

Written Testimony of
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House Committee on Science, Space, and Technology

For a hearing on
“Amplifying the Arctic: Strengthening Science to Respond to a Rapidly Changing Arctic”

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Chairwoman Johnson, Ranking Member Lucas, and distinguished members of the Committee, thank you for convening this hearing on Arctic research. I am Dr. Mike Sfraga and I am honored to appear before you today. I am the presidentially appointed Chair of the United States Arctic Research Commission (Commission).

From my perspective, research is a central tenet in the advancement of U.S. interests and objectives in the Arctic and indeed, globally.

I have been asked by the Committee to address five key areas:

1. Provide an overview of the U.S. Arctic Research Commission (USARC);
2. Describe the role of the Commission in development of the recent Interagency Arctic Research Policy Committee (IARPC) 5-year plan;
3. Discuss priorities for the USARC’s upcoming Goals and Objectives report;
4. Outline the impact of current geopolitical tensions on Arctic research and international collaboration; and
5. Provide recommendations for updates to the Arctic Research and Policy Act (ARPA).

I begin my testimony with anecdotes on how research has positive impacts on the Arctic region. Indigenous Knowledge, supported by scientific research, has shown that bowhead whales, arguably the most important subsistence species in Northern Alaska, live to be over 200 years of age. This is based on scientific analysis of the whale’s baleen and eye lenses along with the discovery of ancient stone and ivory harpoon tips in the blubber of subsistence-harvested whales, and is important in the population management of the species.

These whales, as well as caribou, moose, musk ox and other traditional foods can be found in community freezers and ice cellars across the Arctic. “Food security” is defined as everyone having “physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life¹.”

Much of what is gained from hunting, fishing, and whaling is brought back to communities and shared between families far and wide, or through community freezer programs such as Siglaug in

¹ <https://www.fao.org/3/i0876e/i0876e00.htm>

Kotzebue, Alaska. In 2014², the U.S. Farm Bill was updated and revised to include traditional foods, but the U.S. Department of Agriculture hadn't changed their regulations on inspection and preparation of wild game. Maniilaq Association, Northwest Alaska's health provider, and other agencies worked to update the regulations to make the Kotzebue-based program possible. This trend has spread and, today, inpatients at the Alaska Native Medical Center in Anchorage can order a variety of dishes with caribou, moose, salmon, herring eggs, Alaskan berries and even akutaq--Eskimo ice cream. These foods are more nutritious than most store-bought foods and provide cultural, emotional, social, spiritual, and physical benefits.

Just to the north, in Wales, Alaska, the mainland United States' westernmost town, planning has begun to provide piped water to homes—a first for the majority of this community of 220 people. Research shows the absence of running water is associated with a higher prevalence of respiratory and skin diseases, especially in children. The Infrastructure Investment and Jobs Act will help provide running water in Alaska's unserved and underserved communities, which will make a tremendous difference in the quality of life for those living in rural Alaska.

In Anchorage, Alaska, the 176th Maintenance Group at Joint Base Elmendorf-Richardson is piloting a new virtual reality training laboratory which will enhance training capabilities for maintenance Airmen by giving them an interactive tool to learn maintenance processes without the presence of a physical airframe. This technology may be transferable to training needs in rural communities and remote research installations.

The knowledge and understanding we gain from Arctic research impacts the lives of those who live in and outside of the region. It informs and influences our nation's Arctic policies and related actions in key global matters, such as the broad array of challenges brought about by climate change, for example, to include mitigation and adaptation measures, as well as infrastructure development, and our national and homeland security.

Later in my testimony I will outline the Commission's central Arctic research goals and objectives – each reinforcing and expanding upon the important issues previously noted. Arctic research provides insight into the cause and effects of our changing climate, advances economic development, enhances our nation's national and homeland security, to include environmental, energy, food, and community security writ large. Put simply, investments in Arctic research are investments in our citizens, as well as our nation's security and prosperity.

Research is central to our nation's ability to address the many challenges we face in the region and enables us – with our many international partners – to help shape the environmental, political, social, economic, and security landscape. A well-planned and appropriately funded U.S. Arctic research enterprise is essential to crafting and implementing a well-developed, purposeful, integrated, and complementary national strategy for the Arctic region. It will enhance our applied and basic research efforts across the federal government, and by doing so, help establish fact-based, research-driven policies at the community, regional, sub-national, national, and international levels. Due to the harsh environment, U.S. and international space-based or satellite-derived observations are critically important to underscore research, environmental monitoring, weather forecasting, and economic development.

