Coast Guard Polar Icebreaker Modernization: Background, Issues, and Options for Congress

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Summary

Coast Guard polar icebreakers perform a variety of missions supporting U.S. interests in polar regions. The Coast Guard's two heavy polar icebreakers—*Polar Star* and *Polar Sea*—have exceeded their intended 30-year service lives, and neither is currently in operational condition. The *Polar Star* was placed in caretaker status on July 1, 2006. Congress in FY2009 and FY2010 provided funding to repair *Polar Star* and return it to service for 7 to 10 years; the Coast Guard expects the reactivation project to be completed in December 2012. On June 25, 2010, the Coast Guard announced that *Polar Sea* had suffered an unexpected engine casualty; the ship has been unavailable for operation since then.

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.

The Coast Guard's FY2012 budget proposes decommissioning *Polar Sea* in FY2011 and transitioning its crew to the reactivated *Polar Star*. The resulting U.S. polar icebreaking fleet would consist of one heavy polar icebreaker (*Polar Star*) and one medium polar icebreaker (*Healy*).

The Coast Guard has stated since 2008 that it is studying how many polar icebreakers, with what capabilities, it will need in the future. 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 and dated July 2010 on its cover, concluded the following: "The Coast Guard requires three heavy and three medium icebreakers to fulfill its statutory missions. The Coast Guard requires six heavy and four medium icebreakers to fulfill its statutory missions and maintain the continuous presence requirements of the [2010] Naval Operations Concept. Applying non-material alternatives for crewing and homeporting reduces the overall requirement to four heavy and two medium icebreakers."

Following any decision to design and build one or more new polar icebreakers, the first replacement polar icebreaker might enter service in 8 to 10 years. The Coast Guard estimated in February 2008 that new replacement ships might cost $800 million to $925 million each in 2008 dollars, and that the alternative of extending the service lives of *Polar Sea* and *Polar Star* for 25 years might cost about $400 million per ship. In August 2010, the Commandant of the Coast Guard, Admiral Robert Papp, reportedly estimated the cost of extending their lives at about $500 million per ship.

Potential issues for Congress regarding Coast Guard polar icebreaker modernization include the potential impact on U.S. polar missions of the United States currently having no operational heavy polar icebreakers; the length of time that the Coast Guard has been studying requirements for polar icebreakers; the numbers and capabilities of polar icebreakers the Coast Guard will need in the future; whether to provide these icebreakers through construction of new ships or service life extensions of existing polar icebreakers; and whether new ships should be funded entirely in the Coast Guard budget, or partly or entirely in some other part of the federal budget, such as the Department of Defense (DOD) budget, the National Science Foundation (NSF) budget, or both.

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Introduction

This report provides background information and issues for Congress on the modernization of the Coast Guard's polar icebreaker fleet, which performs a variety of missions supporting U.S. interests in polar regions. The issue for Congress is whether to approve, reject, or modify Coast Guard plans for modernizing its polar icebreakers. 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

The missions 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 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.[1] Supporting NSF research in the Antarctic has included performing—or, in more recent years, standing ready to assist in—an annual mission, called Operation Deep Freeze, to break through the Antarctic ice so as to resupply McMurdo Station, the large U.S. Antarctic research station located on the shore of McMurdo Sound, near the Ross Ice Shelf.

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

[1] This passage, beginning with "The missions 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.

increased levels of support from polar icebreakers.[2] Changing ice conditions in Antarctic waters have made the McMurdo resupply mission more challenging since 2000.[3] An April 18, 2011, press report states that the Commandant of the Coast Guard, 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. It's coming down pretty far. We don't need to get up there just during summer months when there's open water."[4]

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.

Heavy Polar Icebreakers Polar Star and Polar Sea

Polar Star (WAGB-10) and *Polar Sea* (WAGB-11),[5] 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. Neither ship is currently in operational condition.

The ships are 399 feet long and displace about 13,200 tons.[6] They are 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.

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[2] 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.

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

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

[5] 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.

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

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.

Polar Star was commissioned into service on January 19, 1976, and consequently is now beyond its intended 30-year service life. The ship currently is not in operational condition due to worn out electric motors and other problems. The Coast Guard placed the ship in caretaker status on July 1, 2006.[7] Congress in FY2009 and FY2010 provided funding to repair *Polar Star* and return it to service for 7 to 10 years; the Coast Guard expects the reactivation project to be completed in December 2012.[8] An August 30, 2010, press report quoted the 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."[9]

[7] Source for July 1, 2006, date: U.S. Coast Guard e-mail to CRS on February 22, 2008. The Coast Guard's official term for the ship's current status is "In Commission, Special."

[8] "Icebreaker POLAR SEA Sidelined By Engine Troubles," *Coast Guard Compass (Official Blog of the U.S. Coast Guard)*, June 25, 2010. An FY2011 budget justification document—Department of Homeland Security, *Congressional Budget Justification FY 2011*, p. USCG-9 (pdf page 2176 of 3985)—states that the repairs to *Polar Star* are to be completed in FY2012.

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

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 has been unavailable for operation since then.[10]

Figure 2. *Polar Sea*

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

[10] 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….
>
> 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.)

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 has built numerous Coast Guard and Navy ships, and which now forms part of Huntington Ingalls Industries (HII).[11]

Figure 3. *Healy*

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

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 two visitors). The ship is used primarily for supporting scientific research in the Arctic.

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 Edison Chouest Offshore (ECO) of Galliano, LA, a firm that owns and operates research ships

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

and offshore deepwater service ships.[12] NSF uses a contractor, Raytheon Polar Services Company (RPSC), to lease the ship from ECO.[13] *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.[14]

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, 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*), neither currently operational, that are designed to perform missions in either polar area, including the challenging McMurdo resupply mission;
- one medium polar icebreaker (*Healy*) that 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 2** shows the uses of the three Coast Guard polar icebreakers in FY2005-FY2007 by operational hours.

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

[13] For more on RPSC, see the division's website at http://rpsc.raytheon.com/.

[14] 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.

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?	No (was placed in caretaker status July 2006; reactivation work scheduled to be completed December 2012)	No (experienced an engine casualty in June 2010)	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 (ice thickness in feet) at 3 knots	6 feet	6 feet	4.5 feet	3 feet
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 and (for *Palmer*) additional online reference sources.

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 two visitors.

Table 2. Uses of Coast Guard Polar Icebreakers in FY2005-FY2007

(in mission hours)

	Polar Star			*Polar Sea*			*Healy*		
Mission area	**FY 05**	**FY 06**	**FY 07**	**FY 05**	**FY 06**	**FY 07**	**FY 05**	**FY 06**	**FY 07**
SAR	31					2			
ATON									
Ice Ops	1,809	1,642				2,658	3,563	3,210	2,930
MEP						16			
LMR	193								
PWCS									
DR						121			94
Support	34			1	802	21	256	424	596
Total	**2,066**	**1,642**	**0**	**1**	**802**	**2,818**	**3,819**	**3,634**	**3,620**

Source: U.S. Coast Guard data provided to CRS on June 12 and 20, 2008.

Notes: SAR = search and rescue; **ATON** = aids to navigation; **Ice Ops** = ice operations, polar icebreaking and domestic ice; **MEP** = marine environmental protection; **LMR** = living marine resources; **PWCS** = ports, waterways, and coastal security; **DR** = defense readiness; **Support** = includes operations such as training, public affairs, cooperation with federal, state, and local agencies.

The Coast Guard states further that

> for CGC [Coast Guard Cutter] HEALY, all of the Polar Operations hours are either transit to/from the operating area or scientific research. For CGC POLAR SEA/POLAR STAR, all of the Polar Operations hours are transit to/from the operating area, scientific research or mobility logistics (icebreaking for re-supply). We estimate 25% transit / 75% scientific research for HEALY and 50% transit / 10% scientific research / 40% mobility logistics for POLAR SEA/POLAR STAR.

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.[15] 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

[15] For examples of bill and report language in recent years relating to the study of Coast Guard missions and capabilities for operations in high latitude areas, see **Appendix B**.

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.[16]

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.[17] The study was required by report language accompanying the FY2005 Department of Homeland Security (DHS) appropriations act (H.R. 4567/P.L. 108-334).[18] The study was completed in 2006 and published in 2007. Some sources refer to the study as the 2006 NRC report. A hearing on the report was held by the Coast Guard and Maritime Transportation subcommittee of the House Transportation and Infrastructure Committee on September 26, 2006. The report made the following conclusions and recommendations:

> 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

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

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

[18] 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.")

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.[19]

Cost Estimates for Certain Modernization Options

The Coast Guard in February 2008 provided CRS with cost estimates for four potential options for modernizing the Coast Guard's polar icebreaker fleet.[20] The options are summarized below. Congress in FY2009 and FY2010 provided funding to implement the third option—repairing and reactivating *Polar Star* for 7 to 10 years. Funding this option mooted the fourth option of reactivating *Polar Star* for a single deployment. The High Latitude Study provided to Congress in July 2011 provides additional cost estimates for the first option.

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

[20] Source for information and quotations in this section: Coast Guard point paper provided to CRS on February 12, 2008, op cit.

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. 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.[21]

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:

- $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...."[22]

25-Year Service Life Extensions

One alternative to procuring new replacement ships would be to extend the service lives of *Polar Star* and *Polar Sea*. The Coast Guard stated in February 2008 that performing the extensive maintenance, repair, and modernization work needed to extend the service lives of the two ships 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

[21] 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.

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

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.

An August 30, 2010, press report stated that the Commandant of the Coast Guard, 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."[23]

Reactivate *Polar Star* for 7 to 10 Years

The Coast Guard estimated in February 2008 that it would cost $56.6 million to perform the maintenance and repair work needed to reactivate *Polar Star* and extend its service life by 7 to 10 years, which is the approximate amount of time that would transpire under the Coast Guard's plan before a new replacement ship enters service. On July 16, 2008, the Coast Guard similarly testified that the cost of extending the ship's service life by 7 to 10 years would be "into the $60 million range."[24] The work would include system upgrades that have been installed in recent years on the *Polar Sea* but not the *Polar Star*. An additional cost would be incurred to create and train a full 134-person crew for the ship.

Congress in FY2009 and FY2010 provided funding to repair *Polar Star* and return it to service for 7 to 10 years; the Coast Guard expects the reactivation project to be completed in FY2012.[25]

Reactivate *Polar Star* for a Single Deployment

The Coast Guard estimated in February 2008 that it would cost $8.2 million to perform the maintenance and repair work needed to reactivate the *Polar Star* and make it ready for a single Deep Freeze deployment, meaning a deployment to Antarctica, such as the McMurdo resupply mission. On July 16, 2008, the Coast Guard provided a slightly different figure, testifying that the work would cost $8.6 million.[26] The work, the Coast Guard says, would require between 12 months and 18 months to perform. Roughly half of the cost, the Coast Guard says, would be to rebuild the ship's worn-out electric motors. As with the previous option, an additional cost would be incurred to create and train a full 134-person crew for the ship.

This option was mooted by Congress's decision to fund the previous option of repairing and reactivating *Polar Star* for 7 to 10 years.

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

[24] Transcript of spoken remarks of Admiral Thad Allen at July 16, 2008, hearing on Coast Guard icebreaking needs before the Coast Guard and Maritime transportation subcommittee of the House Transportation and Infrastructure Committee.

[25] Department of Homeland Security, *Congressional Budget Justification FY 2011*, p. USCG-9 (pdf page 2176 of 3985).

