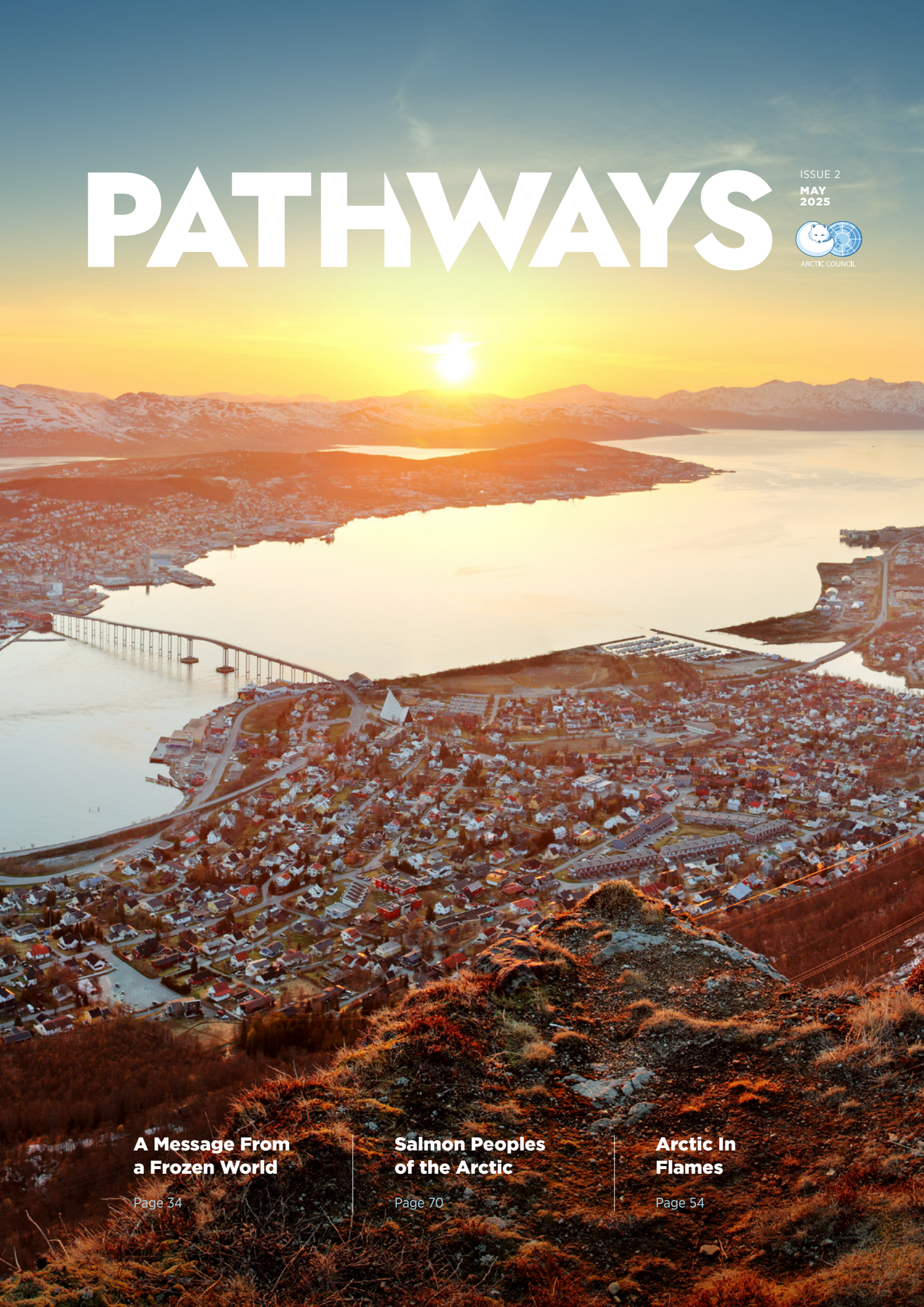
PATHWAYS

ISSUE 2
MAY
2025

ARCTIC COUNCIL



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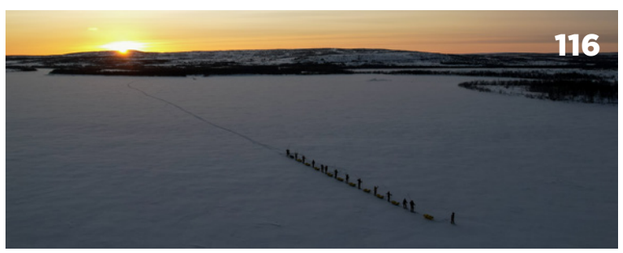
On the cover
Tromsø at sunset
Photo: TT Studio / Adobe Stock



Contents

A Defining Moment for Arctic Cooperation

REFLECTIONS ON NORWAY'S ARCTIC COUNCIL CHAIRSHIP

Espen Barth Eide / Chair of the Arctic Council and Foreign Minister for Norway

The first time I served as Minister of Foreign Affairs, in 2013, I signed a Host Country Agreement between Norway and the Arctic Council, thus establishing the Council's first permanent secretariat, located in Tromsø. This is how Tromsø became the capital of the Arctic. Back then, it was a milestone in strengthening the Council's institutional framework.

Much has changed, both in the Arctic and in other global affairs between 2013 and 2025. When Norway took on the Chairship of the Arctic Council in 2023, it was the most challenging and unprecedented time in the Council's history. Meetings had been paused. The future of the Council's work, and even the Council itself was uncertain.

It has been a demanding, yet rewarding experience to revive the work of the Council. Our guiding goal as Chair has been to steer safely through challenging times, ensuring that the Council can continue its vital work. Ensuring that the Council could continue to address the most important issues facing the Arctic. And ensuring that we continued as the Council we were set up to be, with all the eight Arctic States and six Permanent Participants.

Our Chairship took place during the warmest years ever recorded on the planet Earth. Unprecedented heatwaves, weather events and wildfires spread, even across the Arctic. We began 2025 by breaking more climate records, with this January being the warmest month on record. That serves as a stark reminder of the collective responsibility the Arctic States and Permanent Participants have to lead in responding to environmental challenges. Challenges that not only impact the millions of people who call the Arctic home but also create ripple effects throughout the planet.

When Norway took on the Arctic Council Chairship, we knew that it would not be business as usual. With that in mind, we chose to focus our Chairship program on four key areas that have long been at the heart of the Council's work: Oceans, Climate and Environment, Sustainable Economic Development and People in the North, with Indigenous Peoples and youth as cross-cutting priorities.

While official Arctic Council meetings on the diplomatic level remain on pause, Norway has worked to foster meaningful cooperation by hosting key events and providing platforms for collaboration across the Arctic and beyond. We hosted international meetings on ecosystem-based management in the Arctic Ocean, on polar shipping, and on Arctic youth and emergency management in the Arctic. We addressed the increasing prevalence and severity of Arctic fires by launching a Wildland Fire Initiative to strengthen cooperation and knowledge sharing. We also elevated the urgent issue of cryosphere changes to the global stage at COP29 together with partners across the world.

When we entered our Chairship, we believed that the Arctic Council was the most important intergovernmental forum for circumpolar cooperation. Two years on, we believe that it still is. The Arctic Council remains the leading body for intergovernmental cooperation in the Arctic.

Perhaps that is the most important accomplishments of the Norwegian Chairship; that the Arctic Council is still standing, despite the storms we have been through. One important contribution to that was when we achieved consensus that Working Groups could hold virtual meetings. That enabled them to advance projects and initiatives with contributions from all eight Arctic States, six Permanent Participants and the Council's valuable Observers.

The Arctic Council has a long history as a forum which generates knowledge, exchange information and provides science-based advice. It is imperative that it continues to operate in this role. I believe it is the most efficient response to rapid changes and urgent issues impacting the Arctic region and beyond.

I am proud of what the Council has accomplished. The advancements we made have been possible through the strong commitment of the Arctic States, Permanent Participants, Working Groups, and Observers. This commitment required resilience, adaptability and a steadfast focus on unprecedented collaboration.

As we now pass the Arctic Council Chairship to the Kingdom of Denmark, I can assure them of Norway's strong support.

Let us continue to foster the spirit of cooperation that lies at the core of the Arctic Council's mandate.

Espen Barth Eide

Espen Barth Eide became Minister of Foreign Affairs of Norway on 16 October 2023. From 14 October 2021 he was Minister of Climate and Environment. He is elected to the Norwegian Parliament as a representative from Oslo.

Previously, he was Minister of Foreign Affairs and Minister of Defence in Jens Stoltenberg's Second Government.

Bringing the Arctic Council Forward

PRIORITIES OF THE CHAIRSHIP OF THE KINGDOM OF DENMARK (2025-2027)

In May 2025, the Kingdom of Denmark will assume the Chairship of the Arctic Council. Together, Greenland, the Faroe Islands and Denmark are honored to be carrying out this task, and we thank Norway for all of their excellent work during their Chairship.

The Kingdom of Denmark / Greenland, the Faroe Islands and Denmark

It's no secret that due to geopolitical tensions the work of the Council is challenged. As Chair, we will work hard to maintain the Council vibrant and resilient. First and foremost, for the benefit of the peoples of the Arctic, so that the Arctic remains a region of stability and constructive cooperation.

We have an overall ambition of being an inclusive Chairship and to bring the work of the Arctic Council close to its citizens, particularly Indigenous Peoples. They must be in the driving seat when it comes to the development of the Arctic. Particularly on how sustainable development is interpreted and advanced. Recognizing that Indigenous Knowledge and perspectives are essential to understanding and managing changes of the Arctic, we will work for strong integration of Indigenous Knowledge alongside scientific insights in the work of the Council.

During our Chairship, we will continue to support ongoing activities and projects run by the Working Groups and the Expert Group on Black Carbon and Methane of the Council. The Arctic Council Strategic Plan 2021-2030 sets a clear direction for the work of the Council. The Strategic Plan will be our compass guiding the entire Chairship.

We will build on previous efforts to promote cross-cutting cooperation and joint projects between the Arctic Council's subsidiary bodies, thereby enhancing synergies and holistic approaches.

Within the Kingdom, we have identified five thematic priorities of our Chairship that are important to us, while at the same time being in conformity with the Strategic Plan:

- **Indigenous Peoples and Communities:** We will continue to focus on the human dimension of the Arctic Council with a particular focus on strengthening the participation of Indigenous Peoples and the inclusion of Indigenous Knowledge.
- **Sustainable Economic Development and Energy Transition Solutions:** We will dedicate efforts and attention towards sustainable economic development, with a goal of ensuring that initiatives in this field are being led by the Peoples of the Arctic for the benefit of all Arctic inhabitants with a particular focus on Indigenous Peoples.
- **Oceans:** Ongoing warming and the reduction of sea ice call on us to step up monitoring developments and to identify the drivers of change, thereby enhancing predictability and effective management of the changing marine environment.
- **Arctic Climate Change:** An issue that affects all spheres of work being undertaken by the Arctic Council with huge cross-cutting consequences for Arctic biodiversity, ecosystems and societies. The Chairship will highlight climate change trends and address the impacts of climate change on sustainable development in the Arctic.
- **Biodiversity:** We will emphasize collaboration across the Arctic region to monitor and assess status and trends of Arctic biodiversity and ecosystems enabling us to continue to detect and predict changes and provide best available scientific data and Indigenous Knowledge for governance.

We are very much looking forward to taking on these challenges in close cooperation with the other Arctic States, the Permanent Participants and all other relevant stakeholders. Together we will strive to keep the Council strong.

Vivian Motzfeldt

Vivian Motzfeldt has served as Minister of Statehood and Foreign Affairs, including research, since 2023. From 2022 to 2023, she served as Minister for Business, Trade, and Foreign Affairs. Previously, she was Speaker of Inatsisartut (the Parliament of Greenland) from 2018 to 2021 and chaired Greenland's Constitutional Commission from 2017 to 2018. In 2018, she also held ministerial roles in Education, Culture, Church, and Foreign Affairs. Since joining Inatsisartut in 2014, she has served on key committees, including Culture, Education, Finance, and Foreign Policy.

Sirið Stenberg

Sirið Stenberg has served as Minister of Minister of Foreign Affairs, Industry and Trade since March 2025. Since November 2024, she has also held the position of Deputy Prime Minister. Former cabinet positions include: Minister of Health from 2015-2019 and Minister of Social Affairs and Culture from 2022-2025. Her political career began at the municipal level when she was first elected to Vágur's City Council in 2008. Sirið Stenberg was first elected to the the Faroese Parliament in 2011. In Parliament, Sirið Stenberg has held several prominent roles, including chairman of the Lagting's Control Committee and member of the Welfare Committee, among others. Sirið Stenberg is the leader of the Republican Party (Tjóðveldi).

Lars Løkke Rasmussen

Lars Løkke Rasmussen has served as Minister for Foreign Affairs of Denmark since December 2022. Prior to this, Lars Løkke Rasmussen served as the Prime Minister of Denmark from 2009-2011 and again from 2015-2019. Before becoming Prime Minister, he held multiple ministerial positions, including Minister of the Interior and Health as well as Minister of Finance. Lars Løkke Rasmussen has been a member of The Danish Parliament since 1994.

The Arctic in Photos

WINNERS OF THE ARCTIC COUNCIL PHOTOGRAPHY CONTEST

In connection with the launch of Pathways, the Arctic Council Secretariat hosted a photo contest, inviting people across the Arctic and beyond to share what the Arctic looks like through their lens. The Arctic Council Secretariat received over 200 images in the following categories: **Pathways**, **Landscapes**, **Life in the Arctic** and **Plants and Animals**. These are the winning photos in each category.

Pathways
Winner: Megan Brief

"Overconsumption of the Arctic threatens all life on Earth." **– Megan Brief**

Landscapes
Winner:
Karli Zschogner

Ice roads are essential transport lines from essential services to connecting families for remote northern and Arctic communities for the winter months. For the Western Canadian Arctic Inuvik-Aklavik Ice Road, which is monitored and maintained by Infrastructure of the Government of the Northwest Territories and plowing by Aklavik Gwich'in-Inuvialuit company K & C Contracting, it's generally open from the end of December to the beginning of May. However, with climate changes including warmer winters (and warmer summers), there are ongoing concerns of more frequent delays for it to be safe in winter 2023-2024 as the photographer reported, and the lack of alternative transport options where expensive small plane services are the only other options.
– Karli Zschogner

Life in the Arctic
Winner:
Aviaaja Schlüter

After an evening of midnight sun, icebergs, and humpback whales, our engine ran dry. We drifted into Oqaatsut, where this kind gentleman not only sold us fuel for our little boat but also shared his freshly caught seal. Before heading home, we sat together and enjoyed the warm liver—an unexpected and generous end to the adventure.
– Aviaaja Schlüter

Plants and Animals
Winner:
Simon
Vandepitte

Long-tailed skuas are among my favorites from the north—not just for their graceful appearance but for the fierce, killer instinct beneath their elegance. The midsummer sun provided perfect conditions to capture this striking bird before it resumed its reign of terror over the tundra.
– Simon Vandepitte

Arctic Shipping on the Rise

What Trends Can Tell Us

NEW DATA FROM THE PROTECTION OF THE ARCTIC MARINE ENVIRONMENT WORKING GROUP OF THE ARCTIC COUNCIL SHEDS LIGHT ON 10+ YEARS OF ARCTIC SHIPPING TRENDS

Jessica Cook / Arctic Council Secretariat

Access to the Arctic Ocean is increasing as sea ice thins and its extent reduces– enabling longer seasons of ship navigation and new access to previously difficult to reach regions. At the same time, the Arctic is home to significant natural resources such as iron ore and natural gas, with high commodity prices and a growing worldwide demand.

The Arctic Council Working Group on the Protection of the Arctic Marine Environment (PAME) is monitoring Arctic ship traffic trends, filling a crucial knowledge gap in the region. PAME's updated data reveals just how much Arctic shipping is increasing, how far they're sailing, what types of ships are in the region and more.

Increase in Arctic ship traffic and distance sailed

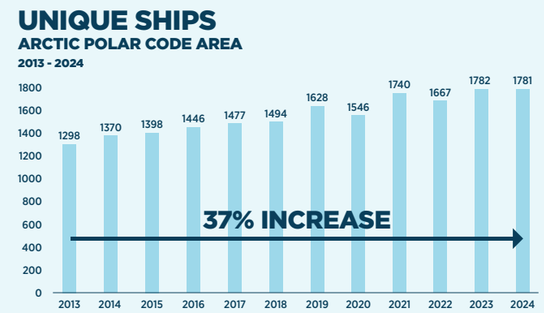
While geographic definitions of the Arctic vary, PAME frequently uses the Arctic Polar Code area as the boundary to identify ship traffic in the Arctic. The area is defined by the International Maritime Organization (IMO), an accredited Arctic Council Observer.

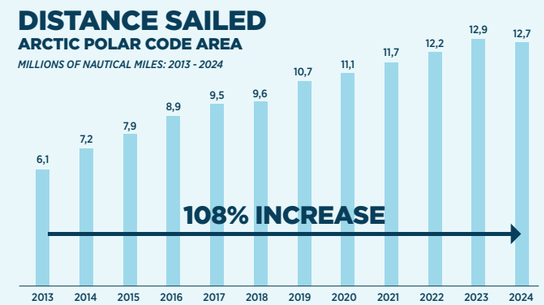
The number of unique ships entering the Arctic Polar Code area from 2013 to 2024 increased by 37 percent, according to PAME's latest Arctic Shipping Status Report released in January 2025. In 2024, 1781 unique ships entered the Arctic Polar Code area, amounting to nearly 500 more ships than in 2013 when data collection began. The term unique ships refers to each ship only counted once, although many ships enter the area multiple times each year.

Container ship on icy-waters. *Photo: iStock*

The number of unique ships entering the Arctic Polar Code area is generally highest in the month of September, when Arctic sea ice is at its lowest extent. For example, in September 2024, 1064 ships entered the Polar Code area, out of the total 1781 ships that entered the entire year, compared to just 404 ships in February 2024.

Comparing 2013 to 2024, the distance sailed by ships in the Arctic Polar Code Area increased 108 percent, from 6.1 million to 12.7 million nautical miles. The distance represents the aggregate sailed for each ship in nautical miles.





Reference: PAME

Types of ships in the Arctic

Fishing vessels are the most common type of ship in the Arctic Polar Code Area, representing over one-third of all ships. The second most common ship type is general cargo ships. Between 2013 and 2024, there was an increase in the number of ships of each ship type in the Arctic Polar Code Area apart from oil tankers and research vessels.

Why is Arctic shipping increasing?

Hjalti Hreinsson is a Project Manager at PAME who creates Arctic Shipping Status Reports and administers the Arctic Ship Traffic Data Program. He shares insight into the shipping trends that have emerged over recent years.

"Several reasons contribute to the increase in Arctic shipping," said Hreinsson. "One of them, and perhaps the most prominent one, is an increase in natural resource extraction. Compared to other marine areas worldwide, there aren't that many ships in the Arctic, and new projects will strongly impact statistics."

"For example, two large projects – the Mary River Mine in Nunavut and the Yamal Gas project – have led to increases in shipping in the Arctic Polar Code area. The number of bulk carriers has significantly increased as has the traffic of gas tankers, of which there were almost none in the Polar Code area prior to 2018."

"It's also significant that the Arctic is seemingly being used more for transport of cargo, with a large increase in general cargo ships in the last few years. A detailed analysis of cargo-transport would be a very interesting research project using data from our ASTD System," Hreinsson added.

The need for more Arctic shipping data

As Arctic shipping increases, monitoring trends and collecting data about Arctic shipping can contribute to enabling safer shipping in the Arctic.

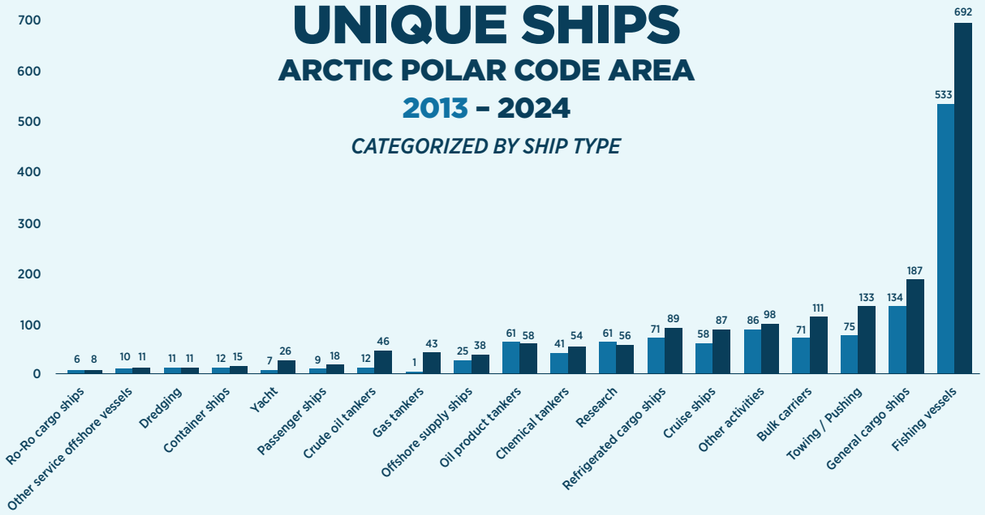
In response to a growing need for accurate, reliable and up-to-date information on Arctic shipping activities, PAME developed the Arctic Ship Traffic Data (ASTD) Program. ASTD collects a wide range of information, including ship tracks by ship type, information on number of ships in over 450 ports/communities across the Arctic, detailed measurements on emissions by ships, shipping activity in specific areas and fuel consumption by ships. PAME and the Arctic Council use data from ASTD to conduct analyses and reports related to Arctic shipping.

"We are producing more reports, one on bulk carriers which is a very interesting case, as one also has to look at the size of each vessel. The bigger the vessel, the more it carries," said Hreinsson. "The same goes with cruise and passenger ships, their number and distance sailed has increased, but the size of the ships and their passenger capacity has also increased."

"All of this results in more maritime activity and therefore more people in the high Arctic, hence the safety of the vessels and their crew and passengers are of upmost importance," remarked Hreinsson, who highlighted the significance of PAME projects such the 'Arctic Shipping Best Practice Information Forum', which assists in the implementation of the IMO's International Code for Ships Operating in Polar Waters.

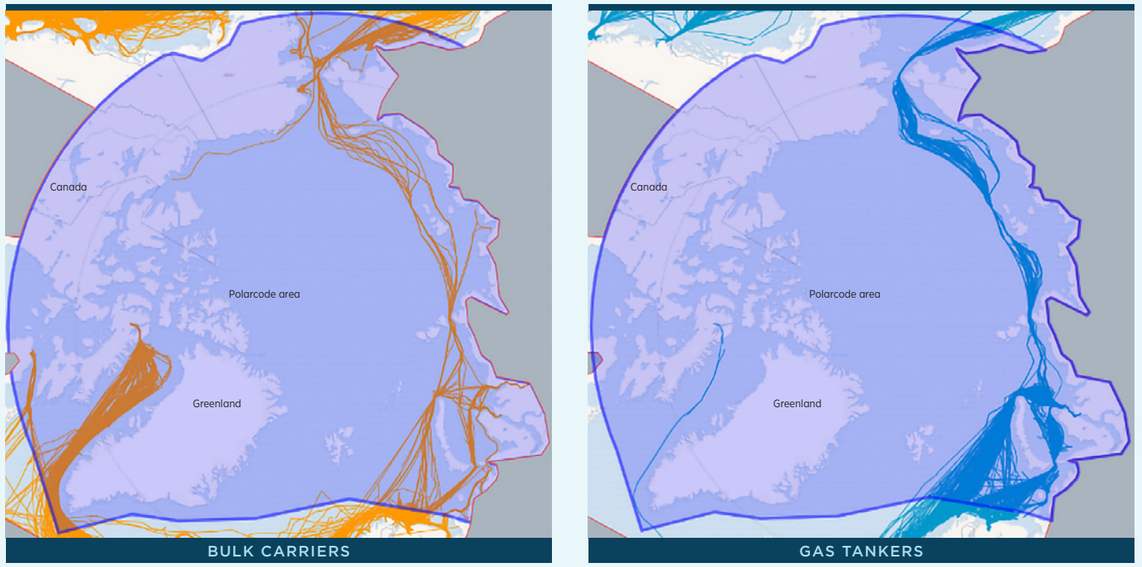
He also highlighted PAME's 'Raising awareness of the Provisions of the IMO's 2012 Cape Town Agreement for the Safety of Fishing Vessels', which, when implemented, will regulate fishing vessels specifically, as many existing international regulations do not apply to fishing vessels. He pointed out that the implementation of these regulations of course protects the environment and the people who live in the Arctic.

All Arctic Shipping Status Reports can be found on www.pame.is.



Reference: PAME

SHIP TRACKS FOR ALL SHIPS 2024



Reference: PAME

Kristina Bär / Arctic Council Secretariat
Sara Olsvig, Axel Ingemann-Jeremiassen, Sophie Crump, and Benjamin McTaggart / Inuit Circumpolar Council
Richard Paton / Qikiqtani Inuit Association

The Custodians of the Pikialasorsuaq

HOW INUIT ARE TAKING THE LEAD IN SAFEGUARDING A UNIQUE ECOSYSTEM

The Pikialasorsuaq area, including the North Water Polynya, is one of the most productive marine ecosystems in the Arctic. Its nutrient-rich upwelling waters provide feeding grounds to many birds, fish and marine mammals that have sustained and nourished Inuit on both sides of the polynya for millennia. Yet, increasing temperatures and the impacts of human activities put the waters and ice of the Pikialasorsuaq, the ecosystems and the Inuit communities that depend on them, under pressure. To safeguard and monitor the changing polynya, an Inuit-led management regime is being established – a prime example of an Indigenous-led ecosystem approach to management.

Between Avanersuaq, Northern Greenland and Ellesmere Island in the Qikiqtani region of Nunavut lies one of the largest Arctic polynyas, an area of year-round open water surrounded by sea ice. In Kalaallisut, the language of the Inuit of Western Greenland, the region has been called Pikialasorsuaq, meaning "great upwelling," a reference to the warm, nutrient-rich waters that sustain one of the Arctic's most biologically productive ecosystems – but the North Water Polynya goes by many names (see box).

In winter, fractures in the polynya's weak ice offer breathing holes for marine mammals like belugas and narwhals. And when the sun returns, the spring light fuels a phytoplankton bloom, providing a feast for one of the world's largest spring migrations of walruses, seals, polar bears, belugas, narwhals and bowhead whales. The polynya also serves as a feeding and breeding ground for millions of seabirds.

For generations, the Pikialasorsuaq has been a vital hunting ground for Inuit, providing food and resources that have shaped traditions and ways of life on both sides of the polynya. Additionally, the northern ice bridge has served as a transportation route, fostering strong ties between Inuit communities in Canada and Greenland.

The whole team coming ashore in Qaanaaq, Greenland.
Photo: Christopher Debicki, courtesy of the ICC Canada Archives

The many names of the North Water Polynya

Throughout this article, we are referring to the Pikialasorsuaq area. However, the area has been referred to by different names by different Inuit communities. Inuit on the Qikiqtani side call it Sarvarjuaq, meaning "the place that never freezes" in Inuktitut. The Inuit Circumpolar Council (ICC) Pikialasorsuaq Commission reported the use of the name Ikeq for Smith Sound. During more recent ICC-led workshops with Inughuit participants, names such as Aniggoq and Ikeq were mentioned. However, Inughuit may not have a singular, widely recognized name for whole polynya; the distinction between Ikeq and Aniggoq depends on the perceived boundaries of the region, with Ikeq meaning "broads" in West Greenlandic and Aniggoq referring to an "inlet" or "fjord". [1]

[1] A hunter in Siorapaluk identified *Ikeq* as a name for part of the Pikialsorsuaq in an interview alongside the Inuit Knowledge workshop in June 2024. This knowledge was also shared in the community visits conducted by the Pikialasorsuaq Commission in 2016. Inuit hunters in Qaanaaq identified part of the Pikialasorsuaq using the term *aniggoq* in ICC's Inuit Knowledge workshop in May 2024.

The Pikialasorsuaq under pressure

Yet, the Pikialasorsuaq is under pressure. Environmental changes including rising temperatures make the polynya less stable and, as the shielding ice disappears, it faces greater impacts from industry as it becomes more accessible to shipping, fisheries, tourism and mining. With less predictable polynya formation, changes in plankton blooms, melting glaciers, eroding shorelines and increased commercial activities, the polynya's unique ecosystem and the Inuit livelihoods it has supported for millennia face an uncertain future.

"Our patterns have changed due to the climate change impacts we see today. Inuit on both sides recognize that it's becoming increasingly difficult to access the polynya because of these changes. Shifting sea ice has altered the way we travel through the region, significantly affecting our lifestyle and culture," shared Richard Paton, Assistant Executive Director at the Qikiqtani Inuit Association.

Boat view of Qullissat, Greenland – the birthplace of Kuupik Kleist, one of the three Pikialasorsuaq Commissioners. *Photo: Bjarne Lyberth, courtesy of the ICC Canada Archives*

The Pikialasorsuaq Commission

Recognizing the significance of this area for Inuit, ICC established the ICC Pikialasorsuaq Commission in 2016. The Commission was formed as a three-year project aimed at producing recommendations for an Inuit strategy for safeguarding and monitoring the health of the polynya for future generations. An important part of its mandate was to consult Inuit communities closely connected to the Pikialasorsuaq in both Greenland and Canada, who have lived in the region and managed its resources for generations.

"As the eyes and ears of the region, Inuit are witnessing the changes in the Pikialasorsuaq daily. We have observed changes in sea ice, snow conditions and the distribution and behavior of marine mammals. We've also noticed new species or sub-species entering our waters," said Paton.

From the consultations, four main themes of concern and action emerged: the uncertain impacts of climate change and their consequences, the importance of food security and subsistence for both physical and mental well-being, the risks and opportunities posed by increased development in the region, and military activities in the area.

Three recommendations for the future of the Pikialasorsuaq

The concerns and visions of community members were summarized in the 2017 report "People of the Ice Bridge: The Future of the Pikialasorsuaq." Based on this assessment, the Commission made three key recommendations.

Firstly, the Commission proposed the creation of an Inuit-led management regime, led by representatives from the Pikialasorsuaq communities. This authority would oversee activities such as transportation, shipping, and offshore industrial development, while also monitoring and conserving living resources within and adjacent to the Pikialasorsuaq to ensure the health of dependent communities.

Top: Kids looking at a map in Pond Inlet, Canada. *Photo: Vincent Desrosiers (VDOpro.co) for ICC Canada, courtesy of the ICC Canada Archives*

Middle: Group photo of public meeting participants in Siorapaluk, Greenland. *Photo: Kuupik Kleist, courtesy of the ICC Canada Archives*

Bottom: Inuit experts at the public meeting in Savissivik, Greenland. *Photo: Kuupik Kleist, courtesy of the ICC Canada Archives*

Secondly, the Commission advocated for a conservation economy by establishing a protected area. This area, identified in consultation with the surrounding Inuit communities, would encompass the polynya and a larger management zone that reflects the connection between communities, their natural resources, and the polynya. This zone, managed by Inuit and recognized by governments, would support their vision of a working seascape.

Thirdly, the Commission recommended creating a free travel zone for Inuit across the Pikialasorsuaq region, honoring the shared history and connections of communities on both sides of the polynya.

