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NATIONAL DEBATE TOPIC FOR HIGH SCHOOLS, 2025–2026

Resolved: The United States Federal Government Should Significantly Increase Its Exploration and/or Development of the Arctic

NATIONAL DEBATE TOPIC FOR HIGH SCHOOLS, 2025–2026
Pursuant to 44 U.S.C. Section 1333

Compiled by the Congressional Research Service
Library of Congress

U.S. Government Publishing Office
Washington, DC 2025

CHAPTER 13—PARTICULAR REPORTS AND DOCUMENTS

Sec. 1333. National high school and college debate topics

(a) The Librarian of Congress shall prepare compilations of pertinent excerpts, bibliographical references, and other appropriate materials relating to:

(1) the subject selected annually by the National University Extension Association as the national high school debate topic and

(2) the subject selected annually by the American Speech Association as the national college debate topic.

In preparing the compilations the Librarian shall include materials which in his judgment are representative of, and give equal emphasis to, the opposing points of view on the respective topics.

(b) The compilations on the high school debate topics shall be printed as Senate documents and the compilations on the college debate topics shall be printed as House of Representative documents, the cost of which shall be charged to the congressional allotment for printing and binding. Additional copies may be printed in the quantities and distributed in the manner the Joint Committee on Printing directs.

(P.L. 90–620, Oct. 22, 1968, 82 Stat. 1270)

Historical and Revision Notes
Based on 44 U.S. Code, 1964 ed., Supp. III, Sec. 170 [Sec. 276a] (Dec. 30, 1963, Pub. L. 88–246, Secs. 1, 2, 77 Stat. 802)

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Foreword

The 2025–2026 high school debate topic is: "Resolved: The United States Federal Government Should Significantly Increase Its Exploration and/or Development of the Arctic."

In compliance with 44 U.S.C., Section 1333, the Congressional Research Service (CRS) and the Law Library of the Library of Congress prepared this bibliography to assist high school debaters in researching this topic. This bibliography is intended to assist debaters in the identification of references and resources on the subject. In selecting items for inclusion in this bibliography, the Library of Congress has sampled a wide spectrum of opinions reflected in the current literature on this topic. No preference for any policy is indicated by the selection or positioning of articles, books, or websites cited, nor is the Library's disapproval of any policy, position, or article to be inferred from its omission.

The bibliography was prepared by Audrey Celeste Crane-Hirsch, Calvin Gibson, Christopher Jester, and Gary Sidor of the Knowledge Services Group, CRS, Emily Peterson of the Resources, Science and Industry Division, CRS, and by Olivia Kane-Cruz of the Law Library of Congress, under the direction of project team leader Maya Thomas, with assistance from Caitlin Keating-Bitonti.

We wish the best to each debater as they research, prepare, and present arguments on this year's topic.

Karen E. Donfried, Director
Congressional Research Service

NATIONAL DEBATE TOPIC FOR HIGH SCHOOLS, 2025–2026

RESOLVED: THE UNITED STATES FEDERAL GOVERNMENT SHOULD SIGNIFICANTLY INCREASE ITS EXPLORATION AND/OR DEVELOPMENT OF THE ARCTIC

AN ANNOTATED BIBLIOGRAPHY ON THE 2025–2026 HIGH SCHOOL DEBATE TOPIC

Compiled by
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Introduction

The 2025-2026 high school debate topic is: “Resolved: The United States Federal Government Should Significantly Increase Its Exploration and/or Development of the Arctic.” The topic is selected annually by ballot of the delegates from the National Catholic Forensic League, the National Debate Coaches Association, and the National Speech and Debate Association, all organized under the umbrella organization, the national Federation of State High School Associations.

This selective bibliography, with brief annotations, is intended to assist debaters in identifying resources and references on the national debate topic. It lists citations to journal articles, books, congressional publications, legal cases, and websites. The bibliography is divided into six broad sections: Basic Definitions and History, Environmental and Climate Impact, Economic and Resource Development, Security and Geopolitical, Legal and Political, and Technology and Innovation.

Summary

The purpose of the bibliography is to provide students with a brief overview of information related to the 2025–2026 high school debate topic.

This compilation is not intended to provide complete coverage of the topic. Further research on the topic may be accomplished at high school, public, and research libraries.

In addition to the resources included in this bibliography, there are many more international organizations, U.S. government agencies, and non-governmental organizations that provide information on the debate topic and sub-topics on their websites. Debaters are encouraged to consult library resources as well as the internet for their research.

Arctic (Overview)

Articles

Fields, Stanley and Kevin Lunday. "The Arctic: Shrinking Ice, Growing Importance." *An Anthology: 60 Years of Transformation | National Security Law,* American Bar Association, (January 09, 2023).
Available at https://www.americanbar.org/groups/law_national_security/publications/aba-standing-committee-on-law-and-national-security-60-th-anniversary-an-anthology/the-arctic-shrinking-ice-growing-importance/.
This article provides an overview of how changes in the Arctic have accelerated interest in the region. It explains how melting sea ice is opening the Arctic to more shipping, resource extraction and strategic geopolitical rivalry.

Reports

U.S. Department of Commerce. National Oceanic and Atmospheric Administration. *2024 Arctic Report Card Documents Rapid, Dramatic Change*, by Theo Stein and Monica Allen, December 10, 2024.
Available at https://www.climate.gov/news-features/understanding-climate/2024-arctic-report-card-documents-rapid-dramatic-change.
This report provides an overview of the 2024 Arctic Report Card published by NOAA. It includes maps that document environmental change in the Arctic.

U.S. Library of Congress. Congressional Research Service. *Changes in the Arctic: Background and Issues for Congress*, by Ronald O'Rourke et al. R41153, updated July 14, 2025.
Available at https://www.congress.gov/crs-product/R41153.
An overview of the United States' interests and involvement in the Arctic, focusing on the impacts of climate change, shifting geopolitical dynamics, and increased human activity. Highlights include environmental changes, security concerns, and the region's growing strategic importance.

Websites

Arctic Council, "Arctic States."
Available at https://arctic-council.org/about/states/.
This Arctic Council, an intergovernmental forum for addressing issues in the Arctic, website gives a list of the eight Arctic States with links to brief descriptions of each State's role as a steward of the region.

The Arctic Portal. "Arctic Countries and Islands."
Available at https://arcticportal.org/maps/download/maps-arctic-countries-and-islands.
The Arctic Portlet offers downloadable maps detailing Arctic countries and islands, including visual insights into the region's geography and political boundaries.

The Arctic Portal. “Arctic Definitions.”
Available at https://arcticportal.org/maps/download/arctic-definitions.
This webpage features a selection of maps illustrating the main definitions of the Arctic.

The Arctic Portal. “Quick Facts: The Arctic.”
Available at https://arcticportal.org/education/quick-facts/the-arctic.
These quick facts summarize key facts about the Arctic's geography, ecosystems, and climate, including information on specific regions such as Greenland and Svalbard.

The Arctic Portal. “Where is the Arctic.”
Available at https://arcticportal.org/the-arctic-portlet/where-is-the-arctic.
This website provides a brief explanation about how defining the Arctic regions may depend on changing conditions such as the environment. It also provides definitions of the Arctic from the Arctic Monitoring and Assessment Program and the Conservation of Arctic Flora and Fauna.

National Geographic. “Arctic.”
Available at https://education.nationalgeographic.org/resource/arctic/.
The National Geographic provides an overview of the Arctic people, resources, and the changing climate and looks at the region’s environmental changes and growing global significance.

National Park Service, “Arctic Exploration”.
Available at https://www.nps.gov/subjects/arctic/exploration.htm.
This National Park Service website provides a historical overview of Arctic exploration in Alaska and the challenges posed by the region’s harsh environment. It discusses how exploration efforts shaped broader interest and understanding of the Arctic.

National Snow and Ice Data Center. “About the Data.”
Available at https://nsidc.org/sea-ice-today/about-data.
This website offers answers to frequently asked questions about how the National Snow and Ice Data Center (NSIDC) collects and uses satellite data to monitor the extinct of sea ice in polar regions.

National Snow and Ice Data Center. “Sea Ice: Overview.”
Available at https://nsidc.org/learn/parts-cryosphere/sea-ice.
NSIDC provides a definition of sea ice, including an explanation about the differences between sea ice in the Arctic and Antarctic.

Environmental and Climate Impacts

Articles

Creel, Roger, Julia Guimond, Benjamin Jones, and Pier Paul Overduin. “Permafrost Thaw Subsidence, Sea-level Rise, and Erosion are Transforming Alaska’s Arctic Coastal Zone.” *PNAS*, 121, no. 50 (2024).
Available at https://www.pnas.org/doi/10.1073/pnas.2409411121.
This study creates a projection of land loss in the Arctic Coastal Plain due to the compounding effects of permafrost thaw, sea-level rise, and erosion. The authors argue that these changes may have profound social and environmental impacts.