[26] Transcript of spoken remarks of Admiral Thad Allen at July 16, 2008, hearing on Coast Guard icebreaking needs before the Coast Guard and Maritime transportation subcommittee of the House Transportation and Infrastructure Committee.

FY2012 Funding Request

The Coast Guard's proposed FY2012 budget requests $39 million for its polar icebreaking program. The budget proposes decommissioning *Polar Sea* in FY2011 and transitioning its crew to the reactivated *Polar Star*. The resulting U.S. polar icebreaking fleet would consist of one heavy polar icebreaker (*Polar Star*) and one medium polar icebreaker (*Healy*). The Coast Guard states that its proposed FY2012 budget

> provides budget authority to enable Coast Guard to make all critical decisions with respect to operation and maintenance of its polar icebreakers, consistent with MOUs [memoranda of understanding] between Coast Guard and its customer agencies. The request provides full-year personnel, operations, and maintenance funding for CGC HEALY and advance funding to support the reactivation of CGC POLAR STAR, ensuring its return to operations in FY 2013. AC&I industrial work on the CGC POLAR STAR reactivation project, funded in FY 2009 and FY 2010, is planned for completion in December 2012. The Coast Guard plans to decommission CGC POLAR SEA in FY 2011 and transition her crew to CGC POLAR STAR, enabling orderly transition to CGC POLAR STAR and facilitating her return to operations in FY 2013.
>
> **Justification**
>
> Based on current Federal requirements, maintaining and operating one medium duty and one heavy duty icebreaker will allow the Coast Guard to meet operational requirements. CGC HEALY must be sustained to meet the federal survey and research needs in the Arctic, including joint projects with other nations that support cooperative efforts to establish jurisdictional rights in this region. Although the existing heavy-duty polar icebreakers are more costly to operate, are physically and technologically aged and are not optimally configured, it is prudent to maintain CGC POLAR STAR which is currently undergoing extensive maintenance to extend its service life as an interim capability while long-term Arctic capability requirements are finalized. CGC POLAR STAR will be a capable backup for the annual resupply of McMurdo Base and for CGC HEALY in the Arctic should it become beset in the ice.
>
> To help define the capability that is needed to meet long-term federal needs in the changing Arctic environment, Coast Guard will participate in the DHS-led interagency working group, funded in FY 2012 to develop final requirements for acquisition of the 21st Century icebreaking capability. In the meantime, CGC POLAR STAR will provide a platform capable of staging resources and supporting international response to unanticipated emergencies or disasters (natural or manmade).
>
> **Impact on Performance**
>
> CGC HEALY and CGC POLAR STAR will continue to support federal activities in the high latitude regions. Additionally, the replacement of CGC POLAR SEA with CGC POLAR STAR in FY 2013 will provide a more dependable resource for contingency operations in both the Arctic and Antarctic. The funding for CGC POLAR STAR in FY 2012 will help Coast Guard sustain a trained crew and make ready for operations as quickly as possible.[27]

[27] *Department og Homeland Security, United States Coast Guard, Fiscal Year 2012 Congressional Justification*, pp. CG-OE-49 and CG-OE-50.

Issues for Congress

The issue of Coast Guard polar icebreaker modernization presents several potential issues for Congress, including but not necessarily limited to those discussed below.

Impact of Currently Having No Operational Polar Icebreakers

One potential issue for Congress concerns the impact of currently having no operational heavy polar icebreakers. Potential oversight questions for Congress include the following:

- What are the mission impacts of currently having no operational heavy polar icebreakers?
- Did the removal of *Polar Star* from operational status in 2006 result in heavier use of *Polar Sea*, and if so, did this heavier use make *Polar Sea's* engine casualty more likely?
- Did the rehabilitation project on *Polar Sea* that was completed in 2006 and which extended the ship's estimated service life to 2014 include work on the ship's engines? Why did the ship experience an engine casualty reportedly involving excessive wear on engine cylinder assemblies four years after the completion of the rehabilitation project?
- How much would it cost to repair *Polar Sea's* engines and return the ship to operational status?

A July 12, 2010, press report states that with neither *Polar Sea* and *Polar Star* in operational status, the Coast Guard may seek assistance from polar icebreakers operated by other countries:

> "There are a number of our allies that have that [polar icebreaking] capability," [Dana] Goward [director of Coast Guard Office of Assessment, Integration and Risk Management], said. "They're not necessarily positioned optimally for support of U.S. missions in our waters, but if push comes to shove we're sure that we can make arrangements with our allies to support the nation's interests while we get the *Polar Sea* back in operation. We have very strong relationships with other coast guards and other navies, and at the moment I don't see that we would have much choice."

The press report states that *Healy* may be shifted between missions, but that the ship "will not likely spend more days than usual at sea."[28]

Length of Time Coast Guard Has Been Studying the Issue

Another potential issue for Congress concerns the length of time that the Coast Guard has been studying the issue of requirements and acquisition options for polar icebreakers. The Coast Guard has stated since 2008 that is studying how may polar icebreakers, with what capabilities, it will need in the future. The Coast Guard stated in February 2008 that it

[28] Cid Standifer, "Coast Guard Looks To Fill Icebreakers Capability Gap With Polar Sea Out," *Inside the Navy*, July 12, 2010.

> is awaiting the identification and prioritization of U.S. national policy in the Polar Regions in order to identify and develop the appropriate capability. In the meantime, the CG is proceeding with pre-acquisition activities, starting with project identification, to assess current capability gaps in Coast Guard mission performance in the high latitudes regions.[29]

In connection with the above statement, it can be noted that a document establishing U.S. national policy in the Arctic—National Security Presidential Directive 66/Homeland Security Presidential Directive 25 (NSPD 66/HSPD 25)—was issued by the George W. Bush Administration on January 12, 2009.[30]

A March 24, 2008, press report stated that

> [Coast Guard] Commanders in Alaska plan to conduct an unprecedented expedition to the Arctic this summer, including a trip already underway by the Healy, to get a clear sense of their capabilities and problems operating above the Bering Strait. When that survey is finished, probably by August [2008], [then-Coast Guard Commandant Admiral Thad] Allen and the commander of District 17, Rear Adm. Arthur "Gene" Brooks, will be able to make their case to Congress for funding and new gear, Allen said.[31]

On July 16, 2008, the Commandant of the Coast Guard at that time, Admiral Thad Allen, testified that

> Today, our nation is at a crossroads with Coast Guard domestic and international icebreaking capabilities. We have important decisions to make. And I believe we must address our icebreaking needs now, to ensure we will continue to prosper in the years and decades to come, whether on the Great Lakes, the critical waterways of the East Coast or the harsh operating environments of the polar region.[32]

An August 17, 2008, press report quoted Admiral Allen as stating that, in light of the time required to build a new polar icebreaker, "I think we're at a crisis point on making a decision."[33]

Almost two years later—on May 10, 2010—a press report quoted him as stating, "We need to be able to project U.S. sovereignty up there [i.e., the Arctic] and do the missions that we need to do. We need to have a serious discussion about icebreakers. It has not concluded. It's not even started, and you can see me be a little more vocal on that on the 26th of May [2010] because my change of command [i.e., the end of his term in office as Commandant of the Coast Guard] is the 25th of May."[34]

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[29] Coast Guard point paper provided to CRS on February 12, 2008, op cit.

[30] For more on NSPD 66/HSPD 25, see CRS Report R41153, *Changes in the Arctic: Background and Issues for Congress*, coordinated by Ronald O'Rourke.

[31] Philip Ewing, "CG Steps Up Bid to Rescue Icebreaker Funding," *Navy Times*, March 24, 2008.

[32] Transcript of spoken remarks of Admiral Allen at July 16, 2008, hearing on Coast Guard icebreaking needs before the Coast Guard and Maritime transportation subcommittee of the House Transportation and Infrastructure Committee.

[33] Andrew C. Revkin, "A Push To Increase Icebreakers In The Arctic," *New York Times*, August 17, 2008.

[34] Cid Standifer, Dan Taylor and Zachary M. Peterson, "Notes From The Navy League's Sea-Air-Space Conference And Exhibition, May 3-5, 2010, National Harbor, MD," *Inside the Navy*, May 10, 2010. On May 1, 2010, Janet Napolitano, Secretary of the Department of Homeland Security, announced that Allen would serve as the National Incident Commander for the Administration's response to the Deepwater Horizon oil spill in the Gulf of Mexico. Allen stepped down as Commandant on May 25, 2010, and retired from active duty service in the Coast Guard on June 30, 2010, but continued as a civilian in his role as the National Incident Commander for the oil spill. A September 27, 2010, press report states that Allen would step down as National Incident Commander on September 30, 2010. (Rick (continued...)

An August 30, 2010, press report states that the current Commandant of the Coast Guard, Admiral Robert Papp,

> has not yet discussed the matter [of polar icebreakers] with Department of Homeland Security Secretary Janet Napolitano because he has been focused on dealing with the Deepwater Horizon oil spill since he took the helm of the Coast Guard in May.
>
> "I will have to make the case with my secretary on what I think the best way ahead [for icebreakers] is," he said. "I've got my staff looking at those options and what we might do, and then once we discern what the best way ahead is, then we're going to have to sell that to the administration and hopefully get the funding from Congress."[35]

A September 2010 Government Accountability Office (GAO) report on the Coast Guard's efforts to identify Arctic requirements in general stated:

> The Coast Guard has taken specific action to identify Arctic requirements and gaps while also collecting relevant information from routine operations. The High Latitude Study is the centerpiece of the agency's efforts to determine its Arctic requirements. The Coast Guard has also established temporary operating locations in the Arctic and conducted biweekly Arctic overflights to obtain more information on the Arctic operating environment. In addition, information gathered during the Coast Guard's routine missions—ice breaking, search and rescue, and others—also informs requirements. The agency's preliminary efforts to identify its Arctic requirements generally align with key practices for agencies defining missions and desired outcomes.
>
> The Coast Guard faces Arctic challenges including limited information, minimal assets and infrastructure, personnel issues, and difficult planning and funding decisions, but is taking initial steps to address these challenges. Specifically, the Coast Guard does not currently have Arctic maritime domain awareness—a full understanding of variables that could affect the security, safety, economy, or environment in the Arctic—but is acquiring additional Arctic vessel tracking data, among other things, to address this issue. In addition, the Coast Guard's Arctic assets and infrastructure are limited and not suitable for the harsh environment, but the agency is testing equipment and using alternative options to mitigate gaps. Finally, the Coast Guard faces uncertainty over the timing of predicted environmental changes in the Arctic, as well as over future funding streams. To address these challenges the Coast Guard obtains scientific data on Arctic climate change and is studying its Arctic resource requirements to support potential future funding needs.[36]

The report also stated:

> The Coast Guard has multiple efforts underway to better understand the agency's future requirements and gaps in both the Arctic and Antarctic with its primary effort being the High Latitude Study, an effort undertaken in response to congressional direction. In August 2009, the Coast Guard contracted out the development of the High Latitude Study with the goal of producing three related mission analyses related to (1) Polar icebreaking needs, (2) all 11

(...continued)

Jervis, "BP Spill Shapes Allen's Legacy," *Navy Times.com*, September 27, 2010.

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

[36] 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, summary page.