An example of Inuit-led ecosystem-based management

The proposed conservation approach of the Pikialasorsuaq serves as an example of Inuit-led ecosystem-based management, grounded in the knowledge of the people who have lived and thrived in the area for thousands of years. "When the value of Indigenous Knowledge is realized, we can get to a place of true ecosystem-based management with Inuit Knowledge as its central pillar," said Herb Nakimayak, Executive Council Member of Inuit Circumpolar Council.

Despite their small population, Inuit already make significant contributions to national conservation efforts. "Our population is less than 0.05 percent of the Canadian population, yet we conserve one-third of Canada's target for the 30 by 30. That is a significant effort by a very small population," emphasized Paton. By leading the conservation efforts of the Pikialasorsuaq, Inuit can draw on their Indigenous Knowledge in management practices, alongside Western science, bringing together two distinct knowledge systems to inform the best management approach.

Furthermore, this management approach enables Inuit to protect the environment while maintaining their right to hunt and harvest in their lands and waters, and building frameworks for sustainable industries and conservation economies based on their knowledge. "Conservation is a driver of change, but it's also an opportunity for Inuit self-determination and enhancing Inuit decision-making. This allows Inuit to bring forward economic opportunities and become self-sustaining," Paton explained.

Putting words into action

The first milestone following the release of the report by the Pikialasorsuaq Commission was reached in October 2023 when the governments of Canada and Greenland signed a Letter of Intent for Cooperation on the Pikialasorsuaq to further collaborate on the recommendation for an Inuit-led management regime put forward by the Commission. Work is under way as noted by Sara Olsvig, ICC Chair: "Together with ICC, our governments are preparing to implement the first of three Pikialasorsuaq Commission recommendations by establishing a Pikialasorsuaq Joint Steering Committee to develop instruments and common foundations for an explicit Inuit-led management area."

Continuing this momentum, ICC is working on implementing the remaining recommendations, including defining the geographical area and ensuring free mobility across the state border. "As the original custodians of the Pikialasorsuaq, we will continue to pursue its more formal safeguarding," said Olsvig.

In September 2024, Inuit Parties met for the first Pikialasorsuaq Meeting of the Parties (MoP), hosted in Nuuk, Kalaallit Nunaat, by ICC and the Qikiqtani Inuit Association (QIA), together with other invited Observers and Participants. Intended to advance upon the work of the ICC Pikialasorsuaq Commission and its three recommendations, those present met to hear updates of the work of participants, the current and future environmental and economic status of the region and advance the recommendation to establish an Inuit-led management regime.

Building on the Letter of Intent signed in 2023, the first MoP worked to ensure continued engagement and leadership of Inuit, producing 21 recommendations to both governments (see link below). They take inspiration from and adhere to the *United Nations Declaration on the Rights of Indigenous Peoples*, building on the work of the ICC Pikialasorsuaq Commission and its 2017 report.

First Pikialasorsuaq Meeting of the Parties.
Photo: Inuit Circumpolar Council

Following the MoP, work has advanced between the governments of Canada and Greenland to enable the establishment of a joint steering committee, as outlined in the 2023 Letter of Intent. "ICC remains committed to working with the governments of Canada and Greenland throughout this process and aims to see the establishment of an Inuit-led management regime that will uphold the rights of Inuit and the role of Indigenous Knowledge," said Olsvig.

The Inuit organization continues to advocate for the Inuit communities of the Pikialasorsuaq region to take full part in the work, as they are best placed to manage and monitor the region and must have a leading role in safeguarding the health of the polynya and its ecosystem for the use of generations to come.

Further reading:

Report of the Pikialasorsuaq Commission:

Read the 21 recommendations of the first MoP here:

Boat sailing outside of Svalbard.
Photo: Theofanis Deligiannis-Virvos

OCEANS

The Changing Soundscape of the Arctic Ocean

HOW HUMAN ACTIVITY IMPACTS UNDERWATER NOISE IN THE ARCTIC AND MODELING SOLUTIONS

Jessica Cook / Arctic Council Secretariat

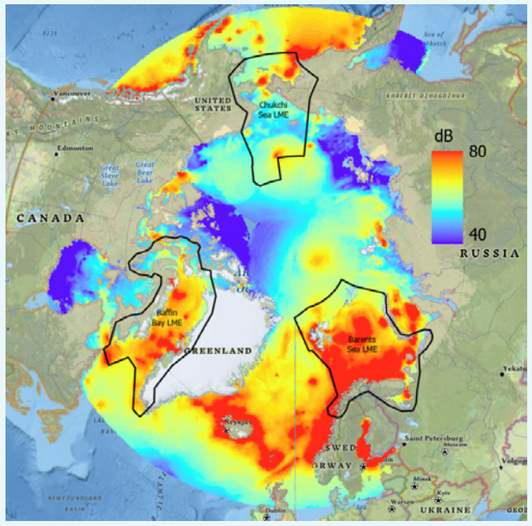
If you were to plunge into the icy waters of the Arctic Ocean and submerge your head underwater, you may hear a range of different sounds. Wind would create sound waves that penetrate below the surface. Near the ice edge, you could hear the cracking and shearing of sea ice. If it were spring, you may hear a bearded seal singing in courtship. You could hear walrus making a knocking sound, or narwhal and beluga whales clicking as they use echolocation. However, what you may also hear is just very quiet ambient sound.

"When sea ice forms over the surface of the Arctic Ocean, it acts like a blanket and things become very quiet," said Dr. Melanie Lancaster, Senior Specialist, Arctic Species at WWF's Global Arctic Programme. "This naturally quiet environment has allowed Arctic marine species to evolve unique acoustics for navigation, feeding, mating and communicating."

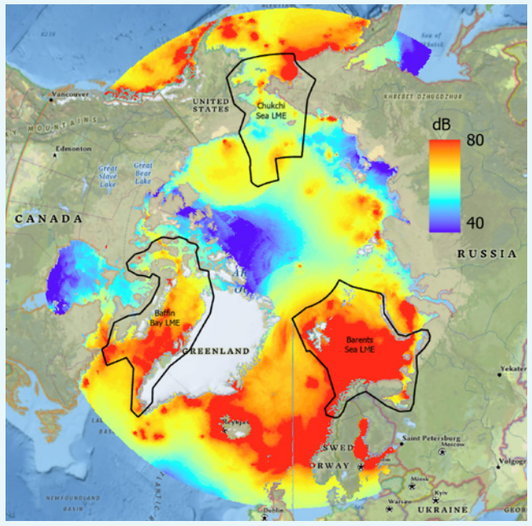
But the Arctic Ocean as we know it is changing. Sea ice is thinning and its extent is decreasing, leading to more human activity in the region and smaller areas of acoustic refuge. All of this is changing the underwater soundscape in the Arctic.

Rising activity in Arctic waters

The Arctic Ocean's underwater acoustic properties differ from non-polar waters. Sea ice acts as a shield and diffuser of underwater sound. Cold water and changing salinity gradients also affect sound propagation underwater. Further, due to properties in the water column, sound can travel longer distances at shallower depths than it can in the world's other oceans. This means the addition of even a small amount of human activity can have major impacts to the underwater soundscape.



Median ship noise at 25 Hz over the month of September in 2019.
Credit: PAME



Predicted median ship noise at 25 Hz over the month of September in 2030.
Credit: PAME

Yet, human activity is on the rise. Shipping in the Arctic has increased 37 percent over the last 11 years, according to the Arctic Council's Protection of the Arctic Marine Environment Working Group (PAME). Other activities like oil and gas exploration (through seismic surveying in particular), as well as port construction also introduce noise into the water, negatively affecting marine ecosystems as well as Indigenous and local ways of life.

For many years, there was a major gap in our knowledge about human-caused underwater noise in the Arctic and the impact it may have. PAME set out to fill this critical knowledge gap, first by developing a State of Knowledge report in 2019, then – for the first time – mapping underwater noise from shipping across the Arctic Ocean, with results published in 2021. Now, PAME is releasing a new report that includes modeling future scenarios of what the Arctic Ocean could sound like in 2030 based on factors likely to influence shipping trends.

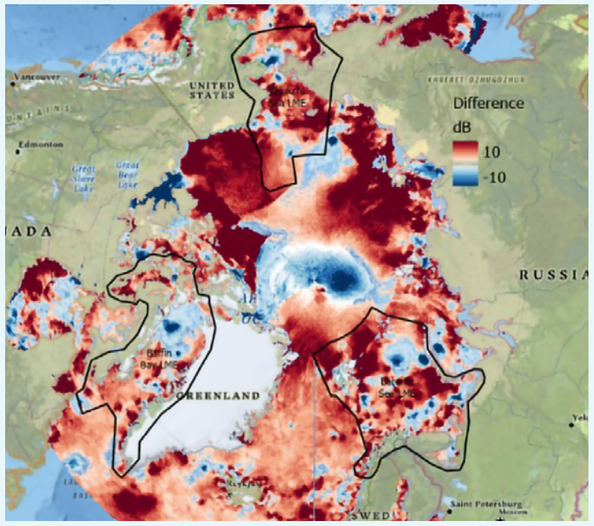
How underwater noise impacts animals and ecosystems

As an Observer to the Arctic Council, the WWF Global Arctic Programme has co-led the Underwater Noise in the Arctic projects. Dr. Lancaster, with her background in research and conservation of species, has been closely involved in PAME's latest report. She explains the big impact that underwater noise can have on Arctic species.

"We know that marine life in the Arctic Ocean is quite naive to underwater noise because they've been naturally shielded from sources of human-made noise," said Dr. Lancaster.

She explains that extremely loud noises can damage animals' ear drums, or even lead them to strand on beaches, which can cause death. Shipping noise, however, is different.

"Shipping is most likely causing disturbance to animals, leading them to stop feeding or



Difference in shipping noise 2019-2030.
Credit: PAME

Bearded seal.
Photo: Vladimir Melnik / Adobe Stock

to leave an area," said Dr. Lancaster. "For example, narwhal are extremely sensitive to underwater noise and can change their entire behavioral pattern. If a ship navigates through their natural habitat, it can cause them to leave and not return for several days or longer if there's repeated activity. The sound can cause narwhal to reduce or completely stop eating, while they also use up more energy to flee."

Dr. Lancaster shared that there have been observations of beluga whales fleeing in response to an ice breaking ship from 30 to 50 kilometers away. She explained that they form groups and once they've fled, they won't come back to the area for several days. Walrus have been observed to change their behavior, increasing their diving and moving away from the source.

Underwater noise doesn't impact species in isolation, it impacts the entire ecosystem. If one species changes behavior because of noise disruption, that can have ripple effects on the food web. A growing body of knowledge also tells us that underwater noise has impacts on many marine species, from mussels to fish, right up to whales. Dr. Lancaster also points out that noise pollution is just one disruption species need to contend with.

"We already have animals trying to cope with transformation of their habitats and changes in their food sources due to climate change. A number of these species are dependent on sea ice for example, so they're experiencing massive changes all around." said Dr. Lancaster. "We're concerned the addition of yet another pressure due to underwater noise is something that's unnecessary in the Arctic."

Healthy populations of marine mammals, fish and other species are critical for the livelihoods, food security and cultures of many Indigenous Peoples.

"A lot of these species that we know to be particularly affected by underwater noise are also species that are heavily relied upon by many coastal Indigenous Peoples. This element can't be understated. We need a healthy ocean," stated Dr. Lancaster.

Young beluga whale.
Photo: Adobe Stock

Mapping a new ambient soundscape

In 2021, PAME used information from its Arctic Ship Traffic Data (ASTD) and the expertise of bio acousticians to create the first ever map of underwater noise from shipping across the entire Arctic Ocean. The results revealed a soundscape that had already undergone dramatic changes.

PAME found that some places in the Arctic Ocean experienced a doubling in noise levels from 2013 to 2019.

"For comparison, the North Pacific Ocean took between 30 and 40 years to reach the same magnitude of noise increase as it took in just six years in the Arctic," said Dr. Lancaster.

During the winter months, underwater noise from shipping was concentrated in areas with more open water such as the Barents and Kara Seas, the southern Bering Sea and along the Greenland coast of Baffin Bay. In the summer months, noise levels were higher and spread out farther, into the Canadian Archipelago, the Chukchi and Beaufort Seas and even the Central Arctic Ocean.

Dr. Lancaster points out that the reason for such a dramatic increase in noise in the Arctic is because the baseline is so low.

"Sometimes people will look at these data and wonder why we are worrying about underwater noise in the Arctic when there's so much more shipping in the Baltic or North Seas, for example. But the point is, the Arctic is a special case. Sound travels differently in the Arctic Ocean compared to other oceans. Baseline levels are low, and so even a small input of ships can have a large effect on the underwater soundscape. If you imagine the animals living in these environments, they're going from having a relatively quiet background to all of a sudden a very loud environment they then have to contend with."

Testing solutions to mitigate underwater noise

After PAME was able to map the Arctic's underwater soundscape, the project entered a new phase: figuring out what the Arctic could sound like in the future and exploring how a variety of shipping management measures could affect underwater noise in three sub-regions of interest: Baffin Bay, the Barents Sea and the Chukchi Sea. The sub-regions were chosen as they are known to have a high overlap between important marine mammal habitats and ship traffic.

The results of the latest project phase show that, with no further policy action, by 2030, underwater noise from shipping will increase across the Arctic Ocean as a result of more ship traffic and reductions in sea ice extent and thickness. The modelling predicts that increases in noise levels will not be uniform and can range from a doubling to a ten-fold increase, even in areas with relatively low shipping currently, such as Baffin Bay and the Chukchi sea.

One suggested measure to limit underwater noise is to reduce ship speeds in the Arctic to 10 knots. However, in the few areas examined, most ships were found not to be travelling above 10 knots in the first place, suggesting that imposing speed reduction measures may not have a large impact in parts of the Arctic where ships are already travelling slowly.

Another potential measure to address underwater noise is to re-route ships around areas of biological importance. However, this measure requires considering an important trade off: moving ships from one location to another also shifts the associated underwater noise. Those consequences should be included in planning.

"The Ocean doesn't have physical barriers, so even designating a marine protected area with limited shipping might not stop noise from entering. One of the project's recommendations is that spatial measures to manage shipping around important habitats should include buffer zones to make sure that underwater noise from ships outside the area won't permeate in."

Technical solutions that can help reduce underwater noise include retrofitting vessels with a different, quieter propeller and regular hull cleaning.

Results from PAME's latest report on underwater noise in the Arctic, including future scenario mapping, will be shared with the International Maritime Organization (IMO), the United Nations agency responsible for the safe shipping and prevention of pollution by ships.

The IMO, who is also an Observer to the Arctic Council, does have global underwater noise reduction guidelines for optional uptake. However, according to Dr. Lancaster, the unique conditions in the Arctic call for special guidance to be put in place in the region.

"WWF as an Observer to the Arctic Council has been contributing to PAME's underwater noise work for about nine years now," said Dr. Lancaster. "We're happy that the Arctic Council continues to work on the issue, as this is an important area of focus for WWF as well. We at WWF continue to advocate for measures to reduce the impacts of underwater noise from shipping, particularly in the Arctic."

PAME's efforts to investigate scenarios for noise levels are important in identifying the most effective management measures. By modeling future scenarios, PAME's recommendations can be acted upon now before underwater noise becomes too much of a problem in the future.

"With the Arctic Ocean, we have an opportunity that we don't have in the rest of the world's oceans anymore," said Dr. Lancaster. "This really is the last ocean that is relatively unpolluted by underwater noise. Instead of degrading nature and then trying to figure out how we can reverse that trend, we have an opportunity to actually put measures in place before more harm is done."

Passenger cruise vessel outside of Svalbard. *Photo: iStock*

Oil Spill Exercise in Kotzebue, Alaska. *Photo: Petty Officer 2nd Class Grant DeVuyst / U.S. Coast Guard*

The Changing Tides of Arctic Shipping

How New Fuels Impact the Arctic

Jessica Cook / Arctic Council Secretariat

Could the Fuels Banned in Recent Regulations be Worse for the Arctic Marine Environment?

As Arctic shipping increases, so are concerns regarding pollution and impacts to the Arctic marine environment. In response, new regulations on fuel types have come into effect. However, the shift towards new fuels, while well-intentioned, has led to unforeseen challenges in Arctic waters. In fact, new fuels in use because of tightening regulations could have a far worse environmental impact than the old fuels being banned in the event of an oil spill. Two Arctic Council Working Groups – the Emergency Prevention, Preparedness and Response (EPPR) and the Protection of the Arctic Marine Environment (PAME) teamed up to fill a knowledge gap on how new fuels could impact the Arctic marine environment and oil spill response. Their work has provided critical insights, revealing that new parameters may be needed to minimize risks and promote healthy Arctic seas.

Arctic shipping is increasing

From 2013 to 2024, the number of ships entering the Arctic Polar Code area increased by 37 percent according to PAME. Not only are there more ships in Arctic waters, but the distance they sailed in the Arctic during that time period grew 108 percent. With more ships sailing longer distances in the Arctic, the type of fuel that ships use – and its impacts on Arctic ecosystems, especially in case of an oil spill – are of growing concern.

Fuels used by ships in the Arctic

Ships operating in Arctic waters use several types of fuels based on ship type, size, logistics and cost. According to Jon Arve Røyset, expert and project lead for PAME and EPPR, around half of the ships operating in the Arctic use residual fuels, while the other half use distillates. However, residuals are the more popular choice for large ships that burn more fuel, leading to a greater volume of residual fuels in use in Arctic waters.

Røyset explains that while each fuel type has its pros and cons, the answer to which fuel type is better – or worse – for the Arctic marine environment is not so black and white.

Changing fuel regulations

In January 2020, driven by environmental and health concerns, the International Maritime Organization (IMO) introduced a cap on sulphur content in fuel oils, reducing the global sulphur limit from 3.50 percent to 0.50 percent. The IMO introduced these regulations to curb harmful emissions of sulphur oxide, expecting a shift away from residual fuels and towards cleaner distillate fuels. However, according to Røyset, a loophole quickly opened.

“The oil industry responded by offering Very Low Sulphur Fuel Oil (VLSFO) and Ultra Low Sulphur Fuel Oil (ULSFO),” said Røyset. “While these fuels comply with the sulphur regulations, they aren’t tested in cold waters. When PAME and EPPR set out to find how they would react in cold Arctic water, we found that these low sulphur fuels actually introduced new challenges.”

On 1 July 2024, the IMO enforced a ban on the carriage and use of Heavy Fuel Oil (HFO) in the Arctic. HFOs are heavy and tar-like and can remain at sea for weeks in the event of an oil spill. They also have the highest levels of black carbon emissions among marine fuels.

Several of the VLSFO and ULSFO fuels are also considered Heavy Fuel Oil – leading oil producers to tailor fuels to comply with regulations. For example, they can add what is called paraffinic cutter stock or other additives used to thin the oil, which could have serious consequences for the Arctic.

Samples of oil and fuel. *Photo: Anders Røeggen / Kystverket*

Distillate fuels

Petroleum products created by refining crude oil. This oil is lighter and considered cleaner than residual fuels. Example fuel types include diesel fuel & marine gas oils.

Residual fuels

Residuals are leftover components of crude oil separated from upgraded distilled products. Residuals tend to be heavier than distillates, and includes fuels categorized as Heavy Fuel Oil.

“When PAME and EPPR set out to find how they would react in cold Arctic water, we found that these low sulphur fuels actually introduced new challenges.”

Jon Arve Røyset / Project lead for PAME and EPPR

“With the rise in Arctic shipping, the risk of oil spills is also increasing. This project is the very first to test how new fuels behave in Arctic waters, providing vital information that will in turn inform our oil spill preparedness and response to ensure we are equipped to react swiftly and effectively to minimize environmental and societal damage.”

Ole Kristian Bjerkemo / Chair Of EPPR

Fuel behavior in Arctic waters

In response to changing fuel regulations, PAME and EPPR joined forces to get a better understanding of the new fuels and the implications of their use in Arctic waters. The project, New Low Sulphur Fuels, Fate and Behavior Cold Water Conditions, identified the low sulphur fuels most commonly used in the Arctic, their transport volumes and their properties to understand how the fuel would act if accidently spilled in Arctic waters.

“With the rise in Arctic shipping, the risk of oil spills is also increasing. This project is the very first to test how new fuels behave in Arctic waters, providing vital information that will in turn inform our oil spill preparedness and response to ensure we are equipped to react swiftly and effectively to minimize environmental and societal damage,” said Ole Kristian Bjerkemo, Chair of EPPR.

Røyset, who leads this project, emphasizes one technical detail that is very important: pour point. This is the temperature below which fuel solidifies.

“In the Arctic, ocean temperatures can hover around 3° Celsius. The high sulphur fuels and Heavy Fuel Oils – both categories that are now prohibited to use – generally have a pour point that was around 0° Celsius or lower. That meant that if there was an oil spill into the sea, the oil would be very thick, but it would still be in liquid form,” explains Røyset.

However, PAME and EPPR’s project revealed that the majority of the new low sulphur fuels that became popular after the IMO regulations have a high pour point, meaning the oil would solidify quickly upon contact with the sea, forming waxy clumps. This solidification can impair oil spill response efforts and wreak havoc on the environment.

New fuels and oil spills in the Arctic

When high sulphur fuels or HFO spills in cold Arctic waters, it stays in liquid form relatively centered where the oil spill takes place until oil spill response equipment can be brought in for clean-up. Oil clumps from low sulphur fuels, however, behave very differently.

“Oil clumps drift away with wind and ocean currents and can spread over a much larger area,” said Røyset. “It could also drift into sea ice in large quantities where it can then freeze and cause significant long-term impacts on the environment.”

Røyset explains that a major finding of the PAME-EPPR project is that current oil spill response equipment is not designed to handle clumps. “Oil skimmers are designed to collect liquid oil, and we have demonstrated that they fail to gather oil clumps. Essentially, oil cleanup equipment will have very limited or even no effect at all if these new fuels spill in Arctic waters.”

Unintended consequences of fuel regulations
The findings from the PAME-EPPR project suggest that the introduction of low-sulphur fuels might have unintended negative consequences for the Arctic environment.

“The IMO had the best intentions when they introduced the HFO ban, and it will no doubt make a positive environmental impact in many ways,” said Røyset. “However, in the event of an oil spill, the new fuels being used as a result of this ban could have a far worse environmental impact than the old fuels they are banning.”

As a result of PAME and EPPR’s report, Norway has advocated for a revised definition of HFO to include fuels that have a pour point of over 0° Celsius, reducing the

Exercising the Agreement on Marine Oil Pollution Preparedness and Response in the Arctic. *Photo: Linnea Nordström / Arctic Council Secretariat*

risk of oil clumping in Arctic water. According to Røyset, the PAME-EPPR project was crucial in pinpointing the problems associated with new fuels and providing evidence of why they are harmful as impetus for regulation changes.

So, what type of fuel is both practical for widespread use and mitigates risk in the case of oil spills? According to EPPR and PAME’s latest report, the answer is distillate fuels.

“Distillate fuels such as diesel are certainly not perfect,” explains Røyset. “However, they’re easier to manage in the event of an oil spill in the Arctic. They also emit much less black carbon than other fuels.” The new report by EPPR and PAME also recommends a requirement for an upper pour point of 0° Celsius, which would alleviate challenges for spill cleanup and the persistence of fuel oil in the Arctic.

As a follow up to the report, a new project is being proposed for EPPR and PAME to explore how fuel behaves in Arctic water when additives, cutter stocks and biofuel are included in fuel blends.

“We don’t know what happens when these are added to fuel blends in the Arctic,” said Røyset. “This is a huge knowledge gap we hope to fill in the future. Additives could also have the potential to be a good thing, for example to reduce pour point. Filling this knowledge gap can lead to better outcomes and regulatory guidelines.”

Industry insights

The PAME-EPPR project also involves professionals in the maritime and oil blending industry to foster greater understanding and cooperation.

“We held a workshop with industry representatives in early 2024 that included people in the oil blending industry,” noted Røyset. “We spoke very openly with each other, and it was a very good learning experience for all.”

“As the shipping industry continues to adapt to new regulatory landscapes, it’s important to balance environmental protection with practical fuel options that meet operational needs and ensure both compliance and safety,” said Røyset. “The ongoing collaboration between PAME, EPPR and industry stakeholders will be crucial in achieving this balance.” ◑

Photo: Ólavur Frederiksen

Gateway to the High Arctic
The Importance of Ocean Connectivity

PRIORITIZING OBSERVATIONS AND MONITORING CRUCIAL FOR BETTER PREDICTABILITY TO SUPPORT DECISION MAKING

Kingdom of Denmark / Greenland, the Faroe Islands and Denmark

In the midst of the UN Ocean Decade (2021-2030) and with the adoption of the Kunming – Montreal Global Biodiversity Framework, there's a new impetus to reinvigorate our focus on the ocean. Important work carried out by the Arctic Council has primarily focused on the High Arctic. The fundamental interconnections with adjacent subarctic seas deserve greater international attention.

The subpolar North Atlantic Ocean plays a critical role in regulating the global climate and sustaining marine food production. Monitoring and understanding the connectivity between the High Arctic, subarctic oceans and lower latitudes is an important prerequisite for short- and long-term climate change projections. Additionally, it's critical in tracking the transport of pollutants, marine biota and invasive species to the High Arctic. Explicitly incorporating knowledge of these interconnections will enhance predictive capabilities, which are fundamental for effective management of this productive, sensitive and rapidly changing region.

This article takes a brief look at these connections, shedding light on how the future of the Arctic and the planet is tied to the dynamic flows of water, heat, and life between the High Arctic and the subarctic oceans.

"Borealization" of the Arctic

The flows of Atlantic water across the Greenland-Scotland Ridge and Pacific water through the Bering Strait act as conveyors for carrying heat northward into the Arctic and drive the "borealization" of the Arctic. Simultaneously, melting Arctic ice sends freshwater southward, altering subarctic currents and impacting weather patterns and ecosystems across the Subpolar North Atlantic and beyond. Monitoring these currents is crucial for understanding the broader impacts of global warming on e.g. biodiversity and provision of ecosystem services.

The subarctic regions can be considered the oceanographic gateway to the High Arctic. Monitoring pollutant transport, invasive species and biodiversity is essential to better understanding the marine environment in the Arctic region and how it is affected by the "borealization".

Changes in the "Gulf Stream"

The Atlantic Meridional Overturning Circulation (AMOC), is a main engine inducing oceanic connectivity between the Arctic and lower latitudes. Warm, saline water flows northward on the surface, while cold, oxygen-rich water returns southward in the depths. It plays a crucial role in the rapidly changing Arctic Ocean, subpolar ocean conditions and global ocean circulation. Changes in the AMOC could therefore have profound implications. If heat transports increase, this would further reduce Arctic sea ice, altering habitats for species like copepods, which are critical to the food web. Similarly, shifts in surface waters could drive marine species, including fish, toward the poles, disrupting ecosystems and fisheries.

While the Intergovernmental Panel on Climate Change (IPCC) predicts a weakened AMOC in the next century, recent studies suggest increased oceanic heat transport to the High Arctic. Either way, these changes will profoundly affect marine biodiversity, biogeochemical cycles and climate feedback mechanisms.

Zonal connectivity

The horizontal, or zonal, connections, driven by large oceanic gyres, are equally important. The atmospheric jet stream drives storm systems and oceanic currents in the subpolar Atlantic, which in turn impact nutrient upwelling and circulation patterns. These movements influence the temperature, salinity and thereby biodiversity of Atlantic waters flowing polewards.

Fish, marine mammals and seabirds are also affected by these currents, with some species migrating horizontally along these oceanic pathways. Understanding these east-west connections in the subpolar region, including convection and water mass mixing processes and their impact on ecosystems, is critical for effective conservation and ecosystem management.

Enhancing Arctic observations for a more predictable future.

To address the challenges of climate change and ensure sustainable management of Arctic and subarctic resources, a robust observational framework is essential. Although existing international and regional observation and monitoring programs cover portions of the subarctic, the Arctic Council could coordinate efforts to better understand how key variables such as ocean temperature, salinity and plankton dynamics interact with fish stocks, seabirds and marine mammals across the circumpolar North.

Enhanced monitoring of the air-sea interface, where atmospheric and oceanic processes converge, would improve weather forecasting and help anticipate future changes. This is critical in a warming world where weather patterns are becoming increasingly variable and extreme.

Prioritizing observations in key regions of the subarctic marine environment is essential for strengthening predictive modelling, advancing comprehensive marine ecosystem-based management and addressing critical challenges such as the transport of marine pollutants and plastics, and shifts in marine biodiversity.

The Faroe Islands. *Photo: Emil Rahr*

Ecological Connectivity in the Arctic Marine Environment

The Arctic Ocean is part of the global ocean and is connected physically, chemically and biologically to the Atlantic and Pacific Oceans. Ecological connectivity is the movement of populations, individuals and genetic material between populations, communities and ecosystems, as well as that of non-living material from one location to another. Connectivity is vital for the survival and migration of many Arctic species and is fundamental to ecosystem functioning and services. Ecological connectivity in the Arctic marine environment is affected by increased human activity and by climate impacts such as sea ice melt, migratory shifts and changing ocean conditions, contributing to negative impacts on biodiversity.

Management options can help safeguard and enhance connectivity across the Arctic by linking conservation areas used by species during different life stages. The Arctic Council has developed a Pan Arctic Conservation Framework to create a common vision for and support countries' implementation of a network of area based management tools, such as marine protected areas, other effective area-based conservation measures, and Indigenous protected and conserved areas. And importantly, Indigenous Peoples and local communities are key partners in understanding this connectivity and protecting marine ecosystems.

More information can be found in the information brief, Ecological Connectivity in the Arctic Marine Environment (CAFF, PAME, 2025).

A Message From a Frozen World

AS THE WORLD'S SNOW AND ICE VANISHES AND PERMAFROST THAWS, THE CRYOSPHERE CALLS FOR URGENT GLOBAL ATTENTION

Kristina Bär / Arctic Council Secretariat

Every living being on Earth is connected to the cryosphere in one way or another. It's therefore a shared responsibility to keep the majority of the frozen part of the world in tact before irrevocable changes alter the world as we know it. To share this message, the Norwegian Chairship of the Arctic Council brought some of the strongest voices on stage during COP29 to speak about the cryosphere. This is their call to action.

The cryosphere is the frozen part of the world; its glaciers and mighty ice sheets, snow, permafrost, and river, lake and sea ice. While seemingly distant to many, these icy masses bind people across the globe together in many ways; mountain glaciers supply freshwater to millions. Ice sheets, snow and sea ice play a crucial role in stabilizing the Earth's climate system while also serving as a basis for culture and well-being, supporting the livelihoods of Indigenous Peoples in particular. Permanently frozen soil protects rich carbon storages and the shores of coastal communities, and many ecosystems rely on snow and ice.

However, our frozen world is under threat. As global temperatures increase, two of the most ice-rich regions are warming faster than the rest of the world: the Arctic three times[1], and the Antarctic at twice the global average. The consequences of the shrinking ice sheets are global, including sea level rise, coastal erosion, contaminated freshwater, damaged infrastructure, a self-perpetuating warming cycle. These changes threaten not only the environment and the Earth's climate systems, but also the rights of Arctic Indigenous Peoples, who have relied on a frozen landscape for time immemorial.