Muir, Derek, Maria J. Gunnarsdóttir, Krystyna Koziol, Frank A. von Hippel, Danuta Szumińska, Nicoletta Ademollo, et al. “Local sources versus long-range transport of organic contaminants in the Arctic: future developments related to climate change.” *Environmental Science: Advances*, 4 (2025).
Available at https://pubs.rsc.org/en/content/articlelanding/2025/va/d4va00240g.
This review article examines how increased human activities, such as shipping, in the Arctic may contribute to further releases of persistent organic pollutants and Chemicals of Emerging Arctic Concern.

Gillis, Daniel P., Charles K. Minns, Steven E. Campana, Brian J. Shuter. “Major changes in fish thermal habitat diversity in Canada’s Arctic lakes due to climate change.” *Communications Earth & Environment*, 5, no. 89 (2024).
Available at https://www.nature.com/articles/s43247-024-01251-8#.
This article examines how the future effects of climate change on Canadian Arctic lakes may impact fish diversity.

Hague, Emily L. and Lauren H. McWhinnie. “Narwhal, Beluga and Bowhead Whale Responses to Marine Vessel Traffic: A Systematic Map.” *Ocean & Coastal Management*, 255 (2024).
Available at
https://www.sciencedirect.com/science/article/pii/S0964569124002369?via%3Dihub.
The authors of this article review the current knowledge of marine vessel traffic’s impact on Arctic whales. They identify several knowledge gaps, and argue that more research should be conducted prior to expanding commercial activities in the Arctic in order to understand how increased vessel traffic may impact whales.

Li, Huiri, Junmei Qu, Zhixin Zhang, Eun Ju Kang, Matthew S. Edwards, and Ju-Hyoung Kim. “Shrinking Suitable Habitat of a Sub-Arctic Foundation Kelp Under Future Climate Scenarios.” *Journal of Phycology*, 60, no. 5 (2024).
Available at https://onlinelibrary.wiley.com/doi/10.1111/jpy.13493.
The authors of this article investigate how climate change may impact the distribution of *Eualria fistulosa* (an Arctic kelp species). Their models project the species will experience a reduction in the distribution, and will shift northward under future increased greenhouse gas emission scenarios.

Nyman, Elizabeth and Jenna A. Lamphere. “Climate Change, Energy Production, and Arctic Tourism: A Case Study Analysis of Northern Alaska.” *Polar Record*, 60 (2024).
Available at https://www.cambridge.org/core/journals/polar-record/article/climate-change-energy-production-and-arctic-tourism-a-case-study-analysis-of-northern-alaska/93E06DBDA41EC43EAEB23FEF0C0B4E12.
This article analyses the potential future of the tourism and energy production industries in Alaska in the context of climate change.

Yarzábal, Luis A., Lenys M. Buela Salazar, and Ramón Alberto Batista-García. "Climate Change, Melting Cryosphere and Frozen Pathogens: Should We Worry…?" *Environmental Sustainability*, 4, no. 3 (2021).
Available at https://pmc.ncbi.nlm.nih.gov/articles/PMC8164958/.
The authors of this article argue that the melting of glaciers and permafrost creates a new pathway for pathogenic bacteria to enter the environment. They hypothesize that this process could lead to epidemics or pandemics.

Yoseph, Elizabeth, Elizabeth Hoy, Clayton D. Elder, Sarah M. Ludwig, David R. Thompson, and Charles E. Miller. “Tundra Fire Increases the Likelihood of Methane Hotspot Formation in the Yukon–Kuskokwim Delta, Alaska, USA.” *Environmental Research Letters*, 18 (2023).
Available at https://iopscience.iop.org/article/10.1088/1748-9326/acf50b#back-to-top-target.
Using hyperspectral imagery, researchers conducted an analysis of recently burned areas of tundra in the Yukon Delta in Alaska and found that methane hotspots are correlated with these fires. They argue that these hotspots may accelerate future warming.

Reports

National Oceanic and Atmospheric Administration. *Arctic Report Card 2024*, 2024.
Available at https://arctic.noaa.gov/wp-content/uploads/2024/12/ArcticReportCard_full_report2024.pdf.
The National Oceanic and Atmospheric Administration has published this report on the Arctic annually since 2006. The 2024 report contains essays that highlight environmental and climate changes in the Arctic.

National Oceanic and Atmospheric Administration. *NOAA’s Arctic Vision and Strategy*, March 2025.
Available at https://arctic.noaa.gov/wp-content/uploads/2025/01/NOAA_Arctic_Vision_Strategy_2025.pdf.
This report presents a three-pillar approach to address the challenges facing Arctic ecosystems and communities as a result of warming Arctic temperatures. The three pillars outlined include: Advance Environmental Science, Promote Collaborative Stewardship, and Support Resilient Communities.

Tracy, Elena. *Missing the Target: Fossil Fuel Production in The Arctic is Out of Step with the 1.5°C–Aligned Emission Reduction Goal*. World Wildlife Foundation, December 2023.
Available at https://apiwwfarcticse.cdn.triggerfish.cloud/uploads/2023/11/27143742/Missing-the-target-research-brief-FINAL.pdf.
The author presents information about the current rate of fossil fuel production in the Arctic and contends that fossil fuel production is not in line with the greenhouse gas emission goals of the Paris Agreement. She proposes that the deployment of renewable energy technologies should take precedent over fossil fuel development in the Arctic in order to meet certain emissions goals.

U.S. Library of Congress. Congressional Research Service. *Changes in the Arctic: Background and Issues for Congress*, by Ronald O'Rourke et al. R41153, July 14, 2025.
Available at https://www.congress.gov/crs-product/R41153.
This report provides background information on a wide array of issues related to the arctic, including climate change and oil and gas exploration. For environment and climate impacts, see sections "Climate Change, with Biophysical and Economic Impacts," "Fisheries," and "Protected Species."

Websites

Arctic Council. "On the Heels of Persistent Pollutants," 2021.
Available at https://arctic-council.org/news/on-the-heels-of-persistent-pollutants/.
This post summarizes a report published by the group's Arctic Monitoring and Assessment Programme on persistent organic pollutants. It also provides a history of the work done by stakeholders on the issue, including negotiations under the Stockholm Convention, an international treaty that aims to protect human health and the environment from the effects of persistent organic pollutants.

Arctic Council. "Snapshot of an Ever-Changing Arctic: The State of Arctic Terrestrial Biodiversity," 2021.
Available at https://arctic-council.org/news/snapshot-of-an-ever-changing-arctic-the-state-of-arctic-terrestrial-biodiversity/.
This Arctic Council's website highlights how the terrestrial biodiversity of the Arctic is impacted by climate change.

Climate.gov. "Arctic Development and Transport."
Available at https://toolkit.climate.gov/arctic-development-and-transport.
Climate.gov is a federal website maintained by the National Oceanic and Atmospheric Administration. This article, captured on May 3, 2025, provides the impact of enhanced development in the Arctic region related to fishing routes, ground transportation improvements, and natural resource exploration.

National Oceanic and Atmospheric Administration. "Arctic Tundra Becoming Source of Carbon Dioxide Emissions," 2024.
Available at https://www.noaa.gov/news-release/arctic-tundra-becoming-source-of-carbon-dioxide-emissions.
This resource from the National Oceanic and Atmospheric Administration summarizes findings presented in the 2024 Arctic Report Card. In particular, it summarizes findings that suggest the Arctic tundra is transitioning from a carbon sink into a carbon source.

Pacific Marine Environmental Laboratory, National Oceanic and Atmospheric Administration. "Arctic Zone: PMEL Arctic Research."
Available at https://www.pmel.noaa.gov/arctic/.
This is a discussion of numerous ongoing scientific research studies, including Arctic carbon studies, climate dynamics in the Arctic, and multinational observational-biology collaborations.

U.S. Environmental Protection Agency. "The Arctic, Alaska, and Climate Change."
Available at https://www.epa.gov/climateimpacts/arctic-alaska-and-climate-change.
This U.S. Environmental Protection Agency (EPA) website compiled a variety of resources on the Arctic, Alaska, and climate change, including links to information from both governmental and non-governmental sources.

U.S. Environmental Protection Agency. "Climate Change Indicators: Permafrost."
Available at https://www.epa.gov/climate-indicators/climate-change-indicators-permafrost.
This website presents 1978-2023 permafrost temperature data for Alaska. It also provides general background information on permafrost, including how permafrost thaw impacts the environment.

Economic and Resource Development

Impacts on the U.S. Economy

Articles

Hu, Sheila. "Offshore Drilling 101." National Resources Defense Council, (April 24, 2025).
Available at https://www.nrdc.org/stories/offshore-drilling-101.
The National Resources Defense Council (NRDC) is an organization that has advocated against offshore drilling for natural resources. This article summarizes offshore drilling and potential negative economic impacts associated with drilling and exploration.