> Coast Guard missions in the Arctic region, and (3) all 11 Coast Guard missions in the Antarctic region. In carrying out the study, contractors have conducted literature reviews, held workshops to obtain Coast Guard stakeholder input, and conducted site visits and interviews with Coast Guard units in Alaska as well as with other stakeholders, including private sector, federal, state, local, Alaska Native, and international interest groups. Coast Guard officials estimate the study's cost at $1.7 million and that all three volumes will be ready for Coast Guard internal review in summer 2010; however, they won't be released publicly until a later date.
>
> The Arctic mission analysis piece of the High Latitude Study is expected to include
>
> - an analysis of the functional requirements to carry out the Coast Guard's existing missions in the Arctic,
> - an analysis of how the Coast Guard might close any operational gaps,
> - solutions for a range of future demand scenarios such as a mass search and rescue incident or an Arctic oil spill (including looking at partnerships and opportunities to leverage resources), and
> - a rough order of magnitude cost estimate.
>
> According to Coast Guard officials, the High Latitude Study is not expected to detail specific recommended solutions or assets, but rather identify the types of capabilities needed in the Arctic. In addition, while not Arctic-specific, DHS and the Coast Guard have begun a comprehensive Fleet Mix Analysis—an analysis of the capabilities, number, and mix of assets it needs to fulfill the agency's missions. According to Coast Guard officials, this analysis is due to be completed in December 2010 and is expected to include more specific fleet requirements for surface operations in the Bering Sea region of the Arctic but not above the Arctic Circle.[37]

A January 17, 2011, press report stated that while the current Commandant of the Coast Guard, Admiral Robert Papp, remained committed to funding the procurement of eight National Security Cutters (NSCs),[38] "the admiral was less optimistic about the prospects of replacing the Coast Guard's heavy polar icebreakers, both of which are currently in port for restoration or repairs. He estimated that replacing them would cost $800 million each, and he does not see a national will to provide that kind of funding right now." The article stated:

> "There is no room in the Coast Guard budget to do that," [Papp] said. "Nor is there a national will or consensus at this point about what we should be doing in the Arctic, who should be doing it, how we do it and how we resource it, so we're continuing to make the case that in order to project our sovereignty in the Arctic, and with the evolving activities that are going on up there, there's a need for a whole range of Coast Guard operational capability up there."[39]

[37] 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, pp. 24-26.

[38] For more on the NSCs, see CRS Report RL33753, *Coast Guard Deepwater Acquisition Programs: Background, Oversight Issues, and Options for Congress*, by Ronald O'Rourke.

[39] Cid Standifer, "Coast Guard Comandant: Service Still Committed To Eight NSCs," *Inside the Navy*, January 17, 2011.

Potential oversight questions for Congress include the following:

- Why has the Coast Guard taken so long to identify requirements and assess acquisition options for polar icebreakers?
- In light of the publication in January 2009 of NSPD 66/HSPD 25 establishing U.S. policy in the Arctic, and the completion in July 2010 of the High Latitude Study, what additional national policy statements or mission and capability analysis does the Coast Guard need to complete its study of requirements and options for polar icebreakers?
- When does the Coast Guard plan to announce its preferences regarding required numbers and capabilities for polar icebreakers, and its preferred acquisition option for achieving and maintaining a polar icebreaker fleet with those numbers and capabilities?
- Has the Coast Guard been putting off announcing a plan for modernizing the polar icebreaker fleet in part because it cannot identify the budget resources that would be needed to implement the plan?

Number and Capabilities of Future Polar Icebreakers

Factors to Consider

Another potential issue for Congress concerns one of the questions the Coast Guard has been studying since 2008, namely, how many polar icebreakers, with what capabilities, the Coast Guard will need in the future. In assessing this issue, factors that Congress may consider include, but are not limited to, the following:

- current and projected mission demands for Coast Guard polar icebreakers, including an assessment of how those demands might be affected in coming years by changing ice conditions and by future NSF decisions on how to acquire icebreaking services to support its research activities;
- the potential for various mission demands (not just those conducted in support of NSF research activities) to be met by non-Coast Guard icebreakers, including leases or charters of icebreakers owned by foreign governments or private firms; and
- the Coast Guard's overall missions-vs.-resources situation, which includes the Coast Guard's requirements to perform many non-polar missions and the Coast Guard's desire to fund programs, such as Deepwater acquisition programs, for performing these non-polar missions.[40]

Regarding the first factor above, the NSF states that although Coast Guard polar icebreakers are very capable, the NSF is mandated by presidential directive to perform its research activities in the most cost-effective way possible, and that it can be more expensive for NSF to support its research activities with Coast Guard polar icebreakers than with charters of icebreakers crewed

[40] For more on Deepwater acquisition programs, see CRS Report RL33753, *Coast Guard Deepwater Acquisition Programs: Background, Oversight Issues, and Options for Congress*, by Ronald O'Rourke.

by contractor personnel. Although Coast Guard polar icebreakers in the past have performed the annual McMurdo break-in mission, the NSF in recent years has chartered Russian and Swedish contractor-operated icebreakers to perform the mission (with a Coast Guard polar icebreaker standing ready to assist if needed). The NSF has also noted that *Healy*, though very capable in supporting Arctic research, operates at sea for about 200 days a year, as opposed to about 300 days a year for foreign contractor-operated polar icebreakers.

Regarding the second factor above, issues to consider would include, among other things, the potential availability of ships for lease, leasing costs, regulatory issues relating to long-term leases of capital assets for the U.S. government, and the ability of leased ships to perform the missions in question, including the mission of defending U.S. sovereignty in Arctic waters north of Alaska, the challenging McMurdo resupply mission, or missions that emerge suddenly in response to unexpected events.[41]

Regarding the first two factors above, 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. According to one source, as of January 2009, Russia had a fleet of 25 polar icebreakers (including six active heavy icebreakers, two heavy icebreakers in caretaker status, 15 other icebreakers, and two additional icebreakers leased from the Netherlands); Finland and Sweden each had seven polar icebreakers; and Canada had six.[42]

Notional Arguments for Various Numbers

Advocates of a Coast Guard polar icebreaker fleet that included two ships—that is, *Healy* and one other ship—might argue that the Coast Guard has been able to operate with such a force since the *Polar Star* went into caretaker status on July 1, 2006, and that a force with *Healy* and one other ship would cost less than a larger icebreaker fleet and thereby permit the Coast Guard to better fund programs for performing its various non-polar missions.

Advocates of a Coast Guard fleet that included three ships—*Healy* and two other icebreakers—might argue that the current force of *Healy* and one other operational ship has made it more difficult for the Coast Guard to perform the McMurdo resupply mission using its own assets, that a force that included *Healy* and two other ships would provide the Coast Guard with more flexibility for responding to contingencies or dealing with mechanical problems on one of the icebreakers, and that it would still be sufficiently affordable to permit the Coast Guard to adequately fund programs for performing non-polar missions.

[41] The potential for using leased ships, and the possible limitations of this option, are discussed at several points in the 2007 NRC report. The report argues, among other things, that the availability of icebreakers for lease in coming years is open to question, that leased ships are not optimal for performing sovereignty-related operations, and that some foreign icebreakers might be capable of performing the McMurdo resupply mission. See, for example, pages 80-81 of the NRC report.

[42] Slide entitled "Icebreaker Force Laydown," in "The Accessible Arctic, A Quick Overview," a presentation given at a seminar entitled "The Changing Strategic Landscape for Sea-Based Missile Defense," Center for Technology and National Security, National Defense University, Fort Lesley J. McNair, Washington, DC, December 2-3, 2009. The slide defined a heavy icebreaker as one with a propulsion plant rated at more than 45,000 break horsepower (BHP). Under this definition, the United States has three heavy icebreakers, including one active heavy icebreaker (*Polar Sea*), one heavy icebreaker in caretaker status (*Polar Star*), and one additional icebreaker (*Healy*). Russia's heavy icebreakers are nuclear powered.

Advocates of a Coast Guard fleet that included *Healy* and three or more other icebreakers might argue that such a fleet would provide additional capability for responding to potentially increased commercial and military activities in the Arctic, and more strongly signal U.S. commitment to defending its sovereignty and other interests in the region. They might argue that although this option would be more expensive than a smaller fleet, the added investment would be justified in light of the growing focus on U.S. polar interests.

Coast Guard High Latitude Study Provided to Congress in July 2011

The High Latitude Study provided to Congress in July 2011 concluded that:

- **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.[43]

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:

[43] *United States Coast Guard High Latitude Region Mission Analysis Capstone Summary*, July 2010, pp. 12-13, 15.

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.[44]

2007 NRC Report

The 2007 NRC concluded that:

> 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

[44] Source: Transcript of hearing.

> 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 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.[45]

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."[46]

New Construction vs. Service Life Extension

Another potential issue for Congress is whether requirements for polar icebreakers over the next 25 to 30 years should be met by building new ships, by extending the service lives of existing polar icebreakers, or by pursuing some combination of these options. In assessing this question, factors to consider include the relative costs of these options, the capabilities that each option would provide, the long-term supportability of older ships whose service lives have been extended, and industrial-base impacts.

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[45] National Research Council, *Polar Icebreakers in a Changing World, An Assessment of U.S. Needs*, Washington, 2007, p. 2.

[46] 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.

Regarding relative costs, as discussed in the "Background" section, the Coast Guard estimates that new icebreakers with a 30-year design life might cost $800 million to $925 million per ship in 2008 dollars, while a 25-year service life extension of *Polar Star* and *Polar Sea* might cost about $400 million per ship in 2008 dollars. (As mentioned earlier, an August 30, 2010, press report stated that the Commandant of the Coast Guard, Admiral Robert Papp, estimated the cost of extending the lives of *Polar Star* and *Polar Sea* at about $500 million per ship.)[47] These estimates, however, should be compared with caution: the estimate for building new ships depends in part on the capabilities that were assumed for those ships, and estimates for service-life extension work can be very uncertain due to the potential for discovering new things about a ship's condition once the ship is opened up for service-life-extension work.

Regarding capabilities provided by each option, the new-construction option would provide entirely new ships with extensive use of new technology, while the service-life-extension option would provide ships that, although modernized and reconditioned, would not be entirely new and would likely make less extensive use of new technologies. Among other things, new-construction ships might be able to make more extensive use of new technologies for reducing crew size, which is a significant factor in a ship's life cycle operating and support costs.

Regarding long-term supportability of older ships, the Coast Guard has expressed concern about the ability to support ships whose service lives have been extended after FY2014, because some contracts that currently provide that support are scheduled to end that year.[48]

Regarding potential impact on the industrial base, 25-year service life extensions would likely provide shipyards and supplier firms with less work, and also exercise a smaller set of shipyard construction skills, than would building new ships.

Funding Ships in Coast Guard Budget or Elsewhere

Another potential issue for Congress, if it is determined that one or more new icebreakers should be built, is whether the acquisition cost of those ships should be funded entirely through Coast Guard's Acquisition, Construction, and Improvements (AC&I) account, or partly or entirely through other parts of the federal budget, such as the Department of Defense (DOD) budget, the NSF budget, or both.[49] Within the DOD budget, possibilities include the Navy's shipbuilding account, called the Shipbuilding and Conversion, Navy (SCN) account, and the National Defense Sealift Fund (NDSF), which is an account where DOD sealift ships and Navy auxiliary ships are funded.

There is precedent for funding Coast Guard icebreakers in the DOD budget: The procurement of *Healy* was funded in FY1990 in the DOD budget—specifically, the SCN account.[50] Advocates of

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

[48] CRS discussion with Coast Guard officials, January 30, 2008.

[49] For more on the NSF, whose budget is normally funded through the annual Commerce, Justice, Science, and Related Agencies appropriations bill, see CRS Report 95-307, *U.S. National Science Foundation: An Overview*, by Christine M. Matthews.