Ice floating by the shoreline of Longyearbyen, Svalbard. *Photo: Kristin Nymark Heggland / Arctic Council Secretariat*

Ship moored in the waters of Qeqertarsuaq, Disko Island, Greenland. *Photo: Susan Christianen / Arctic Council Secretariat*

Disko Island, Greenland.
Photo: Susan Christianen / Arctic Council Secretariat

The Earth's changing cryosphere is thus sending a warning signal; a planet with less snow, ice and permafrost is a very different planet, one unknown to humankind. These were the words of the Minister of the Environment for Chile, Honorable Maisa Rojas Corradi, as she took the stage during an official side event focused on the cryosphere hosted by the Norwegian Chairship of the Arctic Council during the 29th Conference of the Parties (COP29) to the United Nations Framework Convention on Climate Change (UNFCCC) in Baku, Azerbaijan.

Representatives from Chile, Pakistan, Germany, Bhutan, and Norway, the Inuit Circumpolar Council and the International Centre for Integrated Mountain Development, as well as polar scientists shared the stage to bring a message from the frozen world to global leaders. In their words, this is how the Arctic, the Antarctic and the Hindu Kush Himalayan region are changing and why global action is needed.

The Arctic

"Cryosphere for us Inuit translates to rights. Cryosphere for us translates to our infrastructure. The fact that our land is frozen makes our land our infrastructure. The fact that our sea ice is there in the winter, makes our sea and the ice on it our infrastructure. So when it melts, it is literally the ground underneath us that is melting. This has repercussions to our lives, livelihoods and human rights," emphasized Sara Olsvig, Chair of the Inuit Circumpolar Council (ICC).

Since the 1980s, the loss of the Arctic cryosphere has been dramatically accelerating. At its lowest annual extent, the Arctic Sea ice cover has decreased by 58 percent since 1979[2]. If this trend continues, the Arctic Ocean could be considered ice-free in summer as early as by the 2040s[3]. Olsvig shared a story from her homeland, Kalaallit Nunaat (Greenland), where a young man faces more than the loss of a hunting ground when the ice cover gets too fragile to traverse upon. "The fact that the sea ice doesn't settle anymore and it's not safe to travel on also means the loss of knowledge because his grandfather cannot teach him the knowledge of going hunting from the sea ice. It also means the loss of his livelihood for half a year. He has to leave and live in a different town where he can sustain himself and his family from fishing," she told.

Sunset in the Arctic Ocean. *Photo: Ekaterina Ustinova / Arctic Council Secretariat*

All regions of the Arctic are now experiencing net loss of land ice[4]. The Greenland Ice Sheet has lost 5000 billion metric tons of its ice since the beginning of the century (or about 30 million tons of ice every hour at the current rate) making it one of the largest regional contributors to sea level rise. In addition to contributing to coastal erosion and undermining Arctic Indigenous communities' coastal infrastructure, thawing permafrost releases greenhouse gases as microorganisms awaken in the warming soils and feast on one of the largest, millennia-old carbon storages in the world.

Glaciologist Heïdi Sevestre from the Secretariat of the Arctic Council's Working Group Arctic Monitoring and Assessment Programme (AMAP) put the consequences into perspective by comparing the potential greenhouse gas emissions from permafrost to those of countries. "If we reach 1.6°C of temperature increase, permafrost will emit as much greenhouse gases as the country of India by the end of the century." At two degrees, the emissions compare to the EU and at three degrees they would equal the United States' emissions. "Just to make myself very clear here, it would effectively be as if we were adding another India, another EU, another U.S. to our planet."

The loss of Arctic ice not only has disastrous repercussions on the lives, livelihoods and rights of Arctic Indigenous Peoples, but it's also a vicious, amplifying cycle. The warmer it gets, the more ice melts and thaws, causing more greenhouse gases to be released and more solar energy to be absorbed by the now darker, ice-free land and sea surfaces. It is therefore not alarmist when Dr. Sevestre says, "If we lose the Arctic ice, not only will we catalyze the warming of the Arctic, but we will also threaten the stability of the entire climate system".

The Antarctic

The Antarctic ice sheet is the largest freshwater reservoir in the world, it holds 90 percent of the global freshwater and at its thickest, it measures 5 kilometers. If all this ice were to melt, the potential global sea level rise would amount to 58 meters. While this is a hypothetical scenario, the fact that the sea level now is rising twice as fast as it did 30 years ago, is not. And what Antarctic scientists are particularly concerned about is the fate of Antarctic ice shelves.

Ice shelves are floating tongues of ice extending from glaciers that are grounded on land. They act as a cork: while in place, the ice shelves hold back the gigantic masses from the Antarctic ice sheet. But when warming waters melt away the floating ice and the shelves begin to retreat further back and sometimes collapse, it's as if someone releases a cork: there's nothing to stop the land ice from flowing into the sea. In short, "You end up with irreversible sea level rise that will last for centuries," explained James Kirkham, Chief Science Adviser at the International Climate and Cryosphere Initiative.

While some amount of irreversible sea level rise is now locked in because of actions we've already taken, exactly how much sea level rise we will get and how fast it will be is still in our hands. "With the 1.5°C compatible pathways, we can limit sea level rise to half a meter by 2100 and to one to three meters by 2300," said Dr. Kirkham. Yet, this is not the trajectory we are on. Our current emissions have us headed towards one meter sea level increase by 2100 and up to six or seven meters by 2300. Scenarios humanity would likely not be able to adapt to.

In many parts of the world, just 10 centimeters of sea level rise will make coastal flooding occur 10 times more frequently. Adaptation measures protecting shores and low-lying land under these scenarios are "a waste of money," as Dr. Kirkham said. "We are talking about the irreversible damage caused by the inundation of countries." The Bahamas could be under water within the next 50 years if current emissions continue. This "if" is the lifebuoy.

"I'm going to leave you with the most important message that we can still decide how much sea level rise we will get and how fast, but these decisions are being made by policies that you are setting now."

Hindu Kush Himalaya

The high mountain areas of the Hindu Kush Himalaya hold more snow and ice than anywhere else outside the polar regions. The tallest mountain range in the world houses some 54,000 glaciers. Around 240 million people call the mountain range their home, but another 1.6 billion people live downstream, in the valleys and river basins, Pema Gymatsho, Director of the International Centre for Integrated Mountain Development (ICIMOD), reminded the audience. These rivers, including the Ganges, Brahmaputra, Mekong and Yangtze, provide drinking water, irrigation, energy and sanitation.

Yet today, most of the glaciers are retreating and the hydrological cycle becomes more unpredictable. This can have devastating effects, including catastrophic floods, landslides and droughts. Dr. Gymatsho shared the example of Sikkim, India, where heavy rains caused a glacial lake to breach its banks in October 2023, triggering an outburst flood, which wiped away the Teesta III Dam in a matter of minutes. It wasn't a singular incident. The Honorable Ahmen Atteeq Anwar, Parliamentary Secretary for the Ministry of Climate Change in Pakistan, shared how 40 percent of Pakistan was under water in 2022 due to a glacial flash flood. The flood displaced millions of people and destroyed large amounts of food production.

In this cascading domino effect of environmental, social and humanitarian disasters, there's a need for understanding climate impacts on affected communities. Khedrup Dorji from Bhutan, Youth Ambassador for ICIMOD, highlighted the importance of transboundary regional and global cooperation, and the need for systemic and integrated approaches to addressing climate challenges. "The cryosphere must be given due consideration in the global processes and act as a barometer for our planet's health to ensure climate and social justice in the world," he urged.

Calls for action

The message is clear: changes to a frozen world impact every living being on the Earth. Thus, safeguarding it is a global responsibility, as Norway's Prime Minister, Jonas Gahr Støre, stated in his opening video address.

So, how does one protect the cryosphere? By keeping the global temperature below 1.5°C, said Dr. Sevestre. "It means that we will need to reduce our emissions by at least 42 percent by 2030. But to be honest, every ton of CO2 we can avoid matters, every tenth of a degree truly matters," she urged the audience.

Cooperation to keep the frozen world intact requires the co-production of knowledge and bringing together western scientific knowledge and Indigenous Knowledge. Sara Olsvig stated, "If the world only bases its decisions on western scientific knowledge, it fails to holistically include all knowledge systems in our work to mitigate and adapt to climate change." It also requires sharing resources, such as installing early warning systems which can save thousands of lives, as Honorable Atteeq Anwar emphasized.

While COP29 at large might not have brought the global push necessary, it gathered experts, knowledge holders and policy makers willing to pursue change and as Khedrup Dorji observed: "Although Norway, partners here, and the Himalayan region are apart by distance, it's our shared commitment, cooperation and sacrifices in protecting our frozen heritage that binds us together more closely and intimately." What it takes, regardless of your country's size, the Bhutanese youth stated, is that you have the right mindset and act on it.

1: AMAP, 2024. AMAP Arctic Climate Update Report 2024: Key Trends and Impacts.

2–5: AMAP, 2024. AMAP Arctic Climate Update Report 2024: Key Trends and Impacts.

COP29 recording

Watch the COP29 side event "A Message From the Frozen World – the Global Impact of a Changing Cryosphere":

Svinafellsjökull Glacier in South Iceland.
Photo: Tabea Jacob / Arctic Council Secretariat

September storms erosion of permafrost coast.
Photo: Lloyd Pikok / Arctic Council Secretariat

CLIMATE

Oran R. Young / University of California, Santa Barbara
Malgorzata Smieszek-Rice / UiT The Arctic University of Norway
Susan Joy Hassol / Climate Communication
Inge Thaulow / Conservation of Arctic Flora and Fauna
Tom Christensen / Conservation of Arctic Flora and Fauna
Gerlis Fugmann / International Arctic Science Committee
Rolf Rødven / Arctic Monitoring and Assessment Programme

ACIA – An Arctic Council Success Story

HOW A GROUNDBREAKING REPORT BROUGHT ARCTIC VOICES ON THE GLOBAL STAGE

The Arctic Climate Impact Assessment (ACIA) became the gold standard of regional climate assessments. The 2004 report was the first comprehensive assessment of a changing Arctic. Through skillful leadership, a diverse knowledge base, and targeted communication efforts, ACIA made global headlines. Its ripple effects can still be seen in the suite of reports and research efforts that followed.

The Arctic Climate Impact Assessment (ACIA), delivered at the 4th Ministerial Meeting of the Arctic Council in October 2004, stands out as a prominent success story. It presented path-breaking insights regarding the complex coupling between the Arctic and the Earth's climate system, and it exemplified the roles assessments can play in bringing knowledge to action. Considering the continuing relevance of ACIA's principal messages and the lessons to be gleaned from this experience for future assessments, it's timely to reflect on the sources of this success.

From mandate to report

The Barrow Declaration, adopted in October 2000 at the conclusion of the first U.S. Chairmanship of the Arctic Council (1998-2000), launched ACIA as "a joint project of the Arctic Monitoring and Assessment Programme (AMAP) and the Conservation of Arctic Flora and Fauna (CAFF) Working Group, in cooperation with the International Arctic Science Committee (IASC)." The Declaration requests ACIA to evaluate and synthesize knowledge in order to "support policy-making processes and the work of the Intergovernmental Panel on Climate Change (IPCC)." A notable feature of ACIA's mandate is an explicit request that the assessment considers "… environment, human health, social, cultural and economic impacts and consequences, including policy recommendations."

With this mandate as a point of departure, the United States provided funding to establish a project office in Fairbanks, Alaska, which coordinated effectively with the AMAP staff in Norway to provide the resources needed. The CAFF Secretariat in turn supported and coordinated relevant expert inputs and workshops. Lead authors were selected from nominations provided by AMAP, CAFF, IASC and the Indigenous Peoples' Secretariat.

The result of this effort was a series of products delivered initially at the end of the first Icelandic Chairmanship (2002-2004). Particularly notable is the report *Impacts of a Warming Arctic* published in late 2004, which presented the key findings of ACIA, as documented fully in the voluminous scientific evidence assembled by the ACIA team (ACIA 2004), using visually appealing images and highly accessible language.

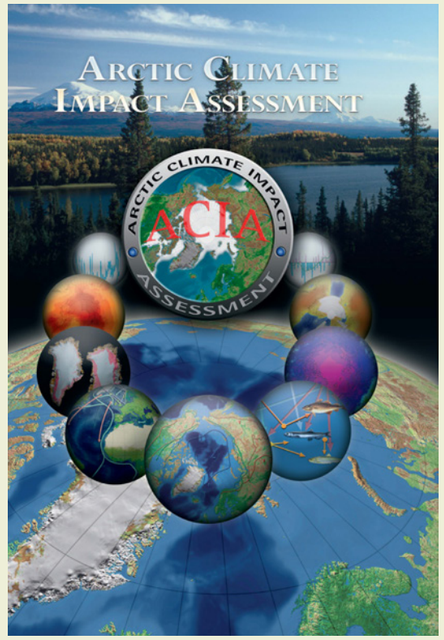
Connecting the dots

ACIA broke new ground in documenting the powerful role of Arctic processes in the Earth's climate system. Not only does the Arctic harbor important amplifying feedback mechanisms (e.g. the increased absorption of solar radiation by open water following the melting of sea ice); the Arctic also is the locus of several major tipping elements in the Earth's climate system (e.g. the melting of the Greenland ice sheet). Equally important, ACIA highlighted the impacts of climate change on the biophysical and socioeconomic systems of the Arctic region. Integrating social sciences and Indigenous Knowledge, ACIA provided a suite of indicators showcasing the impacts of climate change on society as well as natural systems. In the process, ACIA led the way in drawing attention to the growing importance of addressing issues of adaptation alongside issues pertaining to the reduction in emissions of greenhouse gases. These findings take on added significance given that the Arctic today is warming at a rate that is three times the global average.

ACIA did not stop at simply compiling these messages and delivering them to participants in the October 2004 Ministerial meeting. By fully integrating the contributions of natural scientists, social scientists and Indigenous Peoples, ACIA formed a broad coalition of informed contributors ready and able to take the messages to their own communities. By presenting its findings in graphic images and easily accessible language, ACIA ensured these messages would spread to audiences extending far beyond the confines of the Arctic Council. By making a conscious effort to present its findings in other key venues (e.g. the UNFCCC COP 10 in Buenos Aires in December 2004) and to brief the media, ACIA adopted a proactive approach to disseminating these messages to a variety of audiences.

ACIA's ripple effect

The subsequent work of both the producers of the report and other external actors refined ACIA's messages. AMAP pursued the global impacts of Arctic warming in two assessment reports on Snow, Water, Ice and Permafrost (AMAP 2011 & 2017); this Arctic focus was taken up in IPCC's sixth assessment cycle in the Special Report on the Oceans and Cryosphere, further strengthening the findings from ACIA (IPCC 2019). For CAFF, the key message on the importance of tracking Arctic ecosystem change led to the establishment of the Circumpolar Biodiversity Monitoring Program (CBMP), and the development of four ecosystem-based and adaptive long-term biodiversity monitoring plans and associated biodiversity assessments. CAFF's Arctic Biodiversity Assessment from 2013 was a direct follow up



Cover of the ACIA 2004 report. *Credit: AMAP*

Svalbard reindeer and fawn in Kongsfjorden.
Photo: Don-Jean Léandri-Breton / Arctic Council Secretariat

Communicating ACIA

ACIA broke through the noise of the daily news cycle, putting climate change on the front page and at the top of the news. This did not happen by accident. The ACIA team made an intentional effort to communicate the findings of this assessment much more broadly and effectively than had been the case for other scientific assessments.

ACIA chair Robert (Bob) Corell understood and elevated the importance of effective communication from the start. He brought in climate science writer Susan Joy Hassol and graphic designer Paul Grabhorn early in the process, enabling these professional communicators to help shape the excellent science into words and images that would resonate with policymakers and the public. The team pioneered new ways of synthesizing key findings and other material across disciplines, telling the story of Arctic climate change in compelling new ways.

The team recognized the importance of engaging intensively with media. They held a press conference at the National Press Club in Washington, DC and did countless interviews, radio talk shows, call-in shows, and more. ACIA's leaders testified about the report's findings before the United States Senate. The ACIA release event in Iceland brought international attention.

The thoughtful and extensive inclusion of Indigenous Knowledge and perspectives was another important aspect of ACIA. The beautiful photographs of Bryan and Cherry Alexander and others highlighted Arctic communities and brought the words to life.

Sveabreen, Svalbard. *Photo: Sandy Netzel / Arctic Council Secretariat*

Bob Corell in Greenland. *Photo: Active Philanthropy*

Tuktoyaktuk, a hamlet located on the shores of the Arctic Ocean at the tip of the Northwest Territories, which is heavily impacted by coastal erosion. *Photo: Karli Zschogner / Arctic Council Secretariat*

to ACIA, providing policymakers and conservation managers with a synthesis of the best available knowledge on Arctic biodiversity (CAFF 2013). AMAP and CAFF are now jointly investigating how climate changes impact ecosystems and how they accelerate or dampen Arctic warming.

The collaboration with IASC has continued through the decadal International Conferences on Arctic Research Planning (ICARP) coordinated by IASC in collaboration with many international partners (including AMAP and CAFF) to identify priorities and needs for Arctic research for the upcoming decade. The outcomes of ACIA contributed to ICARP II in 2005 and to projects within the 4th International Polar Year in 2007–08. ACIA's legacy is continuing to influence the current ICARP IV process (2022–2026) and planning for the next International Polar Year in 2032-2033.

The key to success

What accounts for the success of ACIA? Timeliness is certainly one factor. ACIA presented an important message at the right time. The availability of sufficient resources to produce high quality work is another factor. A critical factor is that ACIA was a team effort, which combined the importance of presenting and communicating the key messages with the commitment to deliver a high-quality analysis from the outset. Tying these factors together was the brilliant leadership that Bob Corell provided as chair of the ACIA Assessment Steering Committee.

The ACIA success story doesn't provide a simple formula for producing effective assessments. But it does offer important insights about the roots of success in integrating knowledge and action. Critically, success requires an end-to-end engagement rather than expecting members of the knowledge community to deliver their findings and then leaving it to the policy community to turn these findings into actions. This kind of active engagement is needed today more than ever.

References

ACIA (2004). *Impacts of a Warming Arctic*. Cambridge, UK: Cambridge University Press. https://www.amap.no/documents/doc/arctic-arctic-climate-impact-assessment/796

AMAP. (2011). *Snow, Water, Ice and Permafrost in the Arctic (SWIPA): Climate Change and the Cryosphere*. https://www.amap.no/documents/doc/snow-water-ice-and-permafrost-in-the-arctic-swipa-climate-change-and-the-cryosphere/743

AMAP. (2017). *Snow, Water, Ice and Permafrost in the Arctic (SWIPA)*. https://www.amap.no/documents/doc/snow-water-ice-and-permafrost-in-the-arctic-swipa-2017/1610

Arctic Climate Impact Assessment (2004). *Impacts of a Warming Arctic*. Cambridge, UK: Cambridge University Press. https://www.amap.no/documents/doc/arctic-arctic-climate-impact-assessment/796

CAFF. (2013). *Arctic Biodiversity Assessment*. http://hdl.handle.net/11374/223.

IPCC. (2019). *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate* (H.-O. Pörtner, C. Roberts, Debra, V. Masson-Delmotte, P. Zhai, M. Tignor, E. Poloczanska, K. Mintenbeck, A. Andrés, M. Nicolai, A. Okem, J. Petzold, B. Rama, & N. M. Weyer, Eds.).

Photo: Active Philanthropy

Bob Corell – A Brilliant Leader

One condition essential to the success of an enterprise like ACIA is the presence of effective leadership. All agree that in the case of ACIA, Bob Corell as the chair of the Assessment Steering Committee played this role brilliantly.

In part, this is a matter of enabling leadership. With Bob's guidance, ACIA assembled from the outset a remarkable group of natural scientists, social scientists and Indigenous Knowledge holders on the one hand and science writers and graphic artists on the other hand. The trick was to forge a powerful sense among all participants to be part of a team dedicated to achieving a common goal. Rather than drawing attention to himself, Bob found ways to create and sustain a sense of vitality and dedication among all members of the team.

In part, it's a matter of representational leadership, explaining ACIA to various constituencies and disseminating key messages to policymakers and members of the attentive public. In the run-up to the 2004 Reykjavik Ministerial, Bob was able to alleviate concerns in Washington D.C. regarding ACIA's findings on climate change. Following the delivery of the report, Bob worked tirelessly to disseminate ACIA's findings widely.

Arctic Ascent

Science, Adventure and the Changing Cryosphere

HOW A GLACIOLOGIST ENGAGED THE WORLD'S BEST CLIMBERS IN A RESEARCH PROGRAM

Heïdi Sevestre
Arctic Monitoring and Assessment Programme Secretariat

Heïdi Sevestre, an award-winning glaciologist and science communicator with the Secretariat of the Arctic Monitoring and Assessment Programme (AMAP), has dedicated her career to understanding the dynamics of the planet's frozen world. She has led and participated in numerous expeditions – but in summer 2023, she embarked on an adventure out of the ordinary. In this piece, she shares her experience from participating in the National Geographic and Disney+ production "Arctic Ascent", in which she teamed up with world famous climbers for an expedition to one of Greenland's most remote and unexplored corners.

Dr. Heïdi Sevestre and Aldo Kane drilling temperature sensors.
Photo: National Geographic / Pablo Durana

CLIMATE

Back in 2021, I received an email that felt like something out of a dream—an invitation to put together a scientific research program for an expedition unlike any other. I was being asked to join some of the world's most elite climbers on a mission to Greenland's Scoresby Sund, one of the most remote and unexplored corners of the Arctic. Alex Honnold, the legendary climber famous for his free solo ascent of El Capitan, was aiming to climb Ingmikortilaq, potentially the largest rock face found in the Arctic, towering 1,400 meters above the water (much taller than El Cap!). But this wasn't just about climbing—it was about science. To ensure the expedition followed rigorous scientific protocols and contributed valuable research, we partnered with 12 research institutions, including NASA, the Geological Survey of Denmark and Greenland (GEUS), and universities such as Liverpool and Buffalo. The goal: conduct 18 experiments along the way, merging glaciology with climbing.

One of the most important aspects of the research program was Pool Wall—a towering 450-meter vertical face of gneiss, rising dramatically above a turquoise pool. It was the perfect site to bring together science and climbing in a way that had never been done before. Our mission? To collect rock cores from the base to the summit, reconstructing the timeline of ice retreat in this part of Greenland. By analyzing these samples, we could determine how quickly the ice deglaciated at the end of the last Ice Age, which would provide crucial insights into Greenland's sensitivity to modern climate change and, in turn, its contribution to sea-level rise.

Of course, retrieving those samples was no small feat. I would have found scaling this cliff on my own rather "challenging," to put it lightly. But luckily, I had the most skilful and talented team, who were just as excited about the science as they were about the climb. With

Alex Honnold and Heïdi Sevestre inside the moulin. *Photo: National Geographic / Pablo Durana*

each ascent, they helped me carefully drill and extract rock samples. The science and climbing were so deeply intertwined in this project that the climbers themselves became an integral part of the research.

With the rock cores secured, we set off for the next stage of our journey: the Renland Ice Cap. A remote ice mass perched on the periphery of the Greenland Ice Sheet, Renland is a critical site for understanding how ice caps are responding to climate change. These peripheral ice caps are the canary in the coal mine, responding much faster to increasing temperatures and shifting precipitation patterns than the massive ice sheet itself.

Our key scientific task on Renland was to conduct a traverse with ground-penetrating radar (GPR), a method that allows us to see inside the ice, mapping its internal structure and measuring thickness variations. This was a major scientific first, and the success of the operation hinged on the expertise and endurance of our team. Adam Mike Kjeldsen, our Greenlandic guide, was instrumental in making this happen.

After successfully completing our Renland research, we continued deeper into the fjord system, heading toward Ingmikortilaq—the final and most dramatic challenge of our expedition. This colossal rock face, rising 1,400 meters above the sea, was the ultimate test for our climbers. But for me, it was also an opportunity to contribute to critical research on permafrost stability. In high Arctic environments like Greenland, permafrost holds many of these massive cliffs together. As the climate warms and permafrost thaws, these walls can become unstable, leading to dramatic collapses potentially generating tsunamis that threaten coastal communities.

To better understand these risks, we installed some of GEUS' temperature sensors on Ingmikortilaq to monitor rock permafrost conditions over time. Aldo Kane and Mikey Schaefer played a crucial role in placing these sensors in key locations, despite the difficult climbing conditions. For once, I was quite

Heïdi Sevestre takes snow samples on the Renland Icecap in Eastern Greenland. *Photo: National Geographic / Matt Pycroft*

relieved not to be invited to join the climb. With this data, scientists will be able to track changes in permafrost temperature and assess the likelihood of future collapses. The data collected throughout the expedition is now in the hands of the research institutions for processing and interpretation, and the findings will provide valuable insights into the ongoing changes in the Arctic.

Looking back on this expedition, one of the most powerful takeaways was seeing world-class athletes advocate for the Arctic and for climate action. Climbing and science are often seen as separate worlds, but here they came together in the most seamless and meaningful way. The physical challenge of these landscapes mirrored the scientific urgency—both requiring precision, endurance and an unwavering sense of purpose. I truly hope that Arctic Ascent reaching audiences on Disney+ will help highlight the importance of Greenland, the Arctic and the people whose lives and livelihoods are being shaped by climate change. This series is more than just an adventure—it's a call to action. It shows what is possible when diverse communities: scientists, climbers, local guides, bring their knowledge and skills together for the greater good. The Arctic is changing at an alarming rate, but the work we do today can still make a difference. ◑

Arctic Regional Gathering in Girkonjárga (Kirkenes), Norway, in October 2023.
Photos: Rosa-Máren Magga / Indigenous Peoples' Secretariat

The Important Role of Indigenous Knowledge in Global Climate Governance

INDIGENOUS KNOWLEDGE HOLDERS MET TO DISCUSS CLIMATE CHANGE AT ARCTIC REGIONAL GATHERING

Saami Council

Indigenous Peoples are the eyes and ears of a changing Arctic. Having survived and thrived in the circumpolar region for millennia, they possess essential knowledge for mitigation and adaptation efforts. As highlighted during the Arctic Regional Gathering in Girkonjárga (Kirkenes), Norway, in October 2023, Indigenous Knowledge Holders from across the Arctic called for their voices and knowledge to be integrated into global climate governance. In this article, the gathering's host, the Saami Council, shares key insights from the discussions.

The Arctic is warming at an alarming rate – three times faster than the global average. For the Indigenous Peoples of the Arctic, this change is not an abstract scientific statistic; it's a lived reality, deeply affecting their lands, livelihoods and ways of life. In response to these challenges, an Arctic Regional Gathering was convened as part of the Local Communities and Indigenous Peoples Platform (LCIPP) in collaboration with the Norwegian Chairship. This gathering, held in Girkonjárga (Kirkenes), Norway, in October 2023, brought together Indigenous Knowledge Holders from across the Arctic to share experiences, discuss climate solutions and advocate for policy actions that respect and make use of Indigenous Knowledge.

Participants included representatives from the Aleut, Athabascan, Gwich'in, Inuit, Sámi, Masni and Telengit. The Knowledge Holders emphasized that Arctic Indigenous Peoples have survived and thrived for millennia through deep ecological knowledge and sustainable land stewardship practices.

Elin Magga, a Sámi reindeer herder and the deputy chair of the local reindeer herder entity, opened the gathering by describing how climate change is already disrupting traditional Sámi ways of life. She highlighted how unpredictable winter rain creates ice layers in the snow, making grazing difficult or even impossible for reindeer. Unsafe ice conditions and shifting migration patterns also adds to

Arctic Regional Gathering in Girkonjárga (Kirkenes), Norway, in October 2023.
Photos: Rosa-Máren Magga / Indigenous Peoples' Secretariat

factors making herding increasingly challenging. In response, herders are forced to buy expensive supplementary feed, adding financial strain to already vulnerable communities. Other Sámi reindeer herders shared similar concerns.

For Inuit communities, shifts in sea ice conditions are affecting hunting traditions. Hunters now travel at greater risk to find traditional foods. "The melting permafrost is also causing our homes to sink," noted an Inuk youth participant, underscoring the urgent need for climate adaptation strategies tailored to Indigenous realities.

Indigenous Peoples in the Arctic rely on reindeer herding, fishing, hunting and gathering practices that are becoming increasingly challenging due to climate change.

The Arctic plays a crucial role in global climate stability. Its ice and permafrost store massive amounts of carbon, and its ocean currents regulate global weather patterns. The melting of Arctic ice contributes to rising sea levels and altered ocean circulation, impacting ecosystems and communities worldwide. Participants stressed that protecting the Arctic is not just about safeguarding Indigenous Peoples' cultures—it is essential for global climate stability.

Indigenous Knowledge Holders provided firsthand testimonies of climate impacts. One Inuit participant shared that traditional weather forecasting, vital for hunting and navigation, is now unreliable due to rapid environmental changes. "My father's knowledge of predicting weather no longer works," he explained. "The ice we depend on is disappearing, forcing polar bears into our communities and making it dangerous for us to travel."

Beyond climate change, Arctic Indigenous Peoples face additional pressures from industrial development. Plans for wind power industry, mining, and increased shipping threaten traditional land use and disrupt sensitive ecosystems. Participants at the gathering emphasized that climate action cannot come at the expense of the rights of Indigenous Peoples and cultural survival. "We cannot replace one environmental crisis with another," one Sámi leader asserted. "A just transition must respect Indigenous Peoples' land rights and self-determination."

Utilizing Indigenous Knowledge in climate policies

The gathering reaffirmed that Indigenous Knowledge must be recognized and utilized as a vital tool for climate adaptation and mitigation. Arctic Indigenous Peoples have developed intricate knowledge systems based on generations of close observation of environmental patterns. These knowledge systems offer solutions for ecosystem management, sustainable resource use and resilience-building.

Participants called for meaningful utilization of Indigenous Knowledge in global climate governance. The LCIPP's engagement with the Warsaw International Mechanism for Loss and Damage and the Katowice Committee of Experts highlights ongoing efforts to integrate Indigenous Peoples' perspectives into climate policy frameworks. However, Indigenous Peoples at the Arctic Regional Gathering stressed that participation must be more than symbolic; it must translate into tangible policy changes and direct funding for Indigenous-led climate solutions.

The Arctic Regional Gathering concluded with a strong foundation for urgent climate action. Participants emphasized the need for governments and international bodies to recognize the Arctic as a vulnerable ecosystem that's critical to global climate stability. They stressed the importance of fully utilizing Indigenous Knowledge in climate policies and decision-making processes to ensure that these strategies reflect the lived experiences and expertise of Indigenous Peoples.

Ensuring the participation of Indigenous Peoples in climate governance at all levels is vital for equitable and effective policymaking. Participants also highlighted the disproportionate climate burdens faced by Arctic Indigenous Peoples and called for immediate measures to address these inequities. Direct, ongoing and accessible climate finance is necessary to support adaptation and mitigation efforts led by Indigenous Peoples, enabling communities to take proactive steps toward climate resilience.

Arctic Indigenous Knowledge Holders made it clear: the wellbeing of their communities is intertwined with the health of the Arctic environment. As climate change accelerates, the world must listen to those who have stewarded these lands for millennia. The knowledge, perspectives and rights of Indigenous Peoples must be at the heart of climate solutions—not as an afterthought, but as a guiding principle for a sustainable future.