Mills, Elizabeth. “Ice is Melting at Alarming Rates. Why Business Leaders Must Pay Attention.” *World Economic Forum: Centre for Nature and Climate*, (April 17, 2025). Available at https://www.weforum.org/stories/2025/04/ice-melting-adaptation-why-businesses-need-climate-resilience/.
The article on the World Economic Forum’s website explains how melting Arctic ice has significant impacts to the environment. These impacts have implications for business, both as potential opportunities and challenges.

Zhang, Ying. “Limited Increases in Arctic Offshore Oil and Gas Production with Climate Change and the Implications for Energy Markets.” Scientific Reports, 14 (2024).
Available at https://www.nature.com/articles/s41598-024-54007-x.
This article examines how Arctic offshore exploration of gas and oil could impact energy markets and the economies of certain countries.

Reports

Arctic Economic Council. *Arctic Mining Report 2024*. (September 2024).
Available at https://arcticeconomiccouncil.com/wp-content/uploads/2024/10/aec-arctic-mining-report-2024-sample.pdf.
This report provides an overview and data on the current status and potential for mining natural resources in the Arctic region. Barriers to greater mining activity are introduced, as well as projections of future yields depending on various factors.

Energy and Industrial Environmental Partners. *The Economic Impacts of a Consistent Offshore Oil and Natural Gas Legislated Leasing Program*. (January 2025).
Available at https://docs.house.gov/meetings/II/II06/20250211/117868/HHRG-119-II06-20250211-SD014.pdf.
This report was created for consideration by the U.S. Congress. The report provides the economic impacts of U.S. offshore oil and gas exploration, including offshore of Alaska while advocating for less restrictive policies governing those industries.

United Nations, Environment Programme. *Harmful Marine Extractives: Understanding the Risks and Impacts of Financing Non-Renewable Extractive Industries*. (2022).
Available at https://www.unepfi.org/wordpress/wp-content/uploads/2022/04/Harmful-Marine-Extra-ctives_Offshore-Oil-Gas.pdf.
This report looks at economic and other factors on a global scale and in international areas that may impact more than one country. Users may have to fill out a registration webform to access this free full-text report.

U.S. Library of Congress. Congressional Research Service. *Arctic National Wildlife Refuge (ANWR) Oil and Gas Program: Provisions in P.L. 115-97, Tax Cuts and Jobs Act*, by Laura Comay. IF10782, updated September 26, 2024.
Available at https://www.congress.gov/crs-product/IF10782.
This report describes past congressional consideration for authorizing the development of energy resources in the Arctic National Wildlife Refuge, located in northeast Alaska.

U.S. Library of Congress. Congressional Research Service. *Arctic National Wildlife Refuge (ANWR): An Overview*, by Laura Comay et al. RL33872, updated April 25, 2025.
Available at https://www.congress.gov/crs-product/RL33872.
The authors of this report describe prominent issues related to the Arctic National Wildlife Refuge, located in northeast Alaska, with a focus on oil and natural gas development topics.

Websites

U.S. Department of the Army, Operational Environment Data Integration Network. "Economic Overview: Arctic."
Available at
https://odin.tradoc.army.mil/DATE/314a800cd2905107d14cda70684e31ac.
This entry in the web portal provides potential interests and impacts of the Arctic region. It provides detailed economic sector analysis of industries and their output, employment, and importance to the region.

U.S. Department of Energy. "The Economic Benefits of Oil and Gas."
Available at https://www.energy.gov/articles/economic-impact-oil-and-gas?nrg_redirect=45516.
This fact sheet provides talking points about the positive impacts of oil and gas exploration and extraction on the U.S. economy.

University of Alaska-Fairbanks, International Arctic Research Center. *Alaska's Arctic Oil Economy*. (2025).
Available at https://uaf-iarc.org/alaska-arctic-policy-trends/energy-issues/oil-economy/.
This report examines the reliance on the Alaskan economy on oil extraction. Data supports the number of jobs created and the dependence on the oil industry to keep Alaskans out of poverty, and how Alaska is changing to respond to new trends.

Infrastructure and Transportation Effects

Articles

Alisa, Reiner. "Navigating the North Seas: Balancing Environmental and Cultural Concerns of Arctic Shipping." *Yale Environment Review*, (November 2, 2024).
Available at https://environment-review.yale.edu/navigating-north-seas-balancing-environmental-and-cultural-concerns-arctic-shipping.
This article explores shipping activity and routes in the Arctic. It examines environmental, cultural, and economic impacts of enhanced shipping due to multi-national enhanced interest in the region.

The Economist. "The Arctic: Climate Change's Great Economic Opportunity." (January 23, 2025).
Available at https://www.economist.com/finance-and-economics/2025/01/23/the-arctic-climate-changes-great-economic-opportunity.
This article suggests that access to and around the Arctic region could result in exploration and enhancement of many industries due to climate change.

Houck, Olivia Wynne. "Infrastructure in the Arctic: The Arctic Institute Infrastructure Series." *The Arctic Institute*, (March 22, 2022).
Available at https://www.thearcticinstitute.org/infrastructure-arctic-the-arctic-institute-infrastructure-series/.
This article discusses the infrastructure, including railroads, broadband internet, roads, among others, needed for greater exploration of the Arctic. The infrastructure is and would be used by many stakeholders across various sectors.

Jacobsen, Jax. "Could Airships Solve the Arctic's Transportation problems?" *Arctic Research Foundation,* (July 11, 2024).
Available at https://www.arcticfocus.org/stories/could-airships-solve-the-arctics-transportation-problems/.
This article explains that the increased cost of trade in the Arctic north is largely due to transport deficiencies, tied to heavy use of "ice roads" accessible only during (increasingly shorter) winter months. The article discusses the possible use of blimps and other airships to provide large-capacity and cost-effective transportation, for cargo and for passengers alike.

Lasserre, Frédéric. "Arctic Seaways in the Age of Climate Change." G*eorgetown Journal of International Affairs*, (April 18, 2022).
Available at https://gjia.georgetown.edu/2022/04/18/arctic-seaways-in-the-age-of-climate-change/.
This article explores how some countries (Russia, China, and Canada) have approached Arctic shipping strategies in response to Arctic sea ice melt.

Lee, Henry. "Infrastructure Challenges in the Alaskan Arctic." *Belfer Center for Science and International Affairs,* Harvard Kennedy School, (August 31, 2023).
Available at https://www.belfercenter.org/publication/infrastructure-challenges-alaskan-arctic.
Lee discusses the difficulties in providing basic infrastructure such as water, sewage, and electricity transmission systems in northern Alaska settlements with populations of about 3,000 people apiece. Infrastructure materials and equipment are expensive to transport, and the primary source of power, diesel fuel, must be flown in at double cost. Designing and building water and sanitation systems to withstand routine -20° F temperature increases costs severalfold.

Todorov, Andrey. "Arctic Shipping: Trends, Challenges and Ways Forward." *Harvard University, Belfer Center for Science and International Affairs*, (August 23, 2023).
Available at https://www.belfercenter.org/publication/arctic-shipping-trends-challenges-and-ways-forward.
This article reviews commercial shipping trends and challenges in the Arctic region.

Uryupova, Ekaterina. “Climate Change and Challenges of Navigation in the Arctic: How Safe are We?” *The Arctic Institute*, (April 30, 2024).
Available at https://www.thearcticinstitute.org/climate-change-challenges-navigation-arctic-how-safe-are-we/.
This article explores the ways that melting sea ice presents both challenges and opportunities for Arctic navigation.

Reports

Brownlee, Genevieve. *Cold Calculations: Economic Prospects for Arctic Shipping Routes*. Middlebury Institute of International Studies, International Trade and Economic Diplomacy Working Paper Series, (June 2024).
Available at https://www.middlebury.edu/institute/sites/default/files/2024-07/cold-calculations-arctic-shipping-routes_miis_ited-working-paper_june2024.pdf.
This report analyzes the enhanced maritime trade routes of the Arctic region. It discusses economic impacts that the routes would have on countries involved with international interests in the region.

Websites

Arctic Review. “From Planes to Railways: Transport Infrastructure Strategies Across the Arctic.” (August 22, 2024).
Available at https://arctic.review/papers/arctic-transport-strategies/.
This piece provides an overview of some of the difficulties of and potential return on infrastructure investment in regions such as the Arctic.

