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U.S. Research Vessels and Scientific Leadership in Antarctica

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U.S. Research Vessels and Scientific Leadership in Antarctica

SUMMARY

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July 15, 2026

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In October 2025, the National Science Foundation (NSF) terminated the lease of the Research Vessel Icebreaker *Nathaniel B. Palmer* after 33 years of service to the U.S. Antarctic Program (USAP). NSF cited budgetary constraints as its reason for terminating the lease. At the time of its termination, the *Palmer* was the sole U.S. research vessel with icebreaking capability dedicated to Antarctica. NSF had previously ended its support for Antarctic Research and Support Vessel *Laurence M. Gould* after 27 years of service to the USAP in June 2024. Research vessels, particularly those operating in subpolar and polar waters, are designed to withstand different sea ice conditions. The *Palmer* was designed to break through ice up to three feet thick at three knots, making it suitable for operating in Antarctic sea ice conditions. As of the date of this publication, the United States does not have a dedicated Antarctic research vessel (ARV).

In the absence of a U.S. research vessel dedicated to Antarctica, Congress may consider several short-term options that would allow U.S. scientists to continue to have an ocean-based research presence in Antarctica. For example, during the 2025-2026 Antarctic field season, NSF reassigned some U.S. researchers impacted by the termination of the *Palmer*'s lease to the *Sikuliaq* and the *Roger Revelle*, two research vessels in the U.S. Academic Research Fleet. Neither vessel has the *Palmer*'s icebreaking capability, thereby excluding researchers from heavily iced sections close to the Antarctic coastline. One U.S. Coast Guard (USCG) polar icebreaker, Coast Guard Cutter *Healy*, has science research capabilities and supports research and other missions in the Arctic region. The *Healy* could be reassigned to support U.S. Antarctic research. Some U.S. scientists also have conducted research aboard foreign ARVs. Not having a dedicated U.S. research vessel to support the USAP may reduce NSF costs; some stakeholders contend that countries that have ARVs with icebreaking capabilities are global leaders in Antarctic research and exploration. Some stakeholders have proposed that NSF renew its lease for the *Palmer* and/or the *Gould*, although both vessels have surpassed their 30-year service (design) life. Other proposed short-term options include purchasing and retrofitting a used icebreaker for the USAP.

Congress also may consider long-term options for securing an ARV. In February 2024, NSF released a solicitation for the design and construction of a new ARV. The estimated cost of a new ARV could be up to $2.2 billion, according to NSF. The agency's FY2027 budget request included $900 million for a new ARV, with an expected delivery in 2032. Some scientists have identified desired features that NSF's design plans for the new ARV would not include, such as helicopter support for hard-to-access Antarctic field sites. In addition, the United States plans to build and acquire new USCG heavy and medium icebreakers. Some stakeholders suggest that a new USCG icebreaker be constructed to accommodate Antarctic research. The anticipated dates of delivery for new USCG icebreakers are similar to the expected dates of delivery for the new NSF ARV and would not address the short-term research vessel gap.

Congress may weigh the advantages and disadvantages of a U.S. research vessel dedicated to Antarctica. Some scientists and other stakeholders posit that maintaining research stations on Antarctica and deploying research vessels in its surrounding waters not only allow countries to be at the forefront of Antarctic research and exploration but also give a country a presence for geopolitical purposes under the Antarctic Treaty. Under the treaty, 58 parties, including the United States, have agreed to promote international cooperation in scientific investigation in Antarctica. Under the treaty, parties "conducting substantial scientific research activity" can participate in decisionmaking related to Antarctica. An ARV can support one country's inspection of another country's Antarctic research station to ensure its activities align with the treaty (e.g., no military activities). With respect to scientific research, U.S. scientists aboard the *Palmer* have collected data over many decades from remote, heavily iced coastal areas in Antarctica critical to U.S. interests. Other stakeholders contend that given budget constraints, NSF needs to weigh the potential benefits of competing USAP infrastructure projects (e.g., upgrades to the three permanent, year-round NSF research stations) and other research priorities against the potential benefits of a U.S. research vessel dedicated to Antarctic research.

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Antarctica is the coldest, windiest, and driest continent on Earth,[1] and some scientists assert that these extreme environmental conditions provide unique research opportunities across many fields, including oceanography, glaciology, atmospheric chemistry, and astrophysics.[2] The continent of Antarctica has an area of about 5.4 million square miles (14 million square kilometers),[3] nearly 1.5 times larger than the continental United States.[4] Antarctica is surrounded by the Southern Ocean. The surface of the ocean around the continent freezes over in the austral (Southern Hemisphere) winter and melts back in the austral summer. The extent of Antarctic sea ice is generally at its minimum in late February or early March.[5] Because of these environmental conditions and dynamics, research expeditions typically take place from December through February (also referred to as the *field season*).[6]

U.S.-supported research on Antarctica is coordinated through the U.S. Antarctic Program (USAP), which is funded and managed by the National Science Foundation (NSF). NSF states that U.S. researchers travel to the Antarctic to "advance understanding of Antarctica and its ecosystems," "study the continent's influence on global systems such as climate," and "utilize Antarctica's unique conditions for exclusive research opportunities."[7] Approximately 3,500 Americans participate in USAP research and support activities annually.[8] According to the Department of State, the United States "has more personnel based in Antarctica than [does] any other country."[9] Since the 1950s, the United States has had a larger continuous presence on Antarctica than has any other country.

Through the USAP, NSF manages the infrastructure, operations, and logistical support required for U.S. research in Antarctica. NSF operates numerous seasonal field camps, as well as three permanent, year-round stations (**Figure 1**):

1. NSF McMurdo Station, the largest year-round station on Antarctica and logistical hub for the USAP, supporting research and the NSF Amundsen-Scott South Pole Station;

[1] U.S. Antarctic Program (USAP), "About the Continent," https://www.usap.gov/aboutthecontinent/ (hereinafter USAP, "About the Continent").

[2] National Academies of Sciences, Engineering, and Medicine (NASEM), *A Strategic Vision for NSF Investments in Antarctic and Southern Ocean Research* (National Academies Press, 2015), p. 1 (hereinafter NASEM, *A Strategic Vision for NSF Investments in Antarctic and Southern Ocean Research*, 2015).

[3] USAP, "About the Continent."

[4] The continental United States is approximately 3.1 million square miles. National Aeronautics and Space Administration, "Compare the Size of Antarctica to the Continental United States," August 22, 2008, https://svs.gsfc.nasa.gov/3540/.

[5] National Oceanic and Atmospheric Administration (NOAA), "Understanding Climate: Antarctic Sea Ice Extent," March 14, 2023, https://www.climate.gov/news-features/understanding-climate/understanding-climate-antarctic-sea-ice-extent. Also see International Maritime Organization (IMO), "Guidelines of Ships Operating in Polar Waters," A 26/Res.1024, adopted December 2, 2009, p. 4, https://wwwcdn.imo.org/localresources/en/MediaCentre/HotTopics/Documents/A%2026-Res.1024%20-%20en.pdf (hereinafter IMO, "Guidelines of Ships Operating in Polar Waters").

[6] National Science Foundation (NSF), "U.S. Antarctic Program," https://www.nsf.gov/geo/opp/us-antarctic-program (hereinafter NSF, "U.S. Antarctic Program"); and University of California (UC) San Diego, Scripps Institution of Oceanography, "Scripps Scientists in Antarctica Studying Retreating Glaciers, Cancer-Fighting Microbes and More," January 20, 2026, https://scripps.ucsd.edu/news/scripps-scientists-antarctica-studying-retreating-glaciers-cancer-fighting-microbes-and-more (hereinafter Scripps Institution of Oceanography, "Scripps Scientists in Antarctica").

[7] NSF, "U.S. Antarctic Program."

[8] NSF, "U.S. Antarctic Program."

[9] Department of State, Office of Ocean and Polar Affairs (OPA), "Antarctic Region," https://2021-2025.state.gov/key-topics-office-of-ocean-and-polar-affairs/antarctic/ (hereinafter Department of State, OPA, "Antarctic Region").

2. NSF Amundsen-Scott South Pole Station, the southernmost year-round research station in the world and logistical hub for accessing East Antarctica; and
3. NSF Palmer Station, the northernmost U.S. year-round research station on the continent and hub for marine and biological research.[10]

Figure 1. U.S. Research Stations on Antarctica

Source: Created by CRS using data from U.S. Department of State, Natural Earth, and Esri. CRS digitized Thwaites Glacier from https://thwaitesglacier.org/data.

Notes: The map depicts locations of the three permanent U.S. research stations—McMurdo Station, Amundsen-Scott South Pole Station, and Palmer Station—supported by the U.S. Antarctic Program. Notable seas and ice shelves, as well as Thwaites Glacier—a glacier actively being studied by some scientists to measure the relationship between its meltwaters and global sea levels—are also depicted on the map.

Many scientists conducting research on Antarctica (e.g., at the NSF McMurdo and Palmer Stations) or in its surrounding waters have required an icebreaker or research vessel with icebreaking capabilities. According to the International Maritime Organization (IMO), an *icebreaker* is any ship "whose powering and dimensions allow it to undertake aggressive operations in ice-covered waters."[11] Missions to Antarctica generally pose the greatest icebreaking challenge for polar vessels because of the thickness of ice to be broken. The Antarctic and the Arctic have different ice sea conditions—Antarctic sea ice tends to be anchored to the continent, while Arctic sea ice is ocean based.[12] Research vessels, particularly those operating in subpolar and polar waters, are designed to withstand different sea ice conditions, which determines where the vessels can safely operate. The U.S. Coast Guard (USCG) supports the USAP through an annual operation—*Operation Deep Freeze*—by opening a channel through

[10] NSF, "Antarctic Infrastructure and Logistics," https://www.nsf.gov/geo/opp/ail.

[11] IMO, "Guidelines of Ships Operating in Polar Waters," p. 7.

[12] Gabriele Rigaudo, "A Nanook Among Penguins – The Antarctic Journey of UAF's R/V Sikuliaq," *Sun Star*, March 23, 2025, https://www.uafsunstar.com/news/a-nanook-among-penguins-the-antarctic-journey-of-uafs-rv-sikuliaq.

Antarctic sea ice, providing a navigable route for vessels to reach NSF McMurdo Station.[13] The USAP had previously operated leased research vessels with icebreaking capabilities dedicated to Antarctica, including for research trips needing to navigate through ice outside of the channel cleared in Operation Deep Freeze. In November 2025, NSF returned the sole remaining U.S. Antarctic research vessel (ARV)—Research Vessel Icebreaker *Nathaniel B. Palmer*—to its owner, stating that the agency "continues to pursue the development of a new Antarctic research vessel as part of a longer-term strategy for marine science and logistics support."[14] According to NSF, the termination of the *Palmer*'s lease was due to budgetary constraints.[15] In the *Palmer*'s absence, two U.S. Academic Research Fleet (ARF) research vessels, the *Sikuliaq* and the *Roger Revelle*, transported U.S. scientists to Antarctica for the 2025-2026 Antarctic field season—the *Sikuliaq* is the only ice-capable research vessel in the ARF, according to the University of Alaska Fairbanks.[16] The 2025-2026 field season marked the first time in nearly 60 years that the USAP had been without at least one research vessel dedicated to Antarctica.[17]

This report discusses previous NSF-operated research vessels dedicated to Antarctica; whether, if at all, the cessation of operations of the dedicated U.S. ARV may affect U.S. scientific efforts and geopolitical position on the continent; and options, such as a shift in the deployment of ARF vessels, Congress may consider if it seeks to fill this perceived research infrastructure gap as well as the potential advantages and disadvantages of these options.

The Role of Research Infrastructure in the Antarctic Treaty

The Antarctic Treaty, which entered into force in 1961, acknowledges that international cooperation in scientific investigation on Antarctica has made substantial contributions to scientific knowledge.[18] The provisions of the Antarctic Treaty apply to the area south of 60°S latitude, which includes the Antarctic continent and areas of the Southern Ocean.[19] The treaty states that "Antarctica shall be used for peaceful purposes only."[20] While military activities on the continent are prohibited, parties made an exception for the "use of military personnel or equipment for scientific research or for any other peaceful purpose."[21] Parties also agreed that no acts or activities taken by a party "shall constitute a basis for asserting, supporting or denying a

[13] USAP, "USAP at Sea," https://www.nsf.gov/geo/opp/ail/usap-ships-boats (hereinafter USAP, "USAP at Sea").

[14] NSF, "Update on Nathaniel B. Palmer," September 10, 2025, https://www.nsf.gov/geo/opp/updates/update-nathaniel-b-palmer (hereinafter NSF, "Update on Nathaniel B. Palmer"). Also see Kasha Patel, "U.S. to Lose Ground in Antarctica After Pulling Out Last Research Ship, Scientists Say," *Washington Post*, December 11, 2025, https://www.washingtonpost.com/climate-environment/2025/12/11/antarctica-research-ship-nathaniel-palmer/ (hereinafter Patel, "U.S. to Lose Ground in Antarctica").