[50] 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). The NDSF was created three years later, in FY1993, as a fund for procuring DOD sealift ships, among other purposes, and since FY2001 has been used to fund Navy auxiliary ships as well.

funding new icebreakers partly or entirely through the SCN account or the NDSF might argue that this could permit the funding of new icebreakers while putting less pressure on other parts of the Coast Guard's budget. They might also argue that it would permit the new icebreaker program to benefit from the Navy's experience in managing shipbuilding programs. Opponents might argue that funding new icebreakers in the SCN account or the NDSF might put pressure on these other two accounts at a time when the Navy and DOD are facing challenges funding their own shipbuilding and other priorities. They might also argue that having the Navy manage the Coast Guard's icebreaker program would add complexity to the acquisition effort, and that it is unclear whether the Navy's recent performance in managing shipbuilding programs is better than the Coast Guard's, since both services have recently experienced problems in managing shipbuilding programs—the Coast Guard with the procurement of new Deepwater cutters, and the Navy in the Littoral Combat Ship (LCS) program and the LPD-17 class amphibious ship program.[51]

At the July 16, 2008, hearing on Coast Guard icebreaker needs, Dr. Arden Bement, Jr., Director of NSF, when asked whether he would deem it prudent to contribute capital costs for the building of a new icebreaker, replied, "I think at this point, based on my understanding of the mission space, that the Coast Guard has, especially with the opening up of the Arctic over time, that it would be a prudent course of action."[52]

Options for Congress

Potential options for Congress include but are not limited to the following:

- hold hearings to solicit updated information form the Coast Guard on the long-term sustainment of the polar icebreaker fleet; or direct the Coast Guard to provide such information;
- provide guidance to the Coast Guard concerning the long-term sustainment of the polar icebreaker fleet;
- direct the Coast Guard to submit to Congress by a certain date a plan for the long-term sustainment of the polar icebreaker fleet that includes the Coast Guard's preferences regarding required numbers and capabilities for polar icebreakers, and its preferred acquisition option for achieving and maintaining a polar icebreaker fleet with those numbers and capabilities; and
- provide funding to begin implementing one or more options for the long-term sustainment of the polar icebreaker fleet.

[51] For more on Deepwater acquisition programs and the LCS and LPD-17 programs, see CRS Report RL33753, *Coast Guard Deepwater Acquisition Programs: Background, Oversight Issues, and Options for Congress*, by Ronald O'Rourke; CRS Report RL33741, *Navy Littoral Combat Ship (LCS) Program: Background, Issues, and Options for Congress*, by Ronald O'Rourke; and CRS Report RL34476, *Navy LPD-17 Amphibious Ship Procurement: Background, Issues, and Options for Congress*, by Ronald O'Rourke.

[52] Transcript of hearing.

Legislative Activity in 112th Congress

FY2012 Funding Request

The Coast Guard's proposed FY2012 budget requests $39 million for its polar icebreaking program. The budget proposes decommissioning *Polar Sea* in FY2011 and transitioning its crew to the reactivated *Polar Star*.

FY2012 DHS Appropriations Bill (H.R. 2017)

House

H.R. 2017 as reported by the House Appropriations Committee (H.Rept. 112-91 of May 26, 2011) provides funds for the Coast Guard's Operating Expenses (OE) account with certain provisos, including the following:

> … *Provided further,* That of the funds provided under this heading, $75,000,000 shall be withheld from obligation for Coast Guard Headquarters Directorates until (1) a revised future-years capital investment plan for fiscal years 2012 through 2016, as specified under the heading `Coast Guard, Acquisition, Construction, and Improvements' of this Act, that is reviewed by the Comptroller General of the United States; (2) the fiscal year 2012 second quarter acquisition report; and (3) the polar operations high latitude study are submitted to the Committees on Appropriations of the Senate and the House of Representatives:…

This proviso is mentioned on page 72 of the committee's report.

Regarding FY2012 funding for the DHS Office of the Under Secretary of Management, the committee's report states:

> IMMEDIATE OFFICE OF THE UNDER SECRETARY FOR MANAGEMENT
>
> The Committee recommends $2,550,000 for the Immediate Office of the Under Secretary for Management, $5,008,000 below the amount requested. None of the requested funding is provided for analysis of icebreaking requirements in the polar region. The Committee finds this study to be unnecessary, given the extensive analysis that has already been done on the subject. In the Department's own budget justification, there is mention of the "numerous existing and ongoing studies" on the issue. (Page 15)

The committee's report provides $39 million in the Coast Guard's OE account for polar operations (see page 72) and states:

> POLAR OPERATIONS
>
> The Committee appreciates the restoration of $39,000,000 in operating expenses for polar operations within the Coast Guard's budget. However, the restoration of these operational costs to the operator of the Nation's polar icebreaker fleet does little to assure the Committee that national interests in the polar regions can be effectively served in coming years. The current Administration has failed to execute the existing National Arctic Policy, as stated in National Security Presidential Directive-66 and Homeland Security Presidential Directive-25 (NSPD–66 / HSPD–25) released on January 9, 2009, and appears to be permitting the

atrophy of national polar capabilities. As the sustainable service lives of the Coast Guard's heavy icebreakers rapidly approach their expiration, the need for polar capabilities is intensifying due to the presence of increased vessel traffic and energy exploration resources in the Arctic. Rather than address these issues with a cogent implementation plan, the Administration and Department are delaying the submittal of the Coast Guard's High Latitude Study and are requesting an additional $5,000,000 for further study of polar needs. As noted previously in this report, the Committee denies the request for the additional $5,000,000 under the [DHS] Under Secretary for Management since the needs are well known and sufficiently documented. The Coast Guard is directed to submit the High Latitude Study and brief the Committee on the resources required to meet polar mission requirements and fulfill the policy directives set forth in NSPD–66 / HSPD–25 no later than 45 days after the date of enactment of this Act. (Pages 74-75)

Appendix A. Legislative Activity in 111th and 110th Congresses

This appendix presents information on legislative activity regarding polar icebreakers in the 111th and the 110th Congresses, beginning with legislative activity for FY2011 and working backwards.

FY2011 DOD and Full-Year Continuing Appropriations Act (H.R. 1473/P.L. 112-10)

The text of the FY2011 Department of Defense and Full-Year Continuing Appropriations Act (H.R. 1473/P.L. 112-10 of April 15, 2011) does not provide any funding specifically identified as being for polar icebreaker sustainment or refurbishment, or for acquisition of new polar icebreakers.

FY2011 DHS Appropriations Bill (S. 3607)

Senate

The Senate Appropriations Committee, in its report (S.Rept. 111-222 of July 19, 2010) on S. 3607 of the 111th Congress, did not recommend any funding in the Coast Guard's AC&I account for polar icebreaker sustainment or refurbishment, or for acquisition of new polar icebreakers (pages 82-83). The report states:

> POLAR ICEBREAKER SUSTAINMENT
>
> The Coast Guard shall continue to periodically brief the Committee on progress made to reactivate CGC Polar Star. According to the Coast Guard, reactivation work will be completed by 2013, increasing the fleet of operational polar icebreakers to three. As discussed in the "Operating Expenses" section of this report, the Committee expects sufficient funding to be requested in fiscal year 2012 to field a crew for the vessel.
>
> The Committee recently learned that the Polar Sea has been unexpectedly taken out of service due to excessive wear in its main diesel engines and will likely be in a maintenance status and unavailable for operations until at least January 2011. As a result of this situation, the scheduled fall 2010 Arctic patrol will be cancelled as will an Antarctic Operation Deep Freeze standby period (December 2010-January 2011). The Committee is aware of a root-cause failure-analysis into the underlying cause of the engine wear. The Committee is to be briefed on its results upon its completion and the Coast Guard's plans to address them. (Page 86)

The report also states:

> POLAR OPERATIONS AND MAINTENANCE FUNDING
>
> The Committee notes the budget request once again does not transfer operating and maintenance funds for the polar icebreakers from the National Science Foundation [NSF] to the Coast Guard despite congressional direction to the contrary. P.L. 111-117 transfers $54,000,000 from the NSF to the Coast Guard for icebreaking services to cover all

> anticipated operation and maintenance costs for fiscal year 2010.[53] For fiscal year 2012, the Committee expects the operating and maintenance budget authority and associated FTE to be included in the Coast Guard's budget request.
>
> The Coast Guard expects the Polar Star to be reactivated in fiscal year 2013. In keeping with the standard practice of crewing ships in advance to ensure appropriate training and readiness, fielding a crew for the Polar Star is required in fiscal year 2012. The Committee expects sufficient funding to be included in the Coast Guard's fiscal year 2012 request for this purpose.
>
> The Committee also notes that the Coast Guard's analysis of national mission needs in the high latitude regions has yet to be completed. This effort was funded in fiscal year 2009 to inform the national polar policy debate. The results of this study are to be submitted expeditiously and include projected assets and resources necessary to address identified requirements. (Page 80; material in brackets as in original)

Coast Guard Authorization Act of 2010 (H.R. 3619/P.L. 111-281)

H.R. 3619 was passed by the House on October 23, 2009, and by the Senate on May 7, 2010. The Senate-passed version substituted the text of S. 1194 as reported by the Senate Commerce, Science, and Transportation Committee (see below), with modifications. The House and Senate resolved their differences and passed the final version of the bill on September 29 and 30, 2010. The bill was presented to the President on October 4, 2010, and signed into law as P.L. 111-281 on October 15, 2010.

House

The Coast Guard Authorization Act of 2010 (H.R. 3619) as reported by the House Committee on Transportation and Infrastructure (H.Rept. 111-303, Part 1, of October 16, 2009) contains two provisions relating to polar icebreaking—Section 311 and Section 1316.

Section 311 states:

> SEC. 311. ARCTIC MARINE SHIPPING ASSESSMENT IMPLEMENTATION.
>
> (a) Purpose- The purpose of this section is to ensure safe, secure, and reliable maritime shipping in the Arctic including the availability of aids to navigation, vessel escorts, spill response capability, and maritime search and rescue in the Arctic.
>
> (b) International Maritime Organization Agreements- To carry out the purpose of this section, the Secretary of the department in which the Coast Guard is operating shall work

[53] The FY2010 Consolidated Appropriations Act (H.R. 3288/P.L. 111-117 of December 16, 2009) states, in the paragraph that appropriates funds for NSF research and related activities, that the funds are made available provided, among other things, "That from funds specified in the fiscal year 2010 budget request for icebreaking services, $54,000,000 shall be transferred to the U.S. Coast Guard 'Operating Expenses' within 60 days of enactment of this Act…." The conference report on H.R. 3288 (H.Rept. 111-366 of December 8, 2009) states:

> The conference agreement transfers $54,000,000 from NSF to the United States Coast Guard (USCG) for icebreaking services to cover all anticipated operation and maintenance costs for fiscal year 2010. The conferees expect that in future years all operation and maintenance budget authority for these USCG icebreakers will be requested by the Department of Homeland Security. (Page 766)

through the International Maritime Organization to establish agreements to promote coordinated action among the United States, Russia, Canada, Iceland, Norway, and Denmark and other seafaring and Arctic nations to ensure, in the Arctic—

(1) placement and maintenance of aids to navigation;

(2) appropriate icebreaking escort, tug, and salvage capabilities;

(3) oil spill prevention and response capability;

(4) maritime domain awareness, including long-range vessel tracking; and

(5) search and rescue.

(c) Coordination by Committee on the Maritime Transportation System- The Committee on the Maritime Transportation System established under a directive of the President in the Ocean Action Plan, issued December 17, 2004, shall coordinate the establishment of domestic transportation policies in the Arctic necessary to carry out the purpose of this section.