Communities / Land Impacts

Articles

Anania, Katherine.“The Arctic Is Our Last Global Commons – Let’s Manage Its Fisheries Properly.” *RAND Corporation*, (June 30, 2023).
Available at https://www.rand.org/pubs/commentary/2023/06/the-arctic-is-our-last-global-commons-lets-manage-its.html.
In the commentary, the author discusses the need for a fisheries management plan in the Arctic, especially as the potential demand for fisheries resources may increase while climate change may negatively impact some fisheries in the region. Fish resources may become depleted if overharvested, and negative long-term impacts for consumers and the ecosystem may be irreversible.

Silva, Pedro Allemand Mancebo. “The Old Colonialisms and the New Ones: The Arctic Resource Boom as a New Wave of Settler Colonialism.” *The Arctic Institute*, (October 25, 2022).
Available at https://www.thearcticinstitute.org/old-colonialisms-new-ones-arctic-resource-boom-new-wave-settler-colonialism/.
This article discusses the enhanced exploration of the Arctic region and potential impacts may to Indigenous Peoples.

Reports

Kolker, Amanda, Robbin Garber-Slaght, Benjamin Anderson, Timothy Reber, Karina Zyatitsky, and Hannah Pauling. *Geothermal Energy and Resilience in Arctic Countries*. National Renewable Energy Laboratory, April 2022.
Available at https://www.nrel.gov/docs/fy22osti/80928.pdf.
This report evaluates the energy sources currently powering communities in the Arctic, noting in particular that diesel fuel is the primary energy source for remote communities in northern Alaska and across the Arctic. The report analyzes the feasibility of expanding on existing geothermal energy resources to power remote, rural, and (further south) urban Arctic communities. The authors recommend further development of geothermal energy systems across the Arctic.

U.S. Library of Congress. Congressional Research Service. Changes in the Arctic: Background and Issues for Congress, by Ronald O'Rourke et al.. R41153, updated July 14, 2025.
Available at https://www.congress.gov/crs-product/R41153.
This report provides background information on a wide array of issues related to the arctic. For Indigenous Peoples considerations, see the section "Indigenous People Living in the Arctic."

Websites

Sustainability Directory. "Indigenous Arctic Economies." March 23, 2025.
Available at https://climate.sustainability-directory.com/term/indigenous-arctic-economies/.
This website compares the traditional economies of Indigenous communities in Arctic regions to the emerging economies of those same communities - impacted by development, exploration, tourism, and other growing sectors.

Security and Geopolitical Considerations

Articles

Dagaev, Andrei. "The Arctic Is Testing the Limits of the Sino-Russian Partnership." *Carnegie Politika*, (February 18, 2025).
Available at https://carnegieendowment.org/russia-eurasia/politika/2025/02/russia-china-arctic-views.
Dagaev provides commentary on the current state of cooperation between China and Russia on Arctic issues. The author theorizes that meaningful geopolitical cooperation between the two countries remains limited in the Arctic in part due to the differing approaches of each country: Russia desires to act unilaterally, while China remains committed to multilateral participation with additional Arctic stakeholders.

Lamazhapov, Erdem, and Arild Moe. “Russia’s Geopolitical Position in the Arctic: What’s New?” *Strategic Analysis* 48, no. 6 (2024): 604-618.
Available at https://doi.org/10.1080/09700161.2025.2459571
The authors analyze the effects of the Ukraine war on Russia’s geopolitical strategy in the Arctic, finding that the political fallout from the war has served to limit Russia’s plans in the region. They examine changes to Russia’s strategies in the Arctic in terms of policy, economic development, Arctic environment and climate, and increased cooperation with Asian countries.

Magnuson, Stew and Josh Luckenbaugh. “New Arctic Strategy Calls For Updated Cold-Weather Tech.” *National Defense,* (July 22, 2024).
Available at https://www.nationaldefensemagazine.org/articles/2024/7/22/new-arctic-strategy-calls-for-updated-cold-weather-tech
This article reports that the Department of Defense’s 2024 Arctic Strategy anticipates largely ice-free Arctic summers by 2030; increased trans-Arctic shipping and resource extraction; and maritime transit “chokepoints” in the Bering Strait, located between Alaska and Russia, and in the Barents Sea, located north of Norway. The new strategy recommends increased use of sensors, intelligence, and information-sharing capacities.

Ondrášková, Jana.” Securing Our Digital Lifelines: Quantum Technology and the Battle for Arctic Supremacy.” *Center for Circumpolar Security Studies*, The Arctic Institute, (December 19, 2024).
Available at https://www.thearcticinstitute.org/securing-digital-lifelines-quantum-technology-battle-arctic-supremacy/
This article discusses the importance of safeguarding undersea communication cables to preserve the security, reliability, and resilience of trans-Arctic lines of digital telecommunication. The author urges the use of quantum sensors to increase both the resilience and signal-to-noise ratio of the communication traffic, as well as provide early-warning systems for potential sabotage, service disruptions, or signal tapping by Russian or Chinese adversaries.

Pechko, Kiel. “Rising Tensions and Shifting Strategies: The Evolving Dynamics of US Grand Strategy in the Arctic.” *Arctic Institute*, (January 7, 2025).
Available at https://www.thearcticinstitute.org/rising-tensions-shifting-strategies-evolving-dynamics-us-grand-strategy-arctic/
The author examines the evolving geopolitical situation in the Arctic, finding that the Arctic policies of the United States, Russia, and China have transitioned from cooperative to competitive due to a variety of factors. He endorses the 2024 U.S. Department of Defense Arctic Strategy, arguing that, if properly implemented, it will serve to maintain stability and security in the Arctic region.

Pincus, Rebecca. “Three-Way Power Dynamics in the Arctic.” *Strategic Studies Quarterly* 14, no. 1 (2020): 40-63.
Available at https://www.airuniversity.af.edu/Portals/10/SSQ/documents/Volume-14_Issue-1/Pincus.pdf.
The author highlights the growing international significance of the Arctic region to the great power competition between the United States, China, and Russia. She explores the extent of China-Russia cooperation through three facets: economic, military, and political. The author advocates for a linked strategic approach factoring in all three facets from the United States.

Raikov, Yu. A. “Russia and the United States in the Arctic: From Competition to Confrontation.” *Herald of the Russian Academy of Sciences* 92, no. Supp. 2 (2022): S148-S154.
Available at https://doi.org/10.1134/S101933162208010X.
The author places the recent geopolitical developments in the Arctic in the context of the “great powers” rivalry between the United States, Russia, and China. He finds that, amid the backdrop of increasing tensions and security considerations in the Arctic, multilateral cooperation between the United States, Russia, and other Arctic stakeholders will be necessary to maintain stability in the region.

Raspotnik, Andreas, and Andreas Østhagen. “What about the Arctic? The European Union’s Geopolitical Quest for Northern Space.” *Geopolitics* 26, no. 4 (2019): 1150-1174.
Available at https://doi.org/10.1080/14650045.2019.1670643.
This article examines the European Union’s geopolitical involvement in the Arctic region between 2008 and 2018. The authors conclude that the EU has not been able to craft a coherent argument justifying the need for its involvement in the region.

Safeer, Hadia. “The Arctic: A New Arena for U.S., Russian, and Chinese Competition.” *World Geostrategic Insights*, (March 26, 2024).
Available at https://www.wgi.world/the-arctic-a-new-arena-for-u-s-russian-and-chinese-competition/.
The author provides an overview of the geopolitical interests of the United States, Russia, and China in the Arctic region. She presents the strategic interests of the primary stakeholders in the region, examines the key areas of competition between them, and suggests the implementation of specific frameworks for cooperation between the countries in order to maintain stability in the region.

Sharma, Bipandeep, and Uttam Kumar Sinha. “Hot Stakes in the Arctic: Global Rivalries and New Geopolitical Forces.” *Strategic Analysis* 48, no. 6 (2024): 578-587.
Available at https://doi.org/10.1080/09700161.2025.2451001.
The authors analyze the shifting geopolitical situation in the Arctic, finding that threat perceptions between Russia and the other traditional Arctic stakeholders are at an all-time high. Additionally, they examine how India, with its independent diplomatic ties to these countries, can position its geopolitical interests in the region. They argue for a more inclusive Arctic Council, an intergovernmental forum for addressing issues in the Arctic, that expands its membership to non-Arctic states with interests in the region in order to strengthen Arctic governance.

Sharyi, Viacheslav I. "The Arctic: The Struggle for Resources and Influence in the Region." *Comparative Strategy* 42, no. 6 (2023): 776-788.
Available at https://doi.org/10.1080/01495933.2023.2263336.
The author provides a high-level overview of the evolving geopolitical situation in the Arctic due to changing environmental conditions, with a particular focus on the interests of Canada, Russia, the United States, Norway, Denmark, Iceland, Sweden, and Finland (i.e., the eight Arctic Nations with territory in the region). He posits that international cooperation needs to strike a balance between economic interests and environmental protection, while stating that future studies should examine effective methods for doing so.