[15] NSF, *FY 2026 Budget Request to Congress*, May 30, 2025, p. Facilities-2, https://nsf-gov-resources.nsf.gov/files/00-NSF-FY26-CJ-Entire-Rollup.pdf.

[16] University of Alaska Fairbanks (UAF), *Research Vessel Sikuliaq*, https://www.uaf.edu/cfos/files/about-us/publications/CFOS-Sikuliaq-Flyer-4-2025.pdf (hereinafter UAF, *Research Vessel Sikuliaq*).

[17] Scripps Institution of Oceanography, "Scripps Scientists in Antarctica."

[18] Antarctic Treaty, December 1, 1959, 402 U.N.T.S. 71 (entered into force June 23, 1961), https://www.ats.aq/e/antarctictreaty.html (hereinafter Antarctic Treaty).

[19] Article VI of the Antarctic Treaty.

[20] Article I of the Antarctic Treaty.

[21] Article I of the Antarctic Treaty. Prohibited military activities noted in Article I are "any measures of a military nature, such as the establishment of military bases and fortifications, the carrying out of military maneuvers, as well as the testing of any type of weapons."

claim to territorial sovereignty in Antarctica or create any rights of sovereignty in Antarctica."[22] The treaty states that "no new claim, or enlargement of an existing claim, to territorial sovereignty in Antarctica shall be asserted while the present Treaty is in force."[23] Prior to the Antarctic Treaty, seven countries had made territorial claims on the continent.[24] As a party to the treaty, the United States does not recognize the territorial claims of the seven countries. According to the Department of State, "while the United States maintains a basis to claim territory in Antarctica, it has not made a claim."[25]

Fifty-eight countries have acceded to the Antarctic Treaty, and 29 countries, including the United States, are "conducting substantial scientific research activity there, such as [through] the establishment of a scientific station or the [dispatch] of a scientific expedition," as defined by Article IX, Section 2, of the Antarctic Treaty.[26] The 29 countries, known as *consultative parties*, are entitled to participate in Antarctic Treaty Consultative Meetings where the international community (i.e., consultative and non-consultative parties, observers, and invited experts) discusses issues pertaining to the continent. Consultative parties also "have the right to designate observers to carry out any inspection" and, with advance notice, "shall have complete freedom of access at any time to any or all areas of Antarctica," including "all stations, installations and equipment within those areas, and all ships and aircraft at points of discharging or embarking cargoes or personnel in Antarctica."[27]

Some observers assert that maintaining research stations on Antarctica and research vessels in its surrounding waters allows countries to be at the forefront of Antarctic research and exploration and to have a presence for geopolitical purposes under the Antarctic Treaty.[28] The United States has historically maintained a larger scientific presence in Antarctica than has any other country.[29] Stakeholders contend that this infrastructure helps support U.S. inspection of foreign Antarctic research stations to ensure compliance with the Antarctic Treaty.[30] Since 1963, the U.S. government has conducted 16 inspections of foreign research stations.[31] In addition, scientific

[22] Article IV, §2, of the Antarctic Treaty.

[23] Article IV, §2, of the Antarctic Treaty.

[24] Argentina, Australia, Chile, France, New Zealand, Norway, and the United Kingdom had made territorial claims over areas they discovered in Antarctica. Some of these claims overlapped. While other countries had explored the Antarctic, they did not make a territorial claim. Library of Congress, "History of the Antarctic Treaty System," https://www.loc.gov/ghe/cascade/index.html?appid=eb78cec7f5e34c40a2ee13732c4bf805&bookmark=Discovery. The United States maintains a basis to claim territory in Antarctica. Secretariat of the Antarctic Treaty, "The Antarctic Treaty," https://www.ats.aq/e/antarctictreaty.html; and Department of State, OPA, "Antarctic Region."

[25] Department of State, OPA, "Antarctic Region."

[26] Article IX, §2, of the Antarctic Treaty. Secretariat of the Antarctic Treaty, "Parties," https://www.ats.aq/devAS/Parties (hereinafter Secretariat of the Antarctic Treaty, "Parties").

[27] Article VII of the Antarctic Treaty.

[28] See Article IX, §2, of the Antarctic Treaty. Alexandra Witze, "Does US Science Have a Future in Antarctica? Trump Cuts Threaten to Cancel Fieldwork and More," *Nature*, vol. 640 (2025) (hereinafter Witze, "Does US Science Have a Future in Antarctica?").

[29] Department of State, OPA, "Antarctic Region"; and Douglas Fox, "U.S. Cuts Antarctica's Only Research Icebreaker Ship Under Trump Budget Squeeze," *Scientific American*, August 19, 2025, https://www.scientificamerican.com/article/u-s-cuts-antarcticas-only-research-icebreaker-ship-under-trump-budget/ (hereinafter Fox, "U.S. Cuts Antarctica's Only Research Icebreaker Ship Under Trump Budget Squeeze").

[30] DeLaine Mayer, "Retreat at the Bottom of the World: US Polar Policy's Arctic Surge and Antarctic Drawdown," Modern War Institute, March 16, 2026, https://mwi.westpoint.edu/retreat-at-the-bottom-of-the-world-us-polar-policys-arctic-surge-and-antarctic-drawdown/.

[31] The most recent inspection conducted by the United States took place January 16-20, 2026, and involved a "team of U.S. government officials from the Department of State, [NSF], and Department of War." (The Department of Defense (continued...)

data collected by U.S. ARVs can be used to facilitate Antarctic negotiations.[32] For example, the United States and other countries have used data collected from research vessels to document changes in marine ecosystems (e.g., quantifying declines in fisheries), and this documentation in turn has supported the establishment of marine protection areas near the continent.[33]

Selected Previous U.S. Antarctica Research Vessels Leased by the National Science Foundation

Between 1968 and 2025, the USAP had at least one dedicated research vessel operating in the Southern Ocean.[34] Between 1997 and 2024, two research vessels *leased* by NSF supported USAP research.[35] In June 2024, NSF ended its support for Antarctic Research and Support Vessel *Laurence M. Gould* after 27 years of service to the USAP. In October 2025, NSF terminated the lease for the *Palmer* after 33 years of service to the USAP, 3 years ahead of the planned March 2029 lease expiration.[36] NSF cited budgetary constraints as part of its decision to terminate its leases for the *Gould* and *Palmer*.[37] According to NSF, certain information about these vessels, including their annual lease costs and agreed-to day rates, is proprietary.[38] It remains unclear how much money NSF will save by ending the *Palmer*'s lease. As of the date of this publication, the United States has no research vessel with icebreaking capabilities dedicated to Antarctica.

The United States, through the USAP, has three permanent, year-round Antarctic research stations, but not all U.S. Antarctic field sites nor all foreign research stations can be reached via over-snow vehicles, aircraft, or helicopters (e.g., for the purpose of facility inspection under the Antarctic Treaty; see "The Role of Research Infrastructure in the Antarctic Treaty," above) from those three research stations. Many scientists have required a research vessel with icebreaking capabilities to achieve certain research objectives on the continent and in its surrounding ice-covered waters. For example, Thwaites Glacier in West Antarctica is more than 1,000 miles from the nearest research station (**Figure 1**) and is typically accessed via a research vessel with

is "using a secondary Department of War designation" in accordance with Executive Order 14347 of September 5, 2025.) During this five-day inspection, the United States inspected certain research stations of Australia, China, India, and Russia. U.S. Department of State, "United States Conducts Inspections in Antarctica," January 22, 2026, https://www.state.gov/releases/office-of-the-spokesperson/2026/01/united-states-conducts-inspections-in-antarctica.

[32] Witze, "Does US Science Have a Future in Antarctica?"; and open letter from Amy Leventer et al. to NSF regarding scientists' "support of the US Antarctic Program Research Vessel Capabilities," https://docs.google.com/document/d/1Rk77rTtcZ_LSoqkTXh571_HxpMhfYDzoO6ZkE6ThU3k/edit?tab=t.0 (hereinafter open letter to NSF regarding scientists' "support of the US Antarctic Program Research Vessel Capabilities").

[33] Fox, "U.S. Cuts Antarctica's Only Research Icebreaker Ship Under Trump Budget Squeeze."

[34] Open letter to NSF regarding scientists' "support of the US Antarctic Program Research Vessel Capabilities."

[35] Agency documentation and reports about the *Gould* and the *Palmer* use the terms "lease" and "charter" in reference to NSF's agreement with the owners to use the vessels. This report uses only the term "lease" for consistency. NSF leased the *Gould* and the *Palmer* from Edison Chouest Offshore (ECO). For information about ECO, see https://www.chouest.com/.

[36] NASEM, *Future Directions for Southern Ocean and Antarctic Nearshore and Coastal Research* (National Academies Press, 2024), p. 18 (hereinafter NASEM, *Future Directions for Southern Ocean and Antarctic Nearshore and Coastal Research*, 2024).

[37] NSF, "Non-Renewal of ARSV Laurence M. Gould Charter: Transition Plans for Antarctic Research Support," April 29, 2024, https://www.nsf.gov/geo/opp/updates/non-renewal-arsv-laurence-m-gould-charter-transition-plans (hereinafter NSF, "Non-Renewal of ARSV Laurence M. Gould Charter"); and NSF, *FY 2026 Budget Request to Congress*, May 30, 2025, p. Facilities-2.

[38] Personal communication between CRS and NSF, Office of Legislative and Public Affairs (OLPA), June 1, 2026.

icebreaking capabilities carrying a helicopter.[39] (For more information about Thwaites Glacier, see the text box "Thwaites Glacier.")

Thwaites Glacier

The National Academies of Sciences, Engineering, and Medicine (NASEM) developed a strategic vision for National Science Foundation (NSF)-supported Antarctic and Southern Ocean research in 2015. One of the strategic research priorities for the next decade (2015-2025) identified in the report included working to answer this question: How fast and by how much will sea level rise as a result of changing Antarctic ice sheets? Regarding the potential for ice loss and ice sheet collapse, NASEM further identified Thwaites Glacier in West Antarctica as a "region of particular concern." Some scientists claim that Thwaites Glacier is "one of the world's most dangerous glaciers for sea level rise."

Thwaites Glacier is estimated to be equivalent in size to the U.S. state of Washington and in some places rises over 6,500 feet above the West Antarctic bedrock. Experts project that global sea levels will rise by at least 2 feet if the entire glacier melts. Thwaites Glacier also holds back two other land-based ice shelves in the larger West Antarctic Ice Sheet from flowing into the ocean. According to scientists, the complete melting of these ice shelves together with Thwaites Glacier could cause global sea levels to rise by 10 feet. Sea level rise would have uneven impacts globally, with a greater impact on coastlines with shallower slopes, such as those along the Gulf of America and the eastern United States.

While some research questions, such as how fast the Thwaites Glacier is melting, may be answered using satellite data and imagery, answering other research questions about Thwaites Glacier requires scientists to conduct field work on the glacier. Scientists typically access Thwaites Glacier via a research vessel equipped with a helicopter pad from which they take a specialized helicopter to the glacier to conduct their field work. According to some scientists "ship-based helicopter support is particularly important for Antarctic glacial research." For example, in January 2026, scientists on board the South Korean Icebreaking Research Vessel *Araon* took an 18-mile helicopter ride to establish a camp on Thwaites Glacier to drill an approximately 3,000-foot hole to where ice, sea, and land meet (i.e., the *grounding line*). Changes to the grounding line—for example, through exposure to warmer ocean currents—can result in rapid changes in glacier and ice-shelf dynamics. According to some stakeholders, U.S. Antarctic research vessel expeditions to "remote parts of the Antarctic coast have gathered voluminous data that are critical to U.S. interests." For example, the Research Vessel Icebreaker *Nathaniel B. Palmer* had supported U.S. Antarctic Program research expeditions to the Thwaites Glacier in 2019, 2020, and 2022.