(d) Agreements and Contracts- The Secretary of the department in which the Coast Guard is operating may, subject to the availability of appropriations, enter into cooperative agreements, contracts, or other agreements with, or make grants to individuals and governments to carry out the purpose of this section or any agreements established under subsection (b).

(e) Icebreaking- The Secretary of the department in which the Coast Guard is operating shall promote safe maritime navigation by means of icebreaking where needed to assure the reasonable demands of commerce.

(f) Demonstration Projects- The Secretary of Transportation may enter into cooperative agreements, contracts, or other agreements with, or make grants to, individuals to conduct demonstration projects to reduce emissions or discharges from vessels operating in the Arctic.

(g) Authorization of Appropriations- There are authorized to be appropriated—

(1) to the Secretary of the department in which the Coast Guard is operating—

(A) $5,000,000 for each of fiscal years 2011 through 2015 for seasonal operations in the Arctic; and

(B) $10,000,000 for each of fiscal years 2012 through 2015 to carry out agreements established under subsection (d); and

(2) to the Secretary of Transportation $5,000,000 for each of fiscal years 2011 through 2015 to conduct demonstration projects under subsection (f).

(h) Icebreakers-

(1) ANALYSES- Not later than 90 days after the date of enactment of this Act or the date of completion of the ongoing High Latitude Study to assess Arctic polar ice-breaking mission requirements, which ever occurs later, the Commandant of the Coast Guard shall—

(A) conduct a comparative cost-benefit analysis of—

(i) rebuilding, renovating, or improving the existing fleet of icebreakers for operation by the Coast Guard,

(ii) constructing new icebreakers for operation by the Coast Guard, and

(iii) any combination of the activities described in clauses (i) and (ii), to carry out the missions of the Coast Guard; and

(B) conduct an analysis of the impact on mission capacity and the ability of the United States to maintain a presence in the Arctic regions through the year 2020 if recapitalization of the icebreaker fleet, either by constructing new icebreakers or rebuilding, renovating, or improving the existing fleet of icebreakers, is not fully funded.

(2) REPORTS TO CONGRESS-

(A) Not later than 90 days after the date of enactment of this Act or the date of completion of the ongoing High Latitude Study to assess Arctic ice-breaking mission requirements, which ever occurs later, the Commandant of the Coast Guard shall submit a report containing the results of the study, together with recommendations the Commandant deems appropriate under section 93(a)(24) of title 14, United States Code, to the Senate Committee on Commerce, Science, and Transportation and the House of Representatives Committee on Transportation and Infrastructure.

(B) Not later than 1 year after the date of enactment of this Act, the Commandant shall submit reports containing the results of the analyses required under subparagraphs (A) and (B) of paragraph (1), together with recommendations the Commandant deems appropriate under section 93(a)(24) of title 14, United States Code, to the Senate Committee on Commerce, Science, and Transportation and the House of Representatives Committee on Transportation and Infrastructure.

(i) Arctic Definition- In this section the term 'Arctic' has the same meaning as in section 112 of the Arctic Research and Policy Act of 1984 (15 U.S.C. 4111).

Section 1316 states:

SEC. 1316. ASSESSMENT OF NEEDS FOR ADDITIONAL COAST GUARD PRESENCE IN HIGH LATITUDE REGIONS.

Within 270 days after the date of enactment of this Act, the Secretary of the department in which the Coast Guard is operating shall submit a report to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Transportation and Infrastructure of the House of Representatives assessing the need for additional Coast Guard prevention and response capability in the high latitude regions. The assessment shall address needs for all Coast Guard mission areas, including search and rescue, marine pollution response and prevention, fisheries enforcement, and maritime commerce. The Secretary shall include in the report—

(1) an assessment of the high latitude operating capabilities of all current Coast Guard assets, including assets acquired under the Deepwater program;

(2) an assessment of projected needs for Coast Guard forward operating bases in the high latitude regions;

(3) an assessment of shore infrastructure, personnel, logistics, communications, and resources requirements to support Coast Guard forward operating bases in the high latitude regions;

(4) an assessment of the need for high latitude icebreaking capability and the capability of the current high latitude icebreaking assets of the Coast Guard, including—

(A) whether the Coast Guard's high latitude icebreaking fleet is meeting current mission performance goals;

(B) whether the fleet is capable of meeting projected mission performance goals; and

(C) an assessment of the material condition, safety, and working conditions aboard high latitude icebreaking assets, including the effect of those conditions on mission performance;

(5) a detailed estimate of acquisition costs for each of the assets (including shore infrastructure) necessary for additional prevention and response capability in high latitude regions for all Coast Guard mission areas, and an estimate of operations and maintenance costs for such assets for the initial 10-year period of operations; and

(6) detailed cost estimates (including operating and maintenance for a period of 10 years) for high latitude icebreaking capability to ensure current and projected future mission performance goals are met, including estimates of the costs to—

(A) renovate and modernize the Coast Guard's existing high latitude icebreaking fleet; and

(B) replace the Coast Guard's existing high latitude icebreaking fleet.

Senate

On May 7, 2010, the Senate passed S.Amdt. 3912, which amended H.R. 3619 by substituting the text of S. 1194 as reported by the Senate Commerce, Science, and Transportation Committee (see below), with modifications. The Senate then passed H.R. 3619 the same day. **Section 603** of the Senate-passed version of H.R. 3619 states:

SEC. 603. ICEBREAKERS.

(a) ANALYSES- Not later than 90 days after the date of enactment of this Act or the date of completion of the ongoing High Latitude Study to assess polar ice-breaking mission requirements, whichever occurs later, the Commandant of the Coast Guard shall require a nongovernmental, independent third party (other than the National Academy of Sciences) which has extensive experience in the analysis of military procurements to—

(1) conduct a comparative cost-benefit analysis, taking into account future Coast Guard budget projections (which assume Coast Guard budget growth of no more than inflation) and other recapitalization needs, of—

(A) rebuilding, renovating, or improving the existing fleet of polar icebreakers for operation by the Coast Guard,

(B) constructing new polar icebreakers for operation by the Coast Guard,

(C) construction of new polar icebreakers by the National Science Foundation for operation by the Foundation,

(D) rebuilding, renovating, or improving the existing fleet of polar icebreakers by the National Science Foundation for operation by the Foundation, and

(E) any combination of the activities described in subparagraph (A), (B), (C), or (D) to carry out the missions of the Coast Guard and the National Science Foundation;

(2) conduct an analysis of the impact on mission capacity and the ability of the United States to maintain a presence in the polar regions through the year 2020 if recapitalization of the polar icebreaker fleet, either by constructing new polar icebreakers or rebuilding, renovating, or improving the existing fleet of polar icebreakers, is not fully funded; and

(3) conduct a comprehensive analysis of the impact on all Coast Guard activities, including operations, maintenance, procurements, and end strength, of the acquisition of polar icebreakers described in paragraph (1) by the Coast Guard or the National Science Foundation assuming that total Coast Guard funding will not increase more than the annual rate of inflation.

(b) Reports to Congress-

(1) Not later than one year and 90 days after the date of enactment of this Act or the date of completion of the ongoing High Latitude Study to assess polar ice-breaking mission requirements, whichever occurs later, the Commandant of the Coast Guard shall submit a report containing the results of the study, together with recommendations the Commandant deems appropriate under section 93(a)(24) of title 14, United States Code, to the Senate Committee on Commerce, Science, and Transportation and the House of Representatives Committee on Transportation and Infrastructure.

(2) Not later than 1 year after the date of enactment of this Act, the Commandant shall submit reports containing the results of the analyses required under paragraphs (1) and (2) of subsection (a), together with recommendations the Commandant deems appropriate under section 93(a)(24) of title 14, United States Code, to the Senate Committee on Commerce, Science, and Transportation and the House of Representatives Committee on Transportation and Infrastructure.

Final Version

Section 307 of H.R. 3619/P.L. 111-281 states:

SEC. 307. ARCTIC MARINE SHIPPING ASSESSMENT IMPLEMENTATION.

(a) Purpose- The purpose of this section is to ensure safe and secure maritime shipping in the Arctic including the availability of aids to navigation, vessel escorts, spill response capability, and maritime search and rescue in the Arctic.

(b) International Maritime Organization Agreements- To carry out the purpose of this section, the Secretary of the department in which the Coast Guard is operating is encouraged to enter into negotiations through the International Maritime Organization to conclude and execute agreements to promote coordinated action among the United States, Russia, Canada, Iceland, Norway, and Denmark and other seafaring and Arctic nations to ensure, in the Arctic—

(1) placement and maintenance of aids to navigation;

(2) appropriate marine safety, tug, and salvage capabilities;

(3) oil spill prevention and response capability;

(4) maritime domain awareness, including long-range vessel tracking; and

(5) search and rescue.

(c) Coordination by Committee on the Maritime Transportation System- The Committee on the Maritime Transportation System established under a directive of the President in the Ocean Action Plan, issued December 17, 2004, shall coordinate the establishment of domestic transportation policies in the Arctic necessary to carry out the purpose of this section.

(d) Agreements and Contracts- The Secretary of the department in which the Coast Guard is operating may, subject to the availability of appropriations, enter into cooperative agreements, contracts, or other agreements with, or make grants to individuals and governments to carry out the purpose of this section or any agreements established under subsection (b).

(e) Icebreaking- The Secretary of the department in which the Coast Guard is operating shall promote safe maritime navigation by means of icebreaking where necessary, feasible, and effective to carry out the purposes of this section.

(f) Independent Ice Breaker Analyses-

(1) IN GENERAL- Not later than 90 days after the date of enactment of this Act, the Secretary of the department in which the Coast Guard is operating shall require a nongovernmental, independent third party (other than the National Academy of Sciences) that has extensive experience in the analysis of military procurements, to—

(A) conduct a comparative cost-benefit analysis, taking into account future Coast Guard budget projections (which assume Coast Guard budget growth of no more than inflation) and other recapitalization needs, of—

(i) rebuilding, renovating, or improving the existing fleet of polar icebreakers for operation by the Coast Guard;

(ii) constructing new polar icebreakers for operation by the Coast Guard;

(iii) construction of new polar icebreakers by the National Science Foundation for operation by the Foundation;

(iv) rebuilding, renovating, or improving the existing fleet of polar icebreakers by the National Science Foundation for operation by the Foundation; and

(v) any combination of the activities described in clause (i), (ii), (iii), or (iv) to carry out the missions of the Coast Guard and the National Science Foundation; and

(B) conduct a comprehensive analysis of the impact on all Coast Guard activities, including operations, maintenance, procurements, and end strength, of the acquisition of polar icebreakers described in subparagraph (A) by the Coast Guard or the National Science

Foundation assuming that total Coast Guard funding will not increase more than the annual rate of inflation.

(2) REPORT- Not later than 1 year after the date of enactment of this Act, the Secretary of the department in which the Coast Guard is operating shall submit a report containing the results of the analyses required under paragraph (1), together with recommendations the Commandant considers appropriate under section 93(a)(24) of title 14, United States Code, to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Transportation and Infrastructure of the House of Representatives.

(g) High-Latitude Study- Not later than 90 days after the date of enactment of this Act or the date of completion of the ongoing High-Latitude Study to assess polar icebreaking mission requirements for all Coast Guard missions including search and rescue, marine pollution response and prevention, fisheries enforcement, and maritime commerce, whichever occurs later, the Commandant of the Coast Guard shall submit a report containing the results of the study, together with recommendations the Commandant considers appropriate under section 93(a)(24) of title 14, United States Code, to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Transportation and Infrastructure of the House of Representatives.

(h) Arctic Definition- In this section the term `Arctic' has the same meaning as in section 112 of the Arctic Research and Policy Act of 1984 (15 U.S.C. 4111).