Fire in North Slave Complex, Canada, in 2023.
Photo: NWT Fire

Arctic In Flames

CIRCUMPOLAR EFFORTS ADDRESSING AN ARCTIC ON FIRE

Kristina Bär / Arctic Council Secretariat

The world is woefully unprepared for the challenges Arctic wildland fires pose, believes Edward Alexander, Gwich'in Council International Co-Chair, Co-lead of the Wildland Fires Initiative (WFI), and former firefighter. Throughout the Norwegian Chairship of the Arctic Council he has repeated his wake-up call on countless stages and panels: wildland fires in the Arctic are profoundly different from fires in other parts of the world, and they have the potential to fundamentally change the Earth's climate. Here's why and how the WFI has contributed to amplifying these concerns.

Fire is at the center of many Arctic communities. During cold and dark winters, it gathers people, offers warmth, cooks food and provides a direction for those who return home. Fire is a natural part of many ecosystems and a source of renewal. Indigenous Peoples have harnessed fire for millennia to manage landscapes that sustain healthy communities, plants and animals.

"When I was a little boy, elders would burn the meadows to get rid of all the dead grass. It would make it easy to move through the landscape, keep harmful bugs down, and bring biodiversity. When we burn these areas, they don't just come back as grassland, they come back as fireweed, roses, yarrow and other plants that are beneficial for people, animals and all kinds of pollinating insects," said Edward Alexander.

Across the Arctic, Indigenous Peoples have understood the threats and benefits of fire and developed practices based on their knowledge of the landscape, its climate, ignition sources and fire behaviors. As David Natcher, Professor at the University of Saskatchewan, and colleagues stated in a publication on Indigenous cultural burning practices: "what may appear to have been the carelessness and negligence on the part of the Gwich'in was in reality an indication of a highly sophisticated understanding of fire when used strategically on the land"[1].

Changing policies, changing fire regimes

Sadly, colonial ambitions had little respect for these millennia-old practices and severely limited Indigenous cultural burning. Suppressing forest fires became the norm for much of the 20th Century with many detrimental impacts, ranging from the build up of highly flammable biomass to the loss of cultural practices that have shaped traditions, languages and identities.

Fire in North Slave Complex, Canada, in 2023
Photo: NWT Fire

Fires in Yellowknife, summer 2023
Photo: Devlin Fernandes / Gwich'in Council International

Wildland Fire Sharing Circle at Arctic Frontiers in January 2024
Photo: David Jensen / jensenmedia

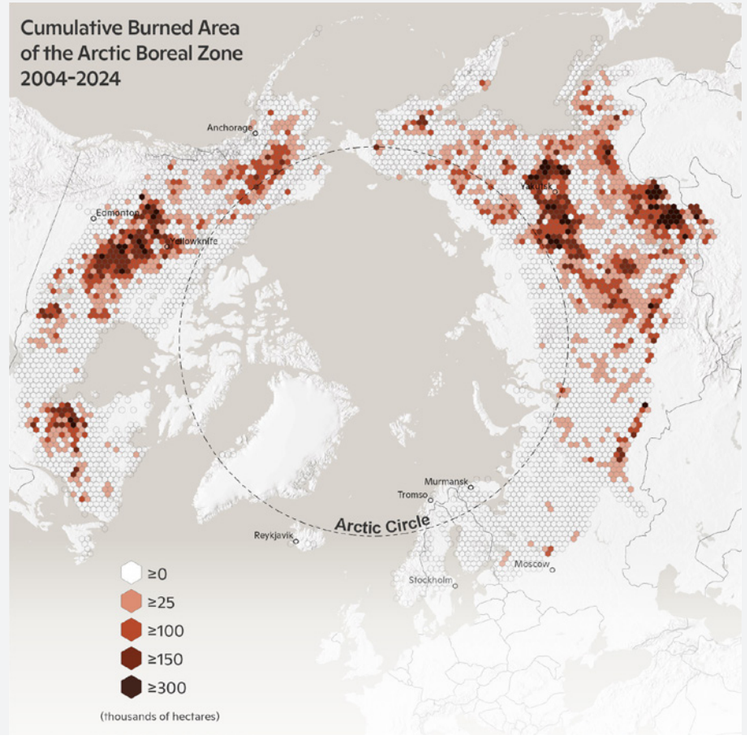
In the 1970s and 80s, policies shifted from suppressing fires to another extreme: the let-burn policy. Suddenly, naturally-caused fires were allowed to burn uncontrolled in designated wilderness areas – such as Alexander's homelands. Add to this, the warming of the Arctic, the changing weather and increase of lightning strikes, and one receives the recipe for unparalleled wildfires that spread across the North.

Understanding the scale of Arctic fires

Over the past 20 years, 174 million hectares have burned across the circumpolar North (see map). Many of these fires, some up to a million acres, have gone unresponded to because the areas were considered sparsely inhabited. Yet, not only do communities live on these lands, but their soils also store large amounts of carbon.

"There're 480 gigatons of greenhouse gases stored inside a special kind of permafrost called *yedoma*, which contains a significant amount of organic material and is underlying much of our Gwich'in homelands and the homelands of many Arctic Indigenous Peoples," Alexander explained. These 480 gigatons are around half of the carbon dioxide in the atmosphere today. It's enough, Alexander emphasizes, to upset the applecart on this planet. "It's enough to change the way of life of everyone reading this, everyone that you've ever met, and everyone that will ever be on this planet."

Map showing the cumulative burned area of the Arctic Boreal Zone 2004-2024
Credit: Greg Fiske / Woodwell Climate Research Center



Much of the combustion in the Arctic, up to 80-90 percent, is happening below the ground because of these large carbon stores. Once fires have removed trees, shrubs and organic soil, the permafrost lies bare. "It's essentially like opening the top of a cooler," explained Sue Natali, Ecologist at the Woodwell Climate Research Center. "As fires are removing that protective layer, you will often have a much deeper thaw of the permafrost for years to decades to come."

Fires paired with warm summers can have profound compounding impacts on permafrost soils. So much so, that the Arctic tundra has now shifted from storing carbon in the soil to becoming a carbon dioxide source.[2] On average, circumpolar wildland fires have emitted 207 million tons of carbon annually since 2003[2] - equivalent to the annual emissions from over 45 million passenger cars. And, if this trend continues, fire-sourced carbon emissions in high latitude regions could increase two to three times by 2100[3].

Zooming in on the 2023 record-breaking fire season in Canada, its permafrost region alone emitted 381 million tonnes of carbon and across the whole country up to 640 million metric tons of carbon were released[4]. According to NASA scientists, this is comparable in magnitude to the annual fossil fuel emissions of a large, industrialized nation[5].

A burning issue for circumpolar cooperation

With the Arctic facing ferocious wildfires and the looming threat of more extreme weather, increased lightning activity and drier vegetation[6], what role can international forums like the Arctic Council play in addressing this burning issue? Several years ago, this is the question Gwich'in chiefs asked Edward Alexander and so, Gwich'in Council International (GCI) together with other Permanent Participants became a driving force for the Arctic Council's work on wildland fires.

As a result, the Council's Working Groups have put substantial effort into understanding and addressing wildland fires from multiple angles, including monitoring, developing prevention and response strategies, fostering cross-border cooperation, examining climate and health impacts, and integrating Indigenous Knowledge and Local Knowledge for effective fire management.

Yet, as the 2023 fires were raging in Canada and the Council's work was picking up pace after a pause in all official meetings, Morten Høglund, Chair of the Senior Arctic Officials, decided that wildland fires needed to be elevated on the Council's agenda – with immediate effect. Together with his team, he started to prepare the Norwegian Chairship's Wildland Fires Initiative (WFI). With fires being a common concern for all Arctic States, requiring cross-border cooperation, knowledge sharing

and partnerships, the WFI quickly emerged as a prime example for the need of circumpolar collaboration.

A knowledge hub on search for solutions

One of the initiative's main objectives was to foster dialogue, cooperation and a better understanding of how joint efforts can address fires and safeguard communities. This included a public discussion series featuring a diverse group of experts, including Indigenous Knowledge holders, scientists, firefighters and policymakers from across the Arctic and the Council's Observer states.

"Everyone was bringing their own expertise, and all these different puzzle pieces coming together gave us a much clearer picture. Each time, we achieved a better resolution, and sometimes new insights emerged," said Alexander upon reflecting on the WFI's accomplishments together with Høglund, who says, "for me it revealed the complexity of the different aspects related to fire. There are so many facets, and we've demonstrated that the Arctic Council is dedicated to the issue and capable of bringing together various knowledge holders, creating a hub for knowledge sharing on fires within the Arctic. I see many possibilities moving forward, using this network to be relevant for the communities and people affected."

Going forward, what can this network achieve and how will it continue past the Norwegian Chairship's Wildland Fires Initiative? How can the Council contribute to better preparing the world for the challenges circumpolar fires pose to the global community? "It's a big challenge, and there are no easy answers—it requires multiple solutions," Alexander said. "For example, we have been reinvigorating our cultural burning practices and discussing how to promote mild fire instead of wildfire in our homeland."

As the parameters of wildland fire have changed in the Arctic, how these fires are addressed needs to be adjusted. What may work in more southern latitudes may not work in the Arctic, thus fire management will have to adapt to unique ecosystems, climatic conditions, community needs and economic development[7]. Alexander and Høglund agree that this will require more science and knowledge co-creation, investments and cooperation on the political level. To play a role in tackling these future needs, the Arctic Council is currently exploring the possibilities of setting up a dedicated Expert Group on wildland fires, building on the legacy of the WFI and the input from ongoing projects.

Panel discussion on the need for international cooperation to address Arctic Fires during Arctic Circle Forum Berlin in May 2024
Photo: Kristina Bär / Arctic Council Secretariat

Learn more about the Norwegian Chairship's Wildland Fires Initiative and watch the recordings of the discussion series:

1: Natcher, David C., et al. "Factors contributing to the cultural and spatial variability of landscape burning by native peoples of interior Alaska." Ecology and Society 12.1 (2007). https://www.jstor.org/stable/26267834

2: NOAA Arctic Report Card 2024

3: NOAA Arctic Report Card 2024

4: Silver, B., Arnold, S.R., Reddington, C.L. et al. Large transboundary health impact of Arctic wildfire smoke. Commun Earth Environ 5, 199 (2024). https://doi.org/10.1038/s43247-024-01361-3 https://www.nature.com/articles/s43247-024-01361-3

5: NASA https://www.jpl.nasa.gov/news/new-nasa-study-tallies-carbon-emissions-from-massive-canadian-fires/

6: Ibid.

7: McCarty, Jessica L., et al. "Reviews & syntheses: arctic fire regimes and emissions in the 21st century." Biogeosciences Discussions 2021 (2021): 1-59.

8. McCarty, Jessica L., et al. "Reviews & syntheses: arctic fire regimes and emissions in the 21st century." Biogeosciences Discussions 2021 (2021): 1-59.

Fire Stories

While Arctic fires often make headlines and their consequences without doubt are newsworthy, the Wildland Fires Initiative also provided a space for personal stories, shared experiences and the many social and economic impacts fires have on affected communities. Here are some of the lived experiences from across the Arctic.

Chief Bill Erasmus */ Chair Arctic Athabaskan Council - Yellowknife, NWT*
In 2023, 70 percent of the population in our territory had to evacuate. We never thought that Yellowknife would be evacuated and so it was very unsettling. There was a press conference late in the evening on a Wednesday, they said the fire was getting closer and that we had to evacuate. Everyone had to be out by Friday noon. There was mass confusion. You either drive or fly out. Those flying didn't know who they were flying with or when. So, families were separated. Others drove out and as they started driving, there were fires on both sides of the highway. It was very scary; it was a traumatic and impactful experience.

Karin Nutti Pilflykt */ Advisor at the Saami Council – Norrbotten, Northern Sweden / Sápmi*
Due to the rising temperatures, it's getting drier and much easier for wildfires to spread also in Sápmi. When big areas are burning, it can directly impact the grazing grounds of reindeer, but also other species that reindeer forage on, for example, mushrooms or shrubs. We had a huge wildfire in 2006, which burned more than 1900 hectares. Two years later, my uncle together with scientists worked to restore and artificially spread lichen on the fire site[1]. I was back to the site two years ago, and while it was still black in many places, I could also see that the lichen is growing back well.

1: Roturier et al. 2017

Vladimir Klimov */ Russian Association of Indigenous Peoples of the North – Siberia, Russia*
I was born in a small village, where we burnt the old dry grass on the meadows in spring to give way to the new grass, to provide for our horses and also to fertilize the soil. From all my childhood memories, I can't remember a single case where our controlled burning would have turned into wildfire. But now that many of us live in the city, the majority of these meadows are abandoned and privately owned. It's forbidden to burn, so there's a lot of dry grass. That's why any match or cigarette stub just thrown out of a passing car can start a fire.

Lena Popova */ PhD student at the University of Fribourg – Sakha Republic, Russia*
In 2020 and 2021, the number of wildfires in the Arctic increased, and the most intense ones occurred in Siberia. It was terrible. The smoke from these fires reached the North Pole and eventually spread across large parts of the Arctic. Can you imagine what the air was like during the fires in Siberia, the smoke from which reached Alaska and Canada? It was very difficult to breathe, you could feel bitterness in your lungs.

Building Capacity Through the Arctic Remote Energy Network Academy

EMPOWERING COMMUNITIES WITH CLEAN ENERGY CAPACITY

Sarah Cox and Elisaveta Robertova / Crown-Indigenous Relations and Northern Affairs Canada

Remote Arctic communities face unique challenges in accessing sustainable, affordable energy. The Arctic Remote Energy Network Academy (ARENA) addresses these challenges by equipping local leaders with the knowledge, skills, and networks to develop clean energy solutions. Through a blend of hands-on learning, site visits and inter-regional collaboration, ARENA is contributing to the creation of a sustainable energy future for the Arctic.

The Arctic is defined by harsh weather, remote communities and unique environmental conditions. These challenges make access to reliable and affordable energy difficult, forcing many communities to depend on costly and environmentally harmful imported diesel fuel. Yet, the resilience and ingenuity of Arctic communities and Indigenous Peoples are equally remarkable. They're turning to local renewable resources to meet their energy needs. By adopting clean energy solutions, they aim to reduce fossil fuel reliance, lower costs and minimize environmental impacts.

The Arctic Remote Energy Network Academy (ARENA), an initiative of the Arctic Council's Sustainable Development Working Group (SDWG), plays a vital role in this transition. ARENA provides the knowledge, skills and networks needed to design and implement renewable energy systems suited to the unique needs of Arctic communities.

Endorsed by Canada, the United States and Iceland at SDWG, ARENA was created to address the urgent need for reliable, affordable and sustainable energy in remote Arctic communities. Supported by Crown-Indigenous Relations and Northern Affairs Canada, the Alaska Center for Energy and Power, and GRO Geothermal Training Programme, ARENA offers a comprehensive program that integrates training, mentorship and site visits to renewable energy projects in Arctic communities. The initiative focuses on the development and operation of energy networks in remote areas, giving participants the skills and knowledge to lead positive change.

ARENA's first pilot program, launched in 2017, brought together participants from across the Arctic. These "energy champions" engaged in hands-on learning through site visits to renewable energy projects in Alaska, Canada and Iceland. Participants explored clean energy technologies and collaborated on feasibility studies to address energy challenges in their own communities. One participant reflected, "We were introduced to many different projects in the North and learned that anything is possible."

ARENA III cohort in Iceland.
Photo: Jesse Delgrosse / The Capital Collective

"After our third iteration of ARENA, we'll have approximately 50 alumni, which means 50 opportunities for new renewable energy installations across the Arctic, as well as folks who will pass on that knowledge to the younger generation and other community members. That's a huge success for us."

Sarah Cox / Canadian Head of Delegation SDWG

Building on the pilot's success, ARENA II expanded its reach and fostered broader collaboration across Arctic stakeholders. During this iteration, Gwich'in Council International joined as a co-lead, strengthening the program's engagement with Arctic communities. Over three and a half years, the program navigated challenges like pandemic delays, a pause in Arctic Council activities and a shift in its delivery format. Despite these setbacks, ARENA II was completed successfully, and participant feedback was overwhelmingly positive, with many emphasizing the importance of community site visits and continued alumni engagement.

In its third iteration (2023–2025), ARENA III, now joined by the Aleut International Association as a co-lead, continues to expand its influence. With all onsite visits completed in Alaska, Canada, Greenland and Iceland, participants gained unique insights into renewable energy solutions such as solar, wind, microgrid and geothermal technologies.

Central to ARENA's success is its emphasis on inter-regional knowledge exchange. By bringing together energy professionals from diverse Arctic communities, the program fosters collaboration and the sharing of challenges, successes and lessons learned. This approach allows participants to adopt best practices, avoid common pitfalls and tailor solutions to their communities. By integrating Indigenous Knowledge and local knowledge into decision-making, ARENA ensures that energy systems are both effective and community-centered. As one participant noted, "Connecting with others across the North who share a passion for improving energy security and resiliency was inspiring."

As ARENA's network of energy champions grows, so does its impact on the future of the Arctic. By empowering communities with the tools to harness local renewable resources, ARENA is helping build a more sustainable and resilient Arctic.

CLIMATE

The Sustaining Arctic Observing Networks' Roadmap for Arctic Observing and Data Systems (ROADS) is built upon a holistic benefit analysis. It takes the environmental, economic and social domains into account in which services, operations, and research provide societal benefit. To implement this ambitious roadmap, the partnership with, and active, equitable involvement of Indigenous Peoples and local communities is essential. ROADS will draw on community-led approaches, and involve Indigenous knowledge holders, local organizations and networks to fill existing observation gaps, which are critical to add to the understanding of the Arctic system as a whole.

Wildfire theme Shared Arctic Variables workhop in Korpikartano, Finland. *Photo: Mikko Strahlendorff from the Finnish Meteorological Institute*

Fire in Fort Liard, Canada, in May 2024. *Photo: NWT Fire*

Wildfire in the Anárjohka National Park, Norway, in September 2024. *Photo: Still from a video filmed by Karina Kåven Kaaby, Norwegian Civil Defense local task force*

Building a One-Stop shop for Arctic Observations

ON THE COMPLEX TASK OF OBSERVING ARCTIC WILDFIRES

Kristina Bär / Arctic Council Secretariat

Arctic observations provide an understanding of the rapidly changing region and can inform decisions and actions from the local to the global level. However, setting up a robust observation system that delivers tangible societal benefits is a complex undertaking. In this brief interview, Mikko Strahlendorff from the Finnish Meteorological Institute, provides an example of how observation needs for wildfires are identified and developed into practical tools.

SAON's Arctic Roadmap for Observing and Data Systems (ROADS) is identifying priority areas for future observations. How are these being selected?
Future observation priorities are developed from the bottom up. Any community or institution, at the local, national, or global level can propose a phenomenon to be observed. The ROADS advisory panel reviews these proposals and provides guidance to help them mature by, for example, linking them to existing observing efforts. Our goal is to improve and sustain observing networks that integrate local, national and global observation needs.

For example, I've been involved in identifying wildfire-related observation needs. The Finnish Meteorological Institute issues warnings of very dry conditions that pose a wildfire risk, potentially leading to campfire bans. Our work is therefore of immediate interest on the national and regional level. But in order to better identify local observation needs, we decided to reach out to different local actors, such as the Sámi educational center in Inari and a local fire chief. Through discussions and workshops, we learned more about their fire knowledge and observation needs.

There are of course many parameters linked to fire that can be observed but we don't want to duplicate efforts. Based on our discussions, we decided to focus on what we call ignition identification. This variable brings together different data sets that can inform fire departments and communities quickly about the type of fire and which action is needed.

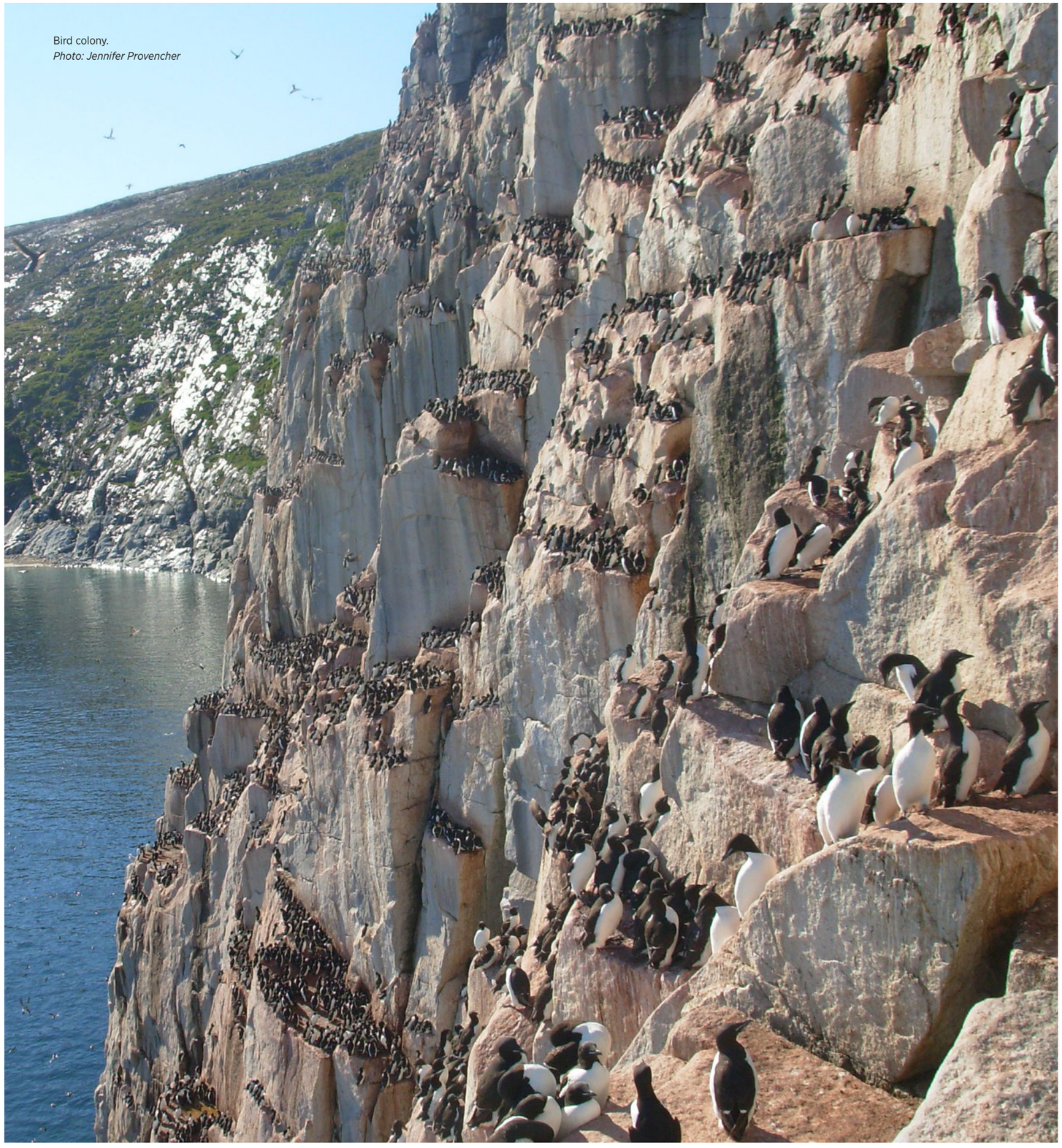
How is Indigenous Knowledge included in defining observing requirements for wildfires?
Indigenous Peoples and local communities play a crucial role in identifying observables and contributing to their development. They are adept at reading their surroundings and understanding fire risks. Indigenous Peoples across the Arctic have experience from cultural burning practices and have used fire proactively in springtime to prevent uncontrollable fires later in the season.

They also help us understand land use, community locations and infrastructure that needs protection from wildfires. However, much of this information is also sensitive. Cultural burning practices, for example, have been banned for a long time, and communities practicing it today may not share it widely.

How do you foresee your work will contribute to future monitoring of fires in the Arctic?
With ignition identification recognized as a valuable observable, the next steps are developing the tools needed for meaningful observations and finding partners to implement sustainable practices.

Currently, we're gathering data to demonstrate how this variable can inform action. Nowadays, data on ignition comes from various sources, including satellites, but also social media, and we are working on an app where people can share local parameters, such as humidity, dead fuel build-up, etc. in areas where they are hiking. All this information enhances our fire risk modeling capabilities.

At the moment, we are working on a demonstration project, which includes building modelling software and developing a scorecard. These tools will allow us to assess fire risks and to provide information to fire departments and municipalities to potentially mobilize their resources, issue warnings or evacuation orders.



Bird colony.
Photo: Jennifer Provencher

5 Things to Know About Arctic Seabirds and Plastics

FILLING A KNOWLEDGE GAP ON THE IMPACTS OF PLASTIC POLLUTION ON ARCTIC SEABIRDS

Jessica Cook / Arctic Council Secretariat

Seabirds play an important role in marine ecosystems and are culturally significant for Arctic Indigenous Peoples. However, some Arctic seabird species are in decline due to threats such as overfishing of food sources, climate change and pollution. Plastic pollution may further exacerbate these declines.

Concentrations of plastics in the world's oceans are increasing. The Arctic is no exception, where increasing amounts have been found in both water and sea ice. To date, plastic pollution and the impacts on seabirds have been inconsistently monitored, but the Arctic Council's Conservation of Arctic Flora and Fauna Working Group (CAFF), is working to increase our knowledge.

CAFF's Arctic Migratory Birds Initiative (AMBI) released a series of reports reviewing what we know about plastics ingestion by seabirds and plastic pollution policies in Arctic States, as well as recommendations for developing a monitoring plan for seabirds and plastic pollution. Here are five key takeaways from their findings.

Northern Fulmar © *José Sencianes*

Thick-Billed Murre © *José Sencianes*

Black-Legged Kittywake © *José Sencianes*

1. Over half of seabirds examined for plastic in the Arctic were found to have ingested plastic

Of the seabird species examined for plastic ingestion in the Arctic, 53 percent were found to have ingested plastic. However, at the time of CAFF's review, there were only 38 studies on plastic in Arctic seabirds, and many studies had small sample sizes or outdated data.

Seabirds can ingest plastic in a number of ways, including mistaking plastic debris for food or even acquiring it through the prey they eat. Eating plastic can cause harm to seabirds, including internal wounds, digestive blockages, a feeling of fullness resulting in reduced feeding or starvation, reduced body condition, and increased mortality. Rates of plastic ingestion can vary by what, when, where and how seabird species eat, amongst other factors, making some species more vulnerable than others.

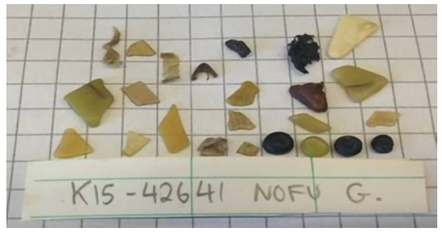


Photo: Jennifer Provencher

Of the seabird species studied, those that feed at the ocean's surface (where they may interact with floating plastics) had the highest incidences of plastic ingestion. For example, although these birds had low sample sizes, 93 percent of the fork-tailed storm petrel and 92 percent of short-tailed shearwater contained plastic. In the most widely studied species, the northern fulmar, 58 percent of samples contained plastic. However, many Arctic seabirds have not been studied.

This review shows that plastic pollution is widespread in Arctic seabirds, but that there are still gaps in our knowledge that we need to fill. So, it's important to continue monitoring seabirds for plastics ingestion and to study how plastics may impact them.

Beach clean up in Iqaluit, Nunavut
Photo: Jennifer Provencher

2. Seabirds can be used to track plastic pollution

Seabirds are migratory species, and many are top predators in their ecosystems. They're also exposed to a number of environmental factors throughout their annual cycle that can affect their physiology and survival. This makes seabirds important indicators of changes that are occurring in the marine environment.

Seabirds are good candidates to track plastic pollution trends, for example, by assessing plastic ingestion at different times of the breeding and non-breeding season. Seabirds have different migratory patterns across different regions and can help determine regions with higher risks for plastic ingestion. Previous research has shown that northern fulmars and thick-billed murres collected earlier in the breeding season have a higher occurrence of plastics, suggesting that at least some of the plastic in birds may have been ingested from other regions during their migration North. Contrastingly, short-tailed shearwaters had more plastic during the breeding season than the non-breeding season, which suggests that Arctic seabirds may be vulnerable to plastic throughout their annual cycle.

3. There's no comprehensive circumpolar plan in place for monitoring plastic ingestion by seabirds

Of the 38 studies found, many contained small sample sizes or failed to report important metrics of plastic ingestion, making it difficult to compare studies across regions and time. While studies are very useful to understand current plastic ingestion levels, long-term monitoring of species over time at the same location is the best tool to assess regional and temporal trends in plastic ingestion across the Arctic.

From a conservation perspective, long-term monitoring programs can be used to monitor not only the impacts of plastic pollution on seabirds, but also the effect of policies intending to reduce the harm that plastics can cause. However, most Arctic States lack standardized long-term monitoring programs on this issue, making it difficult to get an accurate circumpolar understanding of trends over time.

Long-term monitoring is important to inform larger conservation strategies and minimize the threats to seabird populations across the Arctic. Further, monitoring plans can help inform strategies and policies to address key issues and then determine their effectiveness over time.

4. Efforts are being made to standardize plastic pollution monitoring and seabird ingestion of plastics

The need for standardized methods for monitoring plastic ingestion by seabirds in the Arctic has been highlighted by CAFF's Arctic Migratory Birds Initiative. In its report, Plastic Pollution in Seabirds: Developing a Program to Monitor Plastic Pollution in Seabirds in the Pan-Arctic Region, CAFF proposes methods and advice for monitoring trends in plastic ingestion to inform larger conservation strategies and minimize the threats to seabirds across the Arctic.

The advice considers the knowledge on plastic ingestion, seabird conservation status, and the ability to monitor Arctic seabird species. CAFF advises the northern fulmar, black-legged kittiwake and thick-billed murre as target seabird species for monitoring plastic ingestion in the Arctic. Further, the report provides advice on monitoring spatial and temporal trends in plastic ingestion, nest incorporation and entanglement, microplastics and plastic-associated contaminants, point sources of plastic pollution and species of high conservation concern in the circumpolar Arctic. CAFF also encourages collaboration with local hunters, community members and other seabird and contaminant scientists to ensure standardized, systematic sampling of seabirds for plastic ingestion across the Arctic.

The Arctic Council under the Arctic Monitoring and Assessment Program (AMAP) has developed guidelines for monitoring plastic in the Arctic environment. AMAP's Litter and Microplastics Monitoring Plan is the first time that all parts of an Arctic ecosystem are reviewed for traces of litter and microplastics – from the air to the bottom of the sea. AMBI's seabird and plastics ingestion reports informed this monitoring plan.

5. Many Arctic States have marine plastic policies in place, yet few directly address plastic ingestion monitoring for seabirds

Marine plastic is an increasing global issue, making it a critical concern for scientists and policymakers alike. Various policies and programs have been implemented to prevent, reduce and monitor plastic in the marine environment. CAFF reviewed plastic pollution policies from Arctic States and found that there's a broad range of international, national, regional and local policies and legislation that include marine litter, addressing both its sources and impacts in the region, but few policies directly address seabirds and other marine wildlife.

