see that causing us to back down on some minimal level of polar icebreakers," Papp told *Inside the Navy*. "The fact of the matter is, there's still winter ice that's forming [each year]. It's coming down pretty far. We don't need to get up there just during summer months when there's open water."[5]

The Coast Guard's strategy document for the Arctic region, released on May 21, 2013, states that "The United States must have adequate icebreaking capability to support research that advances fundamental understanding of the region and its evolution," and that "The Nation must also make a strategic investment in icebreaking capability to enable access to the high latitudes over the long-term."[6]

Current U.S. Polar Icebreakers

The U.S. polar icebreaker fleet currently includes four ships—three Coast Guard ships and one ship operated by the NSF. The ships are described briefly below.

Three Coast Guard Ships

The Coast Guard's three polar icebreakers are multimission ships that can break through ice, support scientific research operations, and perform other missions typically performed by Coast Guard ships.

[3] For more on changes in the Arctic due to diminishment of Arctic ice, see CRS Report R41153, *Changes in the Arctic: Background and Issues for Congress*, coordinated by Ronald O'Rourke.

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

[5] Cid Standifer, "Adm. Papp: Coast Guard Still Needs Icebreakers For Winter, Antarctic," *Inside the Navy*, April 18, 2011.

[6] *United States Coast Guard Arctic Strategy*, Washington, May 2013, p. 35; accessed May 24, 2013, at http://www.uscg.mil/seniorleadership/DOCS/CG_Arctic_Strategy.pdf.

Heavy Polar Icebreakers Polar Star and Polar Sea

Polar Star (WAGB-10) and *Polar Sea* (WAGB-11),[7] sister ships built to the same general design (**Figure 1** and **Figure 2**), were procured in the early 1970s as replacements for earlier U.S. icebreakers. They were designed for 30-year service lives, and were built by Lockheed Shipbuilding of Seattle, WA, a division of Lockheed that also built ships for the U.S. Navy, but which exited the shipbuilding business in the late 1980s.

The ships are 399 feet long and displace about 13,200 tons.[8] They are among the world's most powerful non-nuclear-powered icebreakers, with a capability to break through ice up to 6 feet thick at a speed of 3 knots. Because of their icebreaking capability, they are considered heavy polar icebreakers. In addition to a crew of 134, each ship can embark a scientific research staff of 32 people.

Figure 1. *Polar Star* and *Polar Sea*

(Side by side in McMurdo Sound, Antarctica)

Source: Coast Guard photo accessed at http://www.uscg.mil/pacarea/cgcpolarsea/history.asp on April 21, 2011.

[7] The designation WAGB means Coast Guard icebreaker. More specifically, W means Coast Guard ship, A means auxiliary, G means miscellaneous purpose, and B means icebreaker.

[8] By comparison, the Coast Guard's new National Security Cutters—its new high-endurance cutters—are about 418 feet long and displace roughly 4,000 tons.

Polar Star was commissioned into service on January 19, 1976, and consequently is now several years beyond its intended 30-year service life. Due to worn out electric motors and other problems, the Coast Guard placed the ship in caretaker status on July 1, 2006.[9] Congress in FY2009 and FY2010 provided funding to repair *Polar Star* and return it to service for 7 to 10 years; the repair work, which reportedly cost about $57 million, was completed, and the ship was reactivated on December 14, 2012.[10] Although the repair work on the ship was intended to give it another 7 to 10 years of service, an August 30, 2010, press report quoted then-Commandant of the Coast Guard, Admiral Robert Papp, as saying, "We're getting her back into service, but it's a little uncertain to me how many more years we can get out of her in her current condition, even after we do the engine repairs."[11]

Figure 2. *Polar Sea*

Source: Coast Guard photo accessed at http://www.uscg.mil/pacarea/cgcpolarsea/img/PSEApics/FullShip2.jpg on April 21, 2011.

Polar Sea was commissioned into service on February 23, 1978, and consequently is also beyond its originally intended 30-year service life. In 2006, the Coast Guard completed a rehabilitation project that extended the ship's expected service life to 2014. On June 25, 2010, however, the Coast Guard announced that *Polar Sea* had suffered an unexpected engine casualty, and the ship was unavailable for operation after that.[12] The Coast Guard placed *Polar Sea* in commissioned,

[9] Source for July 1, 2006, date: U.S. Coast Guard email to CRS on February 22, 2008. The Coast Guard's official term for caretaker status is "In Commission, Special."

[10] See, for example, Kyung M. Song, "Icebreaker Polar Star Gets $57 Million Overhaul," *Seattle Times*, December 14, 2012.

[11] Cid Standifer, "Papp: Refurbished Icebreaker Hulls Could Last 'An Awful Long Time,'" *Inside the Navy*, August 30, 2010.

[12] On June 25, 2010, the Coast Guard announced that

> POLAR SEA suffered an unexpected engine casualty and will be unable to deploy on its scheduled fall 2010 Arctic patrol and may be unavailable for Operation Deep Freeze [the annual mission to break through the Antarctic ice so as to resupply McMurdo Station], Dec. 20 to Jan 2, 2011.
>
> POLAR SEA will likely be in a maintenance status and unavailable for operation until at least January 2011….

(continued...)

inactive status on October 14, 2011. The Coast Guard transferred certain major equipment from *Polar Sea* to *Polar Star* to facilitate *Polar Star's* return to service.[13]

Section 222 of the Coast Guard and Maritime Transportation Act of 2012 (H.R. 2838/P.L. 112-213 of December 20, 2012) prohibited the Coast Guard from removing any part of *Polar Sea* and from transferring, relinquishing ownership of, dismantling, or recycling the ship until it submitted a business case analysis of the options for and costs of reactivating the ship and extending its service life to at least September 30, 2022, so as to maintain U.S. polar icebreaking capabilities and fulfill the Coast Guard's high latitude mission needs, as identified in the Coast Guard's July 2010 High Latitude Study. (The business case analysis was submitted to Congress with a cover date of November 7, 2013.)

Medium Polar Icebreaker Healy

Healy (WAGB-20) (**Figure 3**) was procured in the early 1990s as a complement to *Polar Star* and *Polar Sea*, and was commissioned into service on August 21, 2000. The ship was built by Avondale Industries, a shipyard located near New Orleans, LA, that built numerous Coast Guard and Navy ships, and which eventually became part of Huntington Ingalls Industries (HII).[14] HII in recent years has wound down shipbuilding activities at Avondale; the facility is no longer building ships.[15]

Healy is a bit larger than *Polar Star* and *Polar Sea*—it is 420 feet long and displaces about 16,000 tons. Compared to *Polar Star* and *Polar Sea*, *Healy* has less icebreaking capability (it is considered a medium polar icebreaker), but more capability for supporting scientific research. The ship can break through ice up to 4½ feet thick at a speed of 3 knots, and embark a scientific research staff of 35 (with room for another 15 surge personnel and 2 visitors). The ship is used primarily for supporting scientific research in the Arctic.

(...continued)

> Currently, the 420-foot CGC HEALY, commissioned in 1999, is the service's sole operational polar region icebreaker. While the HEALY is capable of supporting a wide range of Coast Guard missions in the polar regions, it is a medium icebreaker capable of breaking ice up to 4.5-feet thick at three knots.
>
> The impact on POLAR SEA's scheduled 2011 Arctic winter science deployment, scheduled for Jan. 3 to Feb. 23, 2011, is not yet known and depends on the scope of required engine repair.
>
> ("Icebreaker POLAR SEA Sidelined By Engine Troubles," *Coast Guard Compass (Official Blog of the U.S. Coast Guard)*, June 25, 2010.)

A June 25, 2010, report stated that "inspections of the Polar Sea's main diesel engines revealed excessive wear in 33 cylinder assemblies. The Coast Guard is investigating the root cause and hopes to have an answer by August." ("USCG Cancels Polar Icebreaker's Fall Deployment," *DefenseNews.com*, June 25, 2010.) Another June 25 report stated that "five of [the ship's] six mighty engines are stilled, some with worn pistons essentially welded to their sleeves." (Andrew C. Revkin, "America's Heavy Icebreakers Are Both Broken Down," *Dot Earth (New York Times blog)*, June 25, 2010.)

[13] Source: October 17, 2011, email to CRS from Coast Guard Congressional Affairs office.

[14] HII was previously owned by Northrop Grumman, during which time it was known as Northrop Grumman Shipbuilding.

[15] See, for example, Marc Selinger, "Avondale Shipyard's Fate Remains Unclear," *Defense Daily*, April 21, 2015: 5.

Figure 3. *Healy*

Source: Coast Guard photo accessed at http://www.uscg.mil/history/webcutters/Healy_CGC_1_300.jpg on April 21, 2011.

One National Science Foundation Ship

The nation's fourth polar icebreaker is *Nathaniel B. Palmer*, which was built for the NSF in 1992 by North American Shipbuilding, of Larose, LA. The ship, called *Palmer* for short, is owned by Offshore Service Vessels LLC, operated by Edison Chouest Offshore (ECO) of Galliano, LA (a firm that owns and operates research ships and offshore deepwater service ships),[16] and chartered by the NSF. *Palmer* is considerably smaller than the Coast Guard's three polar icebreakers—it is 308 feet long and has a displacement of about 6,500 tons. It is operated by a crew of about 22, and can embark a scientific staff of 27 to 37.[17]

Unlike the Coast Guard's three polar icebreakers, which are multimission ships, *Palmer* was purpose-built as a single-mission ship for conducting and supporting scientific research in the Antarctic. It has less icebreaking capability than the Coast Guard's polar icebreakers, being capable of breaking ice up to 3 feet thick at speeds of 3 knots. This capability is sufficient for breaking through the more benign ice conditions found in the vicinity of the Antarctic Peninsula,

[16] For more on ECO, see the firm's website at http://www.chouest.com/.

[17] Sources vary on the exact number of scientific staff that can be embarked on *Palmer*. For some basic information on the ship, see http://www.nsf.gov/od/opp/support/nathpalm.jsp,
http://www.usap.gov/vesselScienceAndOperations/documents/prvnews_june03.pdfprvnews_june03.pdf,
http://nsf.gov/od/opp/antarct/treaty/pdf/plans0607/15plan07.pdf,
http://www.nsf.gov/pubs/1996/nsf9693/fls.htm, and
http://www.hazegray.org/worldnav/usa/nsf.htm.

so as to resupply Palmer Station, a U.S. research station on the peninsula. Some observers might view *Palmer* not so much as an icebreaker as an oceanographic research ship with enough icebreaking capability for the Antarctic Peninsula. *Palmer's* icebreaking capability is not considered sufficient to perform the McMurdo resupply mission.

Summary

In summary, the U.S. polar icebreaking fleet currently includes

- two heavy polar icebreakers (*Polar Star* and *Polar Sea*), one of which is operational, that are designed to perform missions in either polar area, including the challenging McMurdo resupply mission;
- one medium polar icebreaker (*Healy*) that is used primarily for scientific research in the Arctic; and
- one ship (*Palmer*) that is used for scientific research in the Antarctic.

Table 1 summarizes the four ships.

Table 1. U.S. Polar Icebreakers

	Polar Star	***Polar Sea***	***Healy***	***Palmer***
Operator	USCG	USCG	USCG	NSF
U.S.-Government owned?	Yes	Yes	Yes	No[a]
Currently operational?	Yes (reactivated on December 14, 2012)	No	Yes	Yes
Entered service	1976	1978	2000	1992
Length (feet)	399	399	420	308
Displacement (tons)	13,200	13,200	16,000	6,500
Icebreaking capability at 3 knots (ice thickness in feet)	6 feet	6 feet	4.5 feet	3 feet
Ice ramming capability (ice thickness in feet)	21 feet	21 feet	8 feet	n/a
Operating temperature	-60° Fahrenheit	-60° Fahrenheit	-50° Fahrenheit	n/a
Crew (when operational)	155[b]	155[b]	85[c]	22
Additional scientific staff	32	32	35[d]	27-37

Sources: Prepared by CRS using data from U.S. Coast Guard, National Research Council, National Science Foundation, Department of Homeland Security (DHS) Office of Inspector General, and (for *Palmer*) additional online reference sources. n/a is not available.

a. Owned by Edison Chouest Offshore (ECO) of Galliano, LA, and leased to NSF through Raytheon Polar Services Company (RPSC).

b. Includes 24 officers, 20 chief petty officers, 102 enlisted, and 9 in the aviation detachment.

c. Includes 19 officers, 12 chief petty officers, and 54 enlisted.

d. In addition to 85 crew members 85 and 35 scientists, the ship can accommodate another 15 surge personnel and 2 visitors.