Books

Buchanan, Elizabeth. *Red Arctic: Russian Strategy Under Putin*. Washington, DC: Brookings Institution Press, 2023.
In this book, the author delivers an in-depth exploration of Russia's geopolitical strategy in the Arctic under Putin, with chapters covering the history of Russia's activities in the Arctic, the current geopolitical climate, case studies on international cooperation, and predictions for future activities in the region. The author argues that Russia's Arctic strategy remains reliant on international cooperation with foreign countries and entities.

Coates, Ken S., and Carin Holroyd, eds. *The Palgrave Handbook of Arctic Policy and Politics*. Cham, Switzerland: Palgrave Macmillan, 2020.
Available at https://doi.org/10.1007/978-3-030-20557-7.
This book provides a comprehensive overview of geopolitical issues facing the Arctic region from a wide array of scholars. Subjects covered include sections on the policies of Arctic nations, the Arctic and international relations, Arctic legal and institutional systems, Arctic security, and reflections on the future of the Arctic.

Czarny, Roman S., Magdalena Tomala, and Iwona Wrońska. *Politics and Development in the North American Arctic: Examining the Regional Consequences of Climate Change.* Bingley, UK: Emerald Publishing, 2021.
In this book, the authors examine geopolitical relations in the Arctic through the theoretical framework of game theory. In doing so, they analyze whether international cooperation or competition will best benefit the various Arctic regional stakeholders. The authors theorize that international cooperation would provide the most beneficial results.

Finger, Matthias, and Gunnar Rekvig, eds. *Global Arctic: An Introduction to the Multifaceted Dynamics of the Arctic*. Cham, Switzerland: Springer, 2022.
Available at https://doi.org/10.1007/978-3-030-81253-9.
This book offers in-depth explanations of the varying factors influencing the current geopolitical situation in the Arctic region. The different sections cover subjects as wide-ranging as the evolving images and perceptions of the region, the economic and geopolitical interests of the various Arctic stakeholders, and future potential governance of the Arctic.

Likhacheva, Anastasia, ed. *Arctic Fever: Political, Economic & Environmental Aspects*. Singapore: Palgrave Macmillan, 2022.
Available at
This book provides an exploration of Arctic geopolitics through a comparative analysis of the different regional agendas of Arctic stakeholders, with a particular focus on the United States, China, and Russia. The book utilizes a regional structure for its analyses, with different sections covering the interests of Russia, North America, Scandinavia/Europe, and Asia.

Thompson-Jones, Mary. *America in the Arctic: Foreign Policy and Competition in the Melting North*. New York, NY: Columbia University Press, 2025.
This book examines the history of United States foreign policy involvement in the Arctic, concentrating on U.S. relations with Canada, Iceland, Greenland, Denmark, Norway, Finland, Sweden, and Russia. The author argues that greater United States involvement in the region is needed going forward, particularly in light of changing environmental factors affecting the region.

Weber, Joachim, ed. *Handbook on Geopolitics and Security in the Arctic: The High North Between Cooperation and Confrontation.* Cham, Switzerland: Springer Nature, 2020.
Available at
This book provides a comprehensive overview of Arctic geopolitics and security, with sections covering the "Arctic Five" (Russia, U.S., Canada, Norway, and Denmark) and other "Arctic Stakeholders" (China, European Union, India, and Singapore). The book then analyzes the interplay of these varying stakeholders across geostrategic concepts, including military security and resource interests.

Reports

Koivurova, Timo, Alf Håkon Hoel, Malte Humpert, Stefan Kirchner, Andreas Raspotnik, Małgorzata Śmieszek, and Adam Stępień. *Overview of EU actions in the Arctic and their Impact*. EPRD Consortium, June 2021.
Available at
EU-Policy-Arctic-Impact-Overview-Final-Report.pdf
This report provides an overview of European Union (EU) policies and initiatives relevant to the Arctic, examining both Arctic-specific and broader EU policies that impact the region. It assesses the EU's environmental and economic footprint in the Arctic and explores policy options to strengthen its influence.

Pezard, Stephanie, Stephen J. Flanagan, Scott W. Harold, Irina A. Chindea, Benjamin J. Sacks, Abbie Tingstad, Tristan Finazzo, et al. *China's Strategy and Activities in the Arctic*. RAND Corporation, December 23, 2022.
Available at
This report examines China's growing involvement in the Arctic region and evaluates potential risks stemming from this increased involvement. The researchers find that the government of China's involvement remains limited in the Arctic, primarily due to successful efforts from the U.S., Denmark, and Canada. The report presents recommendations for further steps that can be taken by the United States to limit China's influence in the region.

Rumer, Eugene, Richard Sokolsky, and Paul Stronski. *Russia in the Arctic—A Critical Examination*. Carnegie Endowment for International Peace, March 29, 2021.
Available at https://carnegieendowment.org/research/2021/03/russia-in-the-arctica-critical-examination.
This report analyzes recent developments with Russia's security and geopolitical strategy in the Arctic region. The authors examine these developments in light of Russia's history in the region, finding that they signal a return to Cold War-era posturing. They recommend that the United States and North Atlantic Treaty Organization (NATO) take a measured approach in order to prevent any unnecessary escalation in the region.

Sacks, Benjamin J., Scott R. Stephenson, Stephanie Pezard, Abbie Tingstad, and Camilla T. N. Sørensen. *Exploring Gaps in Arctic Governance*. RAND Corporation, July 27, 2021.
Available at https://www.rand.org/pubs/research_reports/RRA1007-1.html.
This report evaluates governance gaps in the Arctic that could potentially bring to an end the long-standing international cooperation in the region, particularly between the eight Arctic Nations with territory in the region: Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden, and the United States. The researchers recommend addressing these governance gaps by improving communication on military concerns, updating capabilities for implementing existing agreements, and providing for more inclusivity in regional.

Tingstad, Abbie, Scott Savitz, Benjamin J. Sacks, Yuliya Shokh, Irina A. Chindea, Scott R. Stephenson, Michael T. Wilson, et al. *Report on the Arctic Capabilities of the U.S. Armed Forces*. RAND Corporation, November 1, 2023.
Available at https://www.rand.org/pubs/research_reports/RRA1638-1.html.
This report, mandated by Section 8424 of the William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021 (Public Law 116-283), offers an assessment of the Arctic capabilities of the U.S. armed forces. The researchers compare the U.S. armed forces' capabilities with those of other international Arctic stakeholders, finding that they fall short in key areas, in part due to capacity limitations. The report presents several recommendations for addressing these limitations.

Wall, Colin, and Njord Wegge. *The Russian Arctic Threat: Consequences of the Ukraine War.* Center for Strategic and International Studies, January 25, 2023.
Available at https://www.csis.org/analysis/russian-arctic-threat-consequences-ukraine-war.
This report analyzes the effects of the Russia-Ukraine war on the security and geopolitics of the Arctic region. The researchers compare Russia's pre-war military capabilities in the Arctic with its current (as of the date of the report) Arctic military capacity and find that the war has served to weaken its conventional military strength, leading to the potential utilization of "hybrid tactics," such as sabotage and propaganda. They recommend that the United States and North Atlantic Treaty Organization (NATO) develop security strategies taking this possibility into account.

Wall, Colin, Rachel Ellehuus, Andreas Østhagen, Jon Rahbek-Clemmensen, Margrét Cela, and Pia Hansson. *Geopolitics and Neglected Arctic Spaces: Three Northern Perspectives on Balancing External Perspectives*. Center for Strategic and International Studies, November 2, 2020.
Available at https://www.csis.org/analysis/geopolitics-and-neglected-arctic-spaces.
This report provides the geopolitical and security perspective of three Arctic spaces: Svalbard, Norway; Greenland; and Iceland. The authors analyze the unique security concerns of each space, as they navigate the interest of the "great powers" represented by China, Russia, and the United States.

Williams, Ian, Heather A. Conley, Nikos Tsafos, and Matthew Melino. *America's Arctic Moment: Great Power Competition in the Arctic to 2050*. Center for Strategic and International Studies, March 30, 2020.
Available at https://www.csis.org/analysis/americas-arctic-moment-great-power-competition-arctic-2050.
This report provides an in-depth examination of the potential strategic consequences if China and Russia's investments in economic and security interests in the Arctic region outpaces that of the United States. The researchers argue that the United States government needs to prioritize increasing its presence in the Arctic, and they suggest recommendations for increased investment in the region.