Sources: National Academies of Sciences, Engineering, and Medicine, *A Strategic Vision for NSF Investments in Antarctic and Southern Ocean Research* (National Academies Press, 2015), p. 51; Daniel N. Goldberg et al., "Recent Observations of Thwaites Glacier, West Antarctica Are Consistent with High Rates of Loss in Next 50 Years," *Geophysical Research Letters*, vol. 53, no. 5 (2026), article e2025GL118823; National Snow and Ice Data Center, "International Thwaites Glacier Collaboration," https://nsidc.org/our-research/featured-projects/international-thwaites-glacier-collaboration; Woods Hole Oceanographic Institution, "Antarctica's Ice Shelf Loss," https://www.whoi.edu/ocean-learning-hub/multimedia/antarcticas-ice-shelf-loss/; British Antarctic Survey, "Grim Outlook for Antarctic's Thwaites Glacier," September 20, 2024, https://www.bas.ac.uk/news/grim-outlook-for-antarcticas-thwaites-glacier/; University of Colorado Boulder, Cooperative Institute for Research in Environmental Sciences, "The Threat from Thwaites: The Retreat of Antarctica's Riskiest Glacier," December 13, 2021, https://cires.colorado.edu/news/threat-thwaites-retreat-antarcticas-riskiest-glacier; Douglas Fox, "U.S. Cuts Antarctica's Only Research Icebreaker Ship Under Trump Budget Squeeze," August 19, 2025, https://www.scientificamerican.com/article/u-s-cuts-antarcticas-only-research-icebreaker-ship-under-trump-budget/; Marissa Grunes, "Complaints Grow Over $1 Billion U.S. Antarctic Icebreaker Design," *Science*, April 20, 2023, https://www.science.org/content/article/complaints-grow-over-1-billion-u-s-antarctic-icebreaker-design; Miles O'Brien, "On Board the Voyage to Antarctica to Learn Why a Massive Glacier Is Melting," *PBS News*, January 19, 2026, https://www.pbs.org/newshour/show/on-board-the-voyage-to-antarctica-to-learn-why-a-massive-glacier-is-melting; University of California San Diego, Scripps Institution of Oceanography, "Scripps Scientists in Antarctica Studying Retreating Glaciers, Cancer-Fighting Microbes and More," January 20, 2026, https://scripps.ucsd.edu/news/scripps-scientists-antarctica-studying-retreating-glaciers-cancer-fighting-microbes-and-more; and U.S. Antarctic Program, *R/V Nathaniel B. Palmer Cruise History*, October 23, 2025, https://www.usap.gov/usapgov/vesselScienceAndOperations/documents/nbp_history.pdf.

[39] For example, Marissa Grunes, "Complaints Grow Over $1 Billion U.S. Antarctic Icebreaker Design," *Science*, April 20, 2023, https://www.science.org/content/article/complaints-grow-over-1-billion-u-s-antarctic-icebreaker-design (hereinafter Grunes, "Complaints Grow Over $1 Billion U.S. Antarctic Icebreaker Design").

Antarctic Research and Support Vessel *Laurence M. Gould*

In 1997, the *Gould*, built in Galliano, Louisiana, was delivered for use by the USAP (**Figure 2**).[40] It replaced the research vessel *Polar Duke*, which had entered service in 1984.[41] The *Gould* is a 250-foot ice-strengthened vessel (not an icebreaker) capable of breaking through ice 1-foot thick with continuous forward motion. The vessel can accommodate 37 scientists and staff for research missions up to 75 days long.[42] Its inaugural research cruise took place in January 1998, and from 1998 to 2024, the *Gould* primarily supported Antarctic marine research and resupply of USAP stations, including through the transportation of researchers and staff between the NSF Palmer Station (**Figure 1**) and South American ports.[43] The *Gould* had been homeported in Punta Arenas, Chile. During its tenure with the USAP, the *Gould* spent nearly 6,300 days at sea, with over 1,000 days supporting research based out of the NSF Palmer Station.[44]

In a 2023 announcement about future plans for the *Gould*, NSF stated that it was

> exploring several opportunities to continue supporting science along the Antarctic Peninsula and providing logistics support to Palmer Station. Possible options include extending the current charter, partnering with other research vessel operators including those of the U.S. Academic Research Fleet and foreign Antarctic Programs, and evaluating the capabilities of commercial operators to provide logistics support.[45]

In April 2024, NSF announced that it was not renewing the lease for the *Gould*. The agency stated that this decision balanced "scientific priorities, evolving logistical needs, and budget constraints," further noting that "escalating costs and the availability of alternative commercial opportunities have led to this strategic shift in vessel support."[46] The *Gould*'s lease was set to expire in June 2024.[47] While some experts noted that "a one-vessel program would allow for more cost-effective operations," it "would constitute a major restructuring of the USAP that may have far-ranging implications for the research community."[48]

[40] USAP, "Research Vessel Laurence M. Gould Completes 27-Year Run," August 5, 2024, https://www.usap.gov/news/4758/ (hereinafter USAP, "Research Vessel Laurence M. Gould Completes 27-Year Run").

[41] Peter Rybski and Marissa Grunes, "Replacing the Polar Research Vessel Nathaniel B. Palmer," *Sixty Degrees North* (Substack), January 30, 2026, https://sixtydegreesnorth.substack.com/p/replacing-the-polar-research-vessel (hereinafter Rybski and Grunes, "Replacing the Polar Research Vessel Nathaniel B. Palmer").

[42] USAP, *Laurence M. Gould Antarctic Research and Supply Vessel*, https://www.usap.gov/USAPgov/vesselScienceAndOperations/documents/LMG_Guide.pdf.

[43] NSF, "Future Plans for USAP Vessel Support by the ARSV Laurence M. Gould," February 2, 2023, https://www.nsf.gov/geo/opp/updates/future-plans-usap-vessel-support-arsv-laurence-m-gould (hereinafter NSF, "Future Plans for USAP Vessel Support by the ARSV Laurence M. Gould"); and NSF, "Non-Renewal of ARSV Laurence M. Gould Charter."

[44] USAP, "Research Vessel Laurence M. Gould Completes 27-Year Run."

[45] NSF, "Future Plans for USAP Vessel Support by the ARSV Laurence M. Gould."

[46] NSF, "Non-Renewal of ARSV Laurence M. Gould Charter."

[47] NASEM, *Future Directions for Southern Ocean and Antarctic Nearshore and Coastal Research*, 2024, p. 18.

[48] NASEM, *Future Directions for Southern Ocean and Antarctic Nearshore and Coastal Research*, 2024, p. 7.

Figure 2. Antarctic Research and Support Vessel *Laurence M. Gould*

Source: Photo by Mike Lucibella, National Science Foundation (NSF), "Non-Renewal of ARSV Laurence M. Gould Charter: Transition Plans for Antarctic Research Support," April 29, 2024, https://www.nsf.gov/geo/opp/updates/non-renewal-arsv-laurence-m-gould-charter-transition-plans.

Notes: The *Laurence M. Gould*, a former NSF-operated Antarctic research and support vessel, is shown launching a Zodiac boat with scientists and support staff in Antarctic waters.

Research Vessel Icebreaker *Nathaniel B. Palmer*

In 1992, the *Palmer*, built in Galliano, Louisiana, was delivered for use by the USAP (**Figure 3**).[49] It is a 308-foot icebreaking vessel—capable of breaking 3 feet of ice at 3 knots—that can carry 45 scientists and technicians and 22 crew members for research missions up to 65 days long.[50] According to scientists, a research vessel that can remain at sea for prolonged periods of time is valuable for conducting research in the ice-heavy regions of Antarctica.[51] For example, a round trip to Thwaites Glacier can take up to two weeks from the nearest port, and additional time may be required to wait for "rafts of sea ice and icebergs to shift and open a passage."[52]

During its service to USAP, the *Palmer* was homeported in Punta Arenas, Chile,[53] and sailed an average of 240 days per year.[54] The *Palmer* can support the operation of a pair of helicopters as well. The *Palmer* reportedly deployed helicopters three times between 1992 and 2025.[55] Experts attributed the limited use of the helicopters to their "extremely high costs," in addition to harsh weather conditions and alternative uses for the helicopter hangers, such as storing sensitive

[49] USAP, "Nathaniel B. Palmer," https://www.usap.gov/vesselscienceandoperations/1561/.

[50] USAP, "USAP at Sea"; NASEM, *A Strategic Vision for NSF Investments in Antarctic and Southern Ocean Research*, 2015, p. 86; and Fox, "U.S. Cuts Antarctica's Only Research Icebreaker Ship Under Trump Budget Squeeze."

[51] Illuminem, "U.S. to Lose Ground in Antarctica after Pulling Out Last Research Ship, Scientists Say," December 11, 2025, https://illuminem.com/illuminemvoices/us-to-lose-ground-in-antarctica-after-pulling-out-last-research-ship-scientists-say.

[52] Fox, "U.S. Cuts Antarctica's Only Research Icebreaker Ship Under Trump Budget Squeeze."

[53] Jeffrey Mervis, "How NSF Hopes to Keep Antarctic Scientists Afloat Without an Icebreaker," *Science*, vol 390, no. 6772 (2025), https://doi.org/10.1126/science.zy39blv (hereinafter Mervis, "How NSF Hopes to Keep Antarctic Scientists Afloat Without an Icebreaker").

[54] USAP, "USAP at Sea."

[55] Rybski and Grunes, "Replacing the Polar Research Vessel Nathaniel B. Palmer."

scientific equipment.[56] According to a 2024 National Academies of Sciences, Engineering, and Medicine (NASEM) report, NSF estimated that the cost of supporting helicopter operations was $2 million to $3 million per deployment.[57]

Figure 3. Antarctic Research Vessel Icebreaker *Nathaniel B. Palmer*

Source: U.S. Antarctic Program, "USAP at Sea," https://www.nsf.gov/geo/opp/ail/usap-ships-boats.

Notes: The *Nathaniel B. Palmer*, a former National Science Foundation (NSF)-operated research vessel with icebreaking capabilities, is dedicated to U.S. Antarctic research. In October 2025, NSF terminated the *Palmer*'s charter.

In NSF's *FY2026 Budget Request to Congress*, the agency announced its intention to terminate the *Palmer*'s lease in FY2026 "to focus support on the stations and associated logistics."[58] In response to this announcement, 188 scientists signed an open letter to NSF's acting director expressing concern about the loss of the resource and urging reconsideration of the lease termination. The letter asserts the following:

> The early loss of the *N.B. Palmer* is troubling, especially at a time when other nations, including China, Korea, Japan, Britain, and Australia, among others, are increasing their marine capability for Antarctic waters ... Maintaining a continued US ship-based presence also has strong, strategic and national security geopolitical implications.[59]

In September 2025, NSF stated that it "plans to continue supporting the entire portfolio of marine cruise projects planned for the 2025-2026 field season, as well as Palmer Station, including using the U.S. Academic Research Fleet, supported by University-National Oceanographic Laboratory System operators."[60] The agency also stated that it "continues to pursue the development of a new

[56] N.B. Palmer Replacement Committee, *Antarctic Oceanography Planning Workshop: Possible Replacement of the R.V.I.B. Nathaniel B. Palmer*, final report, June 2002, p. 4, https://www.usap.gov/conferencescommitteesandworkshops/usercommittees/documents/AOPWReport.pdf (hereinafter N.B. Palmer Replacement Committee, *Possible Replacement of the R.V.I.B. Nathaniel B. Palmer*).

[57] NASEM, *Future Directions for Southern Ocean and Antarctic Nearshore and Coastal Research*, 2024, p. 96.

[58] NSF, *FY 2026 Budget Request to Congress*, May 30, 2025, p. Facilities-2.

[59] Open letter to NSF regarding scientists' "support of the US Antarctic Program Research Vessel Capabilities."

[60] NSF, "Update on Nathaniel B. Palmer."

Antarctic research vessel as part of a longer-term strategy for marine science and logistics support."[61]

Selected U.S. Academic Research Fleet Antarctic Voyages

The ARF, a subset of the U.S. federal oceanographic fleet, consists of 16 vessels that conduct research on the ocean, seafloor, and sub-seafloor environment, including the Great Lakes.[62] ARF vessels are owned by federal agencies and operated by U.S. academic oceanographic institutions through the University-National Oceanographic Laboratory System (UNOLS).[63] For the 2025-2026 Antarctic field season, NSF reassigned some U.S. researchers affected by the cessation of operations of the *Palmer* to the *Sikuliaq* and *Roger Revelle*, two vessels in the ARF.[64] As of July 9, 2026, ARF ship operators are not planning on ARF ships supporting science in Antarctica during the 2026-2027 field season.[65]

Research Vessel *Sikuliaq*

The *Sikuliaq* (see-KOO-lee-auk) is identified as the only global-class, ice-capable research vessel in the ARF (**Figure 4**).[66] The *Sikuliaq*—capable of breaking 2.5 feet of ice at 2 knots—is owned by NSF and has been operated by the University of Alaska Fairbanks since it was built in 2014.[67] This 261-foot vessel can carry 24 scientists and 22 crew members for missions up to 45 days. According to the University of Alaska Fairbanks, the *Sikuliaq* "allows researchers to collect oceanographic samples directly from the water column and seafloor, host remotely operated vehicles, use a flexible suite of winches to raise and lower scientific equipment, and conduct surveys throughout the water column and sea bottom using a variety of sampling systems."[68]

[61] NSF, "Update on Nathaniel B. Palmer"; and Patel, "U.S. to Lose Ground in Antarctica."

[62] University-National Oceanographic Laboratory System (UNOLS), "The U.S. Academic Research Fleet," https://www.unols.org/us-academic-research-fleet-0.

[63] UNOLS is a consortium of 58 academic oceanographic institutions that collaborate with U.S. federal agencies to ensure access to research vessels, submersibles, and related facilities for ocean science research and education purposes. For more information, see https://www.unols.org/.

[64] Mervis, "How NSF Hopes to Keep Antarctic Scientists Afloat Without an Icebreaker."

[65] Email correspondence between CRS and UNOLS, July 9, 2026.

[66] UAF, *Research Vessel Sikuliaq*.