In addition to the four ships shown in **Table 1**, a fifth U.S.-registered polar ship with icebreaking capability—the icebreaking anchor handling tug supply vessel *Aiviq*—is used by Royal Dutch Shell oil company to support oil exploration and drilling in Arctic waters off Alaska. The ship,

which completed construction in 2012, is owned by ECO and chartered by Royal Dutch Shell. It is used primarily for towing and laying anchors for drilling rigs, but is also equipped for responding to oil spills.

June 2013 DHS Polar Icebreaker Mission Need Statement

The Department of Homeland Security (DHS) approved a Mission Need Statement (MNS) for the polar icebreaker recapitalization project in June 2013. The MNS states (emphasis added):

> This Mission Need Statement (MNS) establishes the need for polar icebreaker capabilities provided by the Coast Guard, to ensure that it can meet current and future mission requirements in the polar regions....
>
> Polar Ice Operations support nine of the eleven authorized [i.e., statutory] Coast Guard missions....[18]
>
> **Current requirements and future projections based upon cutter demand modeling, as detailed in the HLMAR [High Latitude Mission Analysis Report], indicate the Coast Guard will need to expand its icebreaking capacity, potentially requiring a fleet of up to six icebreakers (3 heavy and 3 medium) to adequately meet mission demands in the high latitudes**.... The analysis took into account both the Coast Guard statutory mission requirements and additional requirements for year-round presence in both polar regions detailed in the Naval Operations Concept (NOC) 2010. The NOC describes when, where, and how U.S. naval forces will contribute to enhancing security, preventing conflict, and prevailing in war. The analysis also evaluated employing single and multi-crewing concepts. Baseline employment standards for single and multi-crew concepts used 185 DAFHP and 250/280 DAFHP, respectively. Strategic home porting analysis based upon existing infrastructure and distance to operational areas provided the final input to determine icebreaker capacity demand....
>
> In response to the National guidance, the HLMAR was commissioned that identified capability gaps in the Coast Guard's ability to support and conduct required missions in the polar regions. Nine of the Coast Guard's eleven authorized mission programs are conducted in the high latitudes. These directly support the 2012 Department of Homeland Security Strategic Plan as well as twelve of the 22 goals and objectives stated in the *Quadrennial Homeland Security Review (QHSR) Report: A Strategic Framework for a Secure Homeland, February 2010* and the *U.S. Department of Homeland Security Annual Performance Report, Fiscal Years 2010 – 2012*....
>
> ... numerous agencies of the Federal Government have an obligation to conduct polar ice operations to meet the requirements mandated by treaties, statutes, and executive direction....
>
> Without recapitalizing the Nation's polar icebreaking capability, the gap between the mission demand and icebreaking capacity and capability will continue to grow. Given the most optimistic scenarios, this gap will grow as the existing fleet ages beyond the vessels'

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

> designed service lives and unscheduled maintenance diminishes the assets' operational availabilities. Even with straightline demand, the current polar icebreaker fleet will not be sufficient to meet projected mission demands. The Coast Guard will be unable to meet either the current and projected Coast Guard and Federal agency mission demands or the goals for the QHSR in the high latitudes. Disapproval of the polar icebreaker project will further challenge the agencies responsible for maintaining an active and influential United States presence in the polar regions.[19]

A number of studies have been conducted in recent years to assess U.S. requirements for polar icebreakers and options for sustaining and modernizing the Coast Guard's polar icebreaker fleet. The findings of some of these studies are presented in the **Appendix**.

January 2014 Implementation Plan for National Strategy for Arctic Region

On May 10, 2013, the Obama Administration released a document entitled *National Strategy for the Arctic Region*.[20] On January 30, 2014, the Obama Administration released an implementation plan for this strategy.[21] Of the 36 or so specific initiatives in the implementation plan, one is entitled "Sustain federal capability to conduct maritime operations in ice-impacted waters." The implementation plan states the following regarding this initiative:

> *Objective:* 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.
>
> *Next Steps:* The Federal Government requires the ability to conduct operations in ice-impacted waters in the Arctic. As maritime activity in the Arctic region increases, expanded access will be required. Next steps include:
>
> • The lead and supporting Departments and Agencies will develop a document that lists the capabilities needed to operate in ice-impacted waters to support Federal activities in the Polar Regions and emergent sovereign responsibilities over the next ten to twenty years by the end of 2014.
>
> • Develop long-term plans to sustain Federal capability to physically access the Arctic with sufficient capacity to support U.S. interests by the end of 2017.
>
> *Measuring Progress:* Sustaining federal capability will be demonstrated through the Federal Government's ability to conduct operations in the Arctic to support statutory missions and sovereign responsibilities, and to advance interests in the region. Progress in implementing

[19] Department of Homeland Security, *Polar Icebreaking Recapitalization Project Mission Need Statement, Version 1.0*, approved by DHS June 28, 2013, pp. 1, 2, 9, 10, 11, 12.

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

[21] The White House new release about the release of the implementation plan was posted at http://www.whitehouse.gov/blog/2014/01/30/white-house-releases-implementation-plan-national-strategy-arctic-region. The document is posted at http://www.whitehouse.gov/sites/default/files/docs/implementation_plan_for_the_national_strategy_for_the_arctic_region_-_fi.... pdf.

this objective will be measured by completion of the capabilities document, and long term sustainment plan.

Lead Agency: Department of Homeland Security

Supporting Agencies: Department of Commerce (National Oceanic and Atmospheric Administration), Department of Defense, Department of State, Department of Transportation, National Science Foundation[.][22]

Polar Icebreakers Operated by Other Countries

In discussions of U.S. polar icebreakers, some observers note the size of the polar icebreaking fleets operated by other countries. Countries with interests in the polar regions have differing requirements for polar icebreakers, depending on the nature and extent of their polar activities. **Table 2** shows a Coast Guard summary of major icebreakers around the world; the figures in the table include some icebreakers designed for use in the Baltic Sea.

Table 2. Major Icebreakers Around the World

(as of June 26, 2014)

	Total all types, in inventory (+ under construction + planned)	In inventory, government owned or operated			In inventory, privately owned and operated		
		45,000 or more BHP	20,000 to 44,999 BHP	10,000 to 19,999 BHP	45,000 or more BHP	20,000 to 44,999 BHP	10,000 to 19,999 BHP
Russia	40 (+ 6 + 5)	6 (all nuclear powered; 4 operational)	7	6		12	9
Finland	7 (+ 0 +1)		3	1		3	
Sweden	6		4				2
Canada	6 (+0 +1)		2	4			
United States	5 (+0 +1)	2 (*Polar Star* and *Polar* Sea—Polar *Sea* not operational)	1 (*Healy*)			1 (*Aiviq*—built for Shell Oil)	1 (*Palmer*)
Denmark	4						4
Estonia	2			2			
Norway	1 (+0 +1)			1			
Germany	1 (+0 +1)			1			
China	1 (+0 +1)			1			
Japan	1		1				
Australia	1			1			
Chile	1			1			
Latvia	1			1			

[22] *Implementation Plan for The National Strategy for the Arctic Region*, January 2014, pp. 8-9.

	Total all types, in inventory (+ under construction + planned)	In inventory, government owned or operated			In inventory, privately owned and operated		
		45,000 or more BHP	20,000 to 44,999 BHP	10,000 to 19,999 BHP	45,000 or more BHP	20,000 to 44,999 BHP	10,000 to 19,999 BHP
South Korea	1			1			
South Africa	1			1			
Argentina	1			1 (not operational)			

Source: Table prepared by CRS based on U.S. Coast Guard chart showing data compiled by the Coast Guard as of June 26, 2014, accessed online July 1, 2014, at http://www.uscg.mil/hq/cg5/cg552/ice.asp. The table also lists the United Kingdom as planning one new polar research vessel.

Notes: Includes some icebreakers designed for use in the Baltic Sea. **BHP** = the brake horsepower of the ship's power plant. A ship with 45,000 or more BHP might be considered a heavy polar icebreaker, a ship with 20,000 to 44,999 BHP might be considered a medium polar icebreaker, and a ship with 10,000 to 19,999 BHP might be considered a light polar icebreaker or an ice-capable polar ship.

Cost Estimates for Certain Polar Icebreaker Modernization Options

New Replacement Ships

The Coast Guard estimated in February 2008 that new replacement ships for the *Polar Star* and *Polar Sea* might cost between $800 million and $925 million per ship in 2008 dollars to procure.[23] The Coast Guard said that this estimate

> is based on a ship with integrated electric drive, three propellers, and a combined diesel and gas (electric) propulsion plant. The icebreaking capability would be equivalent to the POLAR Class Icebreakers [i.e., Polar Star and Polar Sea] and research facilities and accommodations equivalent to HEALY. This cost includes all shipyard and government project costs. Total time to procure a new icebreaker [including mission analysis, studies, design, contract award, and construction] is eight to ten years.[24]

The Coast Guard further stated that this notional new ship would be designed for a 30-year service life.

The High Latitude Study provided to Congress in July 2011 states that the above figure of $800 million to $925 million in 2008 dollars equates to $900 million to $1,041 million in 2012 dollars. The study provides the following estimates, in 2012 dollars, of the acquisition costs for new polar icebreakers:

[23] Coast Guard point paper provided to CRS on February 12, 2008, and dated with the same date, providing answers to questions from CRS concerning polar icebreaker modernization.

[24] The Coast Guard states further that the estimate is based on the procurement cost of the *Mackinaw* (WAGB-30), a Great Lakes icebreaker that was procured a few years ago and commissioned into service with the Coast Guard in June 2006. The *Mackinaw* is 240 feet long, displaces 3,500 tons, and can break ice up to 2 feet, 8 inches thick at speeds of 3 knots, which is suitable for Great Lakes icebreaking. The Coast Guard says it scaled up the procurement cost for the *Mackinaw* in proportion to its size compared to that of a polar icebreaker, and then adjusted the resulting figure to account for the above-described capabilities of the notional replacement ship and recent construction costs at U.S. Gulf Coast shipyards.

- $856 million for 1 ship;
- $1,663 million for 2 ships—an average of about $832 million each;
- $2,439 million for 3 ships—an average of $813 million each;
- $3,207 million for 4 ships—an average of about $802 million each;
- $3,961 million for 5 ships—an average of about $792 million each; and
- $4,704 million for 6 ships—an average of $784 million each.

The study refers to the above estimates as "rough order-of-magnitude costs" that "were developed as part of the Coast Guard's independent Polar Platform Business Case Analysis."[25]

25-Year Service Life Extensions

The Coast Guard stated in February 2008 that performing the extensive maintenance, repair, and modernization work needed to extend the service lives of *Polar Star* and *Polar Sea* by 25 years might cost roughly $400 million per ship. This figure, the Coast Guard said, is based on assessments made by independent contractors for the Coast Guard in 2004. The service life extension work, the Coast Guard said, would improve the two icebreakers' installed systems in certain areas. Although the work would be intended to permit the ships to operate for another 25 years, it would not return the cutters to new condition.[26]

An August 30, 2010, press report stated that the Commandant of the Coast Guard at the time, Admiral Robert Papp, estimated the cost of extending the lives of *Polar Star* and *Polar Sea* at about $500 million per ship; the article quoted Papp as stating that *Polar Star* and *Polar Sea* "were built to take a beating. They were built with very thick special steel, so you might be able to do a renovation on them and keep going…. I think there are certain types of steel that, if properly maintained, they can go on for an awful long time. What the limit is, I'm not sure."[27]

Reactivate *Polar Sea* for Several Years

At a June 26, 2013, hearing before the Coast Guard and Maritime Transportation subcommittee of the House Transportation and Infrastructure Committee, Vice Admiral John P. Currier, the Vice Commandant of the Coast Guard, testified that repairing and reactivating *Polar Sea* for an additional 7 to 10 years of service would require about 3 years of repair work at a cost of about $100 million.[28]

As mentioned earlier, the business case analysis required by Section 222 of H.R. 2838/P.L. 112-213 was submitted to Congress with a cover date of November 7, 2013. The executive summary of the analysis states:

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[25] *United States Coast Guard High Latitude Region Mission Analysis Capstone Summary*, July 2010, p. 13.

[26] Coast Guard point paper provided to CRS on February 12, 2008, and dated with the same date, providing answers to questions from CRS concerning polar icebreaker modernization.

[27] Cid Standifer, "Papp: Refurbished Icebreaker Hulls Could Last 'An Awful Long Time,'" *Inside the Navy*, August 30, 2010. Ellipsis as in original.

[28] Transcript of hearing.

Findings:

A total of 43 mission critical systems in five general categories were assessed and assigned a condition rating. Overall, Propulsion, Auxiliary and Prime Mission Equipment are rated Poor to Fair, while Structure and Habitability are rated Fair to Good. POLAR SEA reactivation is estimated to cost $99.2 million (excluding annual operations and support costs) to provide 7-10 years of service to the Coast Guard. Given the age of the icebreaker, operations and support costs are projected to rise from $36.6 million in the first year of operation to $52.8 million in the tenth year of operation. Combining reactivation costs and point estimates for operating costs, reactivation would cost $573.9 million. Accounting for operational and technical uncertainties, using a 90% Confidence Level Risk Analysis, the total potential cost rises to $751.7 million.