Some examples of international efforts include the Global Convention on the Conservation of Migratory Species of Wild Animals and the Convention on Biological Diversity, which encourage parties to address marine litter and its impact on marine and coastal biodiversity. While these conventions are important for global coordination and action, and serve as general frameworks, they still require implementation from Parties to address plastic pollution in seabirds and other wildlife. On the national and local level, while few policies directly address seabirds, there are policies that address marine litter specifically through waste management and preventing pollution from ships. However, many policies are implemented inconsistently across regions, making it difficult to enforce and monitor how effective these policies are.

Regionally, the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) is the only policy that has a component specifically addressing seabirds, where plastic ingestion by northern fulmars is monitored and used as an indicator for the marine environment. However, monitoring is only occurring in the Greater North Sea Area, and so far, Norway and Iceland are the only Arctic States that have implemented the seabird component of the OSPAR plastic pollution monitoring program.

Kittiwake sitting on a nest made with plastic
Photo: Signe Christensen-Dalsgaard / Norwegian Institute for Nature Research

The Arctic Council's Protection of the Arctic Marine Environment Working Group (PAME) developed a Regional Action Plan on Marine Litter in the Arctic, with a focus on Arctic-specific marine litter sources and pathways. The Regional Action Plan will enable the Arctic Council to take targeted and collective action to address this problem within the Arctic and contribute to awareness of the Arctic-specific impacts. It's focused on actions to be taken in the Arctic, by Arctic States collectively and independently, and is designed to be complementary to efforts underway in other international and regional organizations and conventions.

Seabirds are vital cultural resources to peoples in the Arctic and many species are susceptible to plastics ingestion. Arctic seabirds are also accessible and reliable indicators of the environment, and are already targets of study and monitoring effort across the Arctic. Therefore, seabirds are particularly important to consider when examining the marine ecosystem and designing policy to reduce marine litter and plastic pollution.

Kristina Bär / Arctic Council Secretariat
Rosa-Máren Magga / Indigenous Peoples' Secretariat

Salmon Peoples of the Arctic

HOW THE SALMON CRISIS IS AFFECTING INDIGENOUS PEOPLES ACROSS THE CIRCUMPOLAR NORTH

Salmon has made it on the climate change hit list. Arctic rivers, once brimming with diverse salmon species, are experiencing dramatic declines, with populations plummeting up to 90 percent below the average of past decades. Abandoned fish wheels, nets and boats line the shores, serving as witnesses to a crisis. For many Arctic Indigenous Peoples, salmon is not just a source of physical sustenance; it has nourished communities for centuries, shaping traditions, languages and identities. How did it come this far, and are there solutions for the fish and the Salmon Peoples of the Arctic?

Where the Yukon meets the Anvik River in Alaska lies one of the largest spawning grounds for chum salmon. During most of the 2010s, chum salmon were abundant in this region, but suddenly, in the last five years, the stocks have abruptly declined. Falling to a record low in 2021 – 92 percent below the recent 30-year mean of the watershed, as the Arctic Report Card 2023 states.

A salmon crisis and a state of scarcity for the Indigenous Peoples that have lived off and with salmon along the shores of the Yukon and Anvik Rivers for millennia. Most communities have not been able to fish for the past five years, and many are unlikely to fish for salmon in the years to come as a seven-year moratorium on fishing salmon on the Yukon River was implemented in the spring of 2024.

The chum of the Yukon is one of many salmon stocks that have dramatically declined over the past years. In 2023, the International Union for Conservation of Nature (IUCN) moved the Atlantic salmon from the list of least concerned to near threatened species with "new evidence showing the global population decreased by 23 percent between 2006 and 2020[1]".

Salmon are one of the species most affected by climate change, but the stressors and effects on different salmon populations across the Arctic are diverse and complex. On their long migration journey, the fish are exposed to multiple threats, including rising water temperatures, lower river levels, pollution, dams and other barriers, tourism, breeding with escaped farmed salmon, competition with invasive species, trawler bycatch, increased predation and exposure to parasites. These have led to dramatic declines in two Pacific salmon populations, the chum and Chinook salmon, while the sockeye salmon in Bristol Bay, Alaska, has attained record high abundance levels since 2020 – 98 percent above the 30-year average in 2022[2].

Yet, for the communities traditionally relying on the chum or other populations in decline, the Bristol Bay boon brings little solace.

Atlantic salmon in the Teno River.
Photo: Mikko Kytökorpi

"From a very young age, I remember the stories of my late uncles and great uncles harvesting up to a thousand salmon in a single summer to provide for their families and community. It's incredible to hear their stories of how many fish used to run through our rivers. It was really just about putting in our nets or fish wheels, and sometimes, within just a few hours, we had to pull the nets in because of how many fish we caught. But with the steady decline of salmon over the last few decades, it's becoming increasingly challenging for us to put away even a few fish. It got to the point, before we were no longer able to fish, that catching even 20 to 30 king salmon was something to celebrate."

Taa'ąįį Ch'igiiontà' / Gwich'in Council International
– interviewed during the International Indigenous Salmon Peoples Gathering in Karasjok 2024

Jazmyn Vent with a pike. While the fish has always been a part of traditional diets, the decline of salmon has made communities become more reliant on other food sources. *Photo: Jazmyn Vent*

Indigenous Salmon Peoples Gathering in Sápmi 2024.
Photo: Minetta Westerlund / Arctic Council Secretariat

More than a lack of food: food sovereignty vs. food security

The collapse of salmon stocks directly impacts the food security of many communities. Freezers are empty, pantries free from cans of salmon. People are not able to eat salmon throughout the winter and thus are losing food security. This also has huge financial implications for individuals living in rural areas. Alaska imports around 98 percent of its food and given that many communities are only accessible by boat or plane, the delivery of groceries is a costly undertaking. Subsistence hunting, fishing and berry-picking is therefore a necessity.

However, thinking of the salmon crisis as a food insecurity issue, would be too reductionist. Food security refers to the availability and access to sufficient, safe and nutritious food. The traditional ways of living with and catching salmon, however, nurture not only the body. Salmon fosters the food sovereignty of many Arctic Indigenous Peoples.

"For Sámi and other Indigenous Peoples, salmon is more than food—it's language, place and identity. Our fishing traditions carry generations of knowledge, shaping how we relate to the land and waters. When salmon stocks collapse, we lose not only a source of sustenance but also the ability to pass down customs, stories and skills that define who we are. Without sustainable salmon populations, our food security and cultural continuity are both at risk," said Áslat Holmberg, member and former president of the Saami Council.

Many Arctic Indigenous Peoples have been fishing salmon for millennia, in some regions for at least 12,000 years[3]. Their communities, ways of life, languages and identities are tied to the fish. Many Indigenous Peoples are therefore "Salmon Peoples of the Arctic", a term which "recognizes the inextricable bond between human and non-human species in the Indigenous worldview," as the Conservation of Arctic Flora and Fauna's Salmon Peoples project report stated[4].

Group photo of the Indigenous Salmon Peoples Gathering in Sápmi 2024.
Photo: Minetta Westerlund / Arctic Council Secretariat

"People from my region on the Aleutian Islands and the Russian members of our Aleut family on the Commander Islands all subsist on salmon from the ocean. It's a very important part of our diet and a crucial part of our economy in Alaska. We realize that many places around the world are in crisis, seeing the collapse of their salmon populations, and we are not here to promote our commercial fisheries. We want to hear their stories and understand their situations. We couldn't imagine what it would be like to not be fishing for salmon."

Nadine Kochuten / Aleut International Association
– interviewed during the International Indigenous Salmon Peoples Gathering in Karasjok 2024

Traditional fishing practices carry the brunt

The collapse in stocks affects Salmon Peoples to the core of their cultures and identities. In addition, national and regional regulations and fishing bans meant to protect the fish, disproportionally affect Indigenous subsistence fishing. From Sápmi to North America, traditional fishing practices carry the brunt of conservation efforts. In the Tana Valley between Norway and Finland, Sámi traditional fishing practices have come to a halt following a complete ban in salmon fishing.

In the Yukon-Kuskokwim area in Alaska, Jazmyn Vent, an Arctic Athabaskan Council (AAC) youth delegate, conducted a survey for her research and found that 93 percent of people she surveyed think that the closure of subsistence fishing has caused hardship in their life, and 91 percent think that the closure has a negative impact on the health and wellness of their Alaska Native community. "So, the salmon collapse is affecting us on a cultural scale, on an environmental scale and on a food scale", Vent summarized.

"We learned that Indigenous communities across the Nnorthern hemisphere face similar challenges with salmon. [...] It's crucial to align our local conservation efforts with the international initiatives. Salmon are transboundary species and working together with other Indigenous communities can help us tackle these complex issues. [...]

The inclusion of youth in these discussions is vital. We are the future leaders in salmon conservation and our involvement ensures that our perspectives are considered in planning and decision making. Indigenous-led research and the protection of Indigenous Knowledge systems are essential. Sharing best practices and asserting Indigenous rights are key to sustainable salmon management."

Emma Hoogland and Alberta Sam / Kwanlin Dün First Nation (KDFN) Youth Representatives from Whitehorse, Yukon, Canada – attending the Indigenous Salmon Peoples Gathering in Karasjok 2024

Co-creating knowledge for a future of Arctic salmon

Local initiatives like the Smokehouse Collective, a mutual aid network co-founded by the former AAC Alaska Chair Deenaalee Hodgdon and Ruth Łchav'aya K'isen Miller, have a take at a more resilient, reliable and ecologically sound food system for Alaska. The team is setting up a traditional fish camp, including a communal fish processing plant, housing, gardens, a community kitchen and a smokehouse. Their hope is to bring community members from the Yukon and other rivers that are lined with abandoned fish wheels, nets and boats to Dillingham in Bristol Bay.

Yet, Bristol Bay salmon fills empty stomachs, not the hole left by the collapse of other salmon stocks. These initiatives are not aimed at and won't be able to replace the salmon communities have harvested for millennia, they promote a collective approach to making a region more food secure and less reliant on imports. An effort needed in times when other traditional and local foods might face a similar fate to salmon.

In addition, the salmon crisis will have to be addressed at the source of its stressors. Climate mitigation, pollution reduction, ecosystem-based approaches to managing and developing areas and importantly, co-creation of knowledge with the memory, skills and knowledge of the Salmon Peoples in the lead.

References:

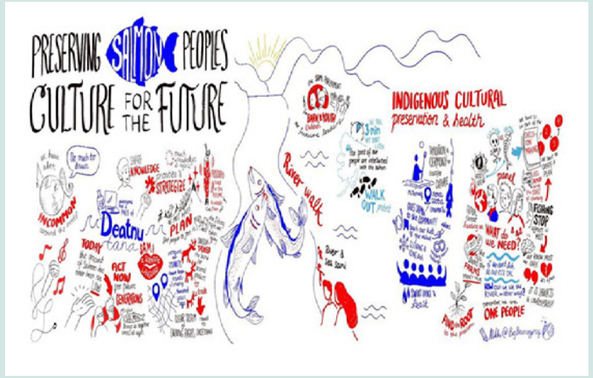
- IUCN, 2023. Freshwater fish highlight escalating climate impacts on species - IUCN Red List. Press release. 11 December 2023.
- Schoen, E.R., Howard, K.G., Murphy, J.M., Schindler, D.E., Westley, P.A.H. and von Biela, V.R., 2023. NOAA Arctic Report Card 2023: Divergent Responses of Western Alaska Salmon to a Changing Climate.
- Carothers, C., Black, J., Langdon, S.J., Donkersloot, R., Ringer, D., Coleman, J., Gavenus, E.R., Justin, W., Williams, M., Christiansen, F. and Samuelson, J., 2021. Indigenous peoples and salmon stewardship: a critical relationship.
- Conservation of Arctic Flora and Fauna, 2019. Salmon Peoples of Arctic Rivers. Progress report: 2017-2019.

[1] IUCN, 2023. https://www.iucn.org/press-release/202312/freshwater-fish-highlight-escalating-climate-impacts-species-iucn-red-list
[2] NOAA Arctic Report Card 2023
[3] NOAA 2023, Carothers et al., 2021
[4] Salmon Peoples of Arctic Rivers. Progress report: 2017-2019

Learn more about food security and food sovereignty:
The Inuit Circumpolar Council Alaska has been spearheading efforts on food sovereignty and self-governance, highlighting unique Indigenous governance practices and recommending ways forward for food sovereignty, holistic and adaptive decision-making and community well-being in the entire Arctic. Read their reports here:

Indigenous Salmon Peoples Gathering in Sápmi

Camilla Brattland / UiT the Arctic University of Norway



Preserving Salmon Peoples culture for the future.
Image produced by live scribe made at the Deanušaldi public meeting.
Illustration: Big Brain Agency

The International Indigenous Salmon Peoples Gathering Week consisted of three events taking place from 30 September to 4 October 2024: The second International Indigenous Salmon Peoples Gathering, a daytrip and Community Town Hall Meeting in Deanušaldi (Tana Bru) and the Indigenous Salmon Research Symposium in Ohcejohka, Finland. The events were organized by the Sámediggi (Norwegian Sami Parliament), Saami Council, DeanuInstituhtta, Joddu National Wild Salmon Centre, UiT The Arctic University of Norway and the International Indigenous Salmon Peoples Network.

It was a week full of events directed towards understanding and discussing the status and future needs of Indigenous Salmon Peoples. The gathering took the participants along the banks of the Deatnu/ Tana River ("big river" in the Sámi language), which is in a state of crises as salmon fisheries have been closed over the last three years due to low Atlantic salmon returns while experiencing an invasion of pink salmon. The participants familiarized themselves with these and other issues while visiting three communities in Norway and Finland, based on the salmon fishing culture from the mouth of the river (Deanušaldi/Tana bridge) to its tributaries Kárášjohka/Karasjok and Ohcejohka/Utsjoki in Finland (*johka* meaning river in Sámi language).

For the first part of the gathering week, representatives from Indigenous Salmon Peoples regions in the Arctic, Northwest Pacific and the Atlantic coasts presented regional updates. In addition, invited speakers from the Kwanlin Dun First Nation in the Yukon region gave updates on restoration of Yukon salmon including perspectives from youth.

The second part of the gathering week, in Deanušaldi, was a public meeting open to everyone. Sámi and the Mikma'w shared their experiences around salmon, a panel with local community participants and politicians discussed cultural survival and management responsibilities in the face of salmon decline, and participants joined a workshop on future visions for Arctic Salmon Peoples.

The third part of the week was the Indigenous Salmon Research Symposium in Ohcejohka/Utsjoki, where Indigenous and non-Indigenous scholars and knowledge holders gathered. The atmosphere was an Indigenous-style symposium centered on discussion and exchange of experiences across diverse geographies and disciplines and based on the principle of Two-Eyed Seeing. The goal was to empower participants with knowledge and perspectives to take back to civil society, communities, academia, Indigenous and public institutions after the gathering.

The most significant outcome of the gathering was the Indigenous Salmon Peoples Gathering Declaration (the Kárášjohka Salmon Declaration). The Declaration is a guiding framework for decision-making processes, empowering Indigenous Peoples to address the alarming state of salmon in the Northern Hemisphere. It's the first Indigenous Declaration on salmon and aims to inform salmon policies that can be adapted to different communities, emphasizing the rights, knowledge and stewardship of Indigenous Peoples. The Declaration was endorsed by a majority in the plenary of the Sami Parliament of Norway on the 5 December 2024.

The full document can be found at the Sámediggi and IISPN webpages:

Invasive Alien Species in the Changing Arctic

A GROWING CIRCUMPOLAR CONCERN

The Conservation of Arctic Flora and Fauna (CAFF) and the Protection of the Arctic Marine Environment (PAME) Working Groups of the Arctic Council developed an information brief, “Invasive Alien Species in the Changing Arctic” to summarize the current status and emerging threats related to invasive alien species in the Arctic outline options for their effective prevention and management. The following are excerpts from the brief.

Jessica Cook / Arctic Council Secretariat

Invasive alien species are a major driver of biodiversity loss in ecosystems globally. Until recently, invasive alien species have been of relatively limited concern in the Arctic. This is likely to change with the ongoing transformation of the Arctic due to the warming climate and increasing human activity.

The Arctic is home to many species and unique habitats, found nowhere else on earth, that can be especially vulnerable to the negative impacts of invasive alien species. A low number of species at some levels of the food web and the prevalence of natural disturbances – factors that are generally known to make ecosystems susceptible to biological invasions – characterize many Arctic ecosystems.

Furthermore, species that have adapted to Arctic conditions through characteristics such as slow growth and delayed maturity may be poor competitors against invasive alien species.

Milder temperatures and the reduction in ice cover favor northward expansion of Sub-Arctic species. Furthermore, it renders the region hospitable to both native species shifting their ranges northwards and alien species brought to the Arctic by human activities, intentionally or unintentionally. Human activities such as maritime traffic, tourism, resource exploration and extraction, as well as marine debris can serve as pathways for biological invasions. If unmanaged, invasive alien species have the potential to threaten Arctic ecosystems and livelihoods and cause serious economic harm. Importantly, they pose a risk to the wellbeing of people, especially Indigenous Peoples, that are reliant on local flora and fauna for subsistence harvesting as well as spiritual and cultural value.

Limiting the risks and negative impacts of invasive alien species is achievable through decisive management actions that combine multiple methods. Prevention and preparedness are often the best and most cost-effective options.

International cooperation and regional coordination are critical for addressing the transboundary nature of invasive species in the Arctic. Additionally, effective management of invasive alien species requires collaboration with Indigenous Peoples as well as other local actors and communities. Education, awareness raising and public engagement are also vital to address this problem.

Want to learn more about Invasive Alien Species in the Arctic?
Read the full information brief, “Invasive Alien Species in the Changing Arctic” on www.caff.is and www.pame.is.

Photo: Adobe Stock

PEOPLES

Arctic Council Ministerial meeting in Rovaniemi, Finland, 2019. Then Foreign Minister of Norway, Ine Marie Eriksen Søreide, greets Chief Gary Harrison from the Arctic Athabaskan Council. *Photo: Jouni Porsanger / Ministry for Foreign Affairs of Finland*

The Importance of the Arctic Council for Indigenous Peoples

HOW THE COUNCIL'S PERMANENT PARTICIPANTS BRING THEIR PERSPECTIVES AND KNOWLEDGE TO THE TABLE

Saami Council

The category of Permanent Participants is a unique model of including Indigenous Peoples in decision-making. It was created to provide Arctic Indigenous Peoples with the means of active participation and full consultation in the Council's deliberations. The Arctic Council is the only international body that has accredited Indigenous Peoples this status. In this article Permanent Participants reflect on the importance of the Council for them – and vice versa.

In general, the engagement by Arctic Indigenous Peoples in the Arctic Council is guided by the understanding that healthy and productive ecosystems, both on land and in marine environments, are fundamental to the cultures, identities, and livelihoods of Arctic Indigenous Peoples. These cultures rely on local food sources and traditional materials to maintain health, safety, and well-being. Indigenous Knowledge has been generated and passed down for generations, ensuring a balanced relationship with the surroundings and the environment. However, climate change, pollution, land use changes, and encroachments are altering natural landscapes and threatening Indigenous ways of life. The Arctic Council is important, as our homelands and matters related to these lands and waters are on the Arctic Council agenda. The Permanent Participants are at the Arctic Council table to address the challenges the Arctic Indigenous Peoples are facing and amplify the voices of Arctic Indigenous Peoples.

Since the first gathering of Arctic Indigenous Peoples in Copenhagen in 1973, cooperation among Indigenous Peoples across the circumpolar region has evolved significantly. From early efforts to unify Indigenous Peoples' voices in addressing shared concerns to achieving formal recognition in international cooperation, the journey has been marked by

First gathering of Arctic Indigenous Peoples in Copenhagen, Denmark, 1973.
Photo: Jens Brøsted

both challenges and accomplishments. At the heart of this progress is the Arctic Council, an intergovernmental forum that has provided Arctic Indigenous Peoples with a seat at the table to shape policies affecting their lands, cultures, and ways of life.

The first Arctic Indigenous Peoples' meeting in 1973 laid the foundation for organized cooperation among Indigenous Peoples across national borders. The participants envisioned a collective body to advocate for their rights and interests. Their declaration emphasized the need to protect their lands, resources, and cultural heritage for future generations.

Indigenous Peoples' leaders at the time understood that environmental protection and Indigenous self-determination were inseparable. This realization would later shape the direction of Arctic cooperation, culminating in Indigenous Peoples' participation in environmental and geopolitical discussions on the global stage.

The Arctic Council, established in 1996, built on the foundation of the Arctic Environmental Protection Strategy and emerged as the most significant institutional recognition of Indigenous Peoples voices in Arctic governance. Unlike other intergovernmental organizations, the Arctic Council includes Indigenous Peoples' Organizations as Permanent Participants, granting them a stronger role than Observer States and institutions. This unique structure allows Indigenous Peoples representatives to influence policy recommendations directly, even if they do not hold formal voting rights.

At its inception, the Arctic Council included three Permanent Participants: the Inuit Circumpolar Council (ICC), the Saami Council, and the Russian Association of Indigenous Peoples of the North (RAIPON). Soon after, the Aleut International Association (AIA), the Gwich'in Council International (GCI), and the Arctic Athabaskan Council (AAC) also joined, ensuring broader representation of Indigenous Peoples across the Arctic region. If we hold hands, we cover the whole Arctic circle.

Ministerial meeting of the Arctic Environmental Protection Strategy with the Indigenous Peoples' representatives who would become the first Permanent Participants in the Arctic Council, Alta, 1997. *Photo: Harald Finkler / Arctic Council*

Meeting between the Permanent Participants and the Norwegian Chairship in Bodø, Norway, in May 2024. *Photo: Minetta Westerlund / Arctic Council Secretariat*

The Arctic Council has become an essential forum for Indigenous Peoples advocacy, allowing Indigenous knowledge to be utilized in scientific research, environmental protection efforts, and sustainable development initiatives. As one Indigenous leader put it, the presence of Permanent Participants ensures that the Arctic Council is not solely focused on environmental concerns like polar bears but also on the people who live and thrive in the Arctic.

During its Chairship of the Arctic Council from 2023 to 2025, Norway has made efforts to restart Arctic cooperation following a pause in official meetings of the Arctic Council initiated by seven Arctic States in February 2022. By focusing on non-political but critical issues such as wildfires, Norway has managed to keep the Council functioning. Additionally, Norway has maintained dialogue with the Indigenous Peoples Organisations, ensuring that all six Permanent Participants remain engaged in discussions about the Council's future.

As Indigenous Peoples continue to navigate the challenges posed by climate change, resource development, and geopolitical tensions, their voices must remain at the centre of Arctic governance. The evolution of Indigenous cooperation in the Arctic, from the 1973 meeting in Copenhagen to their status as Permanent Participants in the Arctic Council, highlights the resilience and determination of leaders of Indigenous Peoples. The Arctic Council has provided a foundation for this engagement and remains a crucial platform for advocating for Indigenous Peoples' rights, environmental protection, and sustainable development, but further steps are necessary to solidify their role. By strengthening Indigenous Peoples' representation, the Arctic Council can continue to serve as a model for inclusive and effective governance in the Arctic and beyond.

"We participate at all levels of the Arctic Council. We're involved in all of the Working Groups and are involved in all of the discussions. The Council's political proceedings are designed by consensus, which makes sure that it includes all of our views.

It's important for Indigenous Peoples to participate in the Arctic Council because the circumpolar world is our homeland. It's where we come from, it's where we've always lived and this is where we will always be. We have to be involved in everything that happens in our territory."

Chief Bill Erasmus / Arctic Athabaskan Council

"The Arctic Council cannot make any decisions about the Arctic without Indigenous Peoples, and that's what Indigenous Peoples have been saying for decades and decades, that nothing about us should be done without us. The Arctic Council, co-founded by Indigenous Peoples, is gaining a lot of legitimacy through having Indigenous Peoples at the table and having that unique structure of including Indigenous Peoples' Organizations as Permanent Participants, by Indigenous Peoples being at the table and being part of the decision making.

That there's nothing in the Arctic that can go on without the participation of Indigenous Peoples gives the Arctic Council legitimacy. If we are to uphold the promises of Arctic States to respect the rights of Indigenous Peoples, this participation in decision-making is key. So, the Arctic Council is a good example of how states can work fully inclusively with Indigenous Peoples in decision making and in work related to our own homelands and seas."

Sara Olsvig / Inuit Circumpolar Council

"It's important for the Arctic Council that Indigenous Peoples are involved for one, for the unique knowledge that's brought forward by all of the different Indigenous Peoples. Thousands to tens of thousands of years of history in different areas around the Arctic; that base of knowledge is very important to inform projects. And in that sense, our knowledge is very important to include in projects, but also for credibility because we are the people of the Arctic. These issues affect us.

It's important for Indigenous Peoples to participate in the Arctic Council because we're the people of the North. We've seen and we know the changes in the Arctic. We know the stories of the North, how rapidly the Arctic is changing from climate change, all the rest of it. It's impacting us as peoples. And so we need to make sure that our peoples have a voice in all the discussions regarding the Arctic."

Edward Alexander / Gwich'in Council International

"First of all, it's important for Indigenous Peoples to be involved with the Arctic Council because Indigenous Peoples have been in the Arctic since time immemorial. It's not a barren space. Secondly, the participation of Indigenous Peoples in the Arctic Council is very important because it gives the Arctic Council an illustration of how the policies and the decisions affect our communities and our culture and our peoples.

By being part of political proceedings, Permanent Participants are involved in all of the decisions that affect us as Indigenous Peoples in the Arctic. The decisions that are made at the policy level give us the ability to hunt and fish. It gives us the ability to remain on the landscape and to continue our culture."

Liza Mack / Aleut International Association

"Probably only thanks to the Permanent Participants, the Arctic Council became a forum where states and Indigenous Peoples sit at the same table and think of how to improve living and working conditions in the Arctic. Permanent Participants are very important to the Arctic Council. It's us who bring in traditional knowledge.

We have always lived in these territories, and we are the first to observe changes happening in the Arctic. Today, we, the Permanent Participants, work within almost all of the Working Groups, And our participation in the Working Groups' activities is impossible to replace. Subsidiary bodies such as SDWG, the Sustainable Development Working Group, in my mind, were created to encourage projects that are jointly implemented by Permanent Participants and Arctic States."

Vladimir Klimov
Russian Association of Indigenous Peoples of the North

"It's important for the Arctic Council to have the Indigenous Peoples involved for credibility, because if you want to develop and make progress in the region, you need to make sure that the people who actually live in and for the region are on board. I think that the perspectives brought to the table from the Indigenous Peoples as Permanent Participants are very valuable also for the Arctic Council officials and delegations, who often come from the outside. So, if we're seeking to develop a thriving Arctic for those who live there already, I think that Indigenous Peoples' perspectives are crucial."

Christina Henriksen / Saami Council

"The unique approach of the Arctic Council is also very important to me, that States and Permanent Participants sit at the same table to shape the work and outcomes of the Council. This is very distinctive, and globally unmatched. I'm pleased to say that the Conservation of Arctic Flora and Fauna Working Group of the Arctic Council currently has several projects, which are led or co-authored by Permanent Participants, including on salmon, Arctic wildland fires, climate change, and Other Effective Area-based Conservation Measures (OECM) in the Arctic."

Inge Thaulow / Conservation of Arctic Flora and Fauna (CAFF)

"Indigenous and coastal communities are often the first responders to emergencies in their communities and surrounding waters. Their presence and capacity to respond can make an important difference in how an emergency unfolds in remote locations. It's therefore critically important that Indigenous Peoples are a part of the work at the Emergency Prevention Preparedness and Response Working Group of the Arctic Council. By sharing their experiences and perspectives, it's helping shape how Arctic States approach emergencies in the Arctic to improve outcomes for those involved in the emergency and mitigate impacts and harms to the communities where they occur."

Kathy Nghiem / Emergency Prevention, Preparedness and Response (EPPR)

Co-Production of Knowledge in the Arctic

Bridging Indigenous and Scientific Perspectives

THE SAAMI COUNCIL SHARES CASE STUDIES OF SUCCESSFUL KNOWLEDGE CO-PRODUCTION

Saami Council

In the Arctic, where rapid environmental changes challenge existing governance and adaptation strategies, co-production of knowledge (CPK) has emerged as a crucial method for making use of diverse knowledge systems to inform decision-making processes. This approach fosters collaboration between Indigenous Knowledge Holders and scientists, ensuring that Arctic research and policy are informed by the most comprehensive and contextually relevant insights. The Saami Council is applying co-production methods to ensure effective participation and effectiveness in knowledge production to inform recommendations in areas such as climate change adaptation, biodiversity management, and sustainable land use.

Reindeer herding in Gálggojávri, Northern Finland. *Photo: Elna Magga*

Co-production of knowledge is a collaborative process that involves the integration of different knowledge systems, values and practices to address complex socio-ecological challenges. According to the framework outlined in recent research, co-production of knowledge is more than just an exchange of information; it's a dynamic, iterative and context-dependent process where Indigenous Knowledge Holders and scientists work together to create new, actionable knowledge. Effective co-production of knowledge requires equitable partnerships, trust-building and sustained engagement, ensuring that diverse perspectives are not only acknowledged but also meaningfully incorporated into decision-making. A key aspect of this approach is recognizing power dynamics and fostering inclusive participation, where Indigenous Knowledge systems are valued alongside scientific methods in shaping research questions, data interpretation and policy recommendations. This also includes ensuring ethical research practices that respect Indigenous data sovereignty, fostering long-term partnerships based on trust, and supporting capacity-building.

Case Study: Climate Impacts on Terrestrial Environments (CITE)

Recognizing the rapid warming of the Arctic and its impact on biodiversity, the Climate Impacts on Terrestrial Environments (CITE) project, initiated by the Saami Council and the Arctic Monitoring and Assessment Programme (AMAP), represents an important effort in the co-production of knowledge. Funded by the Nordic Council of Ministers, CITE bridges Sámi reindeer herders' knowledge with scientific research to assess the effects of climate change on terrestrial ecosystems in Sápmi.

The project focuses on combining Indigenous Knowledge and scientific research to support climate adaptation and sustainable management of terrestrial ecosystems. Through the development of a digital platform, CITE Maptionnaire, which is the result of collaboration between reindeer herders and researchers, it facilitates the systematic documentation of reindeer herders' observations. The platform allows herders to map seasonal changes in snow conditions, vegetation and landscape transformations. Competing land use is also documented, providing a comprehensive view of environmental changes affecting reindeer herding. This data is then used to enhance climate models to improve climate and weather data for reindeer herders, and also to foster a broader understanding within society of the challenges they face.

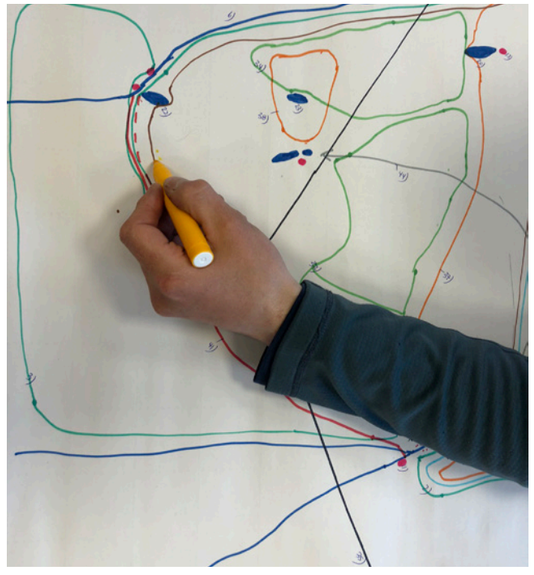
A key feature of the project was its emphasis on Sámi-led research design. Sámi herders played a central role in defining research questions, ensuring that the study addressed their lived experiences. Participatory workshops facilitated collaboration between herders and scientists, fostering trust and mutual learning.