U.S. Congress, House. Subcommittee on Coast Guard and Maritime Transportation of the Committee on Transportation and Infrastructure. *Snowed In: United States Disinvestment in the Arctic*, hearing. 118th Cong., 2nd sess., November 14, 2024: Washington, DC: U.S. Government Publishing Office, 2024.
Available at https://www.govinfo.gov/content/pkg/CHRG-118hhrg58691/pdf/CHRG-118hhrg58691.pdf.
A staff summary, member comments, and witness testimony bring out that the US Coast Guard's Arctic capacities are badly under resourced. Two Coast Guard icebreakers are in service: a heavy-duty icebreaker commissioned in 1976 and long past its regular service life, and a medium-duty icebreaker designed for Arctic research. Both ships were out of service in summer 2024, leaving the United States without an operational vessel capable of polar ice-breaking for several months.

U.S. Library of Congress. Congressional Research Service. *Coast Guard Polar Security Cutter (PSC) and Arctic Security Cutter (ASC) Icebreaker Programs: Background and Issues for Congress*, by Ronald O'Rourke. RL34391, updated June 30, 2025.
Available at https://www.congress.gov/crs-product/RL34391.
The author explains that the U.S. Coast Guard is the sole operator of the U.S. Arctic fleet but does not currently have enough icebreakers to perform its Arctic missions in coming years. Challenges include budget constraints and the need for more highly trained welders and design engineers. This report summarizes the Coast Guard's current two icebreakers and plans for a third to come online in summer 2026; it also discusses plans for delivery in 2030 of heavy Polar Security Cutters.

Legal and Political Frameworks

Articles

Götze, Jacqueline. "Developing a Framework for the Analysis of Arctic Indigenous Institutions in a Rapidly Transforming Region." *Arctic Yearbook,* (2020).
Available at https://arcticyearbook.com/images/yearbook/2020/Scholarly-Papers/8_Goetze.pdf.
This article examines how post-colonial dynamics, international agreements, and other global arrangements affect Indigenous rights in the Arctic region and addresses the roles of Indigenous institutions and bodies, namely the Inuit Circumpolar Council and the Saami Council.

McKenzie, Jeremy. "US Arctic Policy Since Nixon: Continuity and Incremental Change." *Journal of Arctic and Climate Security Studies,* 1, no. 1 (2023): 41-60.
Available at https://www.academia.edu/108164045/US_Arctic_Policy_Since_Nixon_Continuity_and_Incremental_Change.
This article surveys U.S. Policy in the Arctic region since the Nixon Administration in order to compare today's Arctic policy with that of the 1970s and incorporate climate change as a modern-day threat.

Pechko, Kiel. "Rising Tensions and Shifting Strategies: The Evolving Dynamics of US Grand Strategy in the Arctic." *The Arctic Institute*, (January 17, 2025).
Available at https://www.thearcticinstitute.org/rising-tensions-shifting-strategies-evolving-dynamics-us-grand-strategy-arctic/.
The author examines the evolving geopolitical situation in the Arctic, finding that the Arctic policies of the United States, Russia, and China have transitioned from cooperative to competitive due to a variety of factors. He endorses the 2024 U.S. Department of Defense Arctic Strategy, arguing that, if properly implemented, it will serve to maintain stability and security in the Arctic region.

Pincus, Rebecca. "Three-Way Power Dynamics in the Arctic." *Strategic Studies Quarterly,* 14, no. 1 (2020): 40-63.
Available at https://www.jstor.org/stable/26891883.
The author details the economic, military, and political cooperation between China and Russia in the Arctic region and how the United States' geopolitical strategy can be influenced by this relationship.

Rafaly, Vonintsoa. "The Law of the Sea in the Age of Building an Appropriate Arctic Ocean Governance Addressing Climate Change Issues." *The Yearbook of Polar Law Online*, 13, no. 1 (2022): 233-251.
Available at https://doi.org/10.1163/22116427_013010012.
This article provides an overview of the United Nations Convention on the Law of the Sea in the context of environmental policy. It examines how the provisions of this international convention may address issues related to climate change and industrial fishing, and determines whether the convention provides an adequate framework for future governance of the region.

Zellen, Barry Scott. "Arctic Indigenous Peoples and the State: Toward a Universal Convergence of Arctic Reconciliation." *Arctic Yearbook,* (2021).
Available at https://arcticyearbook.com/images/yearbook/2021/Briefing-Notes/4_AY2021_BN_Zellen.pdf.
This briefing note frames the issues of Arctic tribal governance and tribal cooperation within the larger context of regional stability, citing global tension between and among the Arctic governing bodies.

Books

Boyd, Judy. "Striving Towards Comprehensive Security and Governance in the US Arctic." In *The Routledge Handbook of Arctic Governance*, edited by Elena Conde and Corine Wood-Donnelly. Routledge, 2025.
A book chapter that analyzes U.S. security and governance in the Arctic region over time. It highlights the evolution from a strict military focus to a more comprehensive, wide-ranging approach over the past 50 years, culminating with three governance factors that may negatively affect security in the near future. It also includes a list of White House documents on Arctic policy and strategy.

Roncero-Martín, José Miguel. "Social and Political Challenges in a Blue Arctic." In *The Routledge Handbook of Arctic Governance*, edited by Elena Conde and Corine Wood-Donnelly. Routledge, 2025.
This book chapter frames current and future social and political challenges in the Arctic region within the greater context of climate change and the melting of Arctic ice.

Thompson-Jones, Mary. *America in the Arctic*. Columbia University Press, 2025.
This book offers a pathway for United States Arctic policy in light of recent geopolitical events. The author examines past and current relationships between the U.S. and countries in the Arctic region and recaps U.S. Arctic history throughout the 20th century, arguing that the United States must increase its presence in and bolster its commitment to the Arctic region.

Reports

U.S. Department of Defense. *2024 Arctic Strategy*, 2024.
Available at https://media.defense.gov/2024/Jul/22/2003507411/-1/-1/0/DOD-ARCTIC-STRATEGY-2024.PDF.
The Department of Defense 2024 Arctic strategy guides the Department's approach for addressing national security interest in the region and cooperating with Arctic nations, among other issues.

U.S. Library of Congress. Congressional Research Service. *Outer Limits of the U.S. Extended Continental Shelf: Background and Issues for Congress*, by Caitlin Keating-Bitonti. R47912, February 7, 2024.
Available at https://www.congress.gov/crs-product/R47912.
This report provides considerations for Congress regarding the United States' accession to the United National Convention on the Law of the Sea in light of recent establishment of the outer limits of the U.S. Extended Continental Shelf in 2023, which includes areas of the Arctic seabed.

U.S. Library of Congress. Congressional Research Service. *Changes in the Arctic: Background and Issues for Congress*, by Ronald O'Rourke et al. R41153, updated July 14, 2025.
Available at https://www.congress.gov/crs-product/R41153.
This report provides background information on a wide array of issues related to the arctic. From a legal and political perspective, it delves into U.S. Department of Defense and U.S. Coast Guard actions to defend U.S. economic and national security interests. Refer to the report's section, "Major U.S. Policy Documents Relating to the Arctic."

White House. *Implementation Report for the 2022 National Strategy for the Arctic Region*. January 2025.
Available at https://bidenwhitehouse.archives.gov/wp-content/uploads/2025/01/NSAR-2022-Implementation-Report-.pdf.
This 2022 strategy report from the White House elaborates on the United States' presence in the region and how the U.S. federal government seeks to uphold U.S. security, prepare for increased international activity, bolster climate change resilience, and honor Tribal sovereignty in the region.

Websites

Arctic Council. "International Cooperation in the Arctic."
Available at https://arctic-council.org/explore/work/cooperation/.
This website from the Arctic Council, an intergovernmental forum for addressing issues in the Arctic, outlines the international agreements and general cooperation established between the eight Arctic States. These agreements seek to bolster cooperation on maritime, environmental, Indigenous, and scientific issues in the Arctic region.

Arctic Council. "Permanent Participants."
Available at https://arctic-council.org/about/permanent-participants/.
The Arctic Council, an intergovernmental forum for addressing issues in the Arctic, highlights six Indigenous Peoples' organizations that have consultation rights with the Council, including the Aleut International Association, the Inuit Circumpolar Council, and the Russian Association of Indigenous Peoples of the North.

Arctic Portal. “UNCLOS.”
Available at https://arcticportal.org/shipping-portlet/governance/unclos.
This primer on the United Nations Convention on the Law of the Sea (UNCLOS) summarizes and extrapolates key points of the treaty, including rules on maritime boundaries, resource rights, and marine environment protection, which would apply to areas of the Arctic Ocean.

Congress.gov. “S.373 – 98th Congress (1983-1984): Arctic Research and Policy Act of 1984.” July 31, 1984.
Available at https://www.congress.gov/bill/98th-congress/senate-bill/373.
A summary of the Arctic Research and Policy Act of 1984 (Public Law 98-373). The law created the U.S. Arctic Research Commission and promoted inter-governmental cooperation, research and information sharing methods, and public meetings concerning the Arctic region.