Arctic seasonal icebreaking demands through 2022 can be met with existing and planned Coast Guard assets, as current requirements do not justify the need for heavy icebreaking capability in the Arctic. Heavy icebreaker capability is needed to perform Operation Deep Freeze in Antarctica, but Coast Guard assets may not be the only option available to the National Science Foundation to support this activity. Although a second heavy icebreaker would provide redundancy, the cost of this redundant capability would come at the expense of more pressing and immediate operational demands. POLAR STAR, when fully reactivated, will provide heavy icebreaker capability until a new icebreaker can be delivered to meet both current and emerging requirements.[29]

At a July 23, 2014, hearing before the Coast Guard and Maritime Transportation subcommittee of the House Transportation and Infrastructure Committee, Vice Admiral Peter Neffenger, the Vice Commandant of the Coast Guard, testified that "as I understand it, that $100 million [estimate] was a snapshot in time if we were to have begun at that point to reactivate the vessel. We believe that there's been some additional deterioration [in the ship's condition] in the 2.5 years it's been sitting [at pier].... But I suspect that it will be something more than $100 million once we do the assessment [of the ship's condition]."[30]

Recent Coast Guard Polar Icebreaker Acquisition Actions

A March 6, 2015, press report stated:

> The Coast Guard is in consultation with the Canadians and Finnish ship designers on technology that could end up in a future U.S. icebreaker, the service's assistant commandant for acquisitions said on Thursday [March 5].
>
> "We're working very closely with the Canadians and the Finns because there's a small technological base of real ice breaking experts in the world," Rear Adm. Bruce Baffer said....
>
> "We're trying to keep from recreating the wheel whenever we can."[31]

[29] U.S. Coast Guard, *USCGC POLAR SEA Business Case Analysis, 2103 Report to Congress*, November 7, 2013, p. 4. The report was accessed April 9, 2014, at http://assets.fiercemarkets.net/public/sites/govit/polarsea_businesscaseanalysis_nov2013.pdf. See also "Second Heavy Icebreaker Not Necessary Through 2022, Says Coast Guard," Fierce Homeland Security (http://www.fiercehomelandsecurity.com), January 19, 2014, which includes a link to the assets.fiercemarkets.net site at which the report was posted.

[30] Transcript of hearing.

[31] Sam LaGrone, "Coast Guard Working With Canadians, Finns on Future Icebreaker Design," USNI News, March 6, (continued...)

An October 6, 2014, trade press report stated:

> Reaching out to industry, the Coast Guard has issued a Request for Information (RFI) for commercial heavy polar icebreaker designs and the capability of industry in the United States to build such a ship....
>
> In a Sept. 30 notice in the FedBizOpps.gov, the Coast Guard says the RFI is a "precursor" to a potential procurement of a non-nuclear polar icebreaker. The Coast Guard is interested in commercial and scientific research icebreakers that can be, or be configured to meet, its operational mission requirements. Responses may be used to help the service develop an acquisition strategy, it says.
>
> The minimum mission set is to be able to perform operations that the 399-foot Polar Star can do, the Coast Guard says.[32]

The Coast Guard stated on June 20, 2014, that

> The U.S. Coast Guard's Polar Icebreaker acquisition project achieved the next acquisition milestone on June 13, 2014, with approval to enter the Analyze/Select phase of the Department of Homeland Security acquisition lifecycle. This action validates the need for continued icebreaker capabilities and allows the project to move forward to the next acquisition phase.
>
> Approval to proceed was granted after the Coast Guard identified specific capabilities necessary to address mission performance gaps and prepared a formal mission need statement, concept of operations overview and preliminary acquisition plan. During the Analyze/Select Phase, the Coast Guard will develop operational requirements for a future polar icebreaker, identify resources required to maintain the asset through its lifecycle and assess potential alternatives capable of meeting polar icebreaking mission requirements.[33]

Timing and Execution of Polar Icebreaker Acquisition Project Have Become Less Certain

Overview

Beginning with the Coast Guard's FY2014 budget submission, the timing and execution of the procurement of a new polar icebreaker have become uncertain. In the FY2013 budget submission—the submission that initiated the project to acquire the ship—DHS stated that it anticipated awarding a construction contract for the ship "within the next five years" and taking delivery on the ship "within a decade."[34] In the FY2014 budget submission, DHS stated that it anticipated awarding a construction contract for the ship "within the next four years."[35] In the

(...continued)

2015.

[32] Calvin Biesecker, "Coast Guard Requests Information On Heavy Polar Icebreaker," *Defense Daily*, October 6, 2014.

[33] "Acquisition Update: Polar Icebreaker Acquisition Project Approved For Next Phase," June 20, 2014, accessed December 23, 2014, at http://www.uscg.mil/acquisition/newsroom/updates/icebreaker062014.asp.

[34] U.S. Department of Homeland Security, *Annual Performance Report, Fiscal Years 2011-2013*, p. CG-AC&I-40 (pdf page 1,777 of 3,134).

[35] Department of Homeland Security, United States Coast Guard, *Fiscal Year 2014 Congressional Justification*, p. CG-
(continued...)

Coast Guard's FY2015 and FY2016 budget-justification books, the entry for the polar icebreaker program does not make a statement as to when a construction contract for the ship might be awarded.[36]

Table 3 compares funding for the acquisition of a new polar icebreaker under the Coast Guard's FY2013-FY2016 budget submissions. As can be seen in the table, the Coast Guard's FY2013 budget submission included a total of $860 million over five years—enough or almost enough to fully fund the procurement of a new polar icebreaker. (Any remaining needed funding might have been projected for FY2018 and perhaps also FY2019, which were beyond the five-year window of the FY2013 budget submission.)

As can also be seen in the table, compared to the Coast Guard's FY2013 budget submission, the Coast Guard's FY2014, FY2015, and FY2016 budget submissions significantly reduced the total amount of funding included for the ship in each submission's five-year window while deferring the apparent procurement of the ship further into the future. Using the figures in the table, under the Coast Guard's FY2016 budget submission, it would appear that major construction-related activities for building a new polar icebreaker (such as procurement of long lead-time material) would begin no earlier than FY2019.

Table 3. Funding for Acquisition of New Polar Icebreaker Under FY2013-FY2016 Budget Submissions

(millions of then-year dollars)

	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	5-year total
FY2013 budget	8	120	380	270	82				860
FY2014 budget		2	8	100	20	100			230
FY2015 budget			6	4	100	20	100		230
FY2016 budget				4	10	2	100	50	166

Source: Coast Guard FY2013-FY2016 budget submissions.

Reduction in Coast Guard's AC&I Account in FY2014 Budget Submission

The emergence of uncertainty over the timing and execution of the project to procure a new polar icebreaker appears related to a substantial reduction in the annual funding levels in the Coast Guard's Acquisition, Construction, and Improvements (AC&I) that occurred with the Coast Guard's FY2014 budget submission (see **Table 4**). The Coast Guard has testified that if annual funding levels in the AC&I account are not increased from currently programmed levels, the icebreaker will be, essentially, an unfunded requirement. For example, at an April 28, 2015, hearing on Coast Guard resources and priorities before the Oceans, Atmosphere, Fisheries and Coast Guard subcommittee of the Senate Commerce, Science and Transportation Committee, Admiral Paul Zukunft, the Commandant of the Coast Guard, testified that

(...continued)

AC&I-32 (pdf page 204 of 403).

[36] Department of Homeland Security, United States Coast Guard, *Fiscal Year 2015, Congressional Justification*, p. CG-AC&I-42 (pdf page 196 of 474).

> by reactivating Polar Star, we have purchased up to 10 years of decision space to recapitalize our ice-breaking fleet. Two of those years have expired. And while I'm exploring several options to reconstitute our nation's fleet of icebreakers, I will need topline relief [i.e., an increase] in my acquisition budget to make this requirement a reality.[37]

The Coast Guard's strategy for funding the acquisition of a new polar icebreaker now appears to depend on having other federal agencies help pay for part of the ship's cost. The Coast Guard's website for the polar icebreaker acquisition project states:

> In order to fully fund subsequent phases of this program, the Coast Guard believes that a "whole-of-government" approach will be necessary. Obtaining a new, heavy polar icebreaker that meets Coast Guard requirements will depend upon supplementary financing from other agencies whose activities also rely upon the nation possessing a robust, Arctic-capable surface fleet.[38]

Issues for Congress

Whether, When, and How to Fund a New Polar Icebreaker

A central issue for Congress regarding Coast Guard polar icebreakers is whether, when, and how to fund the acquisition of a new polar icebreaker.

Option of Reactivating *Polar Sea*

An alternative to acquiring a new polar icebreaker in the near term would be to repair and reactivate *Polar Sea,* and operate the ship for 7 to 10 years following the end of *Polar Star's* current 7- to 10-year period of reactivation. As discussed earlier, the Coast Guard estimates that repairing *Polar Sea* so as to support its reactivation for 7 to 10 additional years of operation would likely cost more than $100 million (not including the ship's annual operation and support costs for those 7 to 10 years). Pursuing this option could defer, for some number of years, the larger acquisition funding demands associated with procuring a new polar icebreaker.

The further into the future that acquisition funding for the procurement of a new polar icebreaker is deferred, the more likely the option of repairing and reactivating *Polar Sea* might become, by default, the only option with a potential for replacing *Polar Star* on a timely basis at the end of *Polar Star's* current period of reactivation (i.e., without experiencing a gap in having one operational heavy polar icebreaker). At a February 25, 2015, hearing on the proposed FY2016 budgets for the Coast Guard, the Maritime Administration, and the Federal Maritime Commission before the Coast Guard and Maritime Transportation subcommittee of the House Transportation and Infrastructure Committee, Admiral Paul F. Zukunft, the Commandant of the Coast Guard, testified that

> we [the Coast Guard] got money in the [FY20]'15 budget to pull the *Polar Sea* out of the water so we can do a full material inspection of it....

[37] Source: Transcript of hearing.

[38] Coast Guard website, "Icebreaker," accessed March 16, 2015, at http://www.uscg.mil/ACQUISITION/icebreaker/default.asp.

> ... then we can make a full business case analysis of whether it's prudent to invest in buying up to perhaps 10 years of service life on a nearly 40 year old ship or do we repurpose that money for perhaps a total recapitalization of the fleet as well, which at some point we are going to have to make that decision.
>
> But we are running out of time.[39]

Procuring a New Polar Icebreaker with Non-Coast Guard Funding

There is some precedent for the Coast Guard's strategy of funding the acquisition of a new polar icebreaker in part with contributions from other federal agencies: the procurement of *Healy* was entirely funded in FY1990 in the Navy's shipbuilding account.[40] Other federal agencies, however, currently face challenges in being able to fund their own programs within funding constraints, raising a question as to whether they would be able to contribute significant amounts of funding to a project to procure a new polar icebreaker.

Funding Level of Coast Guard's AC&I Account

The Coast Guard's apparent difficulty in identifying funding from within its own budget to fully fund the acquisition of a new polar icebreaker can be viewed as just one reflection of a larger challenge that the Coast Guard faces in funding various acquisition projects within an Acquisition, Construction, and Improvements (AC&I) account that has been reduced in the Coast Guard's FY2014-FY2016 budget submissions to roughly $1 billion to $1.2 billion per year.

The Coast Guard has testified that acquiring the ships and aircraft in its program of record (POR) on a timely basis while also adequately funding other Coast Guard acquisition programs would require a funding level for the AC&I account of roughly $1.5 billion to $2.5 billion per year. As shown in **Table 4** below, the Administration's FY2013 budget submission programmed an average of about $1.5 billion per year in the AC&I account. As also shown in the table, subsequent budget submissions have reduced that figure to roughly $1 billion to $1.2 billion per year.

Table 4. Funding in AC&I Account in FY2013-FY2016 Budgets

Millions of dollars, rounded to nearest tenth

	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	Avg.
FY13 budget	1,217.3	1,429.5	1,619.9	1,643.8	1,722.0				1,526.5
FY14 budget		951.1	1,195.7	901.0	1,024.8	1,030.3			1,020.6
FY15 budget			1,084.2	1,103.0	1,128.9	1,180.4	1,228.7		1,145.0
FY16 budget				1,017.3	1,125.3	1,255.7	1,201.0	1,294.6	1,178.8

Source: Coast Guard FY2013-FY2016 budget submissions.

[39] Transcript of hearing.

[40] The FY1990 DOD appropriations act (H.R. 3072/P.L. 101-165 of November 21, 1989) provided $329 million for the procurement of *Healy* in the SCN account. (See pages 77 and 78 of H.Rept. 101-345 of November 13, 1989.)