The project also underscored the importance of language in knowledge production. Sámi languages contain precise terminology for snow and ice conditions, which are critical for reindeer herding. To bridge linguistic gaps, the project prioritized multilingual communication, allowing herders to share observations in their native language.

Challenges included the need for flexible timelines to accommodate herders' seasonal activities and addressing concerns regarding data ownership. The project established clear agreements to ensure that Indigenous Knowledge remained under the control of the Sámi communities, reinforcing ethical knowledge stewardship.

The CITE initiative has provided invaluable insights into the effectiveness of co-production methodologies. By including Indigenous Knowledge in scientific monitoring, the project has enhanced climate adaptation strategies for Sámi herders and informed broader environmental policies within the Arctic Council framework. A storymap is one of the tangible outcomes from the CITE project.

Cloudberry in Northern Norway.
Photo: Jessica Cook / Arctic Council Secretariat



Participatory Topological Mapping at a wetlands workshop.
Photos: Saami Council

Case Study: Wetlands Sápmi – Indigenous Peoples' Stewardship of Arctic Wetlands

Another significant initiative is the *Wetlands Sápmi* project, which examines the role of wetlands in Sámi reindeer herding and ecosystem resilience. Led by the Saami Council in partnership with the Norwegian Institute for Water Research (NIVA), the project employed participatory mapping and oral histories to document traditional wetland use.

Sámi herders highlighted how wetlands function as critical grazing areas during seasonal transitions. However, encroachments from industrial development and climate-induced changes have disrupted these ecosystems. By incorporating Indigenous Knowledge of Sámi reindeer herders into wetland conservation planning, the project aims to strengthen Indigenous stewardship practices and influence Arctic Council recommendations on wetland management.

The *Wetlands in Sápmi* project used an innovative approach called Participatory Topological Mapping (PTM) to document reindeer herders' knowledge and experiences. This method combines oral histories with hand-drawn maps, fostering collaboration between herders and researchers in the co-production of knowledge. By centering Indigenous Knowledge of the forest Sámi, PTM creates a resource that is both meaningful and practical for local communities. Unlike conventional GIS mapping, which often presents landscapes as static and disconnected from local realities, PTM captures the fluid and dynamic relationships between people and nature. It offers a way to represent the ever-changing Arctic environment while respecting the deep cultural and ecological connections that define Sámi land use.

The project's success relied on in-person fieldwork, allowing researchers and herders to engage directly with the landscape. This approach facilitated deeper discussions and ensured that knowledge was not abstracted from its environmental context. It also underscored the need for flexible timelines, as herding activities fluctuate with the seasons. Scheduling research activities around these cycles respected Indigenous Peoples' livelihoods and enhanced participation.

Indigenous Knowledge Roundtable at the 10th Arctic Council Ministerial meeting in Fairbanks, Alaska, 2017.
Photo: Linnea Nordström / Arctic Council Secretariat

Fishing in Gálggojávri, Northern Finland.
Photo: Elna Magga

Definition of Indigenous Knowledge
The Inuit Circumpolar Council utilizes the following definition of Indigenous Knowledge: Indigenous Knowledge is a systematic way of thinking applied to phenomena across biological, physical, cultural and spiritual systems. It includes insights based on evidence and acquired through direct and long-term experiences and extensive and multigenerational observation, lessons, and skills. It has developed over millennia and is still developing in a living process, including knowledge acquired today and in the future, and it is passed on from generation to generation. (Inuit Circumpolar Council. 2022. Circumpolar Inuit Protocols for Equitable and Ethical Engagement.)

Key lessons from co-production of Knowledge initiatives

The experiences of the Saami Council in co-production of knowledge highlight several conditions for success. Equitable partnerships require Indigenous Knowledge Holders to be involved in all stages of research, from agenda-setting to data interpretation. Their knowledge should not be treated as supplementary but as a foundational element of the research. Ethical knowledge stewardship ensures that Indigenous Peoples retain control over how their knowledge is used. Agreements on data ownership should be established at the outset to ensure that Indigenous Knowledge is not misappropriated. Cultural and linguistic considerations are crucial, and research should be conducted in Indigenous Peoples' languages whenever possible. Recognizing Indigenous Peoples' worldviews and ways of communication strengthens knowledge co-production. Long-term engagement is necessary to build trust, as short-term projects often fail to establish meaningful relationships. Multi-year partnerships enable deeper knowledge exchange. Flexible methodologies allow research timelines to align with Indigenous Peoples' seasonal activities. Creative approaches, such as participatory mapping and multimedia documentation, can facilitate knowledge sharing.

Conclusion

As climate change accelerates, the Arctic faces unprecedented challenges that demand innovative solutions. Co-production of knowledge offers a pathway to more effective and inclusive decision-making by bridging Indigenous Knowledge and scientific expertise. The Saami Council's work in climate adaptation and ecosystem stewardship demonstrates that when Indigenous Peoples are central to decision-making and knowledge plurality is embraced, the resulting policies and strategies are more inclusive, effective, and grounded in diverse perspectives that better reflect real-world challenges.

Moving forward, Arctic research institutions and policymakers must recognize co-production of knowledge as a standard approach rather than an exception. By fostering equitable collaborations, supporting Indigenous Peoples' leadership in research, and ensuring that Indigenous Knowledge remains in hands of Indigenous Peoples, the Arctic community can build resilient futures based on the best available knowledge—both Indigenous and scientific. ◑

SODA
– Sámi Ownership and Data Access
The CARE Principles (Collective Benefit, Authority to Control, Responsibility, and Ethics) were developed to guide the management of Indigenous data, emphasizing the importance of recognizing Indigenous Peoples' rights and authority to control their data. The Saami Council has built upon these principles to create the SODA (Sámi Ownership and Data Access) principles, which include a crucial addition: they explicitly recognize the principle of ownership. While the CARE principles imply control over data, the SODA principles make it clear that ownership is a fundamental right of the Sámi people, respecting and protecting their rights, dignity and cultural values.

The SODA principles are:

1. **Collective Benefit:** Data should support Sámi rights, interests, and cultural values, contributing to the well-being of Sámi communities.
2. **Sámi Authority to Control:** Respecting the authority of the Sámi people to govern and control their data, requiring free, prior, and informed consent for data collection and use.
3. **Sámi Ownership:** Recognizing the rights of the Sámi people to own and control their data, developing guidelines on data ownership, and specifying procedures for transferring or sharing ownership.
4. **Responsibility:** Ensuring data is managed in a manner that upholds Sámi rights, dignity, and cultural values, adhering to legal and ethical guidelines.
5. **Ethics:** Ensuring all aspects of data handling are guided by ethical principles, respecting Sámi knowledge systems and considering potential impacts on Sámi communities.

Kimberly Aiken / Sustainable Development Working Group
Trond Trosterud / UiT - the Arctic University of Norway
Mikhail Pogodaev / Ministry Arctic for Development and Indigenous Peoples Affairs, Sakha Republic
Anatoly Zhozhikov / UNESCO Department at North-East Federal University

From Spoken Word to Digital World

SAFEGUARDING ARCTIC INDIGENOUS LANGUAGES

Language is more than a tool for communication; it's the heart of culture, the vessel of history, and the foundation of identity. For Indigenous Peoples of the Arctic, language weaves together the knowledge of ancestors, the rhythms of the land and the spirit of resilience in the face of rapid change. Each word carries centuries of wisdom—stories of survival, traditions of stewardship and unique worldviews that cannot be translated with mere vocabulary. Yet, these languages, once passed seamlessly through generations, now face an unprecedented threat of extinction.

Digitalization as a bridge between generations

The rapid development of the Internet has triggered the creation of social networks, resulting in a new virtual multicultural environment, in which there are no borders, distances or time constraints and in which it's possible to communicate in almost any language of the world. This digital environment offers tremendous opportunities, including freedom of expression, education, preservation and development of languages, culture and spirituality. However, to be present in this new environment and to benefit from digitalization, languages and cultures need to have access to the appropriate tools and resources, including proofing tools, keyboards, letter representation – and not least knowledgeable writers.

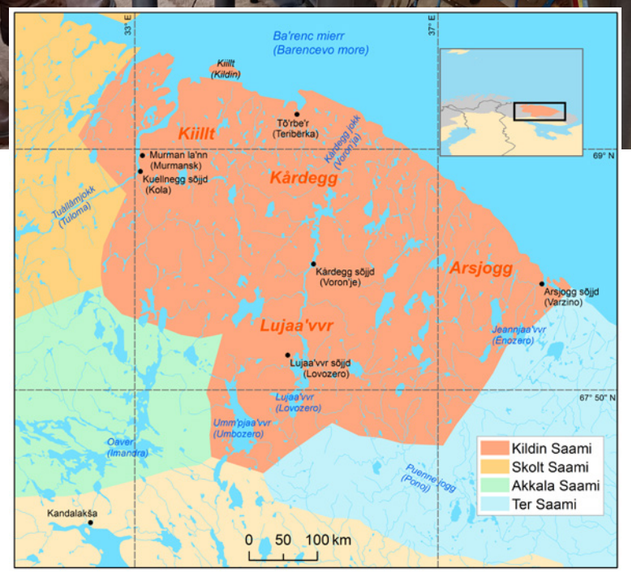
The Arctic is home to over 40 unique Indigenous languages and Indigenous Peoples are the creators and custodians of these rich oral traditions reflecting the diverse cultures and communities of the region. For many centuries they have mastered the Arctic landscapes, adapted to extreme natural and climatic conditions, developed distinctive cultures and lived in harmony with nature. These languages are therefore embedded in traditional ecological knowledge, storytelling and intergenerational teachings.

However, globalization, anthropogenic and technogenic impacts on the environment and active industrial development are having a profound impact on the traditional way of life of Arctic Indigenous Peoples, risking complete assimilation and loss of cultures, ways of life and languages. As fluent speakers age, fewer young people are learning their ancestral tongues, threatening the loss of cultural heritage that has sustained Arctic communities for millennia.

Asya Konstantinova, a leading specialist of NEFU UNESCO Chair, at the Taymyr House of Folk Art, interviewing Yarotskaya Nina and Konstantinova Evdokia, custodians of Evenki culture and language. *Photo: Pavel Sofronov (UNESCO Chair of NEFU)*

It's therefore necessary to pay attention to these processes and to intensify activities to preserve and develop languages and traditional culture. At the present stage, digital technologies such as the Internet, GIS and mobile communications can play an important role in the preservation and development of the languages and cultures of Arctic Indigenous Peoples.

Furthermore, the United Nations declared 2022–2032 as the International Decade of Indigenous Languages in an effort to revitalize and safeguard linguistic diversity worldwide. This decade-long initiative underscores the vital role language plays in upholding human rights, self-determination, Indigenous empowerment, and sustaining traditional lifestyles that are inextricably linked to cultural, spiritual and social practices and connections to the land and its ecosystems.



Traditional territories of Kildin Saami. *Credit: Rantanen et al. (2022)*

"Best practices for spatial language data harmonization, sharing and map creation – A case study of Uralic".

A project leading the way

The Arctic Council's Sustainable Development Working Group (SDWG) responded to this crisis by harnessing technology to document, preserve and make Indigenous languages accessible to all generations. Its Digitalization of the Linguistic and Cultural Heritage of Indigenous Peoples of the Arctic project is led by the Russian Federation, Norway and the Russian Association of Indigenous Peoples of the North (RAIPON), one of the Permanent Participants of the Arctic Council.

A language preservation expedition

To fulfil the project goal, expeditions were organized to the places of traditional residence of Indigenous Peoples of the North: 1) in the following districts of the Republic of Sakha (Yakutia): Momsky, Allaihovsky, Oleneksky, Srednekolymsky, Oymyakonsky and Neryungrinsky (Iengra); 2) Chukotka Autonomous Okrug; 3) Krasnoyarsk Krai, Taymyrsky Dolgano-Nenetsky District; 4) Khabarovsk Krai. Within the framework of these expeditions, recordings were made of more than 100 speakers of the Indigenous languages. The recorded informants are representatives and keepers of the culture and language of the Even, Evenki, Yukagir, Nenets, Nganasan, Dolgan, Chukchi, Enets and others.

Through innovative collaborations with Indigenous Knowledge Holders, linguists and digital experts, the project developed tools such as language-learning apps, digital dictionaries and online storytelling platforms, such as the Arctic Multilingual Portal. This digital knowledge hub provides text, audio and video materials on circumpolar languages. These resources reflect the lived experiences and knowledge systems of Arctic Indigenous Peoples and ensure that Indigenous languages continue to thrive in a modern world, empowering Indigenous youth to reclaim their heritage in ways that resonate with their digital realities.

The project was developed by the UNESCO Chair on Social and Human Adaptation of the Arctic regions to Climate Change of the M.K. Ammosov North-Eastern Federal University in the Republic of Sakha, Yakutsk, in collaboration with institutions such as the International Institute of Reindeer Husbandry, UiT - the Arctic University of Norway and RAIPON. The project aims to create an international, multicultural internet portal on the languages, culture and food heritage of Indigenous Peoples of the Arctic and over the past years, it has completed several taskings: developing a project action plan (December 2021 to January 2022), conducting expeditions for data collection and content creation (January 2022 – December 2023), and maintaining the project portal and disseminating the results (January 2024 to December 2024).

At the initial stage of the project, it was decided to choose the Republic of Sakha (Yakutia) as a pilot region, where five Indigenous Peoples of the Arctic live (Even, Evenki, Yukagir, Chukchi and Dolgans), with further plans to implement the project throughout the Russian Federation.

A major milestone of the project was the creation of an online educational resource, the main result of which is a GIS map of the languages of Indigenous Peoples of the Arctic, visually representing linguistic diversity and fostering awareness of endangered languages. An initiative developed in collaboration with institutions such as The University of the Arctic, UiT - Arctic University of Norway and the University of Alaska, Fairbanks.

Currently, the project is encoding grammar into models for digital text processing of Kildin Sámi and Mansi. While, in the Russian Federation, the M.K. Ammosov North-Eastern Federal University (NEFU) in cooperation with the Federal Service for State Registration, Cadaster and Cartography (Rosreestr) is creating a GIS map of Arctic Indigenous languages – with the aim to integrate both GIS maps to fully grasp the project's circumpolar scope.

Despite global challenges, efforts to support the digitalization of Arctic Indigenous languages has continued. While project implementation within the Arctic Council framework was temporarily paused, important progress was made within the Russian Federation, home to 40 Indigenous Peoples of the North, Siberia and the Far East. These efforts highlight the ongoing commitment to preserving and revitalizing Indigenous languages through digital tools, ensuring that linguistic heritage remains accessible for future generations.

The human journey to revitalize indigenous language with the Arctic Council

The revitalization of Arctic Indigenous languages is not just a project—it's a journey undertaken by individuals, families and entire communities. This journey is deeply personal, as it represents the reconnection to linguistic roots that have been threatened by historical disruptions. Indigenous youth, Elders, linguists and educators are all part of this movement, working together to reclaim, strengthen and safeguard their languages for generations to come.

At the core of this journey are the Elders and youth, with Elders preserving the ancestral knowledge and linguistic traditions that define Indigenous cultures, while the youth are now carrying these traditions forward in innovative ways. Through storytelling, song and oral traditions, Elders pass down the spirit of their languages to younger generations, who in turn, are embracing language-aware digital tools to learn and practice their native tongue through creative and digital expression merging tradition with technology.

New tools for old languages

The SDWG project is invaluable to Indigenous identity and the exchange between Elders and youth harnessing best practices for engagement with the use of traditional languages both in the field and Indigenous communities at large. The project is working on language technology development, including the creation of keyboards, grammatical models and proofing tools. These innovations enable digital communication and literacy, ensuring that these languages can be actively used in modern technology.

SDWG's efforts, combined with the ambition of Arctic Indigenous Peoples, demonstrate that language revitalization is more than preservation—it's an ongoing human journey of cultural survival, identity and renewal. In the long term, it's planned to carry out this work throughout the Russian Federation, where 40 Indigenous Peoples live, and the aim is to integrate the project with that of Norwegian colleagues, who have the required language infrastructure ready.

Educational classes on the languages and culture of the Indigenous Peoples of the Arctic held as part of the Project "Children's Cultural and Creative Playground 'Children of the Arctic". *Photo: Svetlana Chernyshova*

A legacy for future generations

As the world advances into an increasingly digital era, it's crucial that Indigenous languages do not remain trapped in the pages of history but evolve alongside technology. The language digitalization project is not just about preservation; it's about creating a sustainable linguistic future where Arctic Indigenous voices remain strong, audible and respected.

Language is more than words—it's identity, belonging and the essence of what it means to be Indigenous in the Arctic. SDWG, in collaboration with Indigenous Permanent Participants, is ensuring that Arctic languages are not just remembered but lived.

Learn more

Arctic Multilingual Portal:

GiellaLT – language technology for all:

Woven From the Bonds of Cultural Cooperation

FOR INDIGENOUS PEOPLES, CULTURE IS VIABLE, CENTRAL AND FUNDAMENTAL TO THEIR LIVES

Izabel Nordlund / The Saami Council

The everyday lives and cultural practices of Arctic Indigenous Peoples are both material and immaterial; they are woven into relationships, places and stories. We all confront similar dilemmas in a world marked by climate change and the loss of biodiversity — where not only our daily lives are affected, but also our entire cultures are at risk. To navigate an uncertain future, we need each other.

It's no secret that we're facing major challenges. To raise awareness on Arctic Indigenous' languages and to mark the *UN International Decade on Indigenous languages* (2022-2032), the first edition of the *Pathways Magazine* (2021) featured an article on the endangered languages of Indigenous Peoples. Languages contain knowledge systems and relationships — just like other parts of an Indigenous culture. In the Arctic, Indigenous Peoples share similar challenges, each at different stages of reconciliation. We share a common history of assimilation, racism and oppression that fosters a mutual understanding among us. Colonization erodes culture and languages, but through artistic and cultural practices, we can find a shared path toward growth and unity. By bringing them to global platforms, ripple effects can be felt on the national level.

The land of the Sámi, *Sámeednam*, stretches across Norway, Sweden, Finland and Russia; cooperation across national borders is a must, yet seldom easy to solve in practice. Cross-border cooperation is often shaped by obstacles due to the laws of states. Each state has its own priorities and budgets for Sámi culture, and along with different laws, it poses difficulties. This is a recurring challenge for the commerce of *duodje/Sámi handicrafts*, as customs duties often hinder the movement of products across borders — a practical obstacle which affects cross-border cooperation within Sámeednam. We need laws that attend to our traditional borders.

Cooperation evolves us

Cultural cooperation initiatives amongst Indigenous Peoples are widespread. Dáiddadállu, an art and culture institution in Sámeednam, works to develop and showcase

Duodje images from Izabel Nordlund's exhibition.
Photos: Izabel Nordlund / Saami Council

Sámi art and artists. Dine Arnannguaq Fenger Lynge, CEO, believes building infrastructure and capacity in Sámeednam as a foundation is the key to cultural cooperation and self-determination. Lynge highlights the value of collaborating with other Indigenous Peoples, allowing us to learn from other practices and adapt them to our own context. This helps us gather strength and hope from each other. Successful methods from other communities can be adapted to suit local needs, but it requires time, cross-border cooperation, and a focus on institutional rather than individual development according to Lynge.

The Saami Council organizes *KulturSápmi*, an annual meeting point for the Sámi art and culture sector, where relationships are built across borders and disciplines. It's the only professional, cross-border platform for Sámi culture, helping to strengthen and develop art and culture by and for the Sámi. KulturSápmi also provides an opportunity for cultural actors to network and present their work, while addressing relevant topics. The program is developed in collaboration with field actors, including networking meetings that encourage cooperation. Another important platform, the Arctic *Art Summit*, also builds networks and solidarity among Indigenous Peoples in the Arctic. By creating these arenas on our own terms, we can highlight the issues that matter most to our communities. It's crucial to connect with others who share our understanding; collaborating on our own terms and in spaces that foster meaningful dialogues.

The changing tide of time

Our conditions are changing rapidly, as factors such as climate change affect our everyday lives. As the climate becomes warmer, our traditions are affected, thus our culture. Nothing is separate from everything else. The *guobaga/shoes of reindeer fur* I sewed last year I rarely use as there's no proper winter; the humidity makes the hair liable to come off. When factors such as warmer climate affect us deeply, we rely on each other to adapt to new situations. There's a constant pressure to preserve our culture and traditions in the present and for future generations — an idea that lies at the heart of Indigenous Peoples' culture — and at

Dáiddadállu continuously cooperates with other Indigenous Peoples' communities, especially in the Arctic region. The pictures show when Dáiddadállu was in Nuuk during a project focused on promoting Indigenous Peoples' art internationally.
Photo: Dáiddadállu

the same time lets the culture evolve according to the time. This shared understanding between Indigenous Peoples can help tackle the problems at hand.

The path forward lies in cooperation, grounded in the perspectives of Arctic Indigenous Peoples and on our own terms. Cultural cooperation is crucial, not only to shape the future, but also to unite us in recognizing the challenges we share. The needs lie in more cross-border cooperation in the Arctic, as well as platforms to collaborate and strengthen the cultural cooperation. When perspectives are shared, the collective becomes greater than the sum of its parts. Cooperation fosters relationships and knowledge, sparking new ways of thinking. The concept of Indigenous Peoples' culture should be understood in a broader sense; traditional customs such as a *vuolle/joik* should not be simplified as a song, it could be a feeling, a story, and at times, simply an extension of a thought. The broad understanding of culture among Indigenous Peoples forms the foundation for cooperation, and the potential is everywhere. Cultural cooperation springs from the bonds that weave us together.

Per-Olof Nutti / President of the Saami Council

"We know that Sámi artists and cultural actors often work alone, even though they have a great and collective responsibility as Sámi cultural bearers. Inadequately adapted resources, national borders and few arenas for building networks prevent Sámi actors from collaborating more, both with each other and with other Indigenous Peoples. In the Saami Council, we are committed to supporting our cultural actors, because they are fundamental to our continued existence."

Photo: Piera Heaika Muotka / Saami Council

Rosa-Máren Magga / Indigenous Peoples' Secretariat

Sámi Museum Siida – The European Museum in 2024

The Sámi Museum Siida, located in Aanaar/Inari – the traditional homeland of the Inari Sámi People – in Northern Finland, is both a national museum dedicated to Sámi culture and a regional museum responsible for tasks related to cultural environments in the Sámi area.

Siida stores, researches and showcases Sámi culture in Finland, and it has the largest Sámi museum collection in the world. Siida also has statutory duties in regard to Sámi cultural environment, including land-use related matters, statements and inspections, the reception of artifacts and observation from the Sámi homeland as well as the maintenance of ancient monuments and antiquities.

Sámi Museum as the European Museum 2024

The Sámi Museum Siida was awarded "European Museum of the year 2024" as recognition of the Siida exhibition because of its societal impact and the close cooperation with the Sámi people. The museum created the new exhibition in a groundbreaking way, giving the space for the Sámi themselves to tell their stories. This allowed the exhibition to bring the traditional knowledge and western scientific knowledge in an equal position and placed Sámi traditional livelihoods and art into the core of the exhibition. Siida Museum Director Taina Máret Pieski explains:

"The exhibition is primarily made for the Sámi people. We tell our own story, and it speaks to people all over the world. It seems to be perceived as genuine that traditional knowledge and scientific knowledge are equal sources of information and art is strongly involved. Also, the fact that the Sámi themselves decided what we tell and how we tell it. The main message is probably that we are talking about the living people: Meaning we're still here and heading into the future."

Cultural cooperation in the Arctic

Pieski says that the cooperation between Sámi museums is long-standing and at the core of cultural cooperation in addition to the arts, films, storytelling and handicrafts.

The Sámi Museum is partnering with other Sámi museums that store Sámi culture, especially in repatriation processes and joint exhibitions. However, there is currently no network that specifically supports the Arctic Indigenous Peoples' cultural cooperation and museum work.

"I wish there could be even more cooperation. Cultural cooperation goes beyond museums. The way of thinking is very universal among the Indigenous Peoples. I wish there were more opportunities to collaborate on projects and exhibitions, traveling exhibitions for example."

Photo: European Museum Forum / João Matos / CMP

What's her future vision for more cooperation between museums? More knowledge and exhibition exchange between Indigenous Peoples' museums in the Arctic in order to raise awareness and to learn from each other, summarizes Pieski. Indigenous Peoples have lot in common and their knowledge systems should get more visibility.

"I would like the majority of the population to understand more about the knowledge Arctic Indigenous Peoples have in combating climate change and adapting to it. Our traditional know-how is often not included and considered at the same level as scientific knowledge. A lot of resources are not used properly because of this. Adapting to climate change and combating it is not the sole responsibility of Western scientists. We have a Sámi Climate Council in Finland. But I hope that the know-how of all the Arctic Indigenous Peoples on this issue would become more visible. It could also be done through exhibition activities or art, and in this sense, museums have a role to play."

Photo: Jessica Cook / Arctic Council Secretariat

Advancing Gender Equality in the Arctic

UNDERSTANDING AND ADDRESSING GENDER ISSUES IN THE CIRCUMPOLAR ARCTIC

Jessica Cook / Arctic Council Secretariat

Gender equality is a fundamental human right and component of sustainable development. As the Arctic undergoes rapid ecological, social and economic changes, the importance of gender and diversity issues is increasingly evident.

What does gender mean in the Arctic?

There is no one definition or understanding of gender and gender equality in the Arctic. According to the Arctic Council's Pan-Arctic Report on Gender Equality in the Arctic[1], the Arctic is inhabited by both Indigenous and non-Indigenous Peoples who may ascribe to definitions of gender ranging from ultra binary—with exaggerated ideas of masculinity and femininity—to highly fluid non-binary understandings. Arctic Indigenous Peoples have varying views on gender, based on both their traditional cultures and the dominant Western cultures with which they interact.

Gender issues in the Arctic are not equated with women's issues. As the Report on Gender Equality in the Arctic points out, challenges such as the impacts of climate change, high suicide rates and lower levels of higher education tend to disproportionately affect more men in the Arctic, and particularly Indigenous young men. This stands in contrast to global trends, emphasizing the need to focus on gender equality in the Arctic accounting for the region's particular characteristics.

The first 'Chairship'

Norway put gender equality and inclusion on its Arctic Council Chairship agenda as a focal point under its People in the North priority. Norway's Arctic Council Chairship program states, "Norway will seek to ensure the continuation of the Arctic Council's long-term work on gender, diversity and inclusion during its Chairship."

One symbolic move towards promoting gender equality was a change in terminology for Norway's leadership of the Arctic Council. The term 'Chairship' was used for the first time in an official Arctic Council capacity.

Photo: Jessica Cook / Arctic Council Secretariat

"Of course, a word alone does not make change," said Morten Høglund, Chair of the Senior Arctic Officials. "But it removes a small barrier for all genders currently in or aspiring to be in a leadership role. It may be a small gesture, but a way to pave the way for something new and to transform."

Morten Høglund also notes that it can be a conversation starter and a way to get more people to reflect on established terms and possible gender bias inherent in them. "It created attention, which was actually positive. If people had questions about the terminology, this creates discussion, and we get the opportunity to explain why we did it," Høglund added.

Why gender equality is on the Arctic Council agenda

Sustainable development and environmental protection are the core pillars of the Arctic Council. Accounting for gender equality and gender-related perspectives is central to the realization of its mandate, addressing climate change and ensuring sustainable development for all.

"The Arctic Council can contribute to advancing an understanding of gendered aspects of trends and developments in the Arctic and, through that, contribute to providing a more nuanced and adequate picture of changes in the region," said Dr. Malgorzata Smieszek-Rice, postdoctoral researcher at UiT The Arctic University of Norway and co-lead of the Pan-Arctic Report on Gender Equality in the Arctic. "This, in turn, could provide policy- and decision-makers with crucial data, comprehensive knowledge and enhanced capacity to develop well-informed policies and tailored, effective measures."

In 2013, the Sustainable Development Working Group of the Arctic Council (SDWG) launched the Gender Equality in the Arctic (GEA) project. Now in its fourth iteration, GEA has three key objectives:

- Raise visibility and understanding of the importance of gender issues in the Arctic;
- Provide information that facilitates sustainable policymaking in the future;
- Identify priorities and concrete strategies to increase diversity and gender balance in policymaking and decision-making processes.

The latest phase of the project has made space for several workshops that aimed to bring Indigenous voices to the forefront in shaping discussions on gender equality in a rapidly changing Arctic. To conclude phase four, SDWG will publish a comprehensive gender-based analysis report on existing data and challenges to gender and sex disaggregated data in the Arctic region in 2025.

1: Agustsson, H.; Oddsdottir, E. Pan-Arctic Report: Gender Equality in the Arctic

Women of the Arctic Council

The Women of the Arctic Council series was initiated in honor of International Women's Day to introduce some of the extraordinary women leading Arctic Council work on various levels. Through personal interviews, they share insights from their experiences as women, career advice, inspirations and more.

Read their full interviews online:

Jennifer Spence

Director, Arctic Initiative at the Belfer Center for Science and International Affairs and Former Executive Secretary of SDWG

"I think one of the greatest challenges for women is the invisibility of the bias, and that you can't undo what people can't see."

Henna Haapala

Senior Ministerial Advisor, Ministry of the Environment Finland

"Development and career advancement are best achieved when one follows one's own interests. Interest and enthusiasm in something are an important resource."

Jessica Veldstra

Executive Director of the Aleut International Association

"Don't be afraid to try new things and keep trying until you find the place that fits right for you. You've just got to be willing to step out there and take the risk, there's lots of people behind you cheering for your success and a lot of mentors that are available to help on your journey."

Guri Storaas

Deputy Director General at the Norwegian Ministry of Climate and Environment

"Ask for higher salary."

Fostering Circumpolar Collaboration for Good Health

HOW THE ONE HEALTH APPROACH CAN CONTRIBUTE TO BETTER PUBLIC HEALTH IN THE ARCTIC

Sarah Cox and Nadia Trempe / Crown-Indigenous Relations and Northern Affairs Canada

One Health is a concept and approach that promotes collaboration across disciplines to identify, prevent and manage health risks. The core principle of One Health is to recognize that ecosystem linkages and interdependencies require a holistic approach to health issues. The approach therefore involves diverse experts and Knowledge Holders in addressing the complex health issues at the human-animal-ecosystem interface.

The Covid-19 pandemic demonstrated the significant impacts public health crises can have on security, economic stability, and population health worldwide. It showed how health threats can destabilize communities and nations.

In the Arctic, the impacts of such crises are even more severe. In a region shaped by extreme temperature, vast distances, and dramatic shifts in daylight, Arctic communities have unique needs regarding access to healthcare, food, water, shelter and community traditions. So, how can public health challenges be addressed in ways that best serve the region and its people?