[67] UAF, *Research Vessel Sikuliaq*. Also see UAF, "Sikuliaq Operating Agreement Extended Through 2028," March 24, 2025, https://www.uaf.edu/news/sikuliaq-operating-agreement-extended-through-2028.php.

[68] UAF, *Research Vessel Sikuliaq*.

Figure 4. Research Vessel *Sikuliaq*

Source: Photo by Ethan Roth, University of Alaska Fairbanks, "Sikuliaq Operating Agreement Extended Through 2028," March 24, 2025, https://www.uaf.edu/news/sikuliaq-operating-agreement-extended-through-2028.php.

Notes: The *Sikuliaq*, a global-class ice-capable research vessel that is part of the U.S. Academic Research Fleet, is shown in the Arctic Ocean in May 2021.

Research Vessel *Roger Revelle*

The *Roger Revelle*, built in 1996, is a 273-foot global-class research vessel in the ARF (**Figure 5**). The *Roger Revelle* is owned by the Department of the Navy's Office of Naval Research and operated by the University of California San Diego's Scripps Institution of Oceanography.[69] This vessel is capable of carrying 35 scientists and 21 crew members for missions up to 60 days.[70] While the "*Roger Revelle* is a capable and highly adaptable platform ideal for conducting scientific research worldwide," according to the National Oceanic and Atmospheric Administration,[71] the ship's design limits its operation to open waters with *light ice conditions*.[72]

[69] NOAA, "Research Vessel *Roger Revelle*," https://oceanexplorer.noaa.gov/technology/research-vessel-roger-revelle/ (hereinafter NOAA, "Research Vessel *Roger Revelle*"); and UC San Diego, Scripps Institution of Oceanography, "R/V Roger Revelle Specifications," https://scripps.ucsd.edu/ships/revelle/rv-roger-revelle-specifications (Scripps Institution of Oceanography, "R/V Roger Revelle Specifications").

[70] Scripps Institution of Oceanography, "R/V Roger Revelle Specifications."

[71] NOAA, "Research Vessel *Roger Revelle*."

[72] *Light ice conditions* may be described as first-year ice or ice concentrations up to 10%. For example, see UC San Diego, Scripps Institution of Oceanography, "Polar Code on Roger Revelle: The What, Why, Where, and How," PowerPoint presentation, 2023, Slides 13-15, https://www.unols.org/sites/default/files/2023-05/202305rvo_ap19.pdf (hereinafter Scripps Institution of Oceanography, "Polar Code on Roger Revelle"); and Woods Hole Oceanographic Institution, *Safety Management Manual: 7.8.8 Icing Conditions / Ice Operations*, effective date October 1, 2021, p. 1, https://www.whoi.edu/wp-content/uploads/2021/12/Icing-Conditions-_Ice-Operations_Final-100121.pdf.

Figure 5. Research Vessel *Roger Revelle*

Source: Image courtesy of the University of California San Diego's Scripps Institution of Oceanography; National Oceanic and Atmospheric Administration, "Research Vessel *Roger Revelle*," https://oceanexplorer.noaa.gov/technology/research-vessel-roger-revelle/.

Notes: The *Roger Revelle*, a global-class research vessel that is part of the U.S. Academic Research Fleet, is shown in Antarctica during a 2007 mission.

Considerations for Congress

The decisions regarding the Antarctic research vessels and the use of the ARF have spurred debate among stakeholders. Some stakeholders contend that "decisions made today [about U.S. ARVs] will have implications for U.S. activities in Antarctica well beyond 2050."[73] Others have argued that the recent termination of the *Palmer*'s lease may "hamstring U.S. influence in the Antarctic at a time when geopolitical competition and resource exploitation are intensifying in the region."[74] Some scientists contend that a research vessel with icebreaking capabilities is essential for U.S. scientific and geopolitical leadership in Antarctica.[75]

In contrast, some other scientists contend that given budget constraints, NSF needs to weigh competing USAP infrastructure projects, including operations and modernization, and research support to identify the most efficient use of limited resources. To illustrate this point, one scientist said that "most other nations that are operating ships don't operate telescopes at the South Pole or have the largest station on the continent with runways."[76] NSF is currently working to address

[73] William "Bill" Muntean III, "U.S. Operational Retreat from Antarctica," *Center for Strategic & International Studies*, May 8, 2024, https://www.csis.org/analysis/us-operational-retreat-antarctica. Also see Grunes, "Complaints Grow Over $1 Billion U.S. Antarctic Icebreaker Design."

[74] Fox, "U.S. Cuts Antarctica's Only Research Icebreaker Ship Under Trump Budget Squeeze." Also see, for example, open letter to NSF regarding scientists' "support of the US Antarctic Program Research Vessel Capabilities."

[75] Fox, "U.S. Cuts Antarctica's Only Research Icebreaker Ship Under Trump Budget Squeeze"; and Witze, "Does US Science Have a Future in Antarctica?"

[76] Grunes, "Complaints Grow Over $1 Billion U.S. Antarctic Icebreaker Design."

several ongoing Antarctic infrastructure projects—including upgrades to all three USAP research stations, utilities, equipment, and the vehicle fleet—under the Antarctic Infrastructure Recapitalization (AIR) program. The AIR program is a portfolio of investments with a combined total project cost of over $100 million.[77] According to oversight reports, many of those modernization efforts are behind schedule and have reduced NSF's ability to support new scientific research at certain stations.[78]

Congress might choose to increase access to Antarctica through multiple mechanisms, via either short-term or long-term options, independently or in collaboration with other countries.

Short-Term Replacement Options

During FY2026, the first appropriations cycle following NSF's termination of the *Palmer*'s lease, Congress provided direction to NSF regarding Antarctic infrastructure planning and investments through House and Senate reports incorporated by reference in the explanatory statement accompanying the FY2026 appropriations act (P.L. 119-74).[79] The House report (H.Rept. 119-272) directed the agency to "charter, lease, or otherwise procure the services of a U.S.-built vessel in support of U.S. research activities in the Antarctic."[80] The House report also prohibited "NSF from procuring, chartering, or leasing a foreign-flagged vessel for U.S. research activities in Antarctica if a suitable U.S.-built vessel is available for such purpose."[81] The Senate report (S.Rept. 119-44) directed NSF to "submit a comprehensive plan within 180 days, detailing timelines, milestones, and funding needs for Antarctic upgrades, research vessel deployment, and South Pole physics experiments" to the Senate Committee on Appropriations.[82]

Stakeholders have proposed several short-term options that U.S. Antarctic researchers might use for conducting ocean-based research or accessing remote coastal field areas in the absence of a U.S. research vessel available for Antarctic use. Selected short-term options, some of which have been initiated or communicated as options to U.S. scientists by NSF, include

[77] U.S. Government Accountability Office (GAO), *National Science Foundation: Schedule Delays Continue for Some Major and Midscale Research Infrastructure Projects*, GAO-26-107842, February 2026, https://www.gao.gov/assets/gao-26-107842.pdf (hereinafter GAO, *National Science Foundation: Schedule Delays Continue for Infrastructure Projects*); NSF Office of Inspector General, *Management Challenges for the U.S. National Science Foundation in Fiscal Year 2026*, December 5, 2025, p. 8, https://oig.nsf.gov/home/group/reports-publications/page/all-reports?selectedReport=616&viewReport=true. Also see NSF, *FY 2027 Budget Request to Congress*, April 3, 2026, p. NSF-Wide Investments-34, https://nsf-gov-resources.nsf.gov/files/FY-2027-NSF-Budget-Request-to-Congress.pdf.

[78] GAO, *National Science Foundation: Schedule Delays Continue for Infrastructure Projects*. Also see U.S. Congress, House Committee on Appropriations, *Commerce, Justice, Science, and Related Agencies Appropriations Bill, 2026*, report to accompany H.R. 5342, 119th Cong., 1st sess., H.Rept. 119-272, September 12, 2025, p. 107 (hereinafter H.Rept. 119-272, accompanying H.R. 5342).

[79] H.Rept. 119-272, accompanying H.R. 5342, p. 107. The explanatory statement accompanying the Commerce, Justice, Science; Energy and Water Development; and Interior and Environment Appropriations Act, 2026 (P.L. 119-74) references the language set forth in the House report (H.Rept. 119-272) accompanying H.R. 5342 and the Senate report (S.Rept. 119-44) accompanying S. 2354. Rep. Tom Cole, "Explanatory Statement," accompanying the Commerce, Justice, Science; Energy and Water Development; and Interior and Environment Appropriations Act, 2026 (P.L. 119-74), *Congressional Record*, vol. 172, no. 5 (January 8, 2026).

[80] H.Rept. 119-272, accompanying H.R. 5342, p. 107. NSF acquisition of an Antarctic research vessel could be subject to federal domestic content restriction laws, such as the Buy American Act (41 U.S.C. §§8301-8305). For more information about the Buy American Act, see CRS Report R46748, *The Buy American Act and Other Federal Procurement Domestic Content Restrictions*, by David H. Carpenter and Brandon J. Murrill.

[81] H.Rept. 119-272, accompanying H.R. 5342, p. 119.

[82] U.S. Congress, Senate Committee on Appropriations, *Departments of Commerce and Justice, Science, and Related Agencies Appropriations Bill, 2026*, report to accompany S. 2354, 119th Cong., 1st sess., July 17, 2025, S.Rept. 119-44, p. 167.

- using U.S. ARF vessels,
- reassigning an existing USCG polar icebreaker's mission to Antarctica,
- renewing the NSF lease for the *Palmer* or *Gould*,
- sending U.S. scientists aboard a foreign ARV, or
- purchasing an existing used research vessel with icebreaking capabilities.

Scientists have acknowledged that other options exist for studying remote Antarctic coastal areas beyond those listed above. For example, drones and satellites have increased observational capabilities in remote Antarctic areas. Some scientists also argue that "there's no replacement for a dedicated research vessel that can access remote sea ice-covered regions of Antarctica and that allows sampling of the full depth of the ocean and coastal regions on land."[83] Such remote sensing options are beyond the scope of the report.

U.S. Academic Research Fleet

U.S. researchers voyaged aboard the *Sikuliaq* and *Roger Revelle* during the 2025-2026 Antarctic field season. UNOLS does not anticipate federal agencies requesting ARF ships to support Antarctic programs during the 2026-2027 field season.[84] Some stakeholders identified potential drawbacks of continuing to use these vessels for the USAP. For example, the *Sikuliaq* and *Roger Revelle* are in demand for Arctic-based research expeditions, sometimes scheduled for up to a dozen expeditions per year.[85] Other stakeholders, however, have identified that other countries (e.g., Germany) have operated the same research vessel for both Arctic and Antarctic research missions.[86] They highlight that the *Sikuliaq* typically conducts Arctic research expeditions during the Northern Hemisphere's summer, meaning it could operate in the Antarctic during the austral summer. Congress may weigh U.S. priorities in Arctic and Antarctic research and determine whether, if at all, to direct federal agencies to use ARF vessels preferentially for certain research priorities.

A potential issue for Congress is how U.S. polar research might contribute to national security and other U.S. geopolitical objectives. In its deliberation of U.S. Arctic and Antarctic priorities, Congress may consider other countries' interests and activities in the polar regions, including China's and Russia's implementation of national polar policies and strategies and their investment in polar infrastructure.[87] For example, China and Russia each have at least two polar research vessels that are comparable to or exceed the icebreaking capability of the *Palmer*.[88] One observer

[83] Open letter to NSF regarding scientists' "support of the US Antarctic Program Research Vessel Capabilities."

[84] Email correspondence between CRS and UNOLS, July 7, 2026.

[85] Fox, "U.S. Cuts Antarctica's Only Research Icebreaker Ship Under Trump Budget Squeeze"; and Mervis, "How NSF Hopes to Keep Antarctic Scientists Afloat Without an Icebreaker."

[86] Rybski and Grunes, "Replacing the Polar Research Vessel Nathaniel B. Palmer." Between November and March, Germany's research vessel *POLARSTERN* usually operates in the Antarctic, while in the summer months scientists conduct research in Arctic waters. GEOMAR, "RV Polarstern," https://www.geomar.de/en/research-vessels/german-research-vessels/rv-polarstern (hereinafter GEOMAR, "RV Polarstern").

[87] For information about geopolitics in the Arctic, including a discussion of China, Russia, and United States activities in the Arctic, see CRS Report R41153, *Changes in the Arctic: Background and Issues for Congress*.