At a June 26, 2013, hearing on Coast Guard acquisition before the Coast Guard and Maritime Transportation subcommittee of the House Transportation and Infrastructure Committee, CRS testified that

> The Coast Guard's FY2014 Five Year (FY2014-FY2018) CIP includes a total of about $5.1 billion in acquisition funding, which is about $2.5 billion, or about 33%, less than the total of about $7.6 billion that was included in the Coast Guard's FY2013 Five Year (FY2013-FY2017) CIP. (In the four common years of the two plans—FY2014-FY2017—the reduction in funding from the FY2013 CIP to the FY2014 CIP is about $2.3 billion, or about 37%.) This is one of the largest percentage reductions in funding that I have seen a five-year acquisition account experience from one year to the next in many years.
>
> About twenty years ago, in the early 1990s, Department of Defense (DOD) five-year procurement plans were reduced sharply in response to the end of the Cold War—a large-scale change in the strategic environment that led to a significant reduction in estimated future missions for U.S. military forces. In contrast to that situation, there has been no change in the Coast Guard's strategic environment since last year that would suggest a significant reduction in estimated future missions for the Coast Guard.[41]

Funding the AC&I account at a level of about $1 billion per year, the Coast Guard has testified, would make it difficult to fund various Coast Guard acquisition projects. Coast Guard plans, for example, call for procuring Offshore Patrol Cutters (OPCs) at an eventual rate of two per year.[42] If each OPC costs roughly $400 million (a current estimate), procuring two OPCs per year in an AC&I account of about $1 billion per year would leave about $200 million per year for all other AC&I-funded programs.

At an October 4, 2011, hearing on the Coast Guard's major acquisition programs before the Coast Guard and Maritime Transportation subcommittee of the House Transportation and Infrastructure Committee, the following exchange occurred:

> REPRESENATIVE FRANK LOBIONDO:
>
> Can you give us your take on what percentage of value must be invested each year to maintain current levels of effort and to allow the Coast Guard to fully carry out its missions?
>
> ADMIRAL ROBERT J. PAPP, COMMANDANT OF THE COAST GUARD:
>
> I think I can, Mr. Chairman. Actually, in discussions and looking at our budget—and I'll give you rough numbers here, what we do now is we have to live within the constraints that we've been averaging about $1.4 billion in acquisition money each year.
>
> If you look at our complete portfolio, the things that we'd like to do, when you look at the shore infrastructure that needs to be taken care of, when you look at renovating our smaller icebreakers and other ships and aircraft that we have, we've done some rough estimates that it would really take close to about $2.5 billion a year, if we were to do all the things that we would like to do to sustain our capital plant.

[41] Statement of Ronald O'Rourke, Specialist in Naval Affairs, Congressional Research Service, before the House Transportation and Infrastructure Committee, Subcommittee on Coast Guard and Maritime Transportation, Hearing on Coast Guard Readiness: Examining Cutter, Aircraft, and Communications Needs, June 26, 2013, p. 1.

[42] For more on the OPC program, see CRS Report R42567, *Coast Guard Cutter Procurement: Background and Issues for Congress*, by Ronald O'Rourke.

> So I'm just like any other head of any other agency here, as that the end of the day, we're given a top line and we have to make choices and tradeoffs and basically, my tradeoffs boil down to sustaining frontline operations balancing that, we're trying to recapitalize the Coast Guard and there's where the break is and where we have to define our spending.[43]

An April 18, 2012, blog entry stated:

> If the Coast Guard capital expenditure budget remains unchanged at less than $1.5 billion annually in the coming years, it will result in a service in possession of only 70 percent of the assets it possesses today, said Coast Guard Rear Adm. Mark Butt.
>
> Butt, who spoke April 17 [2012] at [a] panel [discussion] during the Navy League Sea Air Space conference in National Harbor, Md., echoed Coast Guard Commandant Robert Papp in stating that the service really needs around $2.5 billion annually for procurement.[44]

At a May 9, 2012, hearing on the Coast Guard's proposed FY2013 budget before the Homeland Security subcommittee of the Senate Appropriations Committee, Admiral Papp testified, "I've gone on record saying that I think the Coast Guard needs closer to $2 billion dollars a year [in acquisition funding] to recapitalize—[to] do proper recapitalization."[45]

At a May 14, 2013, hearing on the Coast Guard's proposed FY2014 budget before the Homeland Security subcommittee of the Senate Appropriations Committee, Admiral Papp stated the following regarding the difference between having about $1.0 billion per year rather than about $1.5 billion per year in the AC&I account:

> Well, Madam Chairman, $500 million—a half a billion dollars—is real money for the Coast Guard. So, clearly, we had $1.5 billion in the [FY]'13 budget. It doesn't get everything I would like, but it—it gave us a good start, and it sustained a number of projects that are very important to us.
>
> When we go down to the $1 billion level this year, it gets my highest priorities in there, but we have to either terminate or reduce to minimum order quantities for all the other projects that we have going.
>
> If we're going to stay with our program of record, things that have been documented that we need for our service, we're going to have to just stretch everything out to the right. And when

[43] Source: Transcript of hearing.

[44] David Perera, "The Coast Guard Is Shrinking," *FierceHomelandSecurity.com*, April 18, 2012, accessed July 20, 2012, at http://www.fiercehomelandsecurity.com/story/coast-guard-shrinking/2012-04-18.

[45] Source: transcript of hearing. Papp may have been referring to remarks he made to the press before giving his annual state of the Coast Guard speech on February 23, 2012, in which reportedly stated that the Coast Guard would require about $2 billion per year in acquisition funding to fully replace its current assets. (See Adam Benson, "Coast Guard Cutbacks Will Cost 1,000 Jobs," *Norwich Bulletin*, February 23, 2012, accessed May 31, 2012, at http://www.norwichbulletin.com/news/x1138492141/Coast-Guard-cutbacks-will-cost-1-000-jobs#axzz1wSDAFCzX. See also "Coast Guard Leader Calls For More Ships," *MilitaryFeed.com*, February 24, 2012, accessed May 31, 2012, at http://militaryfeed.com/coast-guard-leader-calls-for-more-ships-5/; Associated Press, "Coast Guard Commandant Calls for New Ships," *TheLog.com*, March 10, 2012, accessed May 31, 2012, at http://www.thelog.com/SNW/Article/Coast-Guard-Commandant-Calls-for-New-Ships-to-Replace-Aging-Fleet; Mickey McCarter, "Congress Poised to Give Coast Guard More Money Than Requested for FY 2013," *HSToday.us*, May 10, 2012, accessed May 31, 2012, at http://www.hstoday.us/focused-topics/customs-immigration/single-article-page/congress-poised-to-give-coast-guard-more-money-than-requested-for-fy-2013.html.) See also "Interview, Adm. Robert Papp, US Coast Guard Commandant," *Defense News*, November 11, 2013: 30.

> we do that, you cannot order in economic order quantities. It defers the purchase. Ship builders, aircraft companies—they have to figure in their costs, and it inevitably raises the cost when you're ordering them in smaller quantities and pushing it off to the right.
>
> Plus, it almost creates a death spiral for the Coast Guard because we are forced to sustain older assets—older ships and older aircraft—which ultimately cost us more money, so it eats into our operating funds, as well, as we try to sustain these older things.
>
> So, we'll do the best we can within the budget. And the president and the secretary have addressed my highest priorities, and we'll just continue to go on the—on an annual basis seeing what we can wedge into the budget to keep the other projects going.[46]

At a March 12, 2014, hearing on the Coast Guard's proposed FY2015 budget before the Homeland Security subcommittee of the House Appropriations Committee, Admiral Papp stated:

> Well, that's what we've been struggling with, as we deal with the five-year plan, the capital investment plan, is showing how we are able to do that. And it will be a challenge, particularly if it sticks at around $1 billion [per year]. As I've said publicly, and actually, I said we could probably—I've stated publicly before that we could probably construct comfortably at about 1.5 billion [dollars] a year. But if we were to take care of all the Coast Guard's projects that are out there, including shore infrastructure that that fleet that takes care of the Yemen [sic: inland] waters is approaching 50 years of age, as well, but I have no replacement plan in sight for them because we simply can't afford it. Plus, we need at some point to build a polar icebreaker. Darn tough to do all that stuff when you're pushing down closer to 1 billion [dollars per year], instead of 2 billion [dollars per year].
>
> As I said, we could fit most of that in at about the 1.5 billion [dollars per year] level, but the projections don't call for that. So we are scrubbing the numbers as best we can.[47]

At a March 24, 2015, hearing on the Coast Guard's proposed FY2016 budget before the Homeland Security subcommittee of the House Appropriations Committee, Admiral Paul Zukunft, Admiral Papp's successor as Commandant of the Coast Guard, stated:

> I look back to better years in our acquisition budget when we had a—an acquisition budget of—of $1.5 billion. That allows me to move these programs along at a much more rapid pace and, the quicker I can build these at full-rate production, the less cost it is in the long run as well. But there's an urgent need for me to be able to deliver these platforms in a timely and also in an affordable manner. But to at least have a reliable and a predictable acquisition budget would make our work in the Coast Guard much easier. But when we see variances of—of 30, 40% over a period of three or four years, and not knowing what the Budget Control Act may have in store for us going on, yes, we are treading water now but any further reductions, and now I am—I am beyond asking for help. We are taking on water.[48]

At an earlier point in the hearing, Zukunft stated:

> The concern is our ability to recapitalize and to recapitalize at—at a pace that would make it affordable. We—we've had unpredictable budgets. I've been through 21 continuing resolutions in the last four years. Under a continuing resolution it prohibits me from

[46] Transcript of hearing. The remarks were made in response to a question from Senator Mary Landrieu.

[47] Transcript of hearing.

[48] Transcript of hearing. The remarks were made in response to a question from Representative John Culberson.

> engaging in—major acquisition programs so a predictable, reliable budget, to have an acquisition budget that is equally predictable and doesn't experience a 35 to 38% reduction over a period of three or four years, at a point in time where I have a confluence of finishing the national security cutter [NSC]. I'd need to bring on the offshore patrol cutter [OPC], finish out the fast-response cutter [OPC] by 2020,[49] and that doesn't even touch the Arctic domain. There—there is no money for me to even address the Arctic. And so those are the challenges that I face and I—I could not be more clear is that a one point, you know, [a] $1 billion AC&I (ph) budget will not address these concerns that are—they're not even over the horizon. They are now in front of me...
>
> REPRESENTATIVE CHRIS STEWART:
>
> (Inaudible)
>
> ZUKUNFT:
>
> ... staring me in the face today.[50]

Although the annual amounts of acquisition funding that the Coast Guard has received in recent years are one potential guide to what Coast Guard acquisition funding levels might or should be in coming years, there may be other potential guides. For example, one could envision potential guides that focus on whether Coast Guard funding for ship acquisition and sustainment is commensurate with Coast Guard funding for the personnel that in many cases will operate the ships. Observations that might be made in connection with this example based on the Coast Guard and Navy budget submissions include the following:

- Using figures from the FY2014 budget submission, the Coast Guard has about 12.9% as many active-duty personnel as the Navy.[51] If the amount of funding for the surface ship acquisition and sustainment part of the AC&I account were equivalent to 12.9% of the amount of funding in the Navy's shipbuilding account, this part of the AC&I account would be about $1.8 billion per year.[52] Navy surface ship acquisition, unlike Coast Guard surface ship acquisition, includes substantial numbers of large and complex ships, including nuclear-powered aircraft carriers, highly capable surface combatants, and large amphibious and auxiliary ships. Accounting for this difference in Navy and Coast Guard surface ship acquisition by reducing the $1.8 billion figure by, say, one-half or one-third would produce an adjusted figure of about $900 million to about $1.2 billion per year.
- Again using figures from the FY2014 budget submission, funding in the Navy's shipbuilding account is equivalent to about 51% of the Navy's funding for active-duty personnel.[53] If Coast Guard funding for surface ship acquisition and

[49] For more on the NSC, OPC, and FRC programs, see CRS Report R42567, *Coast Guard Cutter Procurement: Background and Issues for Congress*, by Ronald O'Rourke.

[50] Transcript of hearing. The remarks were made in response to a question from Representative Chris Stewart.

[51] The Coast Guard for FY2014 appears to be requesting an active-duty end strength—the number of active-duty military personnel—of 41,594 (measured by the Coast Guard in full-time equivalent [FTE] positions); the Navy for FY2014 is requesting an active-duty end strength of 323,600.

[52] The Navy's proposed FY2014 budget requests $14,078 million for the Shipbuilding and Conversion, Navy (SCN) appropriation account.