A promising entry point is the One Health approach. One Health recognizes that everything is interconnected: the health of people, animals and the shared environment. While the approach is increasingly gaining attention internationally, Indigenous Peoples have applied One Health long before the term was

Mother and her child.
Photo: Melynda Ehaloak / Arctic Council Secretariat

Lingon berries from Pingo Park in Tuktoyaktuk, Canada
Photo: Tori Constant / Arctic Council Secretariat

PEOPLES

One Health gathering in Iqaluit, Nunavut, February 2024.
Photo: Chickweed Arts

Elevating Arctic Indigenous Perspectives on One Health
The Qaujigiartiit Health Research Centre in Iqaluit, Nunavut, hosted a One Health gathering in February, 2024. Themed "Elevating Indigenous Voices in One Health Research in the Arctic", the two-day gathering convened around 50 participants from Canada, Greenland and the United States to explore key aspects of One Health research. As Elder Mike Gibbons described, the One Health gathering itself was an example of how to maintain Inuit well-being. Both infectious and non-infectious diseases affect food safety in the region, and discussions highlighted the importance of ensuring that post-secondary education and professional training are widely available to Inuit to enable locally led medical and veterinary services, laboratory capabilities, research and public policy.

"Culture is medicine; country food is medicine; land is medicine."

– Sheila (Siila) Watt-Cloutier, Inuit environmental, cultural and human rights activist, during 2024 One Health gathering in Iqaluit.

coined. Across the Arctic, Indigenous Peoples possess immense understanding of their environments and ecosystems based on millennia of living close to nature and practicing subsistence. Thus, approaching public health issues in the Arctic from a One Health perspective is a natural fit.

"In the Arctic, warming is occurring three times as fast as the global average. This leads to drastic changes in Arctic ecosystems and affects the livelihoods of all, with particular challenges for One Health issues," shared Erlend Tuseth Aasheim, Chair of the Arctic Council's Sustainable Development Working Group's (SDWG) Expert Group on Arctic Human Health. Factors such as eroding coasts, thawing permafrost and shifting species distributions can lead to health risks for both people and animals. The consequences include impacts on the quality and availability of drinking water and food, the spread of water- and foodborne pathogens, and vector-borne diseases transmitted by mosquitoes and ticks.

"The One Health approach requires several sectors to communicate and work together to achieve better public health and is particularly relevant for food security, combating zoonoses and antibiotic resistance. Fostering partnerships among Arctic States, Indigenous Peoples, researchers and communities thus becomes essential, as does knowledge sharing and strengthening local capacities to manage health risks effectively," Tuseth Aasheim emphasized. SDWG therefore introduced the first iteration of its "One Arctic, One Health" project already a decade ago. The aim was and remains to promote a collaborative, multidisciplinary approach to monitor and respond to emerging threats, such as diseases, environmental health risks and food security challenges.

A key strength of the One Health approach is its ability to bring together diverse perspectives and expertise to tackle these complex issues. By integrating Indigenous Knowledge with Western perspectives, One Health research amplifies Indigenous perspectives and holistic models for human-animal-environment interactions, promotes respectful collaboration, and fosters a more comprehensive understanding of health dynamics – contributing to sustainable solutions that benefit humans, animals and the Arctic environment.

Learn more about the One Arctic One Health project:

Read the latest publication "One health in the Arctic – connections and action" by Berner et al. 2024 online:

Building Resilience by Preparing for Disasters in Small Arctic Communities

A Q&A ABOUT EMERGING RISKS AND HOW OUTREACH CAN ENGAGE SMALL COMMUNITIES IN EMERGENCY MANAGEMENT

Jessica Cook / Arctic Council Secretariat

*In this Q&A, **Ole Kristian Bjerkemo**, Chair of EPPR, speaks about the project development, and **Karen Pletnikoff**, Environment and Safety Program Administrator at Aleutian Pribilof Islands Association and representative for Aleut International Association, speaks about risks in Arctic communities and what is needed to prepare and respond.*

Opposite page: City of Adak in the Aleutian Islands.
Photo: Adobe Stock

Small Arctic communities are increasingly at risk of emergency incidents as environmental changes and rising human activity impact the Arctic. To better understand preparedness and risk exposure in small and remote Arctic communities, the Arctic Council's Emergency Prevention, Preparedness and Response Working Group (EPPR) developed a project called Prevention, Preparedness and Response in Small Communities. With a focus on oil spills, the project seeks to meaningfully engage with small communities to raise awareness of oil spill threats, vulnerabilities and impacts, and to ensure communities have access to best practices and capacity building.

To share guidance and best practices with small communities, the Working Group produced a series of animated videos. The first video of the project, released in 2019, focused on basic oil spill response principles. The second video, published in 2020, focused on the impacts of oil spills and the challenges they may create in small communities. EPPR published the third and final video of the series in 2024, which addresses how to develop a community response plan.

How did the Small Communities project come about? Why was there a need for it?

Ole Kristian Bjerkemo: The idea for this project came in 2014, stemming from a presentation in Yellowknife, Canada by Dene leaders about environmental changes to local areas including flooding, lack of habitat and changes in wildlife patterns. It was my first time chairing EPPR, and it was obvious to me that the Working Group needed to have more projects that involve small communities. It was really important for EPPR to have participation by Indigenous Permanent Participant organizations, as it's their communities that are at the frontlines of these risks.

Karen Pletnikoff: Aleut International Association had been advocating for EPPR projects that were more engaged on the issues that our communities face. One of our primary challenges as a small community is our small population. When it comes to emergency response, we've got the same qualified and willing individuals wearing multiple hats. From an incident command structure point of view, that means those individuals will be doubling up on responsibilities to cover all the different aspects of a response. That may help streamline communication requirements, but it also creates a challenge to maintain all the communication pathways to the other less trained, less experienced volunteers that will be required to be part of the response mechanism. This is why general education and outreach campaigns to our small communities are important. It offers people the chance to consider what their role would be in a response. One of the most important roles is minimizing the amount of outside help that ourselves and our families need. That, and how we can be part of that response apparatus in our own communities is the kind of education and communication that can empower and support strong community response.

Why were oil spills chosen as the focus for this project?

Ole Kristian Bjerkemo: It was obvious that we could not cover all the thematical areas of concern in one big project. Because of that, EPPR agreed to have a stepwise approach to addressing the various risks in small Arctic communities, and oil spill was decided to be the first step. My expertise is related to oil spills, so that is one reason this particular topic became a focus.

Karen Pletnikoff: From providing direct technical assistance to Tribal Environmental Programs, I saw the need for better prevention, preparedness and response capacity for oil spills in our local community, but also a better understanding of the larger regional spill possibilities. So, by starting local and understanding what those risks are, we could also build on that for the larger regional issues.

Unalaska, Aleutian Islands, Alaska. *Photo: Adobe Stock*

What are some examples of risks that small Arctic communities face?

Ole Kristian Bjerkemo: Now and in the near future, disasters such as wildland fires, flooding and permafrost thaw leading to infrastructure failure are important risks to consider. The ice melting and new areas with open waters can also be an issue in terms of increasing shipping activity, which leads to an increased risk for accidents at sea. Small Arctic communities must be prepared for all these incidents, as they might be the first responders, or they might have plans for evacuation, for example, in many of these scenarios. A good system for receiving support in the event of an emergency is also an issue they can prepare for.

The hope is that this project will evolve in the future to tackle other risks besides oil spills that small Arctic communities face.

What are the top concerns small Arctic communities have in terms of emergency management?

Karen Pletnikoff: Local preparedness in many of our communities can mean more than just having the resources to camp out at home for three weeks in the event of an emergency. That might be adequate preparation in a larger city such as Anchorage, Alaska, but in some of our tiny communities, there's additional complexities. For example, we need to ensure adequate medication is available, or even specialty foods for infants, elders or anyone who has special diet considerations.

Being able to discuss the anticipated changes in frequency and severity of storms and natural disasters is something that can help us understand what the worst-case scenarios are most likely to be for each of our different regions. And these risks can vary by region and time of year. So, the opportunity to work with the responsible agencies at the national level, and to work with the Permanent Participants – and through them, their connections to small communities around the Arctic – is a way to build resilience for when our small communities are in line for those limited national resources in the event of a widespread disaster.

What are some examples of emerging concerns your community has?

Karen Pletnikoff: For coastal Alaska, typhoons are a growing concern. For example, Typhoon Merbok [2022] caused widespread, significant flooding and other impacts across the West Coast of Alaska. Multiple communities lost infrastructure, housing and other essential goods. Some had freezers taken with the storm surge, causing them to lose at least three weeks of food – impacting the time frame they're able to take care of themselves. And not only that, but they lost their entire winter store, as well as their boats so they couldn't go out and re-stock. That was a financial, health and nutritional impact to those communities with real, legitimate outcomes. When your diet consists of marine mammals, wild salmon, berries from the land – to replace the nutrient profiles of those foods with commercially available foods is nearly impossible from an affordability and accessibility standpoint. It's very likely that those high-quality nutritious foods were replaced with less nutritious foods, and those impacts are very difficult to mitigate in many of these communities.

It's not unusual for our communities to be hit with 100 mile-per-hour wind speeds for example, and more or less they're prepared for that. So, the elements we need to prepare for are not entirely new, but they're at scales and frequencies that change how we need to live on a day-to-day basis. That's where education and public outreach could be effective, and how we can slowly incorporate new standards and small changes that build towards these more extreme events, and potential new events.

The Prevention, Preparedness and Response in Small Communities videos produced by EPPR can be watched here:

What do you think are the key factors that determine whether small Arctic communities can prepare for and respond effectively to emergencies?

Karen Pletnikoff: Small Arctic communities have an innate level of preparedness – they wouldn't be in their 12,000th year of existing on their landscape without that. I think the real discussion is that the hazards – and the scale and frequency of these hazards – are shifting faster than our technology, and faster than our permanently located communities can mitigate those hazards. When you could pick up and move, then you could take a lot of the risk out of your daily life. When you could create most of your home, clothing and transportation from the materials around you, you could be more flexible and resilient in the face of disaster. Now, our reliance on technology, outside goods and permanent settlement locations have really changed the way our cultures can adapt and address these risks.

Funding also plays a role in how our small communities can prepare. But there's also a level of self-empowerment and self-preparation that's just as and sometimes more essential than larger community-scale preparations. For example, in the event of a tsunami, there should be an evacuation site ideally with equipment available for the community. But it may be more reliable and realistic for individuals and families to bring their own resources for a limited tsunami evacuation. Planning for larger-scale community investments should be part of the mix with what community members are better suited to determine for themselves and for their own needs.

New Generation Musher.
Photo: Gunnar Gunnarsson / Visit Greenland

A People-First Approach to Sustainable Development in the Arctic

THE KINGDOM OF DENMARK'S VISION FOR SUSTAINABLE DEVELOPMENT IN THE ARCTIC

The Kingdom of Denmark / Greenland, the Faroe Islands and Denmark

In May 2025, the Kingdom of Denmark will assume the Chairship of the Arctic Council as well as the Chairship of the Sustainable Development Working Group (SDWG), for the period 2025-2027.

A key priority for our upcoming Chairship will be to ensure that the Council's work remains relevant and valuable to the people living in the Arctic region, particularly the Indigenous Peoples, bringing the Council's work even closer to the people who call the Arctic their home. Ensuring that the Council's work is done for and led by the people of the Arctic will be a central guiding principle for our work. This includes projects and initiatives in the Council's Working Groups, who play an important role in ensuring that initiatives in the Arctic stay relevant for the people living in the region.

A main task and focus of SDWG is to advance sustainable development and improve environmental, economic and social conditions of Indigenous Peoples and Arctic communities. A goal that the Kingdom of Denmark shares and strives to promote during our incoming Chairship. To that extent, we will strive to ensure that the interpretation and advancement of sustainable development is guided by the interests and needs of the people living in the Arctic.

Fishing spot in Ilulissat icefjord. Photo: Aningaaq R. Carlsen / Visit Greenland

The Arctic is rapidly changing, and the Peoples of the Arctic are continually facing new challenges and opportunities as a result of climate change and economic developments, as well as increased uncertainty and instability in the world. In order to effectively deal with these challenges and seize these new opportunities, efforts and attention must be dedicated specifically towards sustainable economic development within the region. We wish to further develop this field, focusing on present and future economic activities, while ensuring that initiatives benefit communities in the Arctic and advance economic empowerment of Indigenous Peoples.

We know that working in Arctic conditions requires certain expertise and knowledge. Many people and communities in the Arctic have developed successful businesses and economic growth, and there is a need to connect and utilize this expertise even more between the communities in the Arctic, and to foster greater North-to-North cooperation, as well as partnerships with other relevant stakeholders. While the melting of the Arctic ice may create economic opportunities, climate change and the accelerating biodiversity loss place significant stress on the cultures and livelihoods of Indigenous Peoples. Sustainable development in the Arctic must address these challenges and be reflected in the Council's activities. We will continue the focus on the human dimension of the Arctic Council, with a particular focus on strengthening the participation of Indigenous Peoples and the engagement of Indigenous Knowledge.

Furthermore, we will continue to support SDWG's role in advancing human health approaches to the benefit of all Arctic Council Working Groups, and we will work with all Arctic States, Permanent Participants and Observers of the Arctic Council to address holistic health approaches with Indigenous Peoples.

Frederik D. Heading Out Onto Sea Ice. *Photo: Aningaaq Rosing Carlsen / Visit Greenland*

The Economy of the North

The Sustainable Development Working Group's Economy of the North project (ECONOR) has been essential in providing a comprehensive analysis of Arctic economies, encompassing both market-based industries and traditional nature-based livelihoods. The project report, ECONOR V, will launch in 2025 and serve as a key resource for shaping economic policies that prioritize sustainability and equity. The report examines key economic trends, including the impacts of climate change, the rise of Indigenous-led businesses and the expanding blue economy in regional economies. A primary objective is to enhance the knowledge base for informed decision-making, ensuring economic growth respects cultural integrity and environmental sustainability. Under the Norwegian Chairship of the Arctic Council, a priority is integrating ECONOR V's findings into policy discussions, equipping governments and organizations with insights to foster economic empowerment and environmental stewardship among Arctic Indigenous Peoples. ECONOR V is led by Norway, and co-led by Canada, the United States, Saami Council, Gwich'in International Council, with contributions from institutions such as Université Laval, CICERO Center for International Climate Research, Statistics Norway, and other national statistical offices.

PEOPLES

Happy Birthday, Arctic Economic Council!

THE ARCTIC ECONOMIC COUNCIL CELEBRATED ITS 10TH ANNIVERSARY

Mads Qvist Frederiksen / Arctic Economic Council

Ten years have passed since Arctic Council Ministers established the Arctic Economic Council to increase responsible economic development for the benefit of the people of the Arctic. Mads Qvist Frederiksen, Director of the Arctic Economic Council Secretariat, reflects on a decade of Arctic economic cooperation and the way forward.

Ministerial meeting 2015. *Photo: Denis Drever Photography*

In September 2024, the Arctic Economic Council (AEC) marked its 10th anniversary—a significant milestone for an organization born out of the 2015 Arctic Council Ministerial meeting in Iqaluit. Over the past decade, the AEC has steadfastly represented the voices of the Arctic business community. With members spanning small business owners, SMEs, multinational corporations, and business organizations, both within and beyond the Arctic, the AEC has successfully brought the private sector together in navigating the region's unique challenges.

Today, the AEC is recognized as a key partner in several national Arctic strategies—a testament to its tireless advocacy, global networking through dedicated working groups and consistent presence at international forums. This recognition reflects years of commitment to fostering sustainable economic development while amplifying Arctic perspectives on the global stage.

A cornerstone of the AEC's mission has been its efforts to collaborate with Indigenous Peoples' organizations, youth initiatives and the scientific community. These partnerships underscore the organizations belief in inclusive growth as essential to building resilient, thriving and prosperous Arctic communities. As the AEC looks toward the next decade, it remains steadfast in its goal of advancing sustainable economic opportunities that benefit both people and the environment.

Realizing this vision will require robust partnerships and collaborative efforts. The AEC invites individuals and organizations who share a passion for shaping the Arctic's future to join forces in creating a vibrant and thriving region. While the world has changed significantly since that historic day in Nunavut a decade ago, one truth endures: the best way to predict the future is to create it. Together, we can ensure the Arctic remains a dynamic place to live, work and call home.

Youth Engagement and Expeditions Under the Norwegian Chairship of the Arctic Council

Minetta Westerlund / Arctic Council Secretariat
Malou Platou Johansen / UiT- The Arctic University of Norway

During the Norwegian Chairship of the Arctic Council, youth engagement has been prioritized through impactful initiatives that connect young people with the Arctic's rapidly changing environment. Notable among these are the Arctic Ocean Research Cruise II and the Kristin Harila x AMAP Arctic Youth Expedition, both offering youth immersive, practical experiences. These expeditions not only foster scientific knowledge but also build lasting international connections, empowering youth to become leaders in the future of the Arctic.

EMPOWERING THE NEXT GENERATION: YOUTH ENGAGEMENT THROUGH ARCTIC EXPEDITIONS

Kristin Harila with team. *Photo: Minetta Westerlund / Arctic Council Secretariat*

Skiing over Finnmarksvidda. *Photo: Minetta Westerlund / Arctic Council Secretariat*

Youth engagement has been a cross-cutting priority throughout the Norwegian Chairship of the Arctic Council, with a variety of initiatives designed to empower the next generation of Arctic leaders. The Arctic Youth Conference stands out as a major milestone, but equally important have been the opportunities for youth to participate in hands-on experiences through expeditions. Two such key events are the Arctic Ocean Research Cruise II in August 2023 and the Kristin Harila x AMAP Arctic Youth Expedition in January 2025. These expeditions have provided youth with the chance to connect, learn and grow in meaningful ways, all while deepening their understanding of the Arctic's rapidly changing environment. By engaging with scientific research and local communities, young people have had the chance to gain firsthand experience and contribute to ongoing discussions about the future of the Arctic.

Arctic Ocean Research Cruise II – August 2023

The Arctic Ocean Research Cruise II, organized by the Norwegian Polar Institute and supported by the Norwegian Chairship of the Arctic Council, brought together 14 students and early career professionals from across the Arctic. These participants, coming from diverse backgrounds and regions, set sail for three weeks on the research vessel *Kronprins Haakon* to conduct scientific research and experience the challenges of the Central Arctic Ocean.

The focus of the cruise was twofold: scientific exploration and capacity-building for the next generation of Arctic scientists. Alongside experienced scientists from NPI and two Arctic Council Working Groups - the Arctic Monitoring and Assessment Programme (AMAP) and the Protection of Arctic Marine Environment (PAME) - the participants gathered scientific data while learning about the unique environmental challenges facing the Arctic Ocean. As Nalan Koc, Special Adviser, external relations at NPI, noted:

"Climate challenges know no borders. Diversity was a priority when organizing this cruise, ensuring that students could build international connections. Our aim was not only to advance scientific work but also to create networking opportunities and foster the capacity building of future scientists."

In this spirit, the Arctic Ocean Cruise II exemplified international cooperation in research, and participants were able to develop professional relationships that will extend far beyond the cruise itself. As Ole Arve Misund, expedition leader and former director of NPI, emphasized:

"To solve the climate challenges we face, the international community must come together as a team. This cruise, though one small part of the larger picture, shows how research and cooperation can transcend borders and bring together the scientists of tomorrow."

Malou Platou Johansen (left), Inuit Circumpolar Council participant. Per-Henning Mathisen (right), Saami Council participant. RV Kronprins Haakon in the background at 84°N. Some of the other participants are reflected in the sunglasses. *Photo: Aurora Heim*

While the Arctic Ocean Research Cruise II in August 2023 focused on scientific research and collaboration, the Kristin Harila x AMAP Arctic Youth Expedition in January 2025 brought youth closer to the realities of climate change in Northern Norway.

The Arctic Youth Expedition – January 2025

As part of the lead-up to the Arctic Youth Conference, the Kristin Harila x AMAP Arctic Youth Expedition offered young people a unique chance to witness the Arctic's natural beauty and understand the impacts of climate change in a personal and immersive way by the knowledge of those who live in and of the highland. Over four days, youth participants skied across Finnmarksvidda in Northern Norway, witnessing and experiencing the region's environment themselves.

The expedition aimed to offer participants a deeper, more in-depth understanding of the Arctic and its changing climate. As Rolf Rødven, Executive Secretary of the Working Group AMAP, explained:

"Whenever we discuss climate predictions, especially with youth, there's often a sense of resignation. That's not what we want. This time, we brought young people to the Arctic for them to experience climate change firsthand, interact with local communities, and speak with reindeer herders. Our goal is for them to have a more throughout understanding and then for them to come back and communicate what's going on with their own and a stronger message."

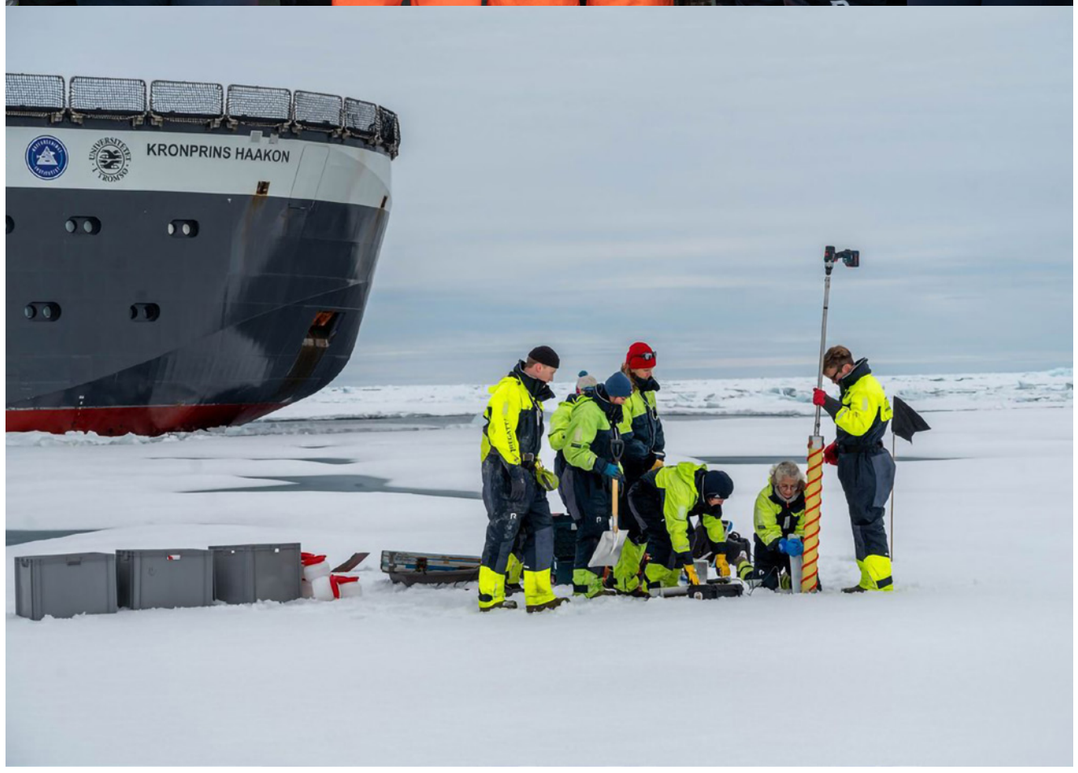
Malou Platou Johansen, marine biologist from Kalaallit Nunaat (Greenland), attended both expeditions and shares her insights and thoughts on why these formats are important and keep youth engaged:

The success of having youth expeditions (Malou)

Building connections across borders can be done in many ways, but the strongest connections are often built through shared experiences. The Norwegian Chairship of the Arctic Council facilitated two expeditions where youth living or working in the Arctic could come together and form bonds by experiencing extraordinary things together.

I was fortunate to attend both expeditions, each with its unique flair. One of the most valuable aspects of these experiences is the lasting relationships formed. These expeditions allowed youth from diverse backgrounds to connect, share knowledge and create memories that would last a lifetime.

Over the course of the three-week Arctic Ocean Research Cruise II, participants collected data on various aspects of the Arctic environment. Those who weren't involved in specific research projects rotated through different forms of data collection, gaining valuable hands-on experience. I was one of the participants who got to try everything. With my background in fish and shrimp collection, it was exciting to learn new techniques while also teaching others what I knew. I was especially proud when senior research scientist Haakon Hop complimented my fish identification skills.



Top: A single jelly fish – the only thing that came up during a highly anticipated fish trawl. *Photo: Jessica Cook / Arctic Council Secretariat*

Bottom: Ice core sampling on RV *Kronprins Haakon*. *Photo: Jessica Cook / Arctic Council Secretariat*

YOUTH

Navigation training with Kristin Harila. *Photo: Minetta Westerlund / Arctic Council Secretariat*

Being on board a ship with the same group of people for three weeks created deep connections. As the only people you see daily, the bonds formed during this cruise have lasted. Many of my peers have continued to support me in my academic work, such as reading through my thesis or helping me practice for my defence. Some have become connections whom I see yearly, for example, when passing through their country and they generously show their working place to me and my colleagues – creating new collaboration opportunities. Other participants, I see either in town or at conferences, which is nice since seeing familiar faces is always comforting.

For the Kristin Harila x AMAP Arctic Youth Expedition, the goal was to create connections between youth while also providing them with a firsthand experience of climate change. Despite a polar low storm disrupting the original plan, the expedition team managed to adapt, ensuring that we still had the opportunity to ski 50 km and meet local communities. It does not matter the age or background you have. After all, you can always learn something new because you talk to someone coming from a different place and life experience than yourself. This trip was indeed an opportunity for this to occur.

Youth are the future, and having connections from an early start makes collaborations easier down the path. How these contacts are made does not have to be in the setting of meetings or conferences. Strong bonds are created by shared memories, which I hope the Arctic Council continues to create for youth in the future.

Conclusion: The future of youth engagement

Through these experiences, the Norwegian Chairship of the Arctic Council has shown that youth engagement goes beyond conferences or meetings. By empowering young people to experience the Arctic's challenges firsthand, these expeditions offer the next generation of Arctic leaders the tools, connections, and inspiration needed to drive meaningful action toward a sustainable future for the region.

Inaugural Arctic Youth Conference

A Historic Milestone for Arctic Youth Engagement

EMPOWERING THE NEXT GENERATION AND SHAPING THE FUTURE OF ARCTIC GOVERNANCE THROUGH YOUTH ENGAGEMENT AT THE ARCTIC YOUTH CONFERENCE

Minetta Westerlund / Arctic Council Secretariat

The Arctic Youth Conference (AYC) set a new precedent for youth involvement in Arctic governance. With nearly 300 participants from across the Arctic and beyond, the conference created a dynamic platform for youth to engage in discussions on pressing Arctic issues, from leadership to preserving Indigenous cultures. This historic event marks the beginning of a new era in Arctic youth leadership.

Over the three-day conference, youth-led sessions, workshops, and critical issues facing the Arctic were addressed. The AYC was a truly youth-driven initiative, offering a space for meaningful dialogue and broadening perspectives and connections amongst youth in the circumpolar Arctic and beyond. At its core, Norway's establishment of the Chairship Youth Committee ensured that the conference remained youth-led, providing a platform for young people to engage with senior Arctic leaders while addressing vital topics like the preservation of Indigenous cultures, youth leadership, mental wellbeing, and more. Participants also had the opportunity to interact with Arctic Council delegates from Arctic States, Permanent Participants and Working Groups. More than 25 side events and workshops organized by major Arctic youth organizations further enriched the conference's impact.

Youth: A cross-cutting priority of Norway's Chairship

Knut Seim, Norway's Deputy Senior Arctic Official, reflected on what inspired the idea for an Arctic Youth Conference and his experience working closely with the Chairship Youth Committee over the past year.

"The emphasis on youth engagement was a natural extension of one of Norway's thematic Chairship priorities: *People of the North.* In the Arctic—where small and scattered populations face harsh climates—a key challenge is making communities attractive and sustainable for young people. Without young people, small local communities risk stagnation. For Arctic communities to thrive, it's vital that youth voices are heard, as the youth of today are the future, and their perspectives matter. We realized that it's essential to give young people a platform to present their ideas, voice their concerns and propose solutions. It was important for us to do more than just invite a few youth to take part in Arctic Council meetings or panel discussions. In other words, — we wanted to avoid tokenism."

Arctic Parliamentarians joined the Youth Leadership in the Arctic workshop, offering a unique chance for youth and parliamentarians to engage in direct dialogue and collaboration.. *Photo: Jamie Michael Bivard*

Consequently, the Chairship decided to explore the possibility of establishing a platform for youth - or more precisely - organizing an Arctic Youth Conference. In Knut's own words, the Chairship allowed themselves to think big and aimed at inviting Indigenous and non-Indigenous youth from across the Arctic to a circumpolar youth conference, where they could meet in person and get to know each other, exchange ideas and experiences, and learn and practice leadership skills in a safe and relaxed environment. And most importantly, they wanted the event to be youth-led.

Drawing inspiration from local and regional youth councils in Norway, the youth work conducted by the Arctic Council's Conservation of Arctic Flora and Fauna (CAFF) Working Group, as well as past youth conferences organized by the Barents Euro Council - the Chairship Youth Committee, who would shape the whole conference - was formed.

The Chairship Youth Committee: Catalysts for success

The Chairship Youth Committee (CYC) comprises members from diverse Arctic youth organizations, ensuring a variety of backgrounds and perspectives. "We were fortunate to have nine highly motivated young people on the committee, eager to realize the Chairship's ambitious vision of organizing this conference," Seim explained. Thanks to their hard work and dedication, the AYC in Tromsø was a huge success.

"The Norwegian Chairship is extremely grateful for the committee's efforts in making the AYC such a wonderful event," he said. "The committee did an outstanding job not only in shaping the program but also as moderators and panelists during the conference itself."

Looking ahead, the committee's next task is to summarize the key takeaways from the conference sessions and advise the current but also the incoming Chairship. We look forward to seeing the results of this work seeing the results of this work published at the 14th meeting of the Arctic Council, which marks the end of the Norwegian

Chairship term. "Our ambition was not to create a youth strategy for the Arctic Council," Seim clarified, "but rather to provide a model for future Arctic Youth Conferences." Future Chairships will decide whether—and how—to develop the youth conference concept further.

Key activities and contributions to conference success

Jens Toft, Project Coordinator for the Arctic Council Secretariat, played a key role in overseeing the preparations for the AYC. He acted as the bridge between the Chairship Youth Committee and other conference organizers, ensuring youth engagement remained central throughout the event.

"The Nomad Indigenous FoodLab, brought to Tromsø by the World Reindeer Herders, was an outstanding event, celebrating the culinary traditions of Indigenous communities," Toft highlighted. "It not only featured traditional dishes but also panels, sharing circles, and discussions, offering an immersive cultural experience."

A critical issue for many participants was mental wellbeing, particularly in relation to climate change. In collaboration with the Arctic Council's Sustainable Development Working Group (SDWG) and the CREATeS Project, a workshop was held where youth worked with professionals to create a video documenting the intersection of climate change and mental health. The workshop resulted in four videos shown at the final plenary session, *Healing Through Connection: Mental Wellbeing in the Arctic* making a powerful contribution to the discourse on Arctic mental health.