[88] China's polar research vessels *Xue Long 2* and *Tan Suo San Hao* have polar class designations of PC3 and PC4, respectively (The State Council Information Office of the People's Republic of China, "Chinese Polar Icebreaker Returns Home After Fruitful Antarctic Research Outcomes," April 10, 2026, http://english.scio.gov.cn/m/chinavoices/2026-04/10/content_118429071.html; Institute of Deep-Sea Science and Engineering, Chinese Academy of Sciences, "R/V Tan Suo San Hao," December 20, 2024, https://english.idsse.cas.cn/pf/ships/202412/t20241220_895653.html; Polar Research Institute of China, "R/V Xuelong," https://en.pric.org.cn/index.php?c=category&id=90; and Polar (continued...)

stated that "China has been expanding its operations in the Antarctic, while the [United States] struggles to replace and update its aging infrastructure."[89]

Some stakeholders also have identified potential cost implications for using the *Sikuliaq* and *Roger Revelle*. Unlike the *Palmer* and *Gould*, which were homeported in Chile, the *Sikuliaq* and *Roger Revelle* have home ports in Seward, AK, and San Diego, CA, respectively.[90] Daily operating rates (which include travel from the home port to the Antarctic) can be $75,000 or higher.[91] For example, the day rate for the *Sikuliaq* in 2025 was $78,354, which included costs of routine operational ship expenses (e.g., fuel, food, crew wages, parts), planned maintenance overhauls (e.g., hull painting, thruster maintenance), and science support expenses (e.g., marine technician wages, oceanographic sensors).[92] At this cost, some U.S. scientists have reportedly questioned whether using the *Sikuliaq* and *Roger Revelle* in place of the *Palmer* is "really cheaper."[93] The Coast Guard Cutter (CGC) *Polar Star* is homeported in Seattle, WA, and each year travels to Antarctica (see "Reassigning an Existing U.S. Coast Guard Polar Icebreaker's Mission to Antarctica," below).[94] According to NSF, information specific to the *Palmer*'s lease is proprietary.[95] Congress may direct NSF to compare the costs of these options, such as by comparing daily cost breakdowns for the *Sikuliaq* and *Roger Revelle* (including the travel days from their home ports) with a daily cost breakdown for the *Palmer*, particularly if NSF intends to use either of these two ARF vessels to support future USAP field seasons.[96] Congress also may direct NSF to provide an analysis of the overall comparative costs and potential effects that shifting the *Sikuliaq* and *Roger Revelle* to support Antarctic missions would have on vessel maintenance, repair, and life of service. Such an analysis, in addition to the cost analysis, may contribute to Congress's evaluation of the use of existing ARF vessels.

Additional logistical considerations might factor into Congress's deliberations. For example, the *Sikuliaq* has about 20 fewer berths for scientists, and the *Roger Revelle* has about 10 fewer, compared with the *Palmer*. In addition, the *Palmer* could spend longer at sea (65 days) than the *Sikuliaq* (45 days) and the *Roger Revelle* (60 days).[97] These, along with other logistical challenges, such as the smaller total capacity to store *graywater* aboard the *Sikuliaq*, could reduce time spent supporting research, compared with the *Palmer*.[98]

Research Institute of China, "R/V Xuelong 2," https://en.pric.org.cn/index.php?c=category&id=91). Russia's Arctic and Antarctic Research Institute's polar research vessels *Akademik Fedorov* and *Akademik Treshnikov* have estimated polar class designations of PC3 (Arctic and Antarctic Research Institute, https://www.aari.ru/about-us).

[89] Peter Rybski, "America's Maritime Action Plan and the Arctic," *Sixty Degrees North* (Substack), April 1, 2026, https://sixtydegreesnorth.substack.com/p/americas-maritime-action-plan-and.

[90] UAF, "About R/V Sikuliaq," https://www.uaf.edu/cfos/sikuliaq/index.php; and UC San Diego, Scripps Institution of Oceanography, "R/V Roger Revelle," https://scripps.ucsd.edu/ships/revelle.

[91] Mervis, "How NSF Hopes to Keep Antarctic Scientists Afloat Without an Icebreaker."

[92] Email correspondence between CRS and UAF College of Fisheries and Ocean Sciences, May 29, 2026.

[93] Mervis, "How NSF Hopes to Keep Antarctic Scientists Afloat Without an Icebreaker."

[94] USCG, "USCGC Polar Star (WAGB 10)," https://www.pacificarea.uscg.mil/Our-Organization/Cutters/cgcPolarStar/ (hereinafter USCG, "USCGC Polar Star (WAGB 10)").

[95] Personal communication between CRS and NSF, OLPA, June 1, 2026.

[96] According to NSF testimony at a July 16, 2008, hearing of the House Committee on Transportation and Infrastructure, the *Palmer*'s daily operating costs at that time were $54,300. U.S. Congress, House Committee on Transportation and Infrastructure, Subcommittee on Coast Guard and Maritime Transportation, *Coast Guard Icebreaking*, hearings, 110th Cong., 2nd sess., July 16, 2008, H.Hrg. 110-154, p. 41, https://www.govinfo.gov/content/pkg/CHRG-110hhrg43754/pdf/CHRG-110hhrg43754.pdf. CRS was unable to acquire more recent information.

[97] Mervis, "How NSF Hopes to Keep Antarctic Scientists Afloat Without an Icebreaker."

[98] Doug Baird, "R/V Sikuliaq: Lessons Identified from the 2026 Antarctic Voyages," PowerPoint presentation, UNOLS (continued...)

Ice Capability

The design of polar vessels determines where the vessel can safely operate. Sea ice can be a "serious structural hazard to all ships" by imposing additional loads on the hull, propulsion system, and appendages.[99] According to the IMO, "only those ships with a Polar Class [PC] designation or a comparable alternative standard of ice-strengthening appropriate to the anticipated ice conditions should operate in polar ice-covered waters."[100] A vessel with icebreaking capability contracted for construction on or after July 1, 2007, is assigned an International Association of Classification Societies PC designation that reflects the vessel's capability to navigate in ice.[101] The PC designation takes into consideration ice thickness and the vessel's ice-crushing strength, hull form, overall size, and speed.[102] The designations range from PC1 (year-round operation in all polar waters) to PC7 (summer/autumn operation in thin *first-year ice*).[103] Vessels built before July 1, 2007, may have estimated PC designations.

The *Palmer*, built in 1992, has an estimated PC4 or PC5 ship designation and has supported research in some of Antarctica's heavily iced areas, including Thwaites Glacier (**Table 1**).[104] While ARF vessels supported the 2025-2026 Antarctic field season, some stakeholders contend that neither the *Sikuliaq* nor the *Roger Revelle* were designed to operate in heavily iced Antarctic conditions (**Table 1**).[105] The *Sikuliaq*, built in 2014, is rated a PC5 ship, meaning that it is designed for year-round operation in *medium first-year ice*.[106] The *Roger Revelle*, built in 1996, is rated an Ice Class C ship, meaning that it can safely operate in the open ocean with *light ice conditions*.[107] Should NSF continue using ARF vessels for U.S. Antarctic research support, researchers likely would need to modify their projects to accommodate the ice capabilities of these ARF vessels.[108] Some experts argue that reduced field work on some of Antarctica's most

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Council 2026 Spring Meeting, April 28, 2026. In general, *graywater* means "galley, bath, and shower water, as well as wastewater from lavatory sinks, laundry, and water fountains," according to the U.S. Environmental Protection Agency (EPA). EPA, Office of Wastewater Management, *Graywater Discharges from Vessels*, EPA-800-R-11-001, November 2011, p. 1, https://19january2021snapshot.epa.gov/sites/static/files/2020-02/documents/vgp_graywater1.pdf.

[99] IMO, "Guidelines of Ships Operating in Polar Waters."

[100] According to the IMO, *ice-covered waters* means "polar waters where local ice conditions present a structural risk to a ship." IMO, "Guidelines of Ships Operating in Polar Waters."

[101] American Bureau of Shipping (ABS), *Guidance Notes on Ice Class*, October 2024, p. 3, https://ww2.eagle.org/content/dam/eagle/rules-and-guides/current/special_service/136-guidance-notes-on-ice-class-2024/ice-class-gn-oct24.pdf (hereinafter ABS, *Guidance Notes on Ice Class*).

[102] ABS, *Guidance Notes on Ice Class*, p. 4.

[103] *First-year ice* means "*sea ice* of not more than one winter's growth, developing from *young ice*." World Meteorological Organization (WMO), *Sea Ice Nomenclature*, WMO No. 259, https://library.wmo.int/records/item/41953-wmo-sea-ice-nomenclature (hereinafter WMO, *Sea Ice Nomenclature*).

[104] The *Palmer* is an ABS ice class A2 ship, which is estimated to correspond to polar class designation of PC4/PC5 (ABS, "NATHANIEL B. PALMER," https://absrecord.eagle.org/#/absrecord/search; and NASEM, *Future Directions for Southern Ocean and Antarctic Nearshore and Coastal Research*, 2024, pp. 17-18). The U.S. Coast Guard (USCG) groups the *Palmer* among "PC5, PC6, or Equivalent" vessels rather than among "PC3, PC3, or Equivalent" vessels (USCG, "Homeports of Major Polar Icebreakers," updated April 4, 2022, https://www.dco.uscg.mil/Portals/9/DCO%20Documents/5pw/Arctic%20Policy/USCG_Icebreaker_Homeports_5_April_2022_red.pdf [hereinafter USCG, "Homeports of Major Polar Icebreakers"]).

[105] For example, Scripps Institution of Oceanography, "Scripps Scientists in Antarctica"; and Mervis, "How NSF Hopes to Keep Antarctic Scientists Afloat Without an Icebreaker."

[106] *Medium first-year ice* is a subset of first-year ice that is 70-120 centimeters (about 28-47 inches) thick. WMO, *Sea Ice Nomenclature*.

[107] See footnote 72 or **Table 1** for a description of *light ice conditions*.

[108] Scripps Institution of Oceanography, "Scripps Scientists in Antarctica"; Patel, "U.S. to Lose Ground in Antarctica"; and Mervis, "How NSF Hopes to Keep Antarctic Scientists Afloat Without an Icebreaker."

dynamic ice shelves may hinder projections of future global sea level rise (refer to the text box "Thwaites Glacier," above). Other experts have countered that, given budget constraints, NSF needs to consider competing research priorities and identify the most efficient use of limited resources.[109]

Alternatively, Congress may determine that a priority for NSF is providing U.S. scientists with regular access to heavily iced Antarctic coastal regions in future Antarctic field seasons. One option to accommodate such a future Antarctic field season would be for Congress to direct NSF and the USCG to coordinate an icebreaker escort for an ARF vessel (see "Reassigning an Existing U.S. Coast Guard Polar Icebreaker," below).[110] Deploying a USCG icebreaker for civilian research in Antarctica may come at a cost to other USCG mission areas, including national security objectives in the Arctic.

[109] Grunes, "Complaints Grow Over $1 Billion U.S. Antarctic Icebreaker Design."

[110] While the *Sikuliaq* is capable of independent operation in the Arctic, it may require an icebreaker escort for safe operation in heavily iced Antarctic coastal regions. USCG, "Homeports of Major Polar Icebreakers."

Table 1. Selected Current and Former Research Vessels/Icebreakers That Have Supported U.S. Antarctic Research

In Order of Icebreaking Capability

Vessel (Year Built)	Owner	Operator	Length/ Displacement	Endurance	Scientific Berthing	PC Designation or Estimated Designation	Icebreaking Capability	Ice Description for Operation Purposes
Healy[a] (2000)	USCG	USCG	420 feet 16,419 long tons	60 days	50	PC3/PC4	4.5 feet at 3 knots	For PC3, year-round operation in second-year ice, which may include multi-year ice inclusions For PC4, year-round operation in thick first-year ice, which may include old ice inclusions
Nathaniel B. Palmer (1992)	ECO	Unknown[b]	308 feet 6,800 long tons	65 days	45	PC4/PC5[c]	3 feet at 3 knots	For PC4, year-round operation in thick first-year ice, which may include old ice inclusions For PC5, year-round operation in medium first-year ice, which may include old ice inclusions
Sikuliaq (2014)	NSF	UAF	261 feet 3,665 long tons	45 days	24	PC5	2.5 to 3 feet at 2 knots	For PC5, year-round operation in medium first-year ice, which may include old ice inclusions
Laurence M. Gould (1997)	ECO	Unknown[b]	250 feet 3,780 long tons	75 days	37	PC5[d]	1 foot with continuous forward motion	For PC5, year-round operation in medium first-year ice, which may include old ice inclusions
Roger Revelle (1996)	ONR	SIOO	273 feet 3,512 long tons	60 days	35	NA[e]	NA	NA

Sources: CRS. American Bureau of Shipping (ABS), *Guidance Notes on Ice Class*, October 2024, https://ww2.eagle.org/content/dam/eagle/rules-and-guides/current/special_service/136-guidance-notes-on-ice-class-2024/ice-class-gn-oct24.pdf; ABS, "LAURENCE M. GOULD," "NATHANIEL B. PALMER," "ROGER REVELLE," and "SIKULIAQ," https://absrecord.eagle.org/#/absrecord/search; Claude Daley, "Ice Class Rules Description and Comparison," PowerPoint presentation, April 2014, Slide