² <https://www.fns.usda.gov/cn/service-traditional-foods-public-facilities>

The United States Arctic Research Commission plays a critical role in advancing these efforts. The Commission is an independent federal agency established by the Arctic Research Policy Act of 1984 (ARPA). It is composed of eight commissioners, seven of whom are directly appointed by the President. The eighth commissioner is the Director of the National Science Foundation (NSF) who serves as a non-voting *ex officio* member.

The current members of the Commission are:

- Dr. Mike Sfraga, Chair; filling an academic/research seat, the founding director of the Wilson Center's Polar Institute, former director, Global Risk and Resilience Program, Wilson Center, and currently serving as chair and distinguished fellow, Polar Institute, Wilson Center.
- Dr. Nikoosh Carlo; filling an academic/research seat, the founder and chief strategist at CNC North Consulting.
- Elizabeth Qaulluq Cravalho; filling an industry seat, the vice president of lands for NANA Regional Corporation, an Alaska Native Corporation.
- David Kennedy; filling an academic/research seat, the current Global Fellow at the Wilson Center's Polar Institute, Board Member of the World Maritime University, and Chairman of the External Advisory Board of the School of Marine Science and Ocean Engineering at the University of New Hampshire.
- Dr. Mark Myers; filling an industry seat, the principal of Myenergies.
- Dr. Jacqueline Richter-Menge; filling an academic/research seat, a research affiliate with the University of Alaska Fairbanks, 34 years of experience with the U.S. Army Corps of Engineers Cold Regions Research and Engineering Laboratory.
- Deborah Vo; filling the Indigenous seat, Program Officer with the Rasmuson Foundation.
- Dr. Sethuraman Panchanathan; Director, NSF

The Commission releases a biennial report to the White House and to Congress on Arctic research goals and objectives to guide the IARPC five-year plan and to inform overall U.S. Arctic research efforts. The Commission also assists IARPC in establishing a national Arctic research program plan every five years to implement Arctic research policy.

In addition to the above tasks, the Commission's duties, assigned by law, include:

- Facilitating cooperation between the Federal Government and State and local governments with respect to Arctic research;
- Reviewing Federal research programs in the Arctic and recommending improvements in coordination among programs;
- Recommending methods to improve logistical planning and support for Arctic research;
- Recommending methods for improving efficient sharing and dissemination of data and information on the Arctic among interested public and private institutions;
- Offering other recommendations and advice to the IARPC as it may find appropriate;
- Cooperating with the Governor of the State of Alaska and with agencies and organizations of that State which the Governor may designate with respect to the formulation of Arctic research policy; and
- Recommending to the IARPC the means for developing international scientific cooperation in the Arctic.

The USARC is a statutory member of the North Pacific Research Board and the North Slope Science Initiative. The USARC is also a member, participant, liaison, or observer on the IARPC, the Interagency Coordinating Committee on Oil Pollution Research, the National Ocean Council, the Extended Continental Shelf Task Force, the Study of Environmental Arctic Change (SEARCH), the Civil Applications Committee, the Scientific Ice Expeditions Interagency Committee (Navy submarines), the Arctic Icebreaker Coordinating Committee of the University National Oceanographic Laboratory System, the Alaska Ocean Observing System, the Department of State's Arctic Policy Group, the Arctic Research Consortium of the United States, the International Permafrost Association, and the Ted Stevens Center for Arctic Security Studies.

BIENNIAL REPORT

The Commission is drafting its next biennial report which will be released in January. We have identified five primary goals which are: environmental risks and hazards, community health and well-being, infrastructure, economic research, and research cooperation. Madam Chairwoman and Ranking Member Lucas, you will see overlapping and reinforcing areas of Arctic research priorities between the Commission and the IARPC.

- **Environmental risks and hazards:** Risks from climatic and geologic hazards have enormous social and economic consequences. Knowledge from research reduces vulnerability and helps prevent or reduce the effects of disasters. Some of the key issues the Commission thinks should be highlighted include: improved monitoring of emissions of greenhouse gas emissions from industry leaks of oil and gas infrastructure, the mapping of priority coastal areas to improve marine commerce (according to the National Oceanic and Atmospheric Administration (NOAA), only 4.1 percent of the U.S. maritime Arctic has been mapped to modern standards³) and facilitate coastal community resilience planning, and a better understanding of the risks of permafrost thaw.
- **Community health and well-being:** The investment of more than \$11 billion into Alaska Native communities through the Infrastructure Investment and Jobs Act will help communities adapt to a warming climate, build water and sanitation infrastructure, expand broadband, and improve Tribal transportation. Remaining challenges, however, include the enduring presence of health disparities in Alaska between Arctic and non-Arctic residents, climate-related health and social risks, food/energy/water insecurity, housing and indoor air quality deficiencies, and workforce development insufficiencies. Among other issues, maternal health research that identifies needed care, and barriers to care, specific to remote Arctic communities, the creation of equitable pathways for Indigenous leadership and mechanisms to improve communication and participation at the local level, and workforce recruitment/retention in remote communities, especially in the health professions are among the Commission's priorities.
- **Infrastructure:** Access to reasonably priced broadband networks, telehealth, in-home running water, and affordable heat and fuel all depend upon innovation to make these