[53] The Navy's proposed FY2014 budget requests $27,824 million for the Military Personnel, Navy (MPN)
(continued...)

sustainment were equivalent to 51% of Coast Guard funding for military pay and allowances, this part of the AC&I account would be about $1.7 billion per year.[54] Reducing the $1.8 billion figure by, say, one-half or one-third to account for differences in the types of surface ships acquired by the Navy and Coast Guard (see previous bullet point) would produce an adjusted figure of about $850 million to about $1.1 billion per year.

Option of Awarding a Contract to Design a Polar Icebreaker with a Contract Option to Build the Ship

The polar icebreaker acquisition project can be viewed as competing for limited acquisition funding against ongoing programs for building other military ships, aircraft, vehicles, weapons, and other equipment. The builders of these other military end items are known; the builder of a polar icebreaker, were such a ship to be funded, is not. One potential option for Congress for addressing the situation of the identity of the builder of a polar icebreaker not being known would be to include, in an annual Coast Guard and maritime transportation authorization act and/or an annual DHS appropriations act, language directing the Coast Guard to complete requirements definition for a polar icebreaker and competitively award a contract for the detailed design of a polar icebreaker, with a priced option in that contract to build the ship, should funding at some point be appropriated for the construction of the ship. Under this option, funding might be authorized and appropriated for completing requirements definition, holding the competition for the contract, and completing the detailed design of the ship.

Coast Guard officials state that defining the requirements for a new polar icebreaker is a lengthy process due to the complexity of the ship's mission and the need to consult with other federal agencies, such as NSF and the Navy.[55] Supporters of completing requirements definition and competitively awarding a contract for the detailed design of a polar icebreaker could argue that although defining requirements is a lengthy process, the Coast Guard has been studying requirements for polar icebreakers for several years and can also draw on decades of experience in operating polar icebreakers to inform its understanding of requirements for a new polar icebreaker.

Procurement vs. Leasing

Another potential issue for Congress is whether future polar icebreakers should be acquired through a traditional acquisition (i.e., the government procuring the ship and owning it throughout its service life) or through a leasing arrangement (under which the icebreakers would be privately built and privately owned, leased to the Coast Guard, and crewed by an all-Coast Guard crew or a mix of Coast Guard personnel and civilian mariners). Factors to consider in assessing this issue include the comparative costs of the two options and the potential differences between them in

(...continued)

appropriation account.

[54] The Coast Guard's proposed FY2014 budget requests $3,425.3 million for military pay and allowances.

[55] See, for example, the spoken comments of Coast Guard Vice Admiral Charles Michel, Deputy Commandant for Operations, at a March 18, 2015, hearing on naval cooperative strategy before the Seapower and Projection Forces subcommittee of the House Armed Services Committee and the Coast Guard and Maritime Transportation subcommittee of the House Transportation and Infrastructure Committee, as reflected in the transcript of the hearing.

terms of factors such as average number of days of operation each year and capability for performing various missions. Comparing the potential costs of leasing versus purchasing a capital asset often involves, among other things, calculating the net present value of each option.

At a December 1, 2011, hearing before the Coast Guard and Maritime Transportation subcommittee of the House Transportation and Infrastructure Committee that focused on the polar icebreaker fleet, Admiral Robert Papp, the Commandant of the Coast Guard at the time, stated:

> As far as we can determine, there are no icebreakers available—no heavy icebreakers available for leasing right now. They would have to be constructed [and then leased].
>
> If we were to lease an icebreaker, I'm sure that a company building an icebreaker outside of the government does not have to contend with the same federal acquisition rules that we have to if we were to construct an icebreaker. It could probably be done quicker.
>
> Personally, I'm ambivalent in terms of how we get an icebreaker for the Coast Guard. We've done the legal research. If we lease an icebreaker, we can put a Coast Guard crew on it and still have it as a U.S. vessel supporting U.S. sovereignty.
>
> But the—but they aren't available right now. And the other challenge that we face is the federal acquisition rules and [Office of Management and Budget Circular] A-11 requirements that [direct how to] score the money [in the budget] for leasing. We'd have to put up a significant amount of upfront money even with a lease that we don't have room for within our budget currently.[56]

At another point in the hearing, Admiral Papp stated:

> We have looked at various business case scenarios, each and every time looking at, once again, from our normal perspective, the Coast Guard perspective, which has been owning ships forever. And generally, we keep ships 30-40 years or beyond. There is a point where leasing becomes more expensive, it's at or about the 20-25-year timeline.
>
> I just don't have the experience with leasing to be able to give you a good opinion on it. And once again, I'm ambivalent. We just need the icebreaking capability, I think it's for people who can do the analysis, the proper analysis of—but also have to take into account the capabilities required and we need to get about the business of determining the exact capabilities that we need which would take into account National Science Foundation requirements, Coast Guard requirements, requirements to break-in at McMurdo, to come up with a capable ship.[57]

At another point in the hearing, he stated:

> As I said, sir, I am truly ambivalent to this except from what I experienced. I do have now two points, yes the Navy leases some ships, but we've got a Navy that has well over 300 ships.
>
> So if they lose a leased vessel or something is pulled back or something happens, they have plenty of other ships they can fall back upon. Right now, all I am falling back on is the Coast

[56] Source: Transcript of hearing.

[57] Source: Transcript of hearing.

> Guard cutter Healy. And it feels good to know that we own that and that is our ship for 30 or 40 years and we can rely upon it.
>
> In terms of leasing, I don't know. My personal experience is I lease one of my two cars and I pay a lot of money leasing my car. But at the end of the lease period, I have no car and I've spent a lot of money. So I don't know if that's directly applicable to ships as well, but right now I got half my garage is empty because I just turned one in.[58]

At another point in the hearing, he stated:

> We've looked through the legal considerations on this, as long as we have a Coast Guard crew. In fact, you can even make a mixed crew of civilians and Coast Guard people. But as long as it's commanding by—commanded by [a] commissioned officer, you can assert sovereignty, you can take it into war zones and, in fact, the Navy does that as well.[59]

Another witness at the hearing—Mead Treadwell, the lieutenant governor of Alaska—stated:

> [Regarding] The issue of the ships, the company that is building these ships for Shell [Oil] has visited with me and other state officials, and that's why you heard us say in our testimony that we think the leasing option should be considered. We don't have a way to judge the relative cost. But if on the face of it, it seems like it may be a way to get us the capability that the admiral needs.[60]

Another witness at the hearing—Jeffrey Garrett, a retired Coast Guard admiral who spent much of his career on polar icebreakers—stated:

> The perspective I could offer was when I was a member of the Cameron [sic: Commandant's?] staff back in the last '80s here in Washington, we were directed to pursue exactly the same sort of lease versus buy analysis, and in fact, the Coast Guard had a two track procurement strategy to compare leasing a new Polar icebreaker or buying it.
>
> And after over a year of analysis, studies, discussion with other agencies looking around, what became clear was, number one, there was no off-the-shelf asset readily available. And secondly, that in the long run, if you—when you cost it all out and the value of the stream of payments, leasing would actually cost more.
>
> And when we did the recapitalization analysis recently, we also reviewed leasing again, and the I think the findings in that report indicate more expensive over the life of the vessel by about 12 percent.[61]

When asked why this was the finding, Garrett stated:

[58] Source: Transcript of hearing.

[59] Source: Transcript of hearing.

[60] Source: Transcript of hearing. The transcript reviewed by CRS attributes this quote to the GAO witness, Stephen Caldwell, but this appears to be a mistake, as the statement is made by a member of the first witness panel, which included the Commandant of the Coast Guard and the Lieutenant Governor. The GAO witness was a member of the second witness panel. The reference in the quote to "me and other state officials" indicates that the witness speaking was the Lieutenant Governor and not the Commandant.

[61] Source: Transcript of hearing.

> A couple of technical things. First of all, whoever builds the ship—and again, this will have to be ship built for the Coast Guard since there's not something off-the-shelf out there that you could lease. Whoever builds it has to raise capital, and nobody can raise capital more inexpensively than the federal government.
>
> Secondly, whoever leases the ship is obviously going to make—want to make a profit on that lease. So just like as Admiral Papp referred to leasing your car, you know, there's going to be a profit involved. And so, if you take the net present value of all of those, of those payments, you got come out with the more expensive package for the same, if you're comparing the same vessel.
>
> The other, the other issue I think is more intangible and that's just the fact that we're really not talking about an auxiliary like the Naval, like the Navy leases a supply ship or something like that. We're talking about a frontline Coast Guard capital asset, if you will, capital ship that's going to be doing frontline government missions projecting U.S. sovereignty.
>
> And you know, the Navy doesn't lease those kinds of ships for its frontline fleet and the Coast Guard doesn't lease those kinds of ships for its mission capabilities, and that's what we're really talking about in terms of the ship we need here.
>
> So while a lease may look attractive, I think there are several things that indicate it may not be the right way to go. And the—I think that's what we came down to. And again, this is all documented in the past and that late '80s analysis was re-summarizing the president's 1990 report to Congress which basically says leasing is more expensive and it's not the way to go for a new ship. That was the ship that actually became the Healy then.[62]

The prepared statement of Stephen Caldwell, the GAO witness at the hearing, states:

> The three reports discussed earlier in this [GAO] 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, 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.[63]

[62] Source: Transcript of hearing.

[63] Government Accountability Office, *Coast Guard[:] Observations on Arctic Requirements, Icebreakers, and Coordination with Stakeholders, Testimony Before the Subcommittee on Coast Guard and Maritime Transportation, Committee on Transportation and Infrastructure, House of Representatives, Statement of Stephen L. Caldwell, Director, Homeland Security and Justice*, GAO-12-254T, December 1, 2011, p. 24.

Legislative Activity for FY2016

FY2016 Funding Request

The Coast Guard's proposed FY2016 budget requests $4 million to continue initial acquisition activities for a new polar icebreaker.

FY2016 Department of Homeland Security (DHS) Appropriations Act (H.R. 3128/S. 1619)

House

The House Appropriations Committee, in its report (S.Rept. 114-215 of July 21, 2015) on H.R. 3128, recommends $4 million for a polar icebreaking vessel (page 61).

H.Rept. 114-215 states:

> Polar Ice Breaking Vessel
>
> The Committee recommends $4,000,000 for the polar ice breaking program, the same amount included in the request and $4,000,000 above the amount provided in fiscal year 2015.
>
> This Administration has failed repeatedly to present a viable acquisition program for a new, heavy icebreaker. Previous CIPs have alluded to an incrementally funded acquisition within the existing Coast Guard AC&I topline funding level—a topline that has apparently been set arbitrarily with no relation to Coast Guard requirements. These proposals only partially fund a new icebreaker while jeopardizing existing, validated Coast Guard recapitalization programs.
>
> Further, it is unreasonable for the Administration to impose the entire cost of an icebreaker on the Coast Guard because this vessel's capability supports the missions and requirements of multiple executive branch agencies and these requirements will significantly increase the total cost of the asset. The Committee believes that shared funding among stakeholder agencies is a more appropriate method of funding, as it allows for continued recapitalization of the Coast Guard while simultaneously acquiring a critically needed ice breaking capability. (Pages 62-63)

H.Rept. 114-215 also states:

> The Committee is alarmed by the significant decrease in the President's budget request for AC&I [Acquisition, Construction, and Improvements]. The Coast Guard continues to communicate publicly that its fleets of aircraft and vessels are in desperate need of recapitalization. Many vessels are decades beyond their useful life. Though the need for recapitalization programs is apparent, the budget request fails to meet the requirement. The Committee recommends a significant increase to the AC&I request and expects the Department and the Administration to provide a more realistic AC&I budget request in the future. (Page 60)

Senate

The Senate Appropriations Committee, in its report (S.Rept. 114-68 of June 18, 2015) on S. 1619, recommends $4 million to continue initial acquisition activities for a new Coast Guard polar icebreaker (pages 80 and 83).