14, https://www.engr.mun.ca/~cdaley/8074/Ice%20Class%20Rules_CD.pdf; National Academies of Sciences, Engineering, and Medicine (NASEM), *A Strategic Vision for NSF Investments in Antarctic and Southern Ocean Research* (National Academies Press, 2015), p. 86; NASEM, *Future Directions for Southern Ocean and Antarctic Nearshore and Coastal Research* (National Academies Press, 2024), pp. 17-18; National Science Foundation (NSF), "USAP at Sea," https://www.nsf.gov/geo/opp/ail/usap-ships-boats; NSF Directorate for Geosciences, Office of Polar Programs, "Antarctic Research Vessel (ARV)," Arctic Icebreaker Coordinating Committee (AICC) 2023 Summer Meeting, July 19, 2023, Slide 3, https://www.unols.org/sites/default/files/2023-07/202307aicc_apxi.pdf; Peter Rybski, "The Challenge of Counting Icebreakers," *Sixty Degrees North* (Substack), October 27, 2025, https://sixtydegreesnorth.substack.com/p/the-challenge-of-counting-icebreakers; U.S. Coast Guard (USCG), "USCGC Healy (WAGB 20): CGC Healy Ship's Characteristics," https://www.pacificarea.uscg.mil/Our-Organization/Area-Cutters/CGC-Healy/Ship/; USCG, *The Cutters, Boats, and Aircraft of the U.S. Coast* Guard, June 2018, https://www.uscg.mil/Portals/0/documents/CG_Cutters-Boats-Aircraft_2015-2016_edition.pdf; USCG, "Homeports of Major Polar Icebreakers," updated April 4, 2022, https://www.dco.uscg.mil/Portals/9/DCO%20Documents/5pw/Arctic%20Policy/USCG_Icebreaker_Homeports_5_April_2022_red.pdf; University of California San Diego, Scripps Institution of Oceanography (SIOO), "R/V Roger Revelle Specifications," https://scripps.ucsd.edu/ships/revelle/rv-roger-revelle-specifications; U.S. Antarctic Program (USAP), *Laurence M. Gould Antarctic Research and Supply Vessel*, https://www.usap.gov/USAPgov/vesselScienceAndOperations/documents/LMG_Guide.pdf; USAP, *Nathaniel B. Palmer Research Vessel / Icebreaker*, https://www.usap.gov/usapgov/vesselscienceandoperations/documents/nbp_guide.pdf; UAF, *Research Vessel Sikuliaq*, https://www.uaf.edu/cfos/files/about-us/publications/CFOS-Sikuliaq-Flyer-4-2025.pdf; University-National Oceanographic Laboratory System, *R/V Sikuliaq*, March 2010, https://www.unols.org/sites/default/files/201003cncap7.pdf; Woods Hole Oceanographic Institution, "USCGC Healy," September 20, 2010, https://archives.whoi.edu/expeditions/vanishing_arctic/page.do@pid=44496.html; and World Meteorological Organization (WMO), *Sea Ice Nomenclature*, WMO No. 259, https://library.wmo.int/records/item/41953-wmo-sea-ice-nomenclature.

Notes: ECO = Edison Chouest Offshore; NA = not applicable; NSF = National Science Foundation; ONR = Office of Naval Research; PC = Polar Class; SIOO = Scripps Institution of Oceanography; UAF = University of Alaska Fairbanks; USCG = U.S. Coast Guard. International Association of Classification Societies PC designations are intended for operations occurring generally in waters at or above 60° latitude and are applied to vessels contracted for construction on or after July 1, 2007. Of the vessels listed in this table, only the *Sikuliaq* was built after this date. Although there is no direct comparison between PC and ice class designations assigned to vessels built before July 1, 2027 (e.g., ABS ice class designation), PC designations for those vessels are based on publicly available estimates. In general, an ice class designation provides verification that the hull and machinery of the vessel are strengthened to withstand ice loads to a level corresponding to the vessel's designed ice class (i.e., a measure of survivability in an ice load). ABS provides ice descriptions based on WMO Sea Ice Nomenclature for PC vessels as shown in the table. *First-year ice* means "*sea ice* of not more than one winter's growth, developing from *young ice,*" *thick first-year ice* is over 120 centimeters (47 inches or about 4 feet) thick, and *medium first-year ice* is 70-120 centimeters (about 28-47 inches) thick. *Old ice* means "*sea ice* which has survived at least one summer's melt; typical thickness up to 3 [meters (about 10 feet)] or more." Old ice includes both second-year ice and multi-year ice. *Second-year ice* means "*old ice* which has survived only one summer's melt; typical thickness up to 2.5 [meters (about 8 feet)] and sometimes more." *Multi-year ice* means "*old ice* up to 3 [meters (10 about feet)] or more thick which has survived at least two summers' melt."

a. While the Coast Guard Cutter *Healy* is a research icebreaker, its mission to Antarctica in 2003 was to complete *Operation Deep Freeze*, an annual NSF McMurdo Station resupply mission (USCG, "USCGC Healy (WAGB 20): History," https://www.pacificarea.uscg.mil/Our-Organization/Area-Cutters/CGC-Healy/History/).

b. Formerly leased by NSF and operated by USAP.

c. ABS A2 is estimated to correspond to PC4/PC5. USCG groups the *Palmer* among "PC5, PC6, or Equivalent" vessels rather than among "PC3, PC4, or Equivalent" vessels.

d. ABS A1 is estimated to correspond to PC5.

e. Ice Class C does not correspond to a PC level. Under Ice Class C, operation is limited to open waters with light ice conditions. *Light ice conditions* may be described as first-year ice or ice concentrations up to 10%. For example, see University of California San Diego, SIOO, "Polar Code on Roger Revelle: The What, Why, Where, and How" PowerPoint presentation, 2023, Slides 13-15, https://www.unols.org/sites/default/files/2023-05/202305rvo_ap19.pdf; and Woods Hole Oceanographic Institution, *Safety Management Manual: 7.8.8 Icing Conditions / Ice Operations*, effective date October 1, 2021, p. 1, https://www.whoi.edu/wp-content/uploads/2021/12/Icing-Conditions-_Ice-Operations_Final-100121.pdf.

Reassigning an Existing U.S. Coast Guard Polar Icebreaker's Mission to Antarctica

Large USCG icebreakers are called *polar* icebreakers because they perform missions in both the Arctic and Antarctic. In addition to serving national security needs in the Arctic, USCG polar icebreaker operations support NSF research activities in both polar regions.[111] The USCG operates one heavy polar icebreaker, CGC *Polar Star*, and two medium polar icebreakers, CGC *Healy* and CGC *Storis*. *Heavy* and *medium* refer to the thickness of ice the cutter is capable of breaking—the *Polar Star* can "break miles of ice up to 21 feet thick" as an estimated PC1 or PC2 icebreaker, the *Healy* can break through ice up to 4.5 feet thick at 3 knots as an estimated PC3 or PC4 icebreaker, and the *Storis* can break through ice 3.3 feet thick at 5 knots as an estimated PC3 or PC4 icebreaker.[112]

As the USCG's sole heavy polar icebreaker, the *Polar Star* supports U.S. Antarctic research through Operation Deep Freeze—an annual NSF McMurdo Station resupply mission.[113] The *Polar Star* is not dedicated to scientific research but rather supports the USAP by opening paths for vessels through ice to NSF McMurdo Station. On the other hand, the *Healy* has capacity for supporting scientific research.[114] The *Healy* entered service in 2000 and spends most of its operational time in the Arctic supporting NSF research activities and performing other operations (**Figure 6**).[115] In addition, the *Healy* completed Operation Deep Freeze in 2003.[116] The *Storis* primarily operates in the Arctic, and scientific research is not listed among its multiple missions.[117]

As the only USCG research icebreaker, the *Healy*'s primary mission is scientific support.[118] In the absence of the *Palmer* and given the icebreaking limitations of other U.S. research vessels, Congress may consider reassigning the *Healy* for U.S. Antarctic research missions (**Table 1**). The *Healy* demonstrated its ability to navigate challenging Antarctic sea ice conditions in 2003 during Operation Deep Freeze and could potentially fulfill U.S. Antarctic research missions as a one-ship operation (the *Palmer* similarly did not require an icebreaker escort). Prior to the USCG's

[111] National Research Council, *Polar Icebreaker Roles and U.S. Future Needs: A Preliminary Assessment* (National Academies Press, 2005), p. 5.

[112] USCG, "USCGC Polar Star (WAGB 10)"; USCG, "USCGC Healy (WAGB 20): CGC Healy Ship's Characteristics," https://www.pacificarea.uscg.mil/Our-Organization/Area-Cutters/CGC-Healy/Ship/ (hereinafter USCG, "USCGC Healy (WAGB 20): CGC Healy Ship's Characteristics); and USCG, "USCGC Storis (WAGB 21): CGC STORIS Ship's Characteristics," https://www.pacificarea.uscg.mil/Our-Organization/Area-Cutters/CGC-STORIS/CGC-STORIS-Characteristics/. For the estimated polar class designations for these USCG icebreakers, see Table C-1 in CRS Report RL34391, *Coast Guard Polar Security Cutter (PSC) and Arctic Security Cutter (ASC) Icebreaker Programs: Background and Issues for Congress*; and Peter Rybski, "The Challenge of Counting Icebreakers," *Sixty Degrees North* (Substack), October 27, 2025, https://sixtydegreesnorth.substack.com/p/the-challenge-of-counting-icebreakers.

[113] USAP, "USAP at Sea"; and USCG, "USCGC Polar Star (WAGB 10)."

[114] USCG, "USCGC Healy (WAGB 20): CGC Healy Ship's Characteristics."

[115] For example, USCG, "U.S. Coast Guard Cutter Healy Arrives in Seattle Following Scientific Research, Onboard Fire," https://www.news.uscg.mil/Press-Releases/Article/3876986/us-coast-guard-cutter-healy-arrives-in-seattle-following-scientific-research-on/.

[116] USCG, "USCGC Healy (WAGB 20): History," https://www.pacificarea.uscg.mil/Our-Organization/Area-Cutters/CGC-Healy/History/.

[117] USCG, "USCGC Storis (WAGB 21)," https://www.pacificarea.uscg.mil/Our-Organization/Area-Cutters/CGC-STORIS/.

[118] For example, see USCG, "U.S. Coast Guard Cutter Healy Crew and Embarked Science Teams Discover Volcano-Like Underwater Feature While Conducting Arctic Research," November 7, 2024, https://www.news.uscg.mil/Press-Releases/Article/3959918/us-coast-guard-cutter-healy-crew-and-embarked-science-teams-discover-volcano-li/.

acquisition of the *Storis* in December 2024,[119] the *Healy* was the "nation's sole surface presence routinely operating in the Arctic Ocean."[120] Relocating the *Healy*, permanently or part time, to the Southern Ocean would allow the United States to maintain a USCG presence at both poles for geopolitical purposes. The USCG serves several missions and at issue for Congress is weighing its current priorities for USCG polar security cutters. For example, while the *Storis* could support U.S. Arctic research by escorting ARF vessels without icebreaking capabilities through the Arctic sea ice, it could come at a cost to other USCG missions and national security objectives. For example, the Arctic region might have greater U.S. national security concerns, compared with the Antarctic, requiring more than one USCG icebreaker to provide enhanced maritime domain awareness in the region.[121]

Figure 6. U.S. Coast Guard Cutter *Healy* (WAGB20)

Source: U.S. Coast Guard (USCG), "U.S. Coast Guard Cutter Healy Returns to Seattle After 129-day Arctic Deployment," October 31, 2025, https://www.news.uscg.mil/Press-Releases/Article/4327241/us-coast-guard-cutter-healy-returns-to-seattle-after-129-day-arctic-deployment/.

Notes: The *Healy*, a USCG research icebreaker, is shown supporting a 2025 Arctic mission that included research conducted by the Office of Naval Research and the National Science Foundation.

Renewing the *Palmer*'s or *Gould*'s Lease

NSF paid for usage of the *Palmer* and *Gould* under an operating lease with the vessels' owner, Edison Chouest Offshore (ECO). ECO leases contractor-owned, contractor-operated (COCO)

[119] USCG, "USCGC Storis Departs on Maiden Voyage," June 4, 2025, https://www.news.uscg.mil/Press-Releases/article/4205955/uscgc-storis-departs-on-maiden-voyage/.

[120] USCG, "U.S. Coast Guard Cutter Healy, National Science Foundation Embark on Arctic Ocean Mission," August 26, 2023, https://www.news.uscg.mil/Press-Releases/Article/3506293/us-coast-guard-cutter-healy-national-science-foundation-embark-on-arctic-ocean/.