³ <https://nauticalcharts.noaa.gov/updates/noaa-surveys-the-unsurveyed-leading-the-way-in-the-u-s-arctic/>

technologies operable and scalable in Arctic conditions. Infrastructure that is practical and functional at the community level is critical, and human infrastructure—people to teach, create, operate and maintain technology—is also essential. Quantifying the resources needed to increase local capacity to meet infrastructure-related innovation and education requirements, ensuring human health and infrastructure research is incorporated into a “whole-of-government” approach to water and sanitation infrastructure build-out efforts, and encouraging research methods to modify infrastructure to adapt to changing Arctic environmental conditions are important steps to infrastructure development and deployment in the Arctic.

- **Economic Research:** While economic research is vital to inform Arctic-relevant policies and decision making, few economists focus on the region. Economic research can help achieve regional sustainable development, and provide a greater understanding of market forces, natural capital, and Indigenous economies. Research emphasis focused on Arctic economics based on work initiated by the NSF’s Arctic Social Science program, a “natural capital accounting” in the Arctic to inform decision making, and a better understanding of Arctic marine operations, shipping, and mariculture are some of the areas the Commission believes should be encouraged.
- **Research Cooperation:** As many Arctic issues are circumpolar in nature, and inherently transnational, they are best addressed by international research cooperation. Cooperation and co-production of knowledge that is consistent with Indigenous values, rights, and protocols will result in a more genuine collective effort to create greater understanding about the Arctic. U.S. Arctic researcher engagement in the European Union’s Horizon Europe, with Arctic-related elements, accelerated progress in developing an international plan for the “Joint Program of Scientific Research and Monitoring” associated with the Central Arctic Ocean Fisheries Agreement that entered into force in 2021, and researcher adoption of the new standard in international engagement with Inuit released in June 2022 by the Inuit Circumpolar Council are among the international research cooperation goals of the Commission.

GEOPOLITICAL CONSIDERATIONS

While the final Goal of our report focuses on international research cooperation, it is impossible to discuss Arctic research without acknowledging that Russia's full-scale invasion of Ukraine has halted cooperation with Russia on international Arctic research. Impacted projects and initiatives include, but are not limited to:

- Joint U.S./Canada/Russia fisheries expeditions in the Bering Sea and the Gulf of Alaska;
- Research on harmful algal blooms;
- Pan-Arctic Observing Networks;
- International partnerships to study polar bears, whales, walruses and seals;
- Collaboration on changes in permafrost, biome shifts, and tundra fires;
- Food security of Indigenous Peoples in Alaska and Siberia, and community vulnerabilities to changes in sea ice and economic expansion; and

- The interruption of Arctic Council working groups focusing on contaminants, monitoring, conservation of flora and fauna, the marine environment, sustainable development, and emergency prevention, preparedness and response.

We often note the desire for the Arctic to remain a “zone of peace” and an area of cooperation and collaboration. That is difficult to achieve now when Russia, which occupies nearly 50 percent of the Arctic, has embarked on an unprovoked invasion of a sovereign country.

That does not mean, however, that Arctic research cannot continue. It must. Changes in the Arctic will not wait for geopolitical challenges to be settled. There already is an *arc of cooperation – an arc of commonality* – that spans the North American Arctic, between the U.S. (Alaska), Canada, and Greenland. We should leverage, enhance, and expand the work that occurs within and across this *arc of cooperation and commonality*; the realities of a rapidly changing Arctic require nothing less.

That *arc of cooperation and commonality* extends to Iceland, the Nordic nations and Europe. Russia's absence from research activities with other Arctic nations has left a void, and the United States should seize the moment and double down on our efforts throughout the region. We have an opportunity to encourage and facilitate international research projects to be carried out in Alaska and throughout the Arctic region such that the US remains an active and reliable scientific leader in the region. The results of such actions would have additional, consequential impacts such as reinforcing the international rules-based order, strengthening the Transatlantic Alliance, enhancing partnerships with non-Arctic nations with interests in the Arctic, and who share our commitment to a peaceful, stable, and productive region, and reinforce respect for the Arctic's indigenous peoples. The United States would certainly benefit from the knowledge, financial investments, and research assets international partners could bring to a heightened international research enterprise, but it requires the United States to make its own investments in the region to attract these partnerships.