Interagency Arctic Research Policy Committee. “About IARPC and IARPC Collaborations.”
Available at https://www.iarpccollaborations.org/about.html.
IARPC, a committee comprised of 18 federal agencies, departments, and offices, focuses on advancing efforts to meet Arctic research needs. This webpage defines the Arctic region, highlights the Arctic Research Plan, and lists the federal entities working together to achieve these goals.

U.S. Arctic Research Commission. “About USARC.”
Available at https://www.arctic.gov/about-usarc/.
A website from the U.S. Arctic Research Commission, an independent federal agency created by the Arctic Research and Policy Act of 1984. It outlines the agency’s functions, which include advising the president and Congress on Arctic policy, crafting biennial scientific research reports, and working with other Arctic-focused councils and foundations.

U.S. Department of Commerce. National Oceanic and Atmospheric Administration. Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean. Ilulissat, Greenland, 2018.
Available at https://vlab.noaa.gov/documents/22926311/0/AGREEMENT+TO+PREVENT+UNREGULATED+HIGH+SEAS+FISHERIES+IN+THE+CENTRAL+ARCTIC+OCEAN.pdf/b33ec030-17f1-20d5-7c73-a50f84cf6712?t=1685588546248.
This agreement between the United States and 8 other countries as well as the European Union seeks to prevent unregulated fishing in the central Arctic Ocean to protect marine ecosystems and to promote sustainable fishing.

University of Washington. “Indigenous Affairs in the Arctic.”
Available at https://guides.lib.uw.edu/research/arctic/indigenous.
This research guide outlines both foreign and domestic Indigenous councils, bodies, and communities that have considerable presence in the Arctic region, including those in Alaska, Canada, Greenland, and Russia.

Technology and Innovation

Emerging Technologies and Tools

Articles

Allen, Kirk. "Arctic Security is Increasingly Under Threat. Drones Can Help." *New Atlanticist*, Atlantic Council, (July 26, 2023).
Available at https://www.atlanticcouncil.org/blogs/new-atlanticist/arctic-security-is-increasingly-under-threat-drones-can-help/.
The author discusses how Arctic-ready unmanned aircraft systems are cost-effective tools to help fill security gaps and monitor increased commercial and illegal activity. The unmanned aircraft systems can provide video, radar, and communications support for situational awareness and real-time intelligence. They can also be used to monitor wildlife and ice melt.

Cashman, Helen. "Airships Offer a Green Alternative to Canada's Melting Ice Roads." *Belfer Center for Science and International Affairs, Harvard Kennedy School,* (March 25, 2024).
Available at https://www.belfercenter.org/publication/airships-offer-green-alternative-canadas-melting-ice-roads.
This article provides a summary of the shrinking availability of winter ice roads in northern Canada each year, and recommends public investment in electric-powered airships. She reports that airships need only minimal landing infrastructure, use less fuel than airplanes, and can haul up to three tractor-trailers' worth of goods. The article identifies several challenges to creating viable business models, including weathering Arctic weather conditions and consulting Indigenous communities.

Castañón, Laura. "Robots to the Rescue." *Oceanus: The Journal of Our Ocean Planet,* Woods Hole Oceanographic Institution, (May 31, 2023).
Available at https://www.whoi.edu/oceanus/feature/robots-to-the-rescue/.
The author explains how robots are important tools for ocean science. Acting as monitors, explorers, warning systems and scientific partners, ocean robots continue to take on new roles as advances in technology facilitate improved longevity, greater processing power and intelligence. She gives an example of robots as emergency responders in the Arctic, where resources are scarce.

Gentemann, Chelle, Marisol Garcia-Reyers and Jorge Vazquez-Cuervo. "Exploring the Arctic Ocean with Sailing Robots." *The Circle*: *Quarterly Magazine*, WWF Arctic Programme*,* (April 2023): 24-27.
Available at https://www.arcticwwf.org/the-circle/stories/exploring-the-arctic-ocean-with-sailing-robots/.
The authors describe a solar-powered autonomous sailing craft called "saildrones," that can measure ocean currents, salinity, and temperature, and transmit the data in real time. The article discusses the research findings from the National Aeronautics and Space Administration and National Oceanic and Atmospheric Administration field campaign of five saildrones deployed to study the marginal Arctic ice zone.

Gupta, Srishti. “US Army to Test MIT’s Smart Fiber Computer Clothing for Arctic Operations." *Interesting Engineering,* (February 26, 2025).
Available at https://interestingengineering.com/innovation/mit-develops-smart-fiber-computers?group=test_b.
This article reports on a fiber-based computer developed by the Massachusetts Institute of Technology that can be integrated into textile fabrics and sewn into Arctic clothing to monitor the wearers’ physical activity and physiological measurements in real time. The author reports that U.S. Army and Navy service members will conduct field tests of the fiber computers during a month-long Arctic expedition called Musk Ox II.

Hentz, Daniel. “A Cabled Ocean.” *Oceanus: The Journal of Our Ocean Planet,* Woods Hole Oceanographic Institution, (April 18, 2024).
Available at https://www.whoi.edu/oceanus/feature/a-cabled-ocean-seafloor-internet-cables-arctic-waves-ice-climate-change/.
Hentz discusses technological innovations using existing internet cables across the seafloor of Prudhoe Bay and planned for the Bering Strait to measure the intensity of resulting ocean swells and troughs.

Lee, Craig M., Michael DeGrandpre, John Guthrie, Victoria Hill, Ron Kwok, James Morison, Christopher J. Cox, Hanumant Singh, Timothy P. Stanton, and Jeremy Wilkinson. “Emerging Technologies and Approaches for In Situ, Autonomous Observing in the Arctic.” *Oceanography* 35, no. 3–4 (2022): 210–221.
Available at https://doi.org/10.5670/oceanog.2022.127.
This paper discusses emerging scientific technologies for Arctic Ocean observations and measurements.

Books

McGovern, Bridget, and Laurie Geller, Rapporteurs. “Technologies for Research and Observational Instrumentation.” In National Academies of Sciences, Engineering, and Medicine, *Technology Developments to Advance Antarctic Research: Proceedings of a Workshop*. Washington, DC: The National Academies Press, 2022.
Available at https://nap.nationalacademies.org/read/26699/chapter/4.
This chapter summarizes advances in marine robotics, such as under-ice robotic tools that provide observations to help understand processes under ice shelves and at other ice-ocean interfaces. Optical and bio-optical sensors provide time-series data up and down hundreds of meters' worth of vertical under-ice cables. Multifrequency radars for ice and snow measure changes in ice mass, and fiber-optic cables facilitate distributed acoustic sensing to obtain seismic data.

Reports

Bielby, Michael. *Military Implications: Artificial Intelligence and the Arctic*. Center for Strategic & International Studies, Northern Connections, December 2, 2022.
Available at https://www.csis.org/analysis/artificial-intelligence-and-arctic.
The author, a Lieutenant Commander in the Canadian Armed Forces, explains that maintaining domain awareness over the vast Arctic requires uncrewed resources, including space-based intelligence, surveillance, and reconnaissance capabilities. Both active and passive sensors are needed to detect contacts and confidently distinguish ships from icebergs. Lt. Cmdr. Bielby contends that artificial intelligence and machine learning tools provide the only functional means to parse the resulting deluge and variety of data.

Frazier, Kelsey. *Arctic Climate Data Science: The Role of Artificial Intelligence in Supporting Operational Decision Making*. Ted Stevens Center For Arctic Security, U.S. Department of Defense, January 3, 2024.
Available at https://tedstevensarcticcenter.org/wp-content/uploads/2024/01/18_TSC_SR_Arctic_Climate_Data_Science_FINAL.pdf.
Frazier discusses the potential for artificial intelligence systems to aid better understanding of environmental dynamics in the Arctic region. She cites as examples using neural networks' analysis of satellite images to forecast ice-melt patterns in Arctic sea ice and the use of deep-learning models to predict ocean heatwaves and marine-life migration patterns.

Tingstad, Abbie, Fabian Villalobos, Rebecca Tisherman, Michelle D. Ziegler. *Unlocking Alaska's Critical Minerals Development Potential: Evaluating Opportunities and Barriers—Findings from a Tabletop Exercise*. RAND Corporation, June 25, 2024.
Available at https://www.rand.org/pubs/perspectives/PEA2970-1.html.
This report summarizes findings from experts across a range of disciplines about challenges and opportunities for developing critical minerals in Alaska. Participants emphasized the need for certain regulatory reforms (such as permits needed for infrastructure to support mineral extraction); protecting local communities, Natives and non-native alike, from economic boom-and-bust cycles and ensuring tangible and sustainable benefits for local and Indigenous communities.

Websites

Arctic Research Foundation. “Arctic Focus: Stories: Innovation.”
Available at https://www.arcticfocus.org/stories/?tag=innovation.
A collection of articles about how Arctic science is being changed by mobile research labs; effects of Arctic ice melt, both within the Arctic and elsewhere; and measurements of Arctic air pollution, among others.