S.Rept. 114-68 states:

> As an extension of our border security needs, the Coast Guard's vessel and air fleets are vital. Yet, the age of those fleets and their antiquated capabilities beg recapitalization and modernization. Year after year, the President's budget requests short-change Coast Guard's acquisition needs and year after year, the Coast Guard's Commandants indicate before Congress that their annual acquisition budget is insufficient. As the Coast Guard proceeds towards selecting a final design for the Offshore Patrol Cutter [OPC], the Committee sees an opportunity for a ninth National Security Cutter [NSC] in the interim. The most capable vessel ever commissioned by the Coast Guard, the NSC will replace aging high endurance cutters which were state-of-the-art nearly a half-century ago. In addition to cutter needs, the Committee continues its acquisition and sustainment investments in the Coast Guard's icebreaking fleet, directs further guidance from the Coast Guard on their air fleet mix, and increases investments in critical shore facilities. (Page 6)

S.Rept. 114-68 also states:

> POLAR ICEBREAKER
>
> It is obvious that the United States needs another polar icebreaker, yet the administration has offered nothing in the way of a plan to fund and procure this new asset. Furthermore, the administration has not articulated a bridging strategy to demonstrate how legacy assets will be used in the interim to accomplish Coast Guard missions. Even with one operational heavy polar icebreaker, it is unclear how the Coast Guard would perform a rescue operation in the event that the Polar Star were to be in jeopardy.
>
> Not later than 180 days after the date of the enactment of this act, the Secretary, in coordination with the Secretary of the Navy, shall submit to Congress a report on the current ability of the Coast Guard to provide the U.S. Navy with adequate icebreaking capabilities to operate a surface combatant ship in the Arctic year-round. This report shall take into account the current requirements on Coast Guard icebreakers to conduct Operation Deep Freeze as well as regularly scheduled maintenance. This report shall also provide what assets are required to ensure that the Coast Guard can provide the Navy year-round icebreaking capabilities in the Arctic while also completing all current missions through 2030. (Pages 74-75)

S.Rept. 114-68 also states:

> CAPITAL INVESTMENT PLAN
>
> The CIP is essential for the Committee to carry out its oversight function of the Coast Guard, especially at a time when recapitalization of aging assets has become so critical for the service. All of the information required by the Committee is in accordance with the Coast Guard's Major Systems Acquisition Manual and applicable DHS management directives. The fiscal year 2017–2021 plan is to be submitted with the fiscal year 2017 congressional budget justification. While the Committee appreciates the timely delivery of the 2016–2020 CIP, the Coast Guard needs to ensure the document it provides is robust and meets congressional intent particularly with respect to detailing the deviations from original

baseline. For example, the Coast Guard has the goal of a C–130 fleet comprised entirely of the ''J'' model by the mid-2020s, but provides no funding to that end and no roadmap to this fleet. The CIP is similarly brief concerning other critical assets such as the polar icebreaker and plans for UAS. The Committee expects additional details on these areas in the CIP accompanying the fiscal year 2017 budget request. (Pages 80-81)

Coast Guard Authorization Act of 2015 (H.R. 1987)

House

Section 208 of H.R. 1987 as reported by the House Transportation and Infrastructure Committee (H.Rept. 114-115 of May 15, 2015) states:

SEC. 208. "Polar Sea" materiel condition assessment and service life extension decision.

Section 222 of the Coast Guard and Maritime Transportation Act of 2012 (Public Law 112–213; 126 Stat. 1560) is amended—

(1) by amending subsection (a) to read as follows:

"(a) In general.—Not later than 270 days after the date of the enactment of the Coast Guard Authorization Act of 2015, the Secretary of the department in which the Coast Guard is operating shall—

"(1) complete a materiel condition assessment with respect to the Polar Sea;

"(2) make a determination of whether it is cost effective to reactivate the Polar Sea compared with other options to provide icebreaking services as part of a strategy to maintain polar icebreaking services; and

"(3) submit to the Committee on Transportation and Infrastructure of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate—

"(A) the assessment required under paragraph (1); and

"(B) written notification of the determination required under paragraph (2).";

(2) in subsection (b) by striking "analysis" and inserting "written notification";

(3) by striking subsection (c);

(4) by redesignating subsections (d) through (h) as subsections (c) through (g), respectively;

(5) in subsection (c) (as redesignated by paragraph (4) of this section)—

(A) in paragraph (1)—

(i) in subparagraph (A) by striking "based on the analysis required"; and

(ii) in subparagraph (C) by striking "analysis" and inserting "written notification";

(B) by amending paragraph (2) to read as follows:

"(2) DECOMMISSIONING.—If the Secretary makes a determination under subsection (a) that it is not cost effective to reactivate the Polar Sea, then, not later than 180 days after written notification of that determination is submitted under that subsection, the Commandant of the Coast Guard may decommission the Polar Sea."; and

(C) by amending paragraph (3) to read as follows:

"(3) RESULT OF NO DETERMINATION.—If the Secretary does not make a determination under subsection (a) regarding whether it is cost effective to reactivate the Polar Sea, then the Commandant of the Coast Guard may decommission the Polar Sea.";

(6) in subsection (d)(1) (as redesignated by paragraph (4) of this section) by striking "analysis" and inserting "written notification"; and

(7) in subsection (e) (as redesignated by paragraph (4) of this section) by striking "in subsection (d)" and inserting "in subsection (c)".

Section 222 of the Coast Guard and Maritime Transportation Act of 2012 (P.L. 112-213)—the provision that would be amended by the above legislation—stated:

SEC. 222. COAST GUARD POLAR ICEBREAKERS.

(a) In General.--The Secretary of the department in which the Coast Guard is operating shall conduct a business case analysis of the options for and costs of reactivating and extending the service life of the Polar Sea until at least September 30, 2022, to maintain United States polar icebreaking capabilities and fulfill the Coast Guard's high latitude mission needs, as identified in the Coast Guard's July 2010, High Latitude Study Mission Analysis Report, during the Coast Guard's recapitalization of its polar class icebreaker fleet. The analysis shall include--

(1) an assessment of the current condition of the Polar Sea;

(2) a determination of the Polar Sea's operational capabilities with respect to fulfilling the Coast Guard's high latitude operating requirements if renovated and reactivated;

(3) a detailed estimate of costs with respect to reactivating and extending the service life of the Polar Sea;

(4) a life cycle cost estimate with respect to operating and maintaining the Polar Sea for the duration of its extended service life; and

(5) a determination of whether it is cost-effective to reactivate the Polar Sea compared with other options to provide icebreaking services as part of a strategy to maintain polar icebreaking services.

(b) Restrictions.--The Secretary shall not remove any part of the Polar Sea until the Secretary submits the analysis required under subsection (a).

(c) Deadline.--Not later than 270 days after the date of enactment of this Act, the Secretary shall submit to the Committee on Transportation and Infrastructure of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate the analysis required under subsection (a).

(d) Requirement for Reactivation of Polar Sea.--

(1) Service life extension plan.--

(A) In general.--If the Secretary determines based on the analysis required under subsection (a) that it is cost-effective to reactivate the Polar Sea compared with other options to provide icebreaking services, the Secretary shall develop a service life extension plan for such reactivation, including a timetable for such reactivation.

(B) Utilization of existing resources.--In the development of the plan required under subparagraph (A), the Secretary shall utilize to the greatest extent practicable recent plans, studies, assessments, and analyses regarding the Coast Guard's icebreakers and high latitude mission needs and operating requirements.

(C) Submission.--The Secretary shall submit the plan required under subparagraph (A), if so required, to the Committee on Transportation and Infrastructure of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 180 days after the submission of the analysis required under subsection (a).

(2) Decommissioning; bridging strategy.-- If the analysis required under subsection (a) is submitted in accordance with subsection (c) and the Secretary determines under subsection (a)(5) that it is not cost-effective to reactivate the Polar Sea, then not later than 180 days after the date on which the analysis is required to be submitted under subsection (c) the Commandant of the Coast Guard--

(A) may decommission the Polar Sea; and

(B) shall submit a bridging strategy for maintaining the Coast Guard's polar icebreaking services until at least September 30, 2022, to the Committee on Transportation and Infrastructure of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate.

(e) Restriction.--Except as provided in subsection (d), the Commandant of the Coast Guard may not--

(1) transfer, relinquish ownership of, dismantle, or recycle the Polar Sea or Polar Star;

(2) change the current homeport of either of the vessels; or

(3) expend any funds--

(A) for any expenses directly or indirectly associated with the decommissioning of either of the vessels, including expenses for dock use or other goods and services;

(B) for any personnel expenses directly or indirectly associated with the decommissioning of either of the vessels, including expenses for a decommissioning officer;

(C) for any expenses associated with a decommissioning ceremony for either of the vessels;

(D) to appoint a decommissioning officer to be affiliated with either of the vessels; or

(E) to place either of the vessels in inactive status.

(f) Definition.--For purposes of this section--

(1) the term ``Polar Sea'' means Coast Guard Cutter Polar Sea (WAGB 11); and

(2) the term ``Polar Star'' means Coast Guard Cutter Polar Star (WAGB 10).

(g) Repeal.--This section shall cease to have effect on September 30, 2022.

Regarding Section 208, H.Rept. 114-115 states:

Sec. 208. POLAR SEA materiel condition assessment and service life extension decision

The POLAR SEA is one of the Coast Guard's and the Nation's two polar class heavy icebreakers. Since it suffered a major engine casualty in June 2010, the icebreaker has not been operational. In October 2011, the Coast Guard placed the POLAR SEA in commissioned, inactive service and cannibalized many of its parts to help reactivate its sister ship, the POLAR STAR.

Section 222 of the Coast Guard and Maritime Transportation Act of 2012 (P.L. 112–213) required the Coast Guard to conduct a business case analysis of the options for, and costs associated with, reactivation of the POLAR SEA. The section further required the Service to make a determination based on the analysis of whether to reactivate or decommission the icebreaker.

In November 2013, the Service completed the analysis and estimated the reactivation would cost approximately $99 million to provide 7 to 10 years of service. Although it completed the analysis nearly two years ago, the Service has refused to make a determination concerning the icebreaker's future. The Service is currently spending $8 million to stabilize and preserve the POLAR SEA and is requesting an additional $6 million in its FY 2016 budget request to conduct a materiel condition assessment of the icebreaker. Under the timeline put forward by the Coast Guard, a determination to reactivate or decommission the icebreaker will not be made before completion of the assessment in late 2016. In the meantime, the POLAR SEA continues to deteriorate and the United States is left with only one functioning polar class heavy icebreaker.

This section sets a deadline of 270 days for the Coast Guard to complete and submit to Congress its assessment of the condition of the POLAR SEA and its determination of whether it is cost effective to reactivate or decommission the icebreaker. (Pages 30-31)

Section 508 of the bill as reported by the committee states:

SEC. 508. National Academy of Sciences cost comparison.

(a) Cost comparison.—The Secretary of the department in which the Coast Guard is operating shall seek to enter into an arrangement with the National Academy of Sciences under which the Academy, by no later than 180 days after the date of the enactment of this Act, shall submit to the Committee on Transportation and Infrastructure of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a comparison of the costs incurred by the Federal Government for each of the following alternatives:

(1) Transferring the Polar Sea to a non-governmental entity at no cost, and leasing back the vessel beginning on the date on which the Coast Guard certifies that the vessel is capable of the breaking out and missions described in subsection (c)(1).

(2) The reactivation and operation by the Coast Guard of the Polar Sea to an operational level at which the vessel is capable of such breaking out and missions.

(3) Acquiring and operating a new icebreaker through the Coast Guard's acquisition process that is capable of such breaking out and missions.

(4) Construction by a non-Federal entity of an icebreaker capable of such breaking out and missions, that will be leased by the Federal Government and operated using a Coast Guard crew.

(5) Construction by a non-Federal entity of an icebreaker capable of such breaking out and missions, that will be leased by the Federal Government and operated by a crew of non-Federal employees.

(6) The acquisition of services from a non-Federal entity to perform such breaking out and missions.

(b) Included costs.—For purposes of subsection (a), the cost of each alternative includes costs incurred by the Federal Government for—

(1) the lease or operation and maintenance of the vessel concerned;

(2) disposal of such vessel at the end of the useful life of the vessel;

(3) retirement and other benefits for Federal employees who operate such vessel; and

(4) interest payments assumed to be incurred for Federal capital expenditures.

(c) Assumptions.—For purposes of comparing the costs of such alternatives, the Academy shall assume that—

(1) each vessel under consideration is—

(A) capable of breaking out of McMurdo Station, and conducting Coast Guard missions in the United States territory in the Arctic (as that term is defined in section 112 of the Arctic Research and Policy Act of 1984 (15 U.S.C. 4111)); and

(B) operated for a period of 20 years;

(2) the acquisition of services and the operation of each vessel begin on the same date; and

(3) the periods for conducting Coast Guard missions in the Arctic are of equal lengths.

Icebreaker Recapitalization Act (S. 1386)

Senate

The text of S. 1386, introduced on May 19, 2015, states:

A BILL

To provide multiyear procurement authority for the procurement of up to six polar icebreakers to be owned and operated by the Coast Guard.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. Short title.

This Act may be cited as the "Icebreaker Recapitalization Act".

SEC. 2. Multiyear procurement authority for polar icebreakers.

(a) Multiyear procurement.—Subject to section 2306b of title 10, United States Code, the Secretary of the Navy shall enter into multiyear contracts for the procurement of up to six heavy duty polar icebreakers and any systems and equipment associated with those vessels.

(b) Authority for advance procurement.—The Secretary may enter into one or more contracts, beginning in fiscal year 2016, for advance procurement associated with the vessels, systems, and equipment for which authorization to enter into a multiyear contract is provided under subsection (a).

(c) Condition for Out-Year Contract Payments.—A contract entered into under subsection (a) shall provide that any obligation of the United States to make a payment under the contract for a fiscal year after fiscal year 2016 is subject to the availability of appropriations or funds for that purpose for such later fiscal year.