FY2010 and FY2011 Coast Guard Authorization Bill (S. 1194)

Senate

The Senate Commerce, Science, and Transportation Committee reported S. 1194 on October 30, 2009 (S.Rept. 111-95 of October 30, 2009). Section 604 of S. 1194 as reported by the committee states:

SEC. 604. ICEBREAKERS.

(a) ANALYSES- Not later than 90 days after the date of enactment of this Act or the date of completion of the ongoing High Latitude Study to assess polar ice-breaking mission requirements, which ever occurs later, the Commandant of the Coast Guard shall—

(1) conduct a comparative cost-benefit analysis of—

(A) rebuilding, renovating, or improving the existing fleet of polar icebreakers for operation by the Coast Guard,

(B) constructing new polar icebreakers for operation by the Coast Guard for operation by the Coast Guard, and

(C) any combination of the activities described in subparagraphs (A) and (B), to carry out the missions of the Coast Guard; and

(2) conduct an analysis of the impact on mission capacity and the ability of the United States to maintain a presence in the polar regions through the year 2020 if recapitalization of the polar icebreaker fleet, either by constructing new polar icebreakers or rebuilding, renovating, or improving the existing fleet of polar icebreakers, is not fully funded.

> (b) Reports to Congress-
>
> (1) Not later than 90 days after the date of enactment of this Act or the date of completion of the ongoing High Latitude Study to assess polar ice-breaking mission requirements, which ever occurs later, the Commandant of the Coast Guard shall submit a report containing the results of the study, together with recommendations the Commandant deems appropriate under section 93(a)(24) of title 14, United States Code, to the Senate Committee on Commerce, Science, and Transportation and the House of Representatives Committee on Transportation and Infrastructure.
>
> (2) Not later than 1 year after the date of enactment of this Act, the Commandant shall submit reports containing the results of the analyses required under paragraphs (1) and (2) of subsection (a), together with recommendations the Commandant deems appropriate under section 93(a)(24) of title 14, United States Code, to the Senate Committee on Commerce, Science, and Transportation and the House of Representatives Committee on Transportation and Infrastructure.

S.Rept. 111-95 summarizes section 604 on pages 24-25.

On May 7, 2010, the Senate passed S.Amdt. 3912, which amended H.R. 3619 (see above) by substituting the text of S. 1194 as reported by the Senate Commerce, Science, and Transportation Committee, with modifications. The Senate then passed H.R. 3619 the same day.

Arctic Marine Shipping Assessment Implementation Act of 2009 (H.R. 2865/S. 1514/S. 1561)

House

H.R. 2865 was introduced on June 12, 2009. Section 8(1)(A) would authorize appropriations of $750 million per year in FY2011 and FY2012 for the construction of two polar capable icebreakers.

Section 2 states that Congress finds and declares several things, including the following:

> The United States has continuing research, security, environmental, and commercial interests in the Arctic region that rely on the availability of icebreaker platforms of the Coast Guard. The Polar Class icebreakers commissioned in the 1970s are in need of replacement.
>
> and
>
> Building new icebreakers, mustering international plans for aids to navigation and other facilities, and establishing coordinated shipping regulations and oil spill prevention and response capability through international cooperation, including the approval of the International Maritime Organization, requires long lead times. Beginning those efforts now, with the completion of an Arctic Marine Shipping Assessment by the eight-nation Arctic Council, is essential to protect United States interests given the extensive current use of the Arctic Ocean and adjacent seas by vessels of many nations.

Section 3 states:

> To carry out the purpose of this Act, the Secretary of the department in which the Coast Guard is operating shall work through the International Maritime Organization to establish agreements to promote coordinated action among the United States, Russia, Canada, Iceland, Norway, and Denmark and other seafaring and Arctic nations to ensure, in the Arctic....
>
> (2) appropriate icebreaking escort, tug, and salvage capabilities.

Section 6 states, in its entirety:

> The Secretary of the department in which the Coast Guard is operating shall promote safe maritime navigation by means of icebreaking where needed to assure the reasonable demands of commerce.

Senate

S. 1514 was introduced on July 24, 2009. Section 8(1)(A) would authorize appropriations of $750 million per year in FY2011 and FY2012 for the construction of two polar capable icebreakers.

Section 2 states that Congress finds and declares several things, including the following:

> The United States has continuing research, security, environmental, and commercial interests in the Arctic region that rely on the availability of icebreaker platforms of the Coast Guard. The Polar Class icebreakers commissioned in the 1970s are in need of replacement.
>
> and
>
> Building new icebreakers, mustering international plans for aids to navigation and other facilities, and establishing coordinated shipping regulations and oil spill prevention and response capability through international cooperation, including the approval of the International Maritime Organization, requires long lead times. Beginning those efforts now, with the completion of an Arctic Marine Shipping Assessment by the eight-nation Arctic Council, is essential to protect United States interests given the extensive current use of the Arctic Ocean and adjacent seas by vessels of many nations.

Section 3 states:

> To carry out the purpose of this Act, the Secretary of the department in which the Coast Guard is operating shall work through the International Maritime Organization to establish agreements to promote coordinated action among the United States, Russia, Canada, and other seafaring and Arctic nations to ensure, in the Arctic…
>
> (2) appropriate icebreaking escort, tug, and salvage capabilities….

Section 6 states, in its entirety:

> The Secretary of the department in which the Coast Guard is operating shall promote safe maritime navigation by means of icebreaking where needed to assure the reasonable demands of commerce.

S. 1561 was introduced on August 3, 2009. Section 11(a)(1) would authorize appropriations of $40 million in FY2011 for the design of a new polar class icebreaker. Section 11(a)(2) would authorize appropriations of $800 million per year in FY2011 and FY2012 for the construction of two polar capable icebreakers.

Section 2 states that Congress finds several things, including the following:

> The United States has continuing research, security, environmental, and commercial interests in the Arctic region that rely on the availability of polar class icebreakers of the Coast Guard that were commissioned in the 1970s and are in need of replacement.
>
> and
>
> Building new icebreakers, forward operating bases, aids to navigation, and other facilities, and establishing coordinated shipping regulations and oil spill prevention and response capability through international cooperation requires long lead times.

Section 5 states:

> It is the sense of Congress that, to carry out the purpose of this Act, the Secretary of State, in consultation with the Secretary of Homeland Security, acting through the Commandant of the Coast Guard, should work to establish agreements to promote coordinated action among the United States, Russia, Canada, Iceland, Norway, and Denmark and other seafaring and Arctic nations with respect to…
>
> (4) appropriate icebreaking escort, tug, and salvage capabilities….

Section 6 states:

> (a) Submission of Report Analysis to Congress-
>
> (1) REQUIREMENT FOR SUBMISSION- Not later than 90 days following the completion of the High Latitude Polar Ice-Breaking Mission Analysis Report, the Commandant of the Coast Guard shall submit to the appropriate committees of Congress—
>
> (A) such report; and
>
> (B) consistent with section 93(a)(24) of title 14, United States Code, any recommendations of the Commandant related to such report.
>
> (2) APPROPRIATE COMMITTEES OF CONGRESS DEFINED- In this subsection, the term `appropriate committees of Congress' means the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Transportation and Infrastructure of the House of Representatives.
>
> (b) Mission Requirements Analysis-
>
> (1) MISSION REQUIREMENTS ANALYSIS- Not later than 90 days after the date of the enactment of this Act, the Commandant of the Coast Guard shall, subject to the availability of appropriations, execute a contract with an independent entity to—
>
> (A) conduct an analysis of future mission requirements of the Coast Guard in the Arctic and Antarctic; and
>
> (B) estimate the necessary resources to provide for such requirements.
>
> (2) SUBMISSION OF ANALYSIS AND ESTIMATE- Not later than 120 days after the date that the contract described in paragraph (1) is executed, the analysis and estimate described in subparagraph (A) and (B) of that paragraph shall be submitted to—

(A) the appropriate committees of Congress;

(B) the Commandant of the Coast Guard; and

(C) the Comptroller General of the United States.

(3) ADDITIONAL RECOMMENDATIONS- Not later than 90 days after the submission of the analysis and estimate described in paragraph (2)—

(A) the Commandant of the Coast Guard shall submit to the appropriate committees of Congress, consistent with section 93(a)(24) of title 14, United States Code, any recommendations of the Commandant related to such analysis and estimate; and

(B) the Comptroller General shall submit to the appropriate committees of Congress any recommendations of the Comptroller General related to such analysis and estimate.

(4) APPROPRIATE COMMITTEES OF CONGRESS DEFINED- In this subsection, the term 'appropriate committees of Congress' means—

(A) the Committee on Commerce, Science, and Transportation and the Committee on Homeland Security and Governmental Affairs of the Senate; and

(B) the Committee on Homeland Security and the Committee on Transportation and Infrastructure of the House of Representatives.

Section 10 states, in its entirety:

Notwithstanding any other provision of law, the Director of the National Science Foundation shall transfer all amounts provided pursuant to any Act for the procurement of polar icebreaking services to the United States Coast Guard Appropriation Accounts, and such amounts shall remain available until expended for operating expenses, renovation, and improvement.

FY2010 DHS Appropriations Act (H.R. 2892/P.L. 111-83)

House

The House Appropriations Committee, in its report (H.Rept. 111-157 of June 16, 2009) on H.R. 2892, did not recommend any funding in the Coast Guard's AC&I account for polar icebreaker sustainment or acquisition of new polar icebreakers. The report stated:

POLAR ICEBREAKING OPERATING AND MAINTENANCE COSTS AND FUTURE POLAR NEEDS

The Committee continues to be concerned about Coast Guard's ability to meet its polar operations mission requirements and provide the United States with the capability to support national interests in the polar regions. These interests extend well beyond the realm of scientific research. As such, last year the Committee directed the Coast Guard and the National Science Foundation (NSF) to renegotiate the existing agreement on polar icebreaking in order to return the budget for operating and maintaining these vessels to the Coast Guard for fiscal year 2010, and to provide a new joint plan for Coast Guard support of scientific research by NSF and other Federal agencies, which was to be included in the 2010

> budget request. No agreement was reached, and no plan was submitted. Negotiations are apparently underway between the Coast Guard and NSF, but the budget has yet to be returned to the Coast Guard accounts. Therefore, the Committee directs the Coast Guard to continue negotiating the agreement for the return of icebreaking in the 2011 budget, and to provide the joint plan for Coast Guard support as soon as possible.
>
> The Committee further directs the Coast Guard to use existing appropriations to continue its analysis of national mission needs in the high latitude regions to inform national polar policy. (Pages 78-79)

Senate

The Senate Appropriations Committee, in its report (S.Rept. 111-31 of June 18, 2009) on the FY2010 DHS appropriation bill (S. 1298), recommended $32.5 million in the Coast Guard's AC&I account for the reactivation and service life extension of *Polar Star*. Of this amount, $27.3 million is in an AC&I line item for polar icebreaker sustainment, and the remaining $5.2 million is included within a line item for AC&I direct personnel costs (page 76). The Senate included the provisions of S. 1298 in an amendment to H.R. 2892.