[121] For example, U.S. Department of Defense, *2024 Arctic Strategy*, June 2024, https://media.defense.gov/2024/Jul/22/2003507411/-1/-1/0/dod-arctic-strategy-2024.pdf. Also see Colby Lamb, "Just In: U.S. Needs More Sensors, Icebreakers to Secure Arctic, Experts Say," *National Defense*, June 29, 2026, https://www.nationaldefensemagazine.org/articles/2026/6/29/just-in-us-needs-to-collaborate-with-arctic-nations-for-central-arctic-ocean-regulations-experts-say.

vessels under long-term charters.[122] Congress might direct NSF to renew the *Palmer*'s or *Gould*'s lease to ensure that a dedicated research vessel is available to support the USAP in the short term. The *Palmer*, built in 1992, has exceeded its planned service (design) life of 30 years,[123] though NSF's previous lease of the *Palmer* was not due to expire until March 2029.[124] The *Gould*, built in 1997, is nearing the end of its 30-year service life.[125] Other vessels in the federal fleet are operating beyond their service life.[126] For example, the CGC *Polar Star* entered into service in 1976 with a design lifespan of 30 years and has undergone service life extension (see "Future U.S. Coast Guard Polar Icebreakers," below).[127]

Leasing a vessel may be more advantageous than purchasing a vessel for the federal fleet. In general, for NSF to purchase a research vessel, the agency would need to complete a multiyear contractor selection and construction activity for the vessel; for example, the completion of multiple design phases and construction for a vessel can take more than a decade.[128] In comparison, ECO testified that the *Palmer* took two years for ECO to build.[129] In addition, ECO has argued that COCO vessels can be more cost-effective for the federal government, compared with purchasing a vessel.[130] In the case of the *Palmer*, the company addressed construction costs and overruns. ECO also partially amortized the construction costs for the *Palmer* over the duration of the lease.[131] Whether costs would be partially amortized now is unclear. According to experts, "commercial shipbuilders today seem unlikely to do this because of the higher up-front cost and the budget requirements concerning leasing."[132] For a discussion about the option to

[122] Testimony of Lieutenant Commander R. George Rey, USN (Ret.), President, COTS Technology, LLC, representing ECO, in U.S. Congress, House Committee on Resources, Subcommittee on Fisheries Conservation, Wildlife and Oceans, *Oversight Hearing on the "Implementation of the Hydrographic Services Improvement Act of 1998,"* 106th Cong., 2nd sess., July 27, 2000, https://naturalresources.house.gov/uploadedfiles/lt._comm._george_rey_testimony_7.27.00.pdf (hereinafter testimony of Lieutenant Commander R. George Rey, representing ECO, in House oversight hearing on the Implementation of the Hydrographic Services Improvement Act of 1998).

[123] Rybski and Grunes, "Replacing the Polar Research Vessel Nathaniel B. Palmer."

[124] NASEM, *Future Directions for Southern Ocean and Antarctic Nearshore and Coastal Research*, 2024, p. 18.

[125] NASEM, *Future Directions for Southern Ocean and Antarctic Nearshore and Coastal Research*, 2024, p. 6.

[126] For example, see Interagency Working Group (IWG) on Facilities and Infrastructure, *Federal Fleet Status Report: Current Capacity and Near-Term Priorities*, March 2016, p. 7, https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/NSTC/federal_fleet_status_report_final.pdf (hereinafter IWG on Facilities and Infrastructure, *Federal Fleet Status Report*, 2016).

[127] USCG, "Polar Star Completes Final Phase of Service Life Extension Program," November 20, 2025, https://www.dcms.uscg.mil/Our-Organization/Assistant-Commandant-for-Acquisitions-CG-9/Newsroom/Latest-Acquisition-News/Article/4339212/polar-star-completes-final-phase-of-service-life-extension-program/ (hereinafter USCG, "Polar Star Completes Final Phase of Service Life Extension Program").

[128] NASEM, *Future Directions for Southern Ocean and Antarctic Nearshore and Coastal Research*, 2024, p. 22; and IWG on Facilities and Infrastructure, *Federal Fleet Status Report*, 2016, p. 10. The NSF solicitation for a contract for services of an integrator for procurement of an Antarctic research vessel was listed as inactive in August 2024; see NSF, "Antarctic Research Vessel (ARV) Integrator, Solicitation," Solicitation No. 49100423R0010, May 7, 2024, https://sam.gov/opp/91adf79c76c245d49408930ae2c49fb4/view

[129] Testimony of Lieutenant Commander R. George Rey, representing ECO, in House oversight hearing on the Implementation of the Hydrographic Services Improvement Act of 1998.

[130] Testimony of Lieutenant Commander R. George Rey, representing ECO, in House oversight hearing on the Implementation of the Hydrographic Services Improvement Act of 1998.

[131] Testimony of Lieutenant Commander R. George Rey, representing ECO, in House oversight hearing on the Implementation of the Hydrographic Services Improvement Act of 1998. Also see NASEM, *Acquisition and Operation of Polar Icebreakers: Fulfilling the Nation's Needs* (National Academies Press, 2017), p. 27 (hereinafter NASEM, *Acquisition and Operation of Polar Icebreakers*, 2017).

[132] Rybski and Grunes, "Replacing the Polar Research Vessel Nathaniel B. Palmer."

purchase a dedicated ARV, see "National Science Foundation Plans for a New U.S. Antarctic Research Vessel," below.

Foreign Antarctic Research Vessels

Congress prohibited NSF from using FY2026 appropriation funding for "procuring, chartering, or leasing a foreign-flagged vessel for U.S. research activities in Antarctica if a suitable U.S.-built vessel is available for such purpose."[133] If the *Palmer* and *Gould* (both U.S.-built) are available, this would appear to prohibit NSF from using FY2026 appropriation funding for a foreign-flagged vessel for U.S. Antarctic research purposes.

In 2015, NASEM had anticipated a potential gap in ship capacity (in the context of the *Palmer* nearing the end of its service life) and suggested that the "only solution at present for U.S. scientists to pursue key research in heavy-ice areas, or along most of the coast ... , is to work on research icebreakers of other nations."[134] U.S. scientists conducting research aboard a foreign vessel may help NSF manage research within its budgetary constraints. In addition, U.S. scientists conducting research aboard a foreign vessel may facilitate international cooperation under the Antarctic Treaty.[135] For example, some U.S. allies that are party to the treaty, such as Australia, Germany, South Korea, and the United Kingdom, have Antarctic research icebreakers.[136] U.S. scientists have previously conducted research aboard foreign ARVs. During the 2025-2026 Antarctic field season, several U.S. scientists conducted federally funded and nonfederally funded research aboard the South Korean Icebreaking Research Vessel *Araon*.[137] Some stakeholders have highlighted that U.S. scientists may have difficulty advocating for U.S. research priorities aboard a foreign research vessel that may be prioritizing the research of its national scientists aboard.[138]

Purchasing an Existing Used Vessel with Icebreaking Capabilities

NSF could pursue the option to purchase an existing used icebreaker for U.S. Antarctic research. However, according to one expert, "icebreakers or polar vessels are rarely for sale, and when they are, they are typically older vessels."[139] For example, a NASEM report on acquisition and operation of polar icebreakers identified that between 2007 and 2017 one foreign icebreaker was available for purchase.[140] Congress may consider several factors should an existing icebreaker become available for purchase. For example, an older used vessel may require more funding for repairs or maintenance operations than a newer vessel and have a shorter operational lifespan. An additional consideration is whether an icebreaker available for purchase meets the icebreaking requirements for use around Antarctica. Furthermore, not all icebreakers might be designed for

[133] H.Rept. 119-272, accompanying H.R. 5342, p. 119.

[134] NASEM, *A Strategic Vision for NSF Investments in Antarctic and Southern Ocean Research*, 2015, p. 86.

[135] Article III of the Antarctic Treaty.

[136] Secretariat of the Antarctic Treaty, "Parties"; Australian Antarctic Program, "RSV Nuyina," https://www.antarctica.gov.au/antarctic-operations/travel-and-logistics/ships/nuyina/; GEOMAR, "RV Polarstern"; Korean Polar Research Institute, "Introduction of the Ice-Breaking Research Vessel," https://eng.kopri.re.kr/eng/html/infra/03030101.html; and British Antarctic Survey, "RRS Sir David Attenborough," https://www.bas.ac.uk/polar-operations/sites-and-facilities/facility/rrs-sir-david-attenborough/.

[137] For example, see Scripps Institution of Oceanography, "Scripps Scientists in Antarctica"; and Raymond Zhong, "On an Ambitious Antarctic Quest, One Nation Is on the Sidelines," *New York Times*, March 3, 2026, https://www.nytimes.com/2026/02/19/climate/antarctica-science-funding.html.

[138] Fox, "U.S. Cuts Antarctica's Only Research Icebreaker Ship Under Trump Budget Squeeze."

[139] Rybski and Grunes, "Replacing the Polar Research Vessel Nathaniel B. Palmer."

[140] NASEM, *Acquisition and Operation of Polar Icebreakers*, 2017, p. 33.

scientific research; an icebreaker available for purchase might require an additional cost to make it suitable for research activities. A 2017 NASEM report estimated that science-specific modifications to an icebreaker could cost $10 million to $20 million (about $13 million to $26 million in current dollars adjusted for inflation).[141] These modifications may include spaces in the ship for laboratories, space on the aft deck to deploy scientific equipment (e.g., autonomous vehicles, moorings), accommodations for researchers, and structural strength to support scientific equipment. These figures do not include the cost of the "installation of the actual science-related equipment and outfitting spaces for science," which NASEM estimated may cost up to $30 million (about $39 million adjusted for inflation) per ship.[142]

Long-Term Replacement Options

The House Committee on Appropriations referred to "efforts to restore American maritime dominance," in FY2026 report language (H.Rept. 119-272) and directed NSF to "charter, lease, or otherwise procure the services of a U.S.-built vessel in support of U.S. research activities in the Antarctic."[143] This section of the report provides Congress with selected long-term options for adding a research vessel with icebreaking capabilities to the USAP. Selected long-term options discussed include

- building a new U.S. ARV dedicated to the USAP, and
- adapting new USCG polar icebreakers to accommodate research activities.

National Science Foundation Plans for a New U.S. Antarctic Research Vessel

NSF has stated its intention to continue "to pursue the development of a new Antarctic research vessel."[144] According to media reports, "such a vessel is at least a decade away."[145]

In 2018, NSF established a team to produce an initial ARV design. The ARV project subsequently went through multiple design phases until, in September 2023, the NSF director approved entry into a final design phase. In February 2024, NSF released a solicitation for a vessel integrator (VI); the selected VI would complete the final design for the ARV, select a shipyard, and manage construction of the vessel.[146] Per the design plans, as compared with the *Palmer*, the ARV would have a larger capacity to host scientific personnel, more laboratory and deck space, a longer endurance, and greater icebreaking capacity (**Figure 7**). In August 2024, the VI solicitation was listed as inactive. According to a 2024 U.S. Government Accountability Office (GAO) report, "ongoing delays in the selection of a [VI] and anticipated issues with the availability of shipyard labor will likely delay the timeline for ship delivery to 2032."[147] A subsequent February 2026 GAO report stated that NSF had "paused its search for a contractor to manage the construction process for the [ARV] project while it assesses potential funding availability from other agencies

[141] NASEM, *Acquisition and Operation of Polar Icebreakers*, 2017, p. 64.

[142] NASEM, *Acquisition and Operation of Polar Icebreakers*, 2017, p. 65.

[143] H.Rept. 119-272, p. 107.

[144] NSF, "Update on Nathaniel B. Palmer." Also see Patel, "U.S. to Lose Ground in Antarctica."

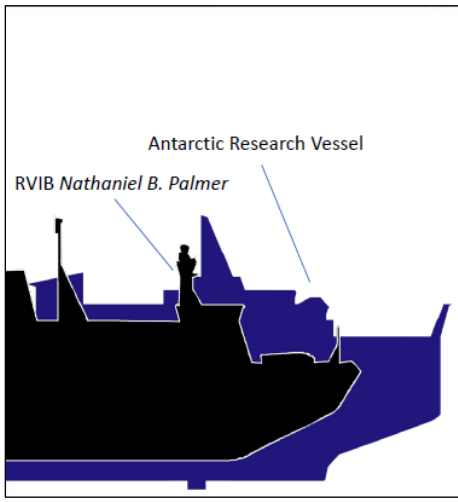
[145] Paul Voosen, "NSF Plans Abrupt End to Lone U.S. Antarctic Research Icebreaker," *Science*, July 28, 2025, https://www.science.org/content/article/nsf-plans-abrupt-end-lone-u-s-antarctic-research-icebreaker.

[146] NSF, "Antarctic Research Vessel (ARV) Integrator, Solicitation," Solicitation No. 49100423R0010, February 16, 2024, https://sam.gov/opp/91adf79c76c245d49408930ae2c49fb4/view.

[147] GAO, *National Science Foundation: Five Major Facilities Projects Experienced Delays*, GAO-24-107044, June 2024, p. 15, https://www.gao.gov/assets/gao-24-107044.pdf.

and the effects of recent executive orders related to federal procurement and the U.S. shipbuilding industry."[148]

Figure 7. National Science Foundation-Planned Antarctic Research Vessel: Technical Comparison with *Nathaniel B. Palmer*



	Nathaniel B. Palmer	Antarctic Research Vessel	
Length	309 ft	365 ft	~20% Larger
Sci/Tech Berthing	45	**55***	**~20% More scientists**
Total Lab Space	3,805 sq ft	4,497 sq ft	~20% More lab space
Working Deck Space	4,054 sq ft	7,197 sq ft	~80% More deck space
Endurance	65 days	**90 days***	**~40% Longer endurance**
Icebreaking	3' @ 3 kts	**4.5' @ 3 kts***	**50% Greater icebreaking**

*Key Performance Parameter

Source: National Science Foundation Directorate for Geosciences, Office of Polar Programs, "Antarctic Research Vessel (ARV)," Arctic Icebreaker Coordinating Committee (AICC) 2023 Summer Meeting, July 19, 2023, Slide 3, https://www.unols.org/sites/default/files/2023-07/202307aicc_apxi.pdf.