(d) Memorandum of agreement.—Not later than 180 days after the date of the enactment of this Act, the Secretary of the Navy and the Secretary of the Department in which the Coast Guard is operating shall enter into a memorandum of agreement establishing a process by which the Coast Guard, in concurrence with the Navy, shall—

(1) identify the vessel specifications, capabilities, systems, equipment, and other details required for the design of heavy polar icebreakers capable of fulfilling Navy and Coast Guard mission requirements, with the Coast Guard, as the sole operator of United States Government polar icebreaking assets, retaining final decision authority in the establishment of vessel requirements;

(2) oversee the construction of heavy polar icebreakers authorized to be procured under this section; and

(3) to the extent not adequately addressed in the 1965 Revised Memorandum of Agreement between the Department of the Navy and the Department of the Treasury on the Operation of Icebreakers, transfer heavy polar icebreakers procured through contracts authorized under this section from the Navy to the Coast Guard to be maintained and operated by the Coast Guard.

FY2016 National Defense Authorization Act (H.R. 1735)

House

The House Armed Services Committee, in its report (H.Rept. 114-102 of May 5, 2015) on H.R. 1735, stated:

Coast Guard polar icebreaker

The committee notes that the United States Coast Guard initiated a new project for the design and construction of a new polar icebreaker in fiscal year 2013, but the timing and execution of this project have become uncertain. The project received $7.6 million in the Department of Defense, Military Construction and Veterans Affairs, and Full-Year Continuing Appropriations Act, 2013 (Public Law 113–6), $2.0 million in Consolidated Appropriations Act, 2014 (Public Law 113–76), and no funding in fiscal year 2015. The budget request for fiscal year 2016 requests $4.0 million to continue initial acquisition activities for the ship. A new polar icebreaker is projected to cost between $900 million to $1.10 billion.

The Department of Homeland Security (DHS) approved a Mission Need Statement for the polar icebreaker recapitalization project in June 2013. The MNS states, ''This Mission Need Statement (MNS) establishes the need for polar icebreaker capabilities provided by the Coast Guard, to ensure that it can meet current and future mission requirements in the polar regions.... Current requirements and future projections based upon cutter demand modeling, as detailed in the HLMAR [High Latitude Mission Analysis Report], indicate the Coast Guard will need to expand its icebreaking capacity, potentially requiring a fleet of up to six icebreakers (3 heavy and 3 medium) to adequately meet mission demands in the high latitudes....''

The committee believes that the administration has inadequately valued the necessity to procure required icebreaking capacity. The committee believes the failure to acquire all domain access capability in polar regions expeditiously may irreparably harm Department of Defense national security missions, and may leave the Department in which the Coast Guard is operating unable to meet its anticipated future responsibilities related to maritime safety and security, search and rescue, environmental response, and fishery law enforcement. The committee supports the use of Department of Defense authorities and acquisition expertise to acquire required icebreaking capabilities. The committee is supportive of interim leasing authority to meet short- and mid-term icebreaking requirements to include the use of section 2401 of title 10, United States Code, leasing authority and other such leasing authorities resident in the Department in which the Coast Guard is operating. The committee encourages the Secretary of Homeland Security and the Secretary of Defense to develop a plan to acquire all domain access capability in polar regions expeditiously. Such a plan should address both a bridging strategy to cover the period between the end of the useful life of the USCGC Polar Star and the construction of a new medium or heavy icebreaker. (Pages 28-29)

Concurrent Resolution on the Budget for FY2016 (S.Con.Res. 11)

Senate

On March 27, 2015, as part of its consideration of S.Con.Res. 11, the Senate agreed by unanimous consent to S.Amdt. 770, which added a new section. The new section (**Section 399k**) states:

SEC. 399k. Deficit-neutral reserve fund relating to the construction of Arctic polar icebreakers.

The Chairman of the Committee on the Budget of the Senate may revise the allocations of a committee or committees, aggregates, and other appropriate levels in this resolution for one or more bills, joint resolutions, amendments, amendments between the Houses, motions, or conference reports relating to the construction of Arctic polar icebreakers, by the amounts

provided in such legislation for those purposes, provided that such legislation would not increase the deficit over either the period of the total of fiscal years 2016 through 2020 or the period of the total of fiscal years 2016 through 2025.

Appendix. Recent Studies Relating to Coast Guard Polar Icebreakers

A number of studies have been conducted in recent years to assess U.S. requirements for polar icebreakers and options for sustaining and modernizing the Coast Guard's polar icebreaker fleet. This appendix presents the findings of some of these studies.

Coast Guard High Latitude Study Provided to Congress in July 2011

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

> [The study] concludes that future capability and capacity gaps will significantly impact four [Coast Guard] mission areas in the Arctic: Defense Readiness, Ice Operations, Marine Environmental Protection, and Ports, Waterways, and Coastal Security. These mission areas address the protection of important national interests in a geographic area where other nations are actively pursuing their own national goals....
>
> The common and dominant contributor to these significant mission impacts is the gap in polar icebreaking capability. The increasing obsolescence of the Coast Guard's icebreaker fleet will further exacerbate mission performance gaps in the coming years....
>
> The gap in polar icebreaking capacity has resulted in a lack of at-sea time for crews and senior personnel and a corresponding gap in training and leadership. In addition to providing multi-mission capability and intrinsic mobility, a helicopter-capable surface unit would eliminate the need for acquiring an expensive shore-based infrastructure that may only be needed on a seasonal or occasional basis. The most capable surface unit would be a polar icebreaker. Polar icebreakers can transit safely in a variety of ice conditions and have the endurance to operate far from logistics bases. The Coast Guard's polar icebreakers have conducted a wide range of planned and unscheduled Coast Guard missions in the past. Polar icebreakers possess the ability to carry large numbers of passengers, cargo, boats, and helicopters. Polar icebreakers also have substantial command, control, and communications capabilities. The flexibility and mobility of polar icebreakers would assist the Coast Guard in closing future mission performance gaps effectively....
>
> Existing capability and capacity gaps are expected to significantly impact future Coast Guard performance in two Antarctic mission areas: Defense Readiness and Ice Operations. Future gaps may involve an inability to carry out probable and easily projected mission requirements, such as the McMurdo resupply, or readiness to respond to less-predictable events. By their nature, contingencies requiring the use of military capabilities often occur quickly. As is the case in the Arctic, the deterioration of the Coast Guard's icebreaker fleet is the primary driver for this significant mission impact. This will further widen mission performance gaps in the coming years. The recently issued Naval Operations Concept 2010 requires a surface presence in both the Arctic and Antarctic. This further exacerbates the capability gap left by the deterioration of the icebreaker fleet....

The significant deterioration of the Coast Guard icebreaker fleet and the emerging mission demands to meet future functional requirements in the high latitude regions dictate that the Coast Guard acquire material solutions to close the capability gaps....

To meet the Coast Guard mission functional requirement, the Coast Guard icebreaking fleet must be capable of supporting the following missions:

- **Arctic North Patrol.** Continuous multimission icebreaker presence in the Arctic.
- **Arctic West Science.** Spring and summer science support in the Arctic.
- **Antarctic, McMurdo Station resupply.** Planned deployment for break-in, supply ship escort, and science support. This mission, conducted in the Antarctic summer, also requires standby icebreaker support for backup in the event the primary vessel cannot complete the mission.
- **Thule Air Base Resupply and Polar Region Freedom of Navigation Transits.** Provide vessel escort operations in support of the Military Sealift Command's Operation Pacer Goose; then complete any Freedom of Navigation exercises in the region.

In addition, the joint Naval Operations Concept establishes the following mission requirements:

- **Assured access and assertion of U.S. policy in the Polar Regions.** The current demand for this mission requires continuous icebreaker presence in both Polar Regions.

Considering these missions, the analysis yields the following findings:

- **The Coast Guard requires three heavy and three medium icebreakers to fulfill its statutory missions.** These icebreakers are necessary to (1) satisfy Arctic winter and transition season demands and (2) provide sufficient capacity to also execute summer missions. Single-crewed icebreakers have sufficient capacity for all current and expected statutory missions. Multiple crewing provides no advantage because the number of icebreakers required is driven by winter and shoulder season requirements. Future use of multiple or augmented crews could provide additional capacity needed to absorb mission growth.
- **The Coast Guard requires six heavy and four medium icebreakers to fulfill its statutory missions and maintain the continuous presence requirements of the Naval Operations Concept.** Consistent with current practice, these icebreakers are single-crewed and homeported in Seattle Washington.
- **Applying crewing and home porting alternatives reduces the overall requirement to four heavy and two medium icebreakers.** This assessment of non-material solutions shows that the reduced number of icebreakers can be achieved by having all vessels operate with multiple crews and two of the heavy icebreakers homeporting in the Southern Hemisphere.

Leasing was also considered as a nonmaterial solution. While there is no dispute that the Coast Guard's polar icebreaker fleet is in need of recapitalization, the decision to acquire this capability through purchase of new vessels, reconstruction of existing ships, or commercial lease of suitable vessels must be resolved to provide the best value to the taxpayer. The multi-mission nature of the Coast Guard may provide opportunities to conduct some subset of its missions with non government-owned vessels. However, serious consideration must be

> given to the fact that the inherently governmental missions of the Coast Guard must be performed using government-owned and operated vessels. An interpretation of the national policy is needed to determine the resource level that best supports the nation's interests....
>
> The existing icebreaker capacity, two inoperative heavy icebreakers and an operational medium icebreaker, does not represent a viable capability to the federal government. The time needed to augment this capability is on the order of 10 years. At that point, around 2020, the heavy icebreaking capability bridging strategy expires.[64]

At a July 27, 2011, hearing on U.S. economic interests in the Arctic before the Oceans, Atmosphere, Fisheries, and Coast Guard subcommittee of the Senate Commerce, Science, and Transportation Committee, the following exchange occurred:

> SENATOR OLYMPIA J. SNOWE: On the high latitude study, do you agree with—and those—I would like to also hear from you, Admiral Titley, as well, on these requirements in terms of Coast Guard vessels as I understand it, they want to have—I guess, it was a three medium ice breakers. Am in correct in saying that? Three medium ice breakers.
>
> ADMIRAL ROBERT PAPP, COMMANDANT OF THE COAST GUARD: I agree with the mission analysis and as you look at the requirements for the things that we might do up there, if it is in the nation's interest, it identifies a minimum requirement for three heavy ice breakers and three medium ice breakers and then if you want a persistent presence up there, it would require—and also doing things such as breaking out (inaudible) and other responsibilities, then it would take up to a maximum six heavy and four medium.
>
> SNOWE: Right. Do you agree with that?
>
> PAPP: If we were to be charged with carrying out those full responsibilities, yes, ma'am. Those are the numbers that you would need to do it.
>
> SNOWE: Admiral Titley, how would you respond to the high latitude study and has the Navy conducted its own assessment of its capability?
>
> REAR ADMIRAL DAVID TITLEY, OCEANORGRAPHER AND NAVIGATOR OF THE NAVY: Ma'am, we are in the process right now of conducting what we call a capabilities based assessment that will be out in the summer of this year.
>
> We are getting ready to finish that—the Coast Guard has been a key component of the Navy's task force on climate change, literally since day one when the Chief of Naval Operations set this up, that morning, we had the Coast Guard invited as a member of our executive steering committee.
>
> So we have been working very closely with the Coast Guard, with the Department of Homeland Security, and I think Admiral Papp—said it best as far as the specific comments on the high latitude study but we have been working very closely with the Coast Guard.[65]

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

[65] Source: Transcript of hearing.

January 2011 DHS Office of Inspector General Report

A January 2011 report on the Coast Guard's polar icebreakers from the DHS Office of the Inspector General stated:

> The Coast Guard does not have the necessary budgetary control over its [polar] icebreakers, nor does it have a sufficient number of icebreakers to accomplish its missions in the Polar Regions. Currently, the Coast Guard has only one operational [polar] icebreaker [i.e., *Healy*], making it necessary for the United States to contract with foreign nations to perform scientific, logistical, and supply activities. Without the necessary budgetary control and a sufficient number of icebreaking assets, the Coast Guard will not have the capability to perform all of its missions, will lose critical icebreaking expertise, and may be beholden to foreign nations to perform its statutory missions. The Coast Guard should improve its strategic approach to ensure that it has the long-term icebreaker capabilities needed to support Coast Guard missions and other national interests in the Arctic and Antarctic regions.[66]

Regarding current polar icebreaking capabilities for performing Arctic missions, the report states:

> The Coast Guard's icebreaking resources are unlikely to meet future demands. [The table below] outlines the missions that Coast Guard is unable to meet in the Arctic with its current icebreaking resources.