The committee's report on S. 1298 stated:

> POLAR ICEBREAKER SUSTAINMENT
>
> The Committee recommends $32,500,000 above the budget request to complete the reactivation and service life extension of Coast Guard Cutter Polar Star. Of this amount, $5,200,000 is funded in the AC&I direct personnel costs PPA [program, project, or activity]. Returning Polar Star to operational status is vital to ensuring the U.S. Government has the ability to project U.S. sovereignty and protect the broad range of security, economic, and environmental interests in the Arctic and Antarctic. Within this amount, the Coast Guard shall begin survey and design and conduct a business case analysis for either a new heavy polar icebreaker class or a major service life extension project for existing heavy icebreakers. The only existing heavy polar class icebreaker, the Polar Sea, has only 7 years remaining in its useful life. (Page 78)

The report also stated:

> POLAR OPERATIONS AND MAINTENANCE FUNDING
>
> The Committee notes the budget request did not include transfer of operating and maintenance funds for the polar icebreakers from the National Science Foundation [NSF] to the Coast Guard as directed in the joint explanatory statement accompanying the Department of Homeland Security Appropriations Act, 2009 (Public Law 110–329). For fiscal year 2011, the Committee expects the operating and maintenance budget authority and associated FTE to be included in the Coast Guard's request. The two agencies shall update the existing Memorandum of Agreement to reflect the change in budget authority. (page 73; material in brackets as in original)

Conference

The conference report (H.Rept. 111-298 of October 13, 2009) on H.R. 2892/P.L. 111-83 of October 28, 2009, provided $32.5 million to complete the reactivation and service life extension

of *Polar Star*. Of this total, $27.3 million was provided in the AC&I account in a line item entitled "Polar Icebreaker sustainment" (Page 87). The conference report stated:

> Polar Icebreaker Sustainment
>
> The conference agreement provides an additional $32,500,000 to complete the reactivation and service life extension of the Coast Guard Cutter POLAR STAR as proposed by the Senate. No additional funding for this activity was proposed by the House. Of this amount, $5,200,000 is provided in the Acquisition, Construction, and Improvements direct personnel costs PPA [program, project, or activity]. Funds shall be applied as specified in the Senate report. The conferees believe returning POLAR STAR to operational status is vital to national interests in the polar regions. According to the Coast Guard the only existing operational heavy icebreaker, the POLAR SEA, has only five years of service life remaining. The absence of requested funding to complete fiscal year 2009 efforts to reactivate POLAR STAR, combined with the lack of compliance with standing Congressional direction on the polar icebreaking budget, implies a broader lack of commitment to sustaining polar capabilities and achieving longterm, strategic objectives in the Arctic. The conferees direct the Coast Guard to brief the Committees no later than December 15, 2009, on the program execution plan for reactivation of POLAR STAR and the status of resources required to achieve mission requirements for polar operations. (Page 89)

The conference report also stated, the section on the Coast Guard's Operating Expenses (OE) account:

> Polar Icebreaking Operations and Maintenance Funding
>
> The conferees expect polar icebreaking operations and maintenance budget authority and associated FTE to be included in the Coast Guard's budget request for fiscal year 2011. The National Science Foundation and Coast Guard shall update the existing Memorandum of Agreement to reflect the change in budget authority as proposed by the Senate. Furthermore, the conferees direct the Coast Guard to follow the direction regarding the high latitude study as outlined in the House report. (Page 85)

American Recovery and Reinvestment Act of 2009 (H.R. 1/P.L. 111-5)

A Senate version of H.R. 1 (amendment in Senate, January 30, 2009) stated, in the section on the Coast Guard's Acquisition, Construction, and Improvements (AC&I) account, that of the funds provided in the bill for the AC&I account, "$87,500,000 shall be for the design of a new polar icebreaker or the renovation of an existing polar icebreaker, and major repair and maintenance of existing polar icebreakers." The provision was not included in other House and Senate versions of the bill, or in the conference version of the bill, which was signed into law on February 17, 2009.

FY2009 DHS Appropriations Act (H.R. 2638/P.L. 110-329)

House

The House Appropriations Committee, in its report (H.Rept. 110-862 of September 18, 2008) on the FY2009 DHS appropriations bill (H.R. 6947), stated:

POLAR ICEBREAKING OPERATING AND MAINTENANCE COSTS AND FUTURE POLAR NEEDS

The Committee is concerned about Coast Guard's ability to meet its polar operations mission requirements and provide the United States with the capability to support national interests in the polar regions. The Committee provides $200,000, as requested, to conduct an analysis of national mission needs in the high latitude regions to inform the national polar policy debate.

In fiscal year 2006 the Committees on Appropriations approved an Administration request for the National Science Foundation (NSF), the primary user of the three Coast Guard polar icebreaker vessels, to fund the costs of operating and maintaining these aging vessels. Because it has become more apparent that the national interest in the polar regions extends beyond scientific research, the Committee questions whether this arrangement should continue. Accordingly, the Committee directs Coast Guard and NSF to renegotiate the existing agreement in order to return the budget for operating and maintaining these vessels to Coast Guard for fiscal year 2010. This change is consistent with a new joint plan for Coast Guard support of scientific research by NSF and other Federal agencies, which also is to be included in the 2010 budget request. NSF shall retain responsibility for the contracting of scientific support services that Coast Guard does not have the capability to perform or cannot perform on a cost-competitive basis. The Committee is aware of a $4,000,000 funding shortfall related to the caretaker status of the POLAR STAR, and directs Coast Guard to address this shortfall within the amounts appropriated for fiscal year 2009. (Page 82)

Senate

The FY2009 DHS appropriations bill (S. 3181) as reported by the Senate appropriations committee would make available about $6.28 billion for the Coast Guard's Operating Expenses (OE) account, provided, among other things, "that notwithstanding any other provision of law, $4,000,000 of the amounts made available under this heading may be available to maintain the USCGC POLAR STAR in caretaker status."

The Senate Appropriations Committee, in its report (S.Rept. 110-396 of June 23, 2008) on S. 3181, stated:

POLAR ICEBREAKERS

The Committee reiterates its concern with the Coast Guard's ability to meet its current and projected polar operations responsibilities. According to correspondence from the Commandant on May 23, 2008, the Coast Guard will submit a report on polar mission requirements no later than August 31, 2008. The Committee expects this report to address the concerns detailed in the explanatory statement accompanying the Department of Homeland Security Appropriations Act, 2008. The Committee also expects all costs to operate the polar icebreakers for National Science Foundation [NSF] research, including unanticipated maintenance, will be reimbursed by NSF. However, the Committee notes that the NSF budget request states, "Effective with the fiscal year 2009 budget, NSF will no longer provide funds to maintain the USCGC Polar Star in caretaker status because NSF does not envision current or future use of this vessel in support of its mission." Due to the changing environmental conditions and increased activity in the polar regions, as well as the Coast Guard's multi-mission responsibilities in the polar regions that are not science related, the Committee includes statutory language making an additional $4,000,000 available to maintain the USCGC Polar Star in caretaker status. The Committee also notes that the forthcoming report on Coast Guard polar mission requirements will address the sustainability of the current operations and maintenance cost sharing arrangement between the Coast

> Guard and the NSF to support both current and projected polar icebreaker operations. (Page 81)

Compromise

The FY2009 DHS appropriations bill became Division D of H.R. 2638/P.L. 110-329 of September 30, 2008, a consolidated appropriations act. H.R. 2638 began as a DHS appropriations act and was then amended to become a consolidated appropriations act that contained that includes, among other things, the FY2009 DHS appropriations act. In lieu of a conference report, there was a compromise version of H.R. 2638 that was accompanied by an explanatory statement. Section 4 of H.R. 2638 stated that the explanatory statement "shall have the same effect with respect to the allocation of funds and implementation of this Act as if it were a joint explanatory statement of a committee of conference."

H.R. 2638 provided $30.3 million for polar icebreaker sustainment. The funding was provided in a new line item in the surface ships section of the Deepwater portion of the Coast Guard's Acquisition, Construction, and Improvements (AC&I) appropriation account. The explanatory statement stated:

> Polar Icebreakers
>
> One of the Coast Guard's missions is to provide the United States with the capability to support national interests in the polar regions. In a report recently submitted, the Coast Guard stated that the United States will need a maritime surface and air presence in the Arctic sufficient to support prevention and response regimes as well as diplomatic objectives. However, no funding has been requested for the Coast Guard's aging icebreakers despite its inability to meet current and projected polar operations mission responsibilities. The Coast Guard is directed to follow House report direction regarding the polar icebreaking operating budget. The Coast Guard should work with the National Science Foundation in the coming year to renegotiate the existing polar icebreaking agreement in order to return the budget for operating and maintaining its polar icebreakers to the Coast Guard in fiscal year 2010. The AC&I appropriation includes $30,300,000 to reactivate the USCGC POLAR STAR for an additional 7-10 years of service life.

Coast Guard Authorization Act For FY2008 (H.R. 2830/S. 1892)

House

Section 422 of H.R. 2830 as passed by the House stated:

> SEC. 422. ASSESSMENT OF NEEDS FOR ADDITIONAL COAST GUARD PRESENCE IN HIGH LATITUDE REGIONS.
>
> Within 270 days after the date of enactment of this Act, the Secretary of the department in which the Coast Guard is operating shall submit a report to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Transportation and Infrastructure of the House of Representatives assessing the need for additional Coast Guard prevention and response capability in the high latitude regions. The assessment shall address needs for all Coast Guard mission areas, including search and rescue, marine pollution response and prevention, fisheries enforcement, and maritime commerce. The Secretary shall include in the report—

(1) an assessment of the high latitude operating capabilities of all current Coast Guard assets, including assets acquired under the Deepwater program;

(2) an assessment of projected needs for Coast Guard forward operating bases in the high latitude regions;

(3) an assessment of shore infrastructure, personnel, logistics, communications, and resources requirements to support Coast Guard forward operating bases in the high latitude regions;

(4) an assessment of the need for high latitude icebreaking capability and the capability of the current high latitude icebreaking assets of the Coast Guard, including—

(A) whether the Coast Guard's high latitude icebreaking fleet is meeting current mission performance goals;

(B) whether the fleet is capable of meeting projected mission performance goals; and

(C) an assessment of the material condition, safety, and working conditions aboard high latitude icebreaking assets, including the effect of those conditions on mission performance;

(5) a detailed estimate of acquisition costs for each of the assets (including shore infrastructure) necessary for additional prevention and response capability in high latitude regions for all Coast Guard mission areas, and an estimate of operations and maintenance costs for such assets for the initial 10-year period of operations; and

(6) detailed cost estimates (including operating and maintenance for a period of 10 years) for high latitude icebreaking capability to ensure current and projected future mission performance goals are met, including estimates of the costs to—

(A) renovate and modernize the Coast Guard's existing high latitude icebreaking fleet; and

(B) replace the Coast Guard's existing high latitude icebreaking fleet.

Senate

Section 917 of S. 1892 as reported in the Senate stated:

SEC. 917. ICEBREAKERS.

(a) IN GENERAL—The Secretary of the department in which the Coast Guard is operating shall acquire or construct 2 polar icebreakers for operation by the Coast Guard in addition to its existing fleet of polar icebreakers.

(b) NECESSARY MEASURES—The Secretary shall take all necessary measures, including the provision of necessary operation and maintenance funding, to ensure that—

(1) the Coast Guard maintains, at a minimum, its current vessel capacity for carrying out ice breaking in the Arctic and Antarctic, Great Lakes, and New England regions; and

(2) any such vessels that are not fully operational are brought up to, and maintained at full operational capability.

> (c) REIMBURSEMENT—Nothing in this section shall preclude the Secretary from seeking reimbursement for operation and maintenance costs of such polar icebreakers from other Federal agencies and entities, including foreign countries, that benefit from the use of the icebreakers.
>
> (d) AUTHORIZATION OF APPROPRIATIONS—There are authorized to be appropriated for fiscal year 2008 to the Secretary of the department in which the Coast Guard is operating such sums as may be necessary to acquire the icebreakers authorized by subsection (a), as well as maintaining and operating the icebreaker fleet as authorized in subsection (b).