I would also like to highlight research opportunities that abound in Greenland. While China's investment interests in the mining sector, and Russia's invasion of Ukraine brought a greater security focus to Greenland, there is substantial potential to grow our diplomatic, scientific, environmental and economic involvement on the island. Reopening the U.S. consulate in Nuuk was an important step forward and one the U.S. must remain committed to. But there is also the opportunity to enhance this partnership and build upon recent scientific collaborations that NSF has fostered between the U.S. and Greenland research communities.

The Inuit peoples live across the North American Arctic, and there are many commonalities between the Inuit in Alaska, Canada, and those in Greenland including language, history and culture. Finding ways to promote joint partnerships and the sharing of best practices between those who share a common heritage is in our own interests and will build upon the existing relationship between the United States, the Kingdom of Denmark, and Greenland.

Earlier this month I participated in several panels at the Arctic Circle Forum in Nuuk, Greenland. I found the Greenlandic government, researchers, and scholars eager to enhance and expand our research and economic ties, to reinforce the inherent cultural and social ties that bind us,

particularly among Indigenous Peoples, and a desire to leverage our shared expertise and understanding of the North for the betterment of the North. Greenland is, in many ways, emblematic of the new North, where you find, the key drivers of Arctic change occurring simultaneously: the geopolitical, environmental, economic, cultural, social and, security landscape in Greenland reflects the broader realities of the region. And many colleagues I spoke to in Nuuk underscored the centrality of U.S. Arctic research and international research cooperation as a shared foundation upon which these challenges can and should be addressed.

Along those lines, I want to highlight the importance of the NSF's efforts to recapitalize the outdated infrastructure at Greenland Summit Station. Originally established as a temporary ice drilling camp in 1990, Summit Station today is the premier, and only, high-latitude, high-altitude, year-round observing platform in the Arctic. It is a uniquely critical platform for understanding past and current climate and environmental changes which then permit modelling of future ice sheet, climate, and sea level rise scenarios. Summit Station is a prime example of long-term, positive science cooperation with Greenland. Whether you live along the coast in Norfolk, Virginia or Nome, Alaska, you should care about what happens to the Greenland icesheet.

Broader than the North American Arctic, there is a need for the research community to be actively engaged with Arctic infrastructure matters such as the critical need for U.S. icebreakers and fiber optic cable and other communication infrastructure. Technologies like unmanned aerial vehicles, or unmanned maritime vehicles are increasingly used in the remote Arctic for research purposes and domain awareness. It is critical that these technologies can effectively operate and adapt to changing Arctic conditions.

On this topic, I would like to bring one particularly interesting opportunity to the Committee's attention, and it is associated with Arctic marine scientific research and the U.S. Coast Guard (USCG), which has long served as a valuable partner in this enterprise, consistent with law. Specifically, among the USCG's seven statutory primary duties, listed in 14 U.S.C. §102, is the duty to "engage in oceanographic research of the high seas and in waters subject to the jurisdiction of the United States."

Over the 20-year history of U.S. Coast Guard Cutter (USCGC) HEALY operations, most of the days that icebreaker has been at sea were in support of conducting science operations that originated with, and were funded by other agencies, such as NSF, NOAA, and ONR. Fundamental data have been collected, and discoveries made. Ship-based science technical support on HEALY, which benefits many agencies, has been funded entirely by the NSF.

For example, over many expeditions, NOAA, the US Geological Survey and State Department supported the mapping of the US's extended continental shelf in the Arctic region, consistent with international law. This has been a critically important process in determining US sovereign rights on and under this seabed, beyond the US's 200-mile Exclusive Economic Zone.

But demands for the use of USCGC HEALY have increased recently, and the vessel is more frequently being used for non-science missions, while, at the same time, the demand for science missions continues to grow.

And that returns me to the opportunity, which is to equip, for scientific research purposes, the “commercially available polar icebreaker” that the USCG intends to purchase with funds in its fiscal year 2023 request to Congress.

Consistent with the “whole of government” approach we are encouraged to pursue, and the high cost of icebreaker operations, the Commission recommends that if the icebreaker is procured, and is refit to meet the requirements of the USCG, that the refit include scientific research infrastructure (e.g., the ability to host and deploy/retrieve remotely operated vehicles and autonomous underwater vehicles, the capability to launch small drone aircraft for ice survey and reconnaissance, laboratory space for biological and chemical analyses, a sub-bottom profiler, and most importantly a multibeam sonar system that maps, in detail the depth of seafloor for a variety of purposes, beyond just research) to meet science mission requirements, subject to the availability of appropriations for such purposes. Complementary support to federal science agencies for operation and maintenance costs, and for research on the shipboard data collected, will also need to be considered.