Notes: RVIB = Research Vessel Icebreaker; ft = feet; sq ft = square feet; ′ = feet (thickness of ice); kts = knots.

The estimated cost of the new NSF ARV could be up to $2.2 billion, according to the agency.[149] As previously discussed, some stakeholders contend that commercially built vessels leased to the federal government are more cost-effective and can be designed and built in less time. For example, during a 2000 House hearing, ECO provided a comparison between the CGC *Healy* and the *Palmer*: According to ECO, the federal government paid more than $350 million for the *Healy*, which took more than nine years to design and build, and ECO paid less than $50 million for the *Palmer*, which took two years to design and build. Other stakeholders have observed that foreign shipyards can build polar icebreakers in shorter time frames. Finnish shipyards reportedly claim they can build polar icebreakers in 36 months.[150] In 2022, South Korea reportedly invested $205 million to build a new icebreaking research vessel for delivery in 2026, as part of a plan to replace the *Araon*.[151]

In its *FY2027 Budget Request to Congress*, NSF is requesting $900 million in one-time mandatory funding for a new ARV "developed as a modern, U.S.-built, ice-capable Polar Class 3 (PC3) research vessel that will … support year-round oceanography, geology and geophysics,

[148] GAO, *National Science Foundation: Schedule Delays Continue for Infrastructure Projects*, p. 21.

[149] NSF, "Antarctic Research Vessel (ARV) Integrator Solicitation," May 6, 2024, p. 8, attachment "49100423R0010 ARV INTEGRATOR 20240506 Track Changes.docx." Also see Jeffrey Mervis, "Trump Seeks to Jump-Start Stalled Icebreaker," *Science*, vol. 392, no. 6795 (April 16, 2026), p. 244.

[150] Peter Rybski, "How to Build an Icebreaker in Three Years," *Sixty Degrees North* (Substack), March 31, 2025, https://sixtydegreesnorth.substack.com/p/how-to-build-an-icebreaker-in-three.

[151] The Maritime Executive, "South Korea Plans to Order a New $200M Icebreaker," November 24, 2022, https://maritime-executive.com/article/south-korea-plans-to-order-a-new-200m-icebreaker.

biology, and atmospheric research in ice-affected waters for the next 30-40 years."[152] According to the VI solicitation documentation, the estimated operating costs in "constant year 2032" dollars would be $44.3 million, with a daily operations cost rate around $121,000.[153]

Some scientists have identified preferred features that NSF's design plans for the new ARV would not include.[154] For example, the new ARF as planned would not include a helideck (i.e., a helicopter landing area located on a ship, which could give scientists access to remote locations in Antarctica) or a moonpool port (i.e., an opening at the base of the hull used for deploying undersea instruments, which could enable scientific operations beneath the sea ice). Both features were eliminated from the conceptual design in 2020.[155] The 2023 designs include a "forward aviation deck" that could support landing and takeoff of a single helicopter.[156] This could be used to "transport scientists from the ARV to a partner vessel that supports helicopters or to enable transport with land-based helicopters. However, it does not provide full support for onboard helicopters without a partner vessel or base."[157] (For more information about helicopter use aboard an ARV, see the text box "Helicopter Capacity on Antarctic Research Vessels.")

[152] NSF, *FY 2027 Budget Request to Congress*, April 3, 2026, p. Overview-8, https://nsf-gov-resources.nsf.gov/files/FY-2027-NSF-Budget-Request-to-Congress.pdf.

[153] NSF, "Antarctic Research Vessel (ARV) Integrator Solicitation," May 6, 2024, attachment "Appendix 06.1-Cost Book_Final.xls," tab "Ship Ops Costs."

[154] Grunes, "Complaints Grow Over $1 Billion U.S. Antarctic Icebreaker Design."

[155] NASEM, *Future Directions for Southern Ocean and Antarctic Nearshore and Coastal Research*, 2024, p. 21. Also see Grunes, "Complaints Grow Over $1 Billion U.S. Antarctic Icebreaker Design."

[156] NSF, "Antarctic Research Vessel (ARV) Integrator Solicitation," January 2023, p. 150, attachment "Project Execution Plan."

[157] NASEM, *Future Directions for Southern Ocean and Antarctic Nearshore and Coastal Research*, 2024, pp. 93, 96.

Helicopter Capacity on Antarctic Research Vessels

Helicopter capacity on a research vessel with icebreaking capabilities can allow researchers to reach remote locations in Antarctica. The Research Vessel Icebreaker *Nathaniel B. Palmer,* a former National Science Foundation (NSF)-operated research vessel with icebreaking capabilities, had capacity for two helicopters to support Antarctic field work. The utility of this capability may be questioned, as the icebreaker rarely carried a helicopter because of the high operating costs (approximately $2 million to $3 million per deployment) and competing space needs for the helicopter landing pad. Some scientists have said that the lack of additional helicopter support "hampered some U.S.-led projects" in Antarctica. For example, according to media reports,

> During a February 2022 research expedition, the *Palmer* and its South Korean counterpart *RV Araon* were halted by thick ice some 160 kilometers from Thwaites [Glacier]. But the *Araon* was still able to send helicopters to Thwaites and complete its science mission ... The *Palmer* had to turn around and study a neighboring glacier.

With respect to the lack of a helideck in the design plans, some stakeholders contend that the plans may reflect NSF's "desire to manage its operational costs." To accomplish research objectives in remote locations that require a helicopter flown from a vessel, NSF has encouraged U.S. researchers to partner with countries that have Antarctic research vessels with helicopter capacity.

> **Sources:** National Academies of Sciences, Engineering, and Medicine, *Future Directions for Southern Ocean and Antarctic Nearshore and Coastal Research* (National Academies Press, 2024), pp. 7, 96; N.B. Palmer Replacement Committee, *Antarctic Oceanography Planning Workshop: Possible Replacement of the* R.V.I.B. Nathaniel B. Palmer, final report, June 2002, https://www.usap.gov/conferencescommitteesandworkshops/usercommittees/documents/AOPWReport.pdf; and Marissa Grunes, "Complaints Grow Over $1 Billion U.S. Antarctic Icebreaker Design," Science, April 20, 2023, https://www.science.org/content/article/complaints-grow-over-1-billion-u-s-antarctic-icebreaker-design.

Future U.S. Coast Guard Polar Icebreakers[158]

The United States plans to build and procure three new heavy icebreakers, called *Polar Security Cutters* (PSCs).[159] The USCG estimates the total procurement cost of a PSC to be about $2.4 billion.[160] Stakeholders expect that these new PSCs will have a PC2 designation.[161] According to the USCG, in April 2025, "the Coast Guard received approval from the Department of Homeland Security for full production of the first PSC"[162] and anticipates its delivery in 2030.[163]

USCG also plans to build and acquire new medium icebreakers, called *Arctic Security Cutters* (ASCs).[164] Congress provided funding to the USCG for a U.S.-built icebreaker that has "scientific

[158] For more information about U.S. Coast Guard cutters, see CRS Report RL34391, *Coast Guard Polar Security Cutter (PSC) and Arctic Security Cutter (ASC) Icebreaker Programs: Background and Issues for Congress*.

[159] Congress provided $167.2 million through §11104 of the Don Young Coast Guard Authorization Act of 2022 (Division K of the James M. Inhofe National Defense Authorization Act for Fiscal Year 2023; P.L. 117-263) and $4.3 billion through §40001 of the FY2025 budget reconciliation law (Title IV of P.L. 119-21) to the USCG for the procurement of PSCs.

[160] See CRS Report RL34391, *Coast Guard Polar Security Cutter (PSC) and Arctic Security Cutter (ASC) Icebreaker Programs: Background and Issues for Congress*.

[161] Rybski and Grunes, "Replacing the Polar Research Vessel Nathaniel B. Palmer."

[162] USCG, "Polar Star Completes Final Phase of Service Life Extension Program."

[163] U.S. Congress, Senate Committee on Commerce, Science, and Transportation, Subcommittee on Coast Guard, Maritime, and Fisheries, *Evaluating Progress After Historic Investments in the U.S. Coast Guard*, 119th Cong., 2nd sess., January 29, 2026. Also see Sen. Maria Cantwell, "Cantwell Secures Commitments from Coast Guard Commandant on Major Investments in Seattle Icebreaker Docks and Base Infrastructure, Visit to Ilwaco," press release, January 31, 2026, https://www.cantwell.senate.gov/news/press-releases/cantwell-secures-commitments-from-coast-guard-commandant-on-major-investments-in-seattle-icebreaker-docks-and-base-infrastructure-visit-to-ilwaco.

[164] Congress provided $150 million for the acquisition or procurement of one U.S.-built ASC (§11104 of the Don Young Coast Guard Authorization Act of 2022; Division K of the James M. Inhofe National Defense Authorization Act for Fiscal Year 2023; P.L. 117-263).

research capacity comparable to [CGC] *Healy* (WAGB 20), for the purposes of hydrographic, bathymetric, oceanographic, weather, atmospheric, climate, fisheries, marine mammals, genetic and other data related to the Arctic, and other research as the Under Secretary [of Commerce for Oceans and Atmosphere] determines appropriate."[165] Congress also provided $3.5 billion through the FY2025 budget reconciliation law (Title IV of P.L. 119-21) for the procurement of ASCs.[166] Beyond stating that these ASCs are "to ensure timely presence of the Coast Guard in the Arctic and Antarctic regions," Congress did not publicly specify their capabilities (e.g., scientific research capacity). According to the Department of Homeland Security, the $3.5 billion for the ASC program will go toward procuring four ASCs from Finland shipyards and seven ASCs from U.S. shipyards.[167] Stakeholders expect that these new ASCs would have PC3 or PC4 designation.[168] The USCG anticipates receiving 11 new ASCs, with the first planned for delivery in 2028.[169]

Some stakeholders have proposed that certain new USCG PSCs and ASCs be constructed as USCG research icebreakers and used for U.S. Antarctic research missions. These stakeholders contend that "it is much easier and cost-effective to design and build an icebreaker ready to incorporate scientific research capabilities than to modify the ship later."[170] As previously discussed, experts estimated in 2017 that an additional $10 million to $20 million (about $13 million to $26 million in current dollars adjusted for inflation) would be needed to make an icebreaker "science-ready."[171] Congress could direct the USCG to incorporate scientific research capacity specific to Antarctic research needs in the construction of an additional ASC or in the construction of at least one planned PSC and use the new USCG icebreaker as a U.S. ARV. It is unclear when in the design and construction process such modifications could be made for NSF scientific purposes. The USCG has sought execution and build strategies for the construction and launch of "an icebreaking-capable vessel within 36-months of a contract award"; however, in many cases, this process can take longer, as previously discussed.[172] The time frames for when a possible new NSF ARV and the new USCG PSCs and ASCs would be expected to enter service are similar.

[165] §11223 of the Don Young Coast Guard Authorization Act of 2022 (Division K of the James M. Inhofe National Defense Authorization Act for Fiscal Year 2023; P.L. 117-263).

[166] §40001 of the FY2025 budget reconciliation law (Title IV of P.L. 119-21).

[167] Department of Homeland Security (DHS), "DHS Celebrates Purchase of New Coast Guard Icebreakers as President Trump Signs Deal with Finland," October 10, 2025, https://www.dhs.gov/news/2025/10/10/dhs-celebrates-purchase-new-coast-guard-icebreakers-president-trump-signs-deal. Also see White House, "President Donald J. Trump Authorizes Construction of Arctic Security Cutters," fact sheet, October 9, 2025, https://www.whitehouse.gov/fact-sheets/2025/10/fact-sheet-president-donald-j-trump-authorizes-construction-of-arctic-security-cutters/.

[168] Rybski and Grunes, "Replacing the Polar Research Vessel Nathaniel B. Palmer."

[169] DHS, "U.S. Coast Guard Finalizes Contracts for Six Arctic Security Cutters," July 2, 2026, https://www.dhs.gov/news/2026/07/02/us-coast-guard-finalizes-contracts-six-arctic-security-cutters.

[170] Rybski and Grunes, "Replacing the Polar Research Vessel Nathaniel B. Palmer."

[171] NASEM, *Acquisition and Operation of Polar Icebreakers*, 2017, p. 64.

[172] USCG, "Request for Information—Arctic Security Cutter (ASC): Icebreaking Capable Vessels or Vessel Designs That Are Ready for Construction," SAM.gov, https://sam.gov/opp/ee911f0016fd4bb0b98d589cfcfc3dca/view.

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