The Senate Commerce, Science, and Transportation Committee, in its report (S.Rept. 110-261 of February 5, 2008) on S. 1892, stated:

> Section 917 would require the Secretary to acquire or construct two new polar icebreakers for operation by the Coast Guard. It also would instruct the Coast Guard to maintain their existing polar icebreakers and return them to operational status, if not operational already. This section would authorize such sums as are necessary to carry out this section. Currently, the Coast Guard's icebreaker fleet is funded by the National Science Foundation. However, the funding for these vessels has been inconsistent, allowing the Polar Star to fall behind on the maintenance necessary to keep the vessel in operating condition. With some climate models predicting an ice-free Arctic summer in the future, more international expeditions will be headed to the region to examine newly revealed oil and gas reserves and other natural resources. Canada, Russia, and other countries will begin to compete with the United States over jurisdiction and, without a strong polar icebreaker fleet, our Nation will suffer a severe disadvantage. A recent 2007 report by the National Academy of Sciences found that the United States needs to maintain polar icebreaking capacity and construct at least two new polar icebreakers. This provision follows those recommendations. (Page 29)

In presenting the CBO's estimate of the cost of Section 917 of S. 1892 as reported, the report stated:

> Assuming appropriation of the necessary amounts, CBO estimates that the USCG would spend about $1.4 billion over the next five years to purchase two icebreakers. (Costs to operate and maintain the two new vessels would total about $50 million a year beginning in 2013.) We estimate that an additional $50 million would be spent over the 2008-2010 period to recondition an existing USCG icebreaker, which is currently out of operation. Operating and maintaining that vessel would cost about $10 million in 2010 and about $25 million annually thereafter. This estimate is based on information provided by the Coast Guard regarding the cost of constructing, operating, and maintaining such vessels to agency specifications. (Page 8; see also pages 6 and 7)

FY2008 Consolidated Appropriations Act (H.R. 2764/P.L. 110-161)

FY2008 funding for the Department of Homeland Security (DHS), which includes the Coast Guard, was provided in the FY2008 Consolidated Appropriations Act (H.R. 2764/P.L. 110-161 of December 26, 2007). The explanatory statement for H.R. 2764/P.L. 110-161, which is intended to be the equivalent of a conference report for the bill, stated the following in its discussion of Division E (the FY2008 DHS appropriations act):

> National Interests in the Polar Regions
>
> The Committees on Appropriations are concerned about Coast Guard's ability to meet its polar operations mission requirements and provide the United States with the capability to

support national interests in the polar regions. These mission requirements include, but are not limited to: global reach to the North and South poles; monitoring of U.S.-bound vessel traffic transiting international waterways in the far north; support of the International Ice Patrol; and support of other governmental and scientific organizations in pursuit of marine and atmospheric science activities in the polar regions. The Committees on Appropriations are specifically concerned whether Coast Guard's aging polar icebreaking fleet can meet current mission performance goals and whether this fleet and the service's small cadre of specialized polar operations personnel are capable of meeting projected mission performance goals in light of changing environmental conditions and increased activity in the polar regions. The National Academy of Sciences made several recommendations in this regard in September 2006, but the Administration has taken no action to implement those recommendations.

Therefore, the Commandant is directed to submit a comprehensive polar operations report that fully assesses the Coast Guard's ability to meet current and projected polar mission requirements and includes an evaluation of how Coast Guard's current capabilities and resources must be adapted or enhanced to account for changing environmental conditions and increased activity in the polar regions. This report is to include an analysis of the need for any permanent, forward operating presence in the polar regions in order to meet mission requirements and an assessment of the Coast Guard's ability to meet the requirements of partner agencies operating in the polar regions, such as the National Science Foundation (NSF) and the Departments of Commerce and Defense, under current and projected environmental conditions. Finally, this report should include an appraisal of the sustainability of the current operations and maintenance cost sharing arrangement between the Coast Guard and NSF to support both current and projected polar icebreaker operations.

Appendix B. Bill and Report Language Relating to Study of High-Latitude Operations

This appendix presents examples of bill and report language in recent years relating to the study of Coast Guard missions and capabilities for operations in high-latitude areas. These examples, which are taken from **Appendix A**, include the following:

- The explanatory statement for the **FY2008 Consolidated Appropriations Act** (H.R. 2764/P.L. 110-161 of December 26, 2007), which included FY2008 funding for DHS, stated: "Therefore, the Commandant is directed to submit a comprehensive polar operations report that fully assesses the Coast Guard's ability to meet current and projected polar mission requirements and includes an evaluation of how Coast Guard's current capabilities and resources must be adapted or enhanced to account for changing environmental conditions and increased activity in the polar regions. This report is to include an analysis of the need for any permanent, forward operating presence in the polar regions in order to meet mission requirements and an assessment of the Coast Guard's ability to meet the requirements of partner agencies operating in the polar regions, such as the National Science Foundation (NSF) and the Departments of Commerce and Defense, under current and projected environmental conditions. Finally, this report should include an appraisal of the sustainability of the current operations and maintenance cost sharing arrangement between the Coast Guard and NSF to support both current and projected polar icebreaker operations."
- Section 422 of the **FY2008 Coast Guard Authorization Act** (H.R. 2830) as passed by the House stated: "Within 270 days after the date of enactment of this Act, the Secretary of the department in which the Coast Guard is operating shall submit a report to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Transportation and Infrastructure of the House of Representatives assessing the need for additional Coast Guard prevention and response capability in the high latitude regions. The assessment shall address needs for all Coast Guard mission areas, including search and rescue, marine pollution response and prevention, fisheries enforcement, and maritime commerce. The Secretary shall include in the report ... an assessment of the need for high latitude icebreaking capability and the capability of the current high latitude icebreaking assets of the Coast Guard...."
- The House Appropriations Committee, in its report (H.Rept. 110-862 of September 18, 2008, page 82) on the **FY2009 DHS Appropriations Act** (H.R. 2638/P.L. 110-329 of September 30, 2008), stated: "The Committee provides $200,000, as requested, to conduct an analysis of national mission needs in the high latitude regions to inform the national polar policy debate."
- The Senate Appropriations Committee, in its report (S.Rept. 110-396 of June 23, 2008, page 81) on the **FY2009 DHS Appropriations Act** (S. 3181), stated: "According to correspondence from the Commandant on May 23, 2008, the Coast Guard will submit a report on polar mission requirements no later than August 31, 2008. The Committee expects this report to address the concerns detailed in the explanatory statement accompanying the Department of Homeland Security Appropriations Act, 2008."

- The House Appropriations Committee, in its report (H.Rept. 111-157 of June 16, 2009, pages 78-79) on the **FY2010 DHS Appropriations Act** (H.R. 2892/P.L. 111-83 of October 28, 2009), stated: "The Committee further directs the Coast Guard to use existing appropriations to continue its analysis of national mission needs in the high latitude regions to inform national polar policy."
- The Senate Appropriations Committee, in its report (S.Rept. 111-31 of June 18, 2009, page 78) on the **FY2010 DHS Appropriations Act** (S. 1298), stated: "Within this amount, the Coast Guard shall begin survey and design and conduct a business case analysis for either a new heavy polar icebreaker class or a major service life extension project for existing heavy icebreakers."
- The conference report (H.Rept. 111-298 of October 13, 2009, page 85) on the **FY2010 DHS Appropriations Act** (H.R. 2892/P.L. 111-83 of October 28, 20097), stated: "Furthermore, the conferees direct the Coast Guard to follow the direction regarding the high latitude study as outlined in the House report."
- Sections 311(h) and 1316 of the **Coast Guard Authorization Act of 2010** (H.R. 3619) as reported by the House Committee on transportation and Infrastructure (H.Rept. 111-303, part 1, of October 16, 2009) (see **Appendix A** for the full texts of these sections).
- Section 603 of the **Coast Guard Authorization Act of 2010** (H.R. 3619) as passed by the Senate (see **Appendix A** for the full text of this section).
- Sections 307(f) and 307(g) of the final version of the **Coast Guard Authorization Act of 2010** (H.R. 3619/P.L. 111-281 of October 15, 2010) (see **Appendix A** for the full texts of these sections).
- The Senate Appropriations Committee, in its report (S.Rept. 111-222 of July 19, 2010, page 80) on the **FY2011 DHS Appropriations Act** (S. 3607), stated: "The Committee also notes that the Coast Guard's analysis of national mission needs in the high latitude regions has yet to be completed. This effort was funded in fiscal year 2009 to inform the national polar policy debate. The results of this study are to be submitted expeditiously and include projected assets and resources necessary to address identified requirements."

The High Latitude Study has a cover date of July 2010. The study was provided to Congress in July 2011. The Coast Guard states that the study was provided to Congress in response to the Coast Guard Authorization Act of 2010 (H.R. 3619/P.L. 111-281), which was enacted into law on October 15, 2010.[54]

[54] Source: Email from Coast Guard Congressional Affairs office to CRS, August 1, 2011.

Appendix C. May 2008 Memorandum from DOD Combatant Commanders

This appendix reprints the text of a May 21, 2008, memorandum for the Chairman of the Joint Chiefs of Staff on the topic of icebreaker support signed by three DOD combatant commanders, each a 4-star general or flag officer.[55]

MEMORANDUM FOR CHAIRMAN, JOINT CHIEFS OF STAFF

FROM: CDR USPACOM / CDR USTRANSCOM / CDR USNORTHCOM

SUBJECT: Icebreaker Support

1. The United States has enduring national, strategic, and economic interests in the Arctic and Antarctic. In the north, the United States is an Arctic nation with broad and fundamental national security interests. In addition to the essential requirements for homeland security and maritime domain awareness, the effects of climate change and increasing economic activity require a more active presence in this maritime domain. In the south, the United States maintains three scientific stations. While the mission of the stations is largely scientific, their presence secures the United States' influential role in the Antarctic Treaty decision making process and maintains the balance necessary to maintain our position on Antarctic sovereignty.

2. To assert our interests in these regions, the United States needs assured access with reliable icebreaking ships. Today, however, two of the three Coast Guard icebreakers are nearing the end of their service lives, with one relegated to caretaker status. Over the past 10 years some routine maintenance has been deferred and there is no service life extension program for these ships. As a result, the nation's icebreaking capability has diminished substantially and is at risk of being unable to support our national interests in the Arctic regions. An example of our reduced icebreaking capability is last season's McMurdo Station resupply mission where USNS GIANELLA spent 50 hours in pack-ice awaiting escort from a leased Swedish icebreaker.

3. In summary, icebreakers are essential instruments of United States policy in the polar regions. We therefore recommend Joint Chiefs of Staff support for the following:

—A program for the construction of new polar icebreakers to be operated by the Coast Guard.

—Coast Guard funding to keep existing icebreakers viable until the new ships enter service.

—Sufficient Coast Guard operations funding to provide increased, regular and reliable icebreaker presence in the polar regions.

[55] Memorandum for Chairman, Joint Chiefs of Staff, from CDR USPACOM / CDR USTRANSCOM / CDR USNOTHCOM, Subject: Icebreaker Support. The Navy Office of Legislative Affairs provided CRS with a copy of the memorandum on September 11, 2008.

[signed]

Victor E. Renuart General, USAF Commander U.S. Northern Command	Norton A. Schwartz General, USAF Commander U. S. Transportation Command	Timothy J. Keating Admiral, USN Commander U.S. Pacific Command

cc :
Commandant, U.S. Coast Guard

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