Arctic Missions Not Being Met

Requesting Agency	Missions Not Being Met
United States Coast Guard	—Fisheries enforcement in Bering Sea to prevent foreign fishing in U.S. waters and overfishing —Capability to conduct search and rescue in Beaufort Sea for cruise line and natural resource exploration ships —Future missions not anticipated to be met: 2010 Arctic Winter Science Deployment
NASA	Winter access to the Arctic to conduct oceanography and study Arctic currents and how they relate to regional ice cover, climate, and biology
NOAA and NSF	Winter research
Department of Defense	Assured access to ice-impacted waters through a persistent icebreaker presence in the Arctic and Antarctic[67]

[66] Department of Homeland Security, Office of Inspector General, *The Coast Guard's Polar Icebreaker Maintenance, Upgrade, and Acquisition Program*, OIG-11-31, January 2011, p. 1 (Executive Summary). Report accessed September 21, 2011, at http://www.dhs.gov/xoig/assets/mgmtrpts/OIG_11-31_Jan11.pdf.

[67] Department of Homeland Security, Office of Inspector General, *The Coast Guard's Polar Icebreaker Maintenance, Upgrade, and Acquisition Program*, OIG-11-31, January 2011, p. 9.

The report also states:

> Should the Coast Guard not obtain funding for new icebreakers or major service life extensions for its existing icebreakers with sufficient lead-time, the United States will have no heavy icebreaking capability beyond 2020 and no polar icebreaking capability of any kind by 2029. Without the continued use of icebreakers, the United States will lose its ability to maintain a presence in the Polar Regions, the Coast Guard's expertise to perform ice operations will continue to diminish, and missions will continue to go unmet.[68]

Regarding current polar icebreaking capabilities for performing Antarctic missions, the report states:

> The Coast Guard needs additional icebreakers to accomplish its missions in the Antarctic. The Coast Guard has performed the McMurdo Station resupply in Antarctica for decades, but with increasing difficulty in recent years. The Coast Guard's two heavy-duty icebreakers [i.e., *Polar Star* and *Polar Sea*] are at the end of their service lives, and have become less reliable and increasingly costly to keep in service….
>
> In recent years, the Coast Guard has found that ice conditions in the Antarctic have become more challenging for the resupply of McMurdo Station. The extreme ice conditions have necessitated the use of foreign vessels to perform the McMurdo break-in….
>
> As ice conditions continue to change around the Antarctic, two icebreakers are needed for the McMurdo break-in and resupply mission. Typically, one icebreaker performs the break-in and the other remains on standby. Should the first ship become stuck in the ice or should the ice be too thick for one icebreaker to complete the mission, the Coast Guard deploys the ship on standby. Since the Polar Sea and Polar Star are not currently in service, the Coast Guard has no icebreakers capable of performing this mission. [The table below] outlines the missions that will not be met without operational heavy-duty icebreakers.

Arctic Missions Not Being Met

Requesting Agency	Missions Not Being Met
NSF	Missions not anticipated to be met: 2010-2011 Operation Deep Freeze – McMurdo Station Resupply
Department of State	Additional inspections of foreign facilities in Antarctica to enforce the Antarctic Treaty and ensure facilities' environment compliance[69]

The report's conclusion and recommendations were as follows:

> **Conclusion**
>
> With an aging fleet of three icebreakers, one operational and two beyond their intended 30-year service life, the Coast Guard is at a critical crossroads in its Polar Icebreaker Maintenance, Upgrade, and Acquisition Program. It must clarify its mission requirements,

[68] Department of Homeland Security, Office of Inspector General, *The Coast Guard's Polar Icebreaker Maintenance, Upgrade, and Acquisition Program*, OIG-11-31, January 2011, p. 10.

[69] Department of Homeland Security, Office of Inspector General, *The Coast Guard's Polar Icebreaker Maintenance, Upgrade, and Acquisition Program*, OIG-11-31, January 2011, pp. 10-11.

and if the current mission requirements remain, the Coast Guard must determine the best method for meeting these requirements in the short and long term.

Recommendations

We recommend that the Assistant Commandant for Marine Safety, Security, and Stewardship:

Recommendation #1: Request budgetary authority for the operation, maintenance, and upgrade of its icebreakers.

Recommendation #2: In coordination with the Department of Homeland Security, request clarification from Congress to determine whether Arctic missions should be performed by Coast Guard assets or contracted vessels.

Recommendation #3: In coordination with the Department of Homeland Security, request clarification from Congress to determine whether Antarctic missions should be performed by Coast Guard assets or contracted vessels.

Recommendation #4: 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.

Recommendation #5: Request appropriations necessary to meet mission requirements in the Arctic and Antarctic.[70]

The report states that

> The Coast Guard concurred with all five of the recommendations and is initiating corrective actions. We consider the recommendations open and unresolved. The Coast Guard provided information on some of its ongoing projects that will address the program needs identified in the report.[71]

2010 U.S. Arctic Research Commission Report

A May 2010 report from the U.S. Arctic Research Commission (USARC) on goals and objectives for Arctic research for 2009-2010 stated:

> To have an effective Arctic research program, the United States must invest in human capital, research platforms, and infrastructure, including new polar class icebreakers, and sustained sea, air, land, space, and social observing systems…. The Commission urges the President and Congress to commit to replacing the nation's two polar class icebreakers.[72]

[70] Department of Homeland Security, Office of Inspector General, *The Coast Guard's Polar Icebreaker Maintenance, Upgrade, and Acquisition Program*, OIG-11-31, January 2011, p. 12.

[71] Department of Homeland Security, Office of Inspector General, *The Coast Guard's Polar Icebreaker Maintenance, Upgrade, and Acquisition Program*, OIG-11-31, January 2011, p. 13.

[72] U.S. Arctic Research Commission, *Report on Goals and Objectives for Arctic Research 2009-2010, May 2010*, p. 4. Accessed online December 5, 2011, at http://www.arctic.gov/publications/usarc_2009-10_goals.pdf.

2007 National Research Council Report

A 2007 National Research Council (NRC) report, *Polar Icebreakers in a Changing World: An Assessment of U.S. Needs*, assessed roles and future needs for Coast Guard polar icebreakers.[73] The study was required by report language accompanying the FY2005 DHS appropriations act (H.R. 4567/P.L. 108-334).[74] The study was completed in 2006 and published in 2007. Some sources refer to the study as the 2006 NRC report. The report made the following conclusions and recommendations:

> Based on the current and future needs for icebreaking capabilities, the [study] committee concludes that the nation continues to require a polar icebreaking fleet that includes a minimum of three multimission ships [like the Coast Guard's three current polar icebreakers] and one single-mission [research] ship [like Palmer]. The committee finds that although the demand for icebreaking capability is predicted to increase, a fleet of three multimission and one single-mission icebreakers can meet the nation's future polar icebreaking needs through the application of the latest technology, creative crewing models, wise management of ice conditions, and more efficient use of the icebreaker fleet and other assets. The nation should immediately begin to program, design, and construct two new polar icebreakers to replace the POLAR STAR and POLAR SEA.
>
> Building only one new polar icebreaker is insufficient for several reasons. First, a single ship cannot be in more than one location at a time. No matter how technologically advanced or efficiently operated, a single polar icebreaker can operate in the polar regions for only a portion of any year. An icebreaker requires regular maintenance and technical support from shipyards and industrial facilities, must reprovision regularly, and has to effect periodic crew changeouts. A single icebreaker, therefore, could not meet any reasonable standard of active and influential presence and reliable, at-will access throughout the polar regions.
>
> A second consideration is the potential risk of failure in the harsh conditions of polar operations. Despite their intrinsic robustness, damage and system failure are always a risk

[73] National Research Council, *Polar Icebreakers in a Changing World, An Assessment of U.S. Needs*, Washington, 2007, 122 pp.

[74] H.R. 4567/P.L. 108-334 of October 18, 2004. The related Senate bill was S. 2537. The Senate report on S. 2537 (S.Rept. 108-280 of June 17, 2004) stated:

> The Committee expects the Commandant to enter into an arrangement with the National Academy of Sciences to conduct a comprehensive study of the role of Coast Guard icebreakers in supporting United States operations in the Antarctic and the Arctic. The study should include different scenarios for continuing those operations including service life extension or replacement of existing Coast Guard icebreakers and alternative methods that do not use Coast Guard icebreakers. The study should also address changes in the roles and missions of Coast Guard icebreakers in support of future marine operations in the Arctic that may develop due to environmental change, including the amount and kind of icebreaking support that may be required in the future to support marine operations in the Northern Sea Route and the Northwest Passage; the suitability of the Polar Class icebreakers for these new roles; and appropriate changes in existing laws governing Coast Guard icebreaking operations and the potential for new operating regimes. The study should be submitted to the Committee no later than September 30, 2005.

The conference report on H.R. 4567 (H.Rept. 108-774 of October 9, 2004) stated:

> As discussed in the Senate report and the Coast Guard authorization bill for fiscal year 2005, the conferees require the National Academy of Sciences to study the role of Coast Guard icebreakers.

The earlier House report on H.R. 4567 (H.Rept. 108-541 of June 15, 2004) contained language directing a similar report from the Coast Guard rather than the National Academies. (See the passage in the House report under the header "Icebreaking.")

and the U.S. fleet must have enough depth to provide backup assistance. Having only a single icebreaker would necessarily require the ship to accept a more conservative operating profile, avoiding more challenging ice conditions because reliable assistance would not be available. A second capable icebreaker, either operating elsewhere or in homeport, would provide ensured backup assistance and allow for more robust operations by the other ship.

From a strategic, longer-term perspective, two new Polar class icebreakers will far better position the nation for the increasing challenges emerging in both polar regions. A second new ship would allow the U.S. Coast Guard to reestablish an active patrol presence in U.S. waters north of Alaska to meet statutory responsibilities that will inevitably derive from increased human activity, economic development, and environmental change. It would allow response to emergencies such as search-and-rescue cases, pollution incidents, and assistance to ships threatened with grounding or damage by ice. Moreover, a second new ship will leverage the possibilities for simultaneous operations in widely disparate geographic areas (e.g., concurrent operations in the Arctic and Antarctic), provide more flexibility for conducting Antarctic logistics (as either the primary or the secondary ship for the McMurdo break-in), allow safer multiple-ship operations in the most demanding ice conditions, and increase opportunities for international expeditions. Finally, an up-front decision to build two new polar icebreakers will allow economies in the design and construction process and provide a predictable cost reduction for the second ship….

The [study] committee finds that both operations and maintenance of the polar icebreaker fleet have been underfunded for many years, and the capabilities of the nation's icebreaking fleet have diminished substantially. Deferred long-term maintenance and failure to execute a plan for replacement or refurbishment of the nation's icebreaking ships have placed national interests in the polar regions at risk. The nation needs the capability to operate in both polar regions reliably and at will. Specifically, the committee recommends the following:

- The United States should continue to project an active and influential presence in the Arctic to support its interests. This requires U.S. government polar icebreaking capability to ensure year-round access throughout the region.

- The United States should continue to project an active and influential presence in the Antarctic to support its interests. The nation should reliably control sufficient icebreaking capability to break a channel into and ensure the maritime resupply of McMurdo Station.

- The United States should maintain leadership in polar research. This requires icebreaking capability to provide access to the deep Arctic and the ice-covered waters of the Antarctic.

- National interests in the polar regions require that the United States immediately program, budget, design, and construct two new polar icebreakers to be operated by the U.S. Coast Guard.

- To provide continuity of U.S. icebreaking capabilities, the POLAR SEA should remain mission capable and the POLAR STAR should remain available for reactivation until the new polar icebreakers enter service.

- The U.S. Coast Guard should be provided sufficient operations and maintenance budget to support an increased, regular, and influential presence in the Arctic. Other agencies should reimburse incremental costs associated with directed mission tasking.

- Polar icebreakers are essential instruments of U.S. national policy in the changing polar regions. To ensure adequate national icebreaking capability into the future, a Presidential Decision Directive should be issued to clearly align agency responsibilities and budgetary authorities.[75]

The Coast Guard stated in 2008 that it "generally supports" the NRC report, and that the Coast Guard "is working closely with interagency partners to determine a way forward with national polar policy that identifies broad U.S. interests and priorities in the Arctic and Antarctic that will ensure adequate maritime presence to further these interests. Identification and prioritization of U.S. national interests in these regions should drive development of associated USCG [U.S. Coast Guard] capability and resource requirements." The Coast Guard also stated: "Until those broad U.S. interests and priorities are identified, the current USG [U.S. Government] polar icebreaking fleet should be maintained in an operational status."[76]

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[75] National Research Council, *Polar Icebreakers in a Changing World, An Assessment of U.S. Needs*, Washington, 2007, pp. 2-3.

[76] Coast Guard point paper provided to CRS on February 12, 2008, and dated with the same date, providing answers to questions from CRS concerning polar icebreaker modernization.