In addition to the research and technology that the NSF supports on USCGC HEALY, I would also like to recognize the NSF’s support for their scientific research on the vessel *R/V Sikuliaq*, which is most capably operated by the University of Alaska’s College of Fisheries and Ocean Sciences. Since 2015, the vessel has conducted scientific expeditions in and around Alaska and the western Arctic, improving our understanding of marine ecosystems, fisheries, physical oceanography, marine geology and geophysics.

ARPA UPDATES

The Commission supports proposed updates to the ARPA included in Section 11 and Section 12 of S. 4736, the Arctic Commitment Act introduced by Alaska Senator Lisa Murkowski. Many are technical in nature to revise legislation written nearly 40 years ago. Others seek to include the growing number of federal agencies that operate in the Arctic and engage in Arctic policy development and implementation. However, the Commission’s positions on Sections 11 and 12 should not be used to infer the Administration’s position on the bill in its entirety.

Section 11(a) updates the Findings and Purposes section of ARPA to emphasize that the Arctic is critical to homeland defense, notes the impact that a changing Arctic has on global weather and climate patterns, and, given the profound impact a rapidly changing climate will have on the region, supports the need for robust Arctic research to inform and influence U.S. domestic and international Arctic policies.

Section 11(b) cleans up language in Section 103 of ARPA which establishes the Commission, as well as increases the number of service days that the Chair of the Commission may be compensated from 90 to 120. I can personally testify that the Chair of the Commission is engaged in official Commission activity on an almost daily basis – much more than the 90 days identified for compensation in ARPA – but I will also recommend that any increase in compensation should begin with the next Chair of the Commission.

Section 11(c) gives greater flexibility to the Commission for entering into contracts with federal entities other than the General Services Administration. The General Services Administration no longer provides the full suite of services required by agencies, which may have been the case in 1984. Other agencies, such as the U.S. Department of Agriculture and the Department of the Interior's Interior Business Center, are now key service providers to other federal agencies, on a cost-reimbursable basis.

Section 11(d) adds the Department of Agriculture, the Marine Mammal Commission, the Smithsonian Institution, and the Denali Commission to the IARPC. Each of these entities play an important role in formulating and carrying out Arctic policy and the Commission believes they should be formally included in the IARPC.

Section 11(e) clarifies that the IARPC five-year Arctic research plan must be transmitted to Congress, notwithstanding the Federal Reports Elimination and Sunset Act of 1995. The Commission believes sharing this document with Congress is important and should be required.

Section 12 of the same bill seeks to highlight and implement an existing section of ARPA: a budget crosscut report of Arctic research programs by every federal agency. The Commission views this activity as imperative to develop a baseline of Arctic research activity within the Federal Government – something that does not exist and is a considerable gap in Arctic research knowledge – and a useful budgeting tool for Congress and Federal agencies moving forward in implementing Arctic research priorities. I would like to emphasize that the Commission does not view this as a one-time activity, but an ongoing, annual crosscut to show funding trends - as is conducted for other research programs.

CONCLUSION

Thank you for this opportunity to testify before the Committee and provide the U.S. Arctic Research Commission's views and priorities on Arctic research.

Dr. Michael Sfraga

Dr. Michael Sfraga was the founding director of the Polar Institute and served as the director of the Global Risk and Resilience Program at the Woodrow Wilson International Center for Scholars in Washington, DC. He currently serves as chair and distinguished fellow in the Polar Institute, where his scholarship and public speaking focus on Arctic policy.

An Alaskan and a geographer by training, his work focuses on the changing geography of the Arctic and Antarctic landscapes, Arctic policy, and the impacts and implications of a changing climate on political, social, economic, environmental, and security regimes in the Arctic.

Sfraga served as distinguished co-lead scholar for the U.S. Department of State's inaugural Fulbright Arctic Initiative from 2015 to 2017, a complementary program to the U.S. Chairmanship of the Arctic Council; he held the same position from 2017 to 2019. He served as chair of the 2020 Committee of Visitors Review of the Section for Arctic Science (ARC), Office of Polar Programs, National Science Foundation, and currently serves on the Scientific Advisory Council of the Finnish Institute for International Affairs. Sfraga previously served in several academic, administrative, and executive positions, including vice chancellor, associate vice president, faculty member, department chair, and associate dean. Sfraga earned the first PhD in geography and northern studies from the University of Alaska Fairbanks.