Technological Challenges

Articles

Baldor, Lolita C. "Pentagon Arctic Strategy Seeks New Tech to Keep Pace with Adversaries." *Military Times*, (July 23, 2024).
Available at https://www.militarytimes.com/news/pentagon-congress/2024/07/23/pentagon-arctic-strategy-seeks-new-tech-to-keep-pace-with-adversaries/.
According to this article, Arctic challenges for US military readiness include the need for deep-water ports; weather- and cold-resistant equipment, including weapons and drones; and increased sensor arrays to compensate for inadequate communication satellite coverage. The author reports that increasing Russian and Chinese activity in the region heightens the urgency of improved US military Arctic capabilities.

Exner-Pirot, Heather. "Overcoming Remoteness: Innovations to Support Economic Development, Critical Minerals, and Security in the Arctic." *Polar Institute*, Wilson Center, (July 8, 2023).
Available at https://www.wilsoncenter.org/article/overcoming-remoteness-innovations-support-economic-development-critical-minerals-and.
This article contends that developing Arctic natural resources, and especially extracting minerals necessary to fossil-fuel alternative sources of energy, will require investments in transformative technologies. The author discusses transformative technologies that could be adopted, ranging from lighter-than-air airships to haul cargo in and transport resources out; small modular nuclear reactors; and autonomous drilling, driverless haul-trucks, and other technologies for mining upgrades.

Fish, Tim. "Increasing Coverage: Overcoming Arctic Challenges." *European Security & Defense,* (May 2024): 60-63.
Available at https://euro-sd.com/2024/05/articles/technology/38351/increasing-coverage-overcoming-arctic-challenges/.
The author explains that intelligence, surveillance, and reconnaissance operations in the Arctic are hindered by inadequate persistent coverage and limited image resolution. The article discusses ongoing efforts to develop new solutions, such as the U.S. Air Force's 2020 Arctic Strategy to test low Earth orbit satellites around the polar region; an Arctic Satellite Broadband Mission being developed jointly by the U.S. Space Force and Norway; and a commercial sea-air-space program known as Integrated Remote Sensing for the Arctic, being developed by companies in multiple countries.

Luckenbaugh, Josh. "Special Operators Increase Demand for Cold Weather Vehicles." *National Defense*, (February 26, 2025).
Available at https://www.nationaldefensemagazine.org/articles/2025/2/26/special-operators-increase-demand-for-cold-weather-vehicles.
The author reports that cold-weather operations are increasingly important for the U.S. military's Special Operations Command readiness. According to a program manager for Special Operations vehicles, existing commercial snowmobiles are inadequate for Special Operations missions and Arctic terrain.

Pozdnakova, Alla. "Space Infrastructure for a Sustainable Arctic: Opportunities and Challenges of Spaceport Development in the High North." *Center for Circumpolar Security Studies*, The Arctic Institute, (May 31, 2022).
Available at https://www.thearcticinstitute.org/space-infrastructure-sustainable-arctic-opportunities-and-challenges-spaceport-development-high-north/.
This article reports on challenges to increased Arctic connectivity via satellite-based communications. The author recommends building on Norwegian and Swedish autonomous launch facilities, and explains that expanding existing spaceports or building new ones will challenge sustainable development within the Arctic. Additional problems are posed by space junk and increasing congestion in polar orbits.

Books

McGovern, Bridget, and Laurie Geller, Rapporteurs. "Power and Energy for Polar Research." In National Academies of Sciences, Engineering, and Medicine, *Technology Developments to Advance Antarctic Research: Proceedings of a Workshop*. Washington, DC: The National Academies Press, 2022.
Available at https://nap.nationalacademies.org/read/26699/chapter/5.
This chapter discusses the power needs for scientific observational instruments, such as sensors deployed in sea ice that must transmit data through satellite networks in temperatures as low as -25℃, and uncrewed, robotic telescopes that require 100-1,000 watts of power. The authors summarize expert recommendations, such as using solar power during summer months to replenish batteries.

Reports

Byers, Michael. *Outer Space and the Arctic: Connections, Opportunities, Challenges*. Centre for International Governance Innovation, CIGI Paper No. 303, September 19, 2024.
Available at https://www.cigionline.org/publications/outer-space-and-the-arctic-connections-opportunities-challenges/.
This paper summarizes challenges to providing GPS, communication, and other satellite coverage over the Arctic, as well as the importance of over-Arctic satellite orbits. The author recommends using more, and more-varied, systems to provide better coverage and redundancy.

Saunavaara, Juha. *Study on the Benefits and Opportunities of Arctic Connectivity Submarine Cables for Secure, Resilient and Sustainable Global Connectivity*. EPRD Office for Economic Policy and Regional Development, January 2025.
Available at https://eprd.pl/wp-content/uploads/2025/02/DPA_Final-Report-on-Arctic-Connectivity-Study-.pdf.
The study reviews past incomplete or failed projects to lay trans-Arctic underwater fiber-optic cable, and provides policy recommendations for the European Union to undertake a new fiber-optic initiative. The study focuses on challenges and opportunities of laying trans-Arctic cable from the EU to Japan, but also evaluates a potential proof-of-concept route from the EU to North America.

U.S. GOVERNMENT INFORMATION RESOURCES

This section of the bibliography was compiled by the U.S. Government Publishing Office Library Services and Content Management.

"Resolved: The United States Federal Government Should Significantly Increase Its Exploration and/or Development of the Arctic."

The U.S. Government Publishing Office offers three major resources for discovering Government information, the Catalog of U.S. Government Publications (CGP), DiscoverGov, and GovInfo.

The Catalog of U.S. Government Publications (CGP)
https://catalog.gpo.gov

The CGP is the finding tool for information products published by all three branches of the U.S. Government. It includes descriptive information for current and historical publications as well as direct links to full-text documents, when available. The catalog also offers the option to locate a nearby Federal depository library that has a particular publication or that can provide expert assistance in finding and using related U.S. Government information.

There are multiple ways to search for publications in the CGP. For detailed guidance on searching, please visit the Help page: https://catalog.gpo.gov/cgphelp/en/help.html.

Follow these steps to start your search for freely available online publications on the debate topic:

1. Visit the CGP homepage: https://catalog.gpo.gov.
2. Select Advanced search: http://purl.fdlp.gov/GPO/lps93625.
3. In the "Search for word/'phrase' in…" box, select "Internet Access" in the first drop-down menu.
4. In the "Enter word/'phrase'" box, enter the value "https?"
5. In the other drop-down menu boxes, start entering keywords relevant to your search.
6. Please explore other search options described on the Help page.

Suggested search terms:

- Arctic regions - Discovery and exploration.
- Polar regions - Discovery and exploration.
- Scientific expeditions - Arctic regions.

Learn more about the CGP: https://www.fdlp.gov/depository-tools/cgp.

DiscoverGov
https://discover.gpo.gov/

DiscoverGov provides simple, one-stop searching across multiple U.S. Federal Government databases including GPO's CGP and GovInfo.

It will retrieve reports, articles, and citations while providing direct links to selected resources and publications available online.

Learn more about DiscoverGov: https://www.fdlp.gov/depository-tools/discovergov.

GovInfo
https://www.govinfo.gov

GovInfo provides free public access to official publications from all three branches of the Federal Government. In addition to providing an advanced, metadata-powered search experience, GovInfo also includes a content management system and a standards-compliant preservation repository.

For detailed guidance on how to search GovInfo, please visit the Finding Information page: https://www.govinfo.gov/help/finding-info.

Learn more about GovInfo: https://www.fdlp.gov/depository-tools/govinfo.

Below are sample publications from the CGP, DiscoverGov, and GovInfo:

CGP Example
Implementation plan 2025-2026 for the Arctic Research Plan 2022-2026
Year/Pages: 2025; 52 pages
Available at: https://purl.fdlp.gov/GPO/gpo247459

DiscoverGov Example
Amplifying the Arctic : strengthening science to respond to a rapidly changing Arctic : hearing before the Committee on Science, Space and Technology of the House of Representatives, One Hundred Seventeenth Congress, second session, September 20, 2022
Publisher: U.S. Government Printing Office
Year/Pages: 2023; iii, 96 pages
Available at: https://purl.fdlp.gov/GPO/gpo215748

GovInfo Example
Snowed in : United States disinvestment in the Arctic : hearing before the Subcommittee on Coast Guard and Maritime Transportation of the Committee on Transportation and Infrastructure, House of Representatives, One Hundred Eighteenth Congress, second session, November 14, 2024
Publisher: U.S. Government Publishing Office
Year/Pages: 2025; xii, 43 pages
Available at: https://purl.fdlp.gov/GPO/gpo237965