Additionally, the *Kristin Harila X AMAP Arctic Youth Expedition* allowed nine youth from the Arctic and beyond to embark on a skiing expedition across Finnmarksvidda, guided by renowned mountaineer Kristin Harila. The expedition offered participants a deeper understanding of the Arctic environment and the impacts of climate change. Sweden's Senior Arctic Official Axel Wernhoff joined for a portion, sharing and exchanging perspectives with participants in the unique Arctic environment. The expedition concluded a few days before the conference started, allowing the expedition team to get back in time for the conference and give a presentation in the Nomad Indigenous Foodlab about their experience.

In addition to workshops and side events, the conference featured a townhall reception, concerts by Norwegian artists Kajsa Balto and Moddi, and other socializing and networking opportunities. On the last day of the conference, a small breakout session with the Secretary General of the Nordic Council of Ministers, Karen Ellemann, provided youth the opportunity to discuss their recommendations on how youth should be involved in the Nordic collaboration. The *Change-makers take the stage* event aimed at fostering dialogue between Arctic youth, Senior Arctic Officials to the Arctic Council and leaders of the Indigenous Peoples' organizations that are Permanent Participants in the Arctic Council. It provided a platform for youth to put their skills in diplomacy, advocacy and leadership into practice.

The Arctic Youth Conference offered youth a wide range of sessions and thematic topics. This was possible because of the diverse perspectives and the inclusivity of different voices from start to finish in the planning and execution.

Gathered around fire in the Nomad Indigenous FoodLab. *Photo: Arjun Acharya*

Julius Mihkkal Eriksen Lindi and Viljo Vuorimäki from the Chairship Youth Committee. *Photo: Petra Polčičová*

The Chairship Youth Committee. *Photo: Jamie Michael Bivard*

Diverse perspectives and inclusivity

Clara Johanne Storgaard Madsen, representing Kalaallit Nunaat (Greenland) and the Kingdom of Denmark in the Chairship Youth Committee, underscored the importance of inclusivity at the AYC.

"The inaugural Arctic Youth Conference prioritized a youth-driven approach, ensuring that diverse Arctic youth voices, including Indigenous Knowledge Holders, were truthfully and meaningfully represented. We played a central role in shaping the program and enhancing inclusivity together with Jens Toft and the key organizations. Attendees were offered platforms to share knowledge through storytelling, various methods and co-leading discussions. The conference fostered true and meaningful engagement and lasting contributions from Arctic youth by embedding inclusivity throughout the entire process."

The conference featured five plenary sessions, each planned by the Chairship Youth Committee. Topics included youth leadership, preservation of Indigenous culture, co-development of knowledge, preparedness and resilience and mental wellbeing.

Kassandra Petsa, representing the Nordland County Youth Council in the Chairship Youth Committee, explained one of the key issues discussed during the AYC:

"The session I was planning focused on preparedness and resilience in Arctic communities, with an emphasis on the role of youth in addressing climate challenges. Topics like climate change impacts, youth engagement and Indigenous Knowledge were central to our discussions," she described.

Preparing for the conference was an inspiring experience for Kassandra, one that helped strengthen youth leadership in the Arctic and will undoubtedly shape future Arctic Youth Conferences.

A lasting impact on the Arctic Council's agenda

Toft highlighted the significant achievements of the Arctic Youth Conference: "This was the first time that Arctic youth, Arctic Council Working Groups, Permanent Participants, state officials, Observers and key organizations came together on such a large scale. This fostered collaboration and dialogue, ensuring youth voices are prioritized in Arctic governance."

For Toft, the key to success lies in the lasting connections formed during the conference. "The next step is to build on the momentum generated by the AYC and ensure that youth engagement continues to influence the Arctic Council's work," he said.

The inaugural Arctic Youth Conference in Tromsø has not only reinforced the role of youth in Arctic governance, but also paved the way for future generations of Arctic leaders. With its focus on inclusivity, sustainability and youth-driven dialogue, the AYC represents a critical milestone. It ensures that Arctic youth voices will continue to be heard, valued and integrated into decisions shaping the region's future.

Julius Mihkkal Eriksen Lindi / Saami Council
Destiny Kushin / Aleut International Association
Zakayla Netro / Gwich'in Council International
Jazmyn Vent / Arctic Athabaskan Council
Tatiana Korthuis / Inuit Circumpolar Counci
Per Henning Mathisen / Saami Council

The co-organizers of the "Resilient Roots – Safeguarding Indigenous Cultures, Identities, and Livelihoods in the Arctic" session from left to right: Julius Mihkkal Eriksen Lindi (moderator), Zakayla Netro, Per Henning Mathisen, Tatiana Korthuis, Destiny Kushin, Jazmyn Vent. *Photo: Arjun Acharya*

Resilient Roots

SAFEGUARDING INDIGENOUS CULTURES, IDENTITIES, AND LIVELIHOODS IN THE ARCTIC

The Permanent Participant Youth Network (PP Youth Network) brings together youth representatives from the Arctic Council's six Permanent Participants to discuss issues of shared concern. Through joint activities and projects, the network ensures that youth play an active role in addressing challenges such as cultural preservation, climate resilience, and sustainable development.

The AYC plenary session titled "Resilient Roots – Safeguarding Indigenous Cultures, Identities, and Livelihoods in the Arctic". *Photo: Arjun Acharya*

Permanent Participant Youth Network

The Permanent Participant Youth Network (PP Youth Network), established after the first Arctic Youth Leaders' Summit in late 2019, is a cooperative platform for the Arctic Indigenous Youth affiliated with and nominated by the Arctic Council's Permanent Participant organization. The network gathers youth representatives from each of the six Permanent Participant organizations - Aleut International Association, Arctic Athabaskan Council, Gwich'in Council International, Inuit Circumpolar Council, Russian Association of Indigenous Peoples of the North, and Saami Council - to discuss topics relevant to the framework of the Arctic Council and bring up perspectives of the Indigenous youth in the work of the Council. The network meets regularly and coordinates joint youth activities of the Permanent Participants.

Indigenous youth engagement is a joint priority for the Permanent Participants, and they have been instrumental in engaging their youth in the work of the Arctic Council. Even before establishing the PP Youth Network, Permanent Participants have included youth representatives in their official delegations to the Arctic Council meetings and Working Group projects and, in this way, have shown examples of meaningful youth engagement through practice. In addition, Permanent Participants have their respective youth councils, member organizations or advisory boards, as well as youth initiatives and youth training and capacity-building programs that strengthen Arctic Indigenous youth activities locally, nationally and internationally.

The Permanent Participant Youth Network started to take shape following the discussions of the Arctic Council Senior Arctic Officials' meeting in Hveragerði, Iceland in 2019. The Arctic Youth Leaders' Summit (AYLS) in November 2019 in Rovaniemi, Finland, gathered Indigenous youth from all over the Arctic and served as a platform to connect the youth. At the summit, the Permanent Participant youth called for more active involvement in the issues that affect them and by doing so they joined a global movement of young people who are speaking up for their rights as they see their future threatened by climate change. The first online meeting of the PP Youth Network took place early 2020 and since then, the network has met in a regular basis to discuss topical issues.

The PP Youth have actively worked with their own projects and initiatives, such the PP Youth podcast project that marked the Arctic Council's 25th anniversary. As part of the meetings between the Senior Arctic Official Chair (SAOC) and PPs throughout the Norwegian Chairship of the Arctic Council (2023-2025), PP youth have been part of the official delegations. In the SAOC-PP Tromsø meeting in January 2023, PP youth briefed the SAOC Chair on their initial ideas and visions for the Arctic Youth Conference (AYC). From the AYC's inception to its delivery, the PP Youth network remained highly involved by offering a valuable platform for elevating young Indigenous voices from around the Arctic.

YOUTH

"The world has a lot to learn from Indigenous values and worldviews. In a world where the levels of consumption are ever-increasing, we need to look to Indigenous Knowledge for sustainable solutions. Indigenous Knowledge has been passed down through generations and serves as a pathway for us all towards the future. However, Sámi Indigenous Knowledge is facing threats on several fronts, such as laws and regulations, as well as climate change, which threaten our culture and prevent the knowledge from being passed on to future generations. An example of this is the traditional knowledge related to Sámi fishing culture. There are currently laws and regulations that prohibit Sámi fishing practices, thereby preventing the intergenerational transfer of knowledge that is essential for the future of Sámi culture. The traditional Sámi fishing culture cannot survive without being practiced and without children and youth having the opportunity to learn from previous generations and knowledge holders. Education and Indigenous-led research play an important role in preserving this knowledge. Indigenous Knowledge does not only involve ways of practicing, but it is also intertwined with the knowledge of language, nature, values, and a deep respect for ecosystems."

Per Henning Mathisen / Saami Council

PP Youth Network with the Indigenous Peoples' Secretariat and the Arctic Council Secretariat in Tromsø for the meeting between the Chair of the Senior Arctic Officials and the Permanent Participants, 2024. *Photo: Kristina Bär / Arctic Council Secretariat*

Arctic Youth Conference session on safeguarding Indigenous cultures, identities, and livelihoods

As part of their contributions to the Arctic Youth Conference, PP Youth organized a plenary session on the opening day of the conference, titled "Resilient Roots - Safeguarding Indigenous Cultures, Identities, and Livelihoods in the Arctic". This session focused on preserving the cultural heritage and traditional livelihoods of Indigenous Peoples in the Arctic. As rapid modernization and climate change continue to affect the region and its peoples, and the knowledge and practices of Indigenous Peoples are more threatened than ever, the PP Youth panel explored the importance of preserving Indigenous cultures, identities and livelihoods not only for the survival of these communities but also for their contributions to climate resilience and sustainable development.

Mental wellbeing was also one of the major themes of the conference with many discussions highlighting its deep ties to culture, environment, and identity. A common message was that when the land, animals, and people are healthy, so are the communities. But when one struggles, the effects are felt by all. This connection reinforces the importance of a holistic approach to mental wellbeing, where cultural identity, language, and traditional practices provide strength and stability.

Reclaiming, revitalizing, and preserving traditions are further important for supporting wellbeing, especially in the face of climate change and biodiversity loss. Practices like storytelling, intergenerational knowledge-sharing, and land-based healing were highlighted as meaningful ways to help Indigenous youth feel grounded and connected in their communities. By blending Indigenous Knowledge with modern mental health strategies, Indigenous youth can create culturally relevant support systems that improves resilience now and for the future.

The aim of the plenary session was to show the importance of preserving Indigenous culture and knowledge and share successful examples of cultural preservation and revitalization initiatives and programs to discuss strategies to preserve indigenous knowledge, continuity, and innovation.

Key themes and takeaways from the Resilient Roots panel

- Cultural practices strengthen Indigenous youth' identity and resilience in the face of external pressures. Cultural traditions, land-based learning and intergenerational knowledge-sharing play a vital role in connecting youth to their heritage.

- Cooperation between the Arctic Indigenous youth is vital for capacity-building, knowledge sharing and strengthening the cultural identity of Indigenous youth. Such cooperation supports Indigenous leadership now and in the future.

- Indigenous Knowledge is important for biodiversity conservation and climate change adaption. There is a need for Indigenous-led research and recognition of Indigenous Knowledge as a legitimate addition to Western science. This would entail a greater involvement of Indigenous communities in shaping research agendas and methods.

- In addition to climate change, evolving fishing regulations and policies have created challenges for Arctic Indigenous communities that impact their traditional fishing practices and contribute to the ongoing salmon crisis, which further impacts food security and traditional livelihoods of Indigenous Peoples across the Arctic. There's a need for stronger Indigenous governance in managing natural resources and Indigenous Peoples' livelihoods.

- The session increased awareness of the importance of preserving Indigenous culture and knowledge, shared practical strategies and tools for participants to engage in cultural preservation. The session wanted to give youth a sense of purpose and optimism about their active role in cultural preservation. The goal was also to empower the audience with tools and knowledge to engage in preservation efforts in their communities.

The panellists discussed the impact of climate change on traditional livelihoods and cultural practices and called for stronger collaboration among Indigenous youth and organizations to learn from each other and to support cultural preservation and resilience of the Indigenous youth. The panel also called for even more Indigenous-lead research initiatives that integrate Indigenous Knowledge with western science, advocate for policies that recognize the Indigenous governance over the Indigenous livelihoods, and advocate land-based learning programs.

YOUTH

"I find it important and meaningful to explore and practice your culture. It can look like many things, such as being on the land with nature and animals or crafting, like doing beadwork and making regalia. I have had such a privilege to grow up surrounded by my culture and having knowledge holders teach me, my grandma is a very strong and hardworking person. I learned from her to always keep busy and use your mind. I believe that the power of voicing your opinion on the topics you are passionate about creates awareness not only for the others but in a personal sense creating a safe place for others to feel comfortable to share theirs. I have always had a connection with the land, water and air. It's what keeps our earth going and keeps it safe and clean. Learning to have this relationship at a young age is very valuable. I look at it as if we are all one and taking care of each other is crucial for us and our future generations. My final point is learning on the land and being on the land. The world is such a busy place, it's so easy to get caught up but when you take time to rest and disconnect from the chaos something beautiful happens where your mind, body and soul has time to reset. I have had numerous experiences when being on the land, where I come back with clarity. That is something I'm very passionate about wanting to do one day, to have land-based learning programs for Indigenous youth but also non-Indigenous youth-focused on reconnecting human and nature."

Zakayla Netro / Gwich'in Council International

Gwich'in Council International
Marlisa Brown, Jerry Carroll, Olivia Dobbs, Mackenzie Englishoe, Raven Firth, Taylor Hoggarth, Kellie Horassi, Ciara Kakfwi-Frost, Amber McSwain, and Zakayla Netro

Engagement, Involvement, and Insights of Gwich'in Youth

Youth are not just the leaders of tomorrow, they are leaders today. They bring critical perspectives, valuable life experiences, and a commitment and need to be involved in discussions and decisions impacting them. In this article, Gwich'in Council International (GCI), provides a snapshot of its youth engagement.

GCI youth delegate Taylor Hoggarth with Edward Alexander at Arctic Encounter in Anchorage, USA. *Photo: Gwich'in Council International*

In a meeting with the US delegation at Arctic Frontiers 2024 in Tromsø, Norway: GCI youth delegates Mackenzie Englishoe (first to left on left side of table) and Olivia Dobbs (closest to wall on left side of table)
Photo: Devlin Fernandes / Gwich'in Council International

Involving youth in conversations about their future is essential. We need to ask for their perspectives, listen in the present, and make room for them to grow as leaders. By doing so, we are ensuring that the decisions we make today will empower them to lead us into a better tomorrow. The presence of youth in these meetings serves as a reminder that the future of our communities rests in their hands, and we are committed to supporting and nurturing that leadership. – Mackenzie Englishoe

We recognize the importance and value of having youth involved in our work. In the past two years, GCI has made intentional efforts to include youth in our delegations. From Arctic conferences and Gwich'in Nation events to Arctic Council related meetings and side meetings with partners, we recruit and support youth delegates to join us.

We asked GCI youth representatives, if they were to share their experience, what would they want people to know? Their reflections and recommendations will shape our programming going forward, and offer insights for youth engagement and involvement across the Arctic.

I had the best time of my life. It was truly eye-opening to be a part of this experience and I would do it again in a heartbeat. It's a trip that made me think about my life differently and in a good way, and now I'm capable of speaking confidently on my life and what I'd like to see in the future for other First Nations youth. It was great to be included, involved, and supported. – Olivia Dobbs

You will feel wholesome, meeting other Indigenous and Inuit people who have passion and respect for the Arctic and are genuinely proud. It is exciting and gives you hope. – Amber McSwain

Your voice is important! I came into this opportunity thinking I would just be sitting in on meetings and conferences listening and learning. However, many people that I met would want to know more about me. This would include asking me my thoughts in side-meetings at times. Do not be scared to voice your opinion and let your heart speak for you! – Taylor Hoggarth

Being a part of the delegation was an empowering experience. Being able to share ideas, passions, and culture in a welcoming and safe space makes all the difference. I have made great connections and am inspired to continue advocating for my peoples. – Kellie Horassi

I felt very supported both from GCI and all the other delegations that attended the Conference. I met some great people and made some new connections. – Jerry Carroll

I was not expecting to learn about the interpersonal skills of all these different cultures and countries… I had an expectation of how I have been taught people interact and presentations are done. GCI invited us on a trip that broke those expectation by encouraging us to be ourselves, introducing us to incredible people, trusting we'll know what to say and catering such a welcoming, playful learning experience. – Raven Firth

I had a great opportunity to speak on one of the panels with other young people. Each one of us had a uniqueness to how we were being affected by the climate change crises, through pollution and politics. It was so beneficial for my own self growth but also connecting with so many people and even cousins that I've never met before… I know so much more, especially on what I want to continue my studies in from attending the Arctic Youth Conference. – Zakayla Netro

It is good medicine to be surrounded by our peoples from different parts of Gwich'in country to connect, learn from one another, and share our strength, knowledge, food, hardships, laughs, dance, and teachings. – Marlisa Brown

Gwich'in Council International is proud of all of the youth who have joined us. They have taken on roles as panelists, speakers, moderators, participants, experts, mentors, and more. We've learned the importance of mentorship; broad recruitment; planning; trust; support; creating space; providing meaningful opportunities; and having more than one youth attend.

We are grateful to the GCI Board members who lead and support our delegations, and everyone who welcomes our youth delegates. Hąį'ęę to the Norwegian Chairship of the Arctic Council, and to others whose support and financial assistance is invaluable: the Indigenous Peoples' Secretariat, Arctic Council Secretariat, Government of Canada's Global Arctic Leadership Initiative, and United States Department of State. Datthak hąį'ęę to our youth, who take time away from families, commitments, and home to bring their perspectives and important voices to the world.

Village of Gjógv, Faroe Islands *Photo: Annie Spratt / Unsplash*

POLLUTION

The Arctic Dilemma

THE HEALTH AND CULTURAL IMPACTS OF CONTAMINANTS ON ARCTIC COMMUNITIES

Kristina Bär / Arctic Council Secretariat

In 2008, Professor and chief physician Pál Weihe publicly recommended removing pilot whale from the Faroese diet. Once a crucial food source that saved the population from starvation and remained a staple for many families, the pilot whale was found to have unsafe levels of contamination. These contaminants, released across the globe, now posed a risk to the Faroese population and impacted the health of Faroese children. Yet, while the Faroese lost a traditional food source, other Arctic communities, which rely almost exclusively on marine mammals, face an even deeper Arctic dilemma.

Faroe Islands. *Photo: Michael Fousert / Unsplash*

In 1984, Prof. Pál Weihe, a Faroese occupational physician, was about to embark on a long-term study that would span the next decades of his career. A warning from the Faroese veterinary authorities some years earlier had prompted Weihe and his colleague Philippe Grandjean to investigate elevated mercury levels in pilot whales, a traditional Faroese staple food. The authorities had cautioned the public about high concentrations of the heavy metal in the whales' inner organs.

"We started in 1984 by taking blood samples from women in fertile age in a small Faroese village, where we knew traditional diets included fish and pilot whale meat and blubber. When we found significant variations in mercury levels among these women, we realized that the Faroe Islands could serve as an ideal location for a long-term study on the effects of mercury exposure," Weihe recalled.

By 1986, Weihe and Grandjean had secured funding to conduct such a study. They established their first cohort with 1,022 participating mothers. And when the children turned seven, they underwent a thorough examination that tested their psychological abilities, intelligence, neurophysiology and more.

"Following these examinations, we found an association between high mercury exposure of the mother before birth and some decline in the children's cognitive abilities," Weihe shared. "We immediately began recommending that women planning to get pregnant should postpone their consumption of pilot whale until after the pregnancy."

How an ear infection exposed the impacts of another set of contaminants

Following years of giving dietary recommendations to women of child-bearing age, Weihe and Grandjean turned their attention to another group of contaminants: persistent organic pollutants (POPs). Unlike mercury, which is bound to the protein in whale meat, POPs are concentrated in the whale's fat tissue, or blubber.

While the impact of these contaminants on the brain was not as significant, Weihe and Grandjean shifted their focus to the immune system due to an unusual observation. "When we examined the first cohort in the mid-1990s, we found a high rate of middle ear infections. As similar observations had been made in other Arctic areas, we wondered if POPs could have a negative impact on the immune system," stated Weihe. They decided to investigate further by analyzing the vaccine response in the population.

"We had a well-defined stimulus, the vaccine, and could directly measure how many antibodies formed over a month or a year. What we then saw was really unexpected: we discovered a clear association between exposure to POPs and a negative impact on antibody formation," said Weihe.

A third group of chemicals upends a century-long practice

Around 2005, Weihe began to study yet another contaminant: PFAS. "Today, everyone speaks about PFAS, but we started measuring the levels of these fluorinated compounds 20 years ago and found a positive correlation between concentrations of PFAS and whale meat consumption," he said. Per- and polyfluoroalkyl substances (PFAS) are a large and complex group of synthetic chemicals used in everyday items such as waterproof clothing, food packaging, and heat-resistant non-stick cooking surfaces since the 1950s. Eventually, they made their way into the bodies of various mammals, including pilot whales off the shores of the Faroe Islands.

"I remember we released a report in 2008, in which we concluded that people who eat several servings of pilot whale per week had higher PFAS values than people eating less or no whale," Weihe shared. A marine source, therefore, seemed very likely and, much like POPs, PFAS affected people's immune systems. "We saw a very dramatic influence on antibody formation. For every doubling of PFAS at the age of five, we could see a 50 percent reduction in the vaccine response at age seven."

Weihe realized they were facing a significant problem. For more than two decades, they had recommended that women avoid whale meat before and during pregnancy. However, POPs and PFAS are very different from mercury. Some POPs can remain in the human body for many years, and PFAS are known as 'forever chemicals' for a reason.

Professor Pál Weihe. *Photo: Harald Bjørgvin*

How mercury, POPs and PFAS accumulate in the human body

While neither the Faroe Islands nor many other coastal Arctic communities have heavy industries using mercury, POPs, or PFAS, these pollutants reach the region through air and ocean currents and are making their way up the food chain. As larger animals consume smaller ones that contain these contaminants, the pollutants accumulate. For each step up the food chain, contamination levels increase by a factor of 10 to 100, ultimately reaching humans. Coastal Arctic communities that rely on marine mammals for their traditional lifestyle often find themselves at the seventh or eighth step of this chain, meaning contamination levels can be multiplied by a factor of up to 10,000.

"In our opinion, it wasn't right to distribute a food item that had higher contamination levels than were generally accepted in our part of the world. We had to go out and tell the Faroese people that they should not eat their traditional food anymore," Weihe explained.

The message came as a shock to many. The Faroese had relied on pilot whales for centuries. When bad harvests and low fish stocks brought the population to the brink of starvation, pilot whales came to the rescue, becoming an integral part of Faroese culture.

Raw seal and narwhal. *Photo: Flyingrussian / iStock*

A good health story – with a gendered effect

While addressing the source of the pollution is a global responsibility, Weihe can look back at 40 years of contaminant studies and health recommendations to the Faroese public with a sense of true accomplishment. “It’s actually a beautiful public health story. We have seen those women, who we initially targeted with our health recommendations, have followed them thoroughly. For example, the mercury level in the umbilical cord in 1986/87 was around 22 micrograms per liter, now it’s close to one, and fetuses are no longer exposed to these environmental substances,” said Weihe.

Yet, while it’s a public health victory for one half of the population, Weihe and his colleagues have witnessed quite a different perspective from the opposite sex. “A lot of men, especially middle-aged and elderly, don’t think the general recommendations not to consume pilot whale at all are right. They say that we have eaten pilot whales for centuries and that it has served the Faroese people well. They ask if I can prove that the harm is caused by eating whale meat and blubber – and of course, I understand, my proof is highly abstract. It’s statistical calculations published in scientific journals. So, it has proven more difficult to convince this demographic of the negative health effects of the consumption of pilot whale,” explained Weihe.

A circumpolar perspective – An Arctic dilemma

Removing a traditional food source from a nation’s menu affects not just people’s diet but also their culture, traditions and livelihoods. Fortunately for the Faroese, the waters off their shores are teeming with rich fish stocks, which are low in contaminants. This made it easier for Weihe to recommend completely dropping the consumption of pilot whale meat and blubber. But not all Arctic communities are this fortunate.

“In places like Qaanaaq in northwestern Greenland, people rely on seals, narwhals, and polar bears. All of these mammals are heavily contaminated. So, if I were to go to Qaanaaq and tell the community to stop eating marine mammals, they would solely have to rely on imported groceries. That would be a blow to their culture, and that’s what we call the Arctic dilemma,” shared Weihe.

The Arctic dilemma, a term coined by the Arctic Monitoring and Assessment Programme (AMAP) in its early contaminant assessments, highlights how the long-range transport of contaminants affects the traditional way of life of Arctic Indigenous Peoples across the circumpolar Arctic.

“The price of avoiding contaminated food sources in many Arctic communities would come at the cost of their culture. It would directly threaten the existence of their societies,” emphasized Weihe. Instead, the best advice from a public health perspective, says Weihe, is to identify the least contaminated food sources.

Man skinning seal in Oqaatsut, Greenland.
Photo: Aviaaja Schlüter / Arctic Council Secretariat

The lessons from the Faroe Islands – a message of hope?

So, what can the world learn from the Faroese case? “That we should act according to the precautionary principle,” said Weihe without hesitation. “Mercury has been with us for a very long time, but PCBs were invented in the 1920s and PFAS as recently as the 1940s. Within those decades, these pollutants have traveled around the world and reached remote areas in the Arctic.”

The precautionary principle urges us to be mindful of new chemicals and the quantities in which we release them into the environment. “Today, we act according to the principle of ‘out of sight, out of mind’ – but these chemicals will come back and claim their presence. We have documented that these substances have harmed our children in the Faroe Islands,” said Weihe.

This article has been published in a longer format on the Arctic Council website. To read the full text and to get links to additional resources, read “The Arctic Dilemma” online:

Kseniia Iartceva / Arctic Contaminants Action Program
Jessica Veldstra / Aleut International Association
Santina Gay / United States Environmental Protection Agency

Waste Management in Remote Arctic Communities

Unique Challenges and Emerging Solutions

Tackling the complex issues of waste management in the remote Arctic through community-driven initiatives and collaborative action.

Solid waste management in the remote Arctic can pose significant human health, environmental and economic challenges to the communities. Geographic remoteness, limited infrastructure, harsh weather and climate change lead to uncontrolled open dumpsites. These sites pose hazards, such as co-mingling of sewage and prohibited waste, burning and seepage into water bodies. Waste management is further hindered by coastal flooding, erosion and thawing permafrost, which limits site access and control.

Indigenous Peoples and local communities are particularly vulnerable, as waste can jeopardize their intimate relationship to the land and their subsistence-based diets. This creates both health and environmental risks, and it also impacts their identity, cultural practices and knowledge systems.

Over the last decade, two Arctic Council Working Groups, the Sustainable Development Working Group (SDWG) and Arctic Contaminants Action Program (ACAP), have worked on various initiatives to address these issues.

Timeline of solid waste management activities

In 2016, ACAP's workshop, "Sharing Approaches on Community Solid and Hazardous Waste Management Within Arctic Indigenous Communities," identified priorities, best practices and the need for a clearing house of solid waste information. In 2018, SDWG launched a desk study, "Best Waste Management Practices for Small and Remote Arctic Communities," providing an overview of best practices from Alaska, Arctic Canada and Finland, along with recommendations for action.

From the start, Indigenous Peoples' organizations have been the driving force behind solid waste initiatives under the Arctic Council. Between 2018-2021, ACAP's Kola Waste project worked in Sámi communities on the Kola Peninsula to inventory 43 and clean up of four illegal waste dumps, with support from local and regional authorities.

Solid Waste Management in Remote Arctic Communities Project

ACAP and SDWG are collaborating on a project to improve solid waste management practices in remote Arctic communities by providing information, training and tools. Co-led by the Aleut International Association (AIA), the Saami Council and several Arctic States, the project builds on previous work related to marine litter and plastics by the Protection of the Arctic Marine Environment (PAME) and Arctic Monitoring and Assessment Programme (AMAP) Working Groups.

Workshop participants in Unalaska, AK.
Photo: Nadine Kochuten / Aleut International Association

Photo: Nadine Kochuten / Aleut International Association

In a pre-project scoping effort, AIA surveyed small Arctic communities (less than 1,500 people), which are isolated for part of the year and face logistical or affordability challenges in waste management. The survey identified the top five challenges these communities face:

1. Need for stronger regulations
2. Need to improve or replace landfills
3. Lack of regional waste management facilities
4. Insufficient resources for maintaining landfills and equipment
5. Need for additional staff for landfill operations

Respondents ranked the following actions as most helpful in addressing these challenges:

1. In-person training
2. Educational materials for residents
3. Public service messages via radio and social media
4. Culturally appropriate community education
5. Training focused on landfill operations

The survey also highlighted that committed individuals or groups are essential for driving successful waste management, even in resource-limited contexts. This was demonstrated by the Kola Waste project, which succeeded due to strong community leadership and support.

Another scoping assessment by the Battelle Memorial Institute for the U.S. Environmental Protection Agency provides a circumpolar overview of waste management in remote Arctic communities. It describes challenges, opportunities and best practices, and suggests pilot projects to improve waste management in the region.

Pilot phase

Both assessments show that solid waste management in remote Arctic communities requires unique, context-specific solutions. However, lessons learned from one community can be shared with others in similar situations throughout the Arctic. One key deliverable of this project will be a toolkit on waste management, compiled by AIA.

Currently, Arctic pilot communities are being identified to implement waste management improvements that can serve as models for other communities. The pilot phase will involve greater collaboration among local, regional, national and international stakeholders and will include an in-person workshop for information sharing and relationship-building among project participants. A strong youth component will be essential to ensure knowledge transfer and generate new solutions.

While there is no one-size-fits-all solution, understanding the reasons behind waste management problems and focusing on community-driven projects tailored to specific needs is crucial. Many Arctic communities face similar challenges, such as remoteness, limited infrastructure and harsh weather. By focusing on pilot projects, best practices can be scaled up and shared to benefit many communities across the Arctic.

6 Facts About PFAS and Arctic Council Efforts to Address the Threats

HOW TWO OF THE ARCTIC COUNCIL'S WORKING GROUPS ARE COMBATING THE PERSISTENT ISSUE OF "FOREVER CHEMICALS" IN THE ARCTIC

Kseniia Iartceva / Arctic Contaminants Action Program
Timo Seppälä / The Finnish Environment Institute (SYKE)

Per- and poly-fluoroalkyl substances (PFAS) is a group of thousands of manufactured chemicals, widely used in industrial and consumer applications since the middle of the 20th century – including nonstick frying pans, water-repellent outdoor wear and firefighting foams. Due to their persistence and the adverse health and environmental effects, some of them are regulated on an international, national or regional level. However, the majority of these chemicals remain unregulated to date. What should we know about PFAS and how does the Arctic Council address the impacts of PFAS in the Arctic?

1. PFAS are known to persist in the environment longer than any other human-made substance.
PFAS are highly persistent in the environment and have been frequently detected in humans and wildlife worldwide, including the Arctic. In fact, they persist in the environment longer than any other human-made substance. As a consequence, humans and other species will be exposed to ever greater concentrations of PFAS for as long as these chemicals continue to be released. In short, even if all releases were to cease tomorrow, PFAS would continue to be present in the environment, and humans, for generations to come.

2. Certain PFAS accumulate in humans, causing serious health effects.
Ongoing research aims to understand how exposure to various PFAS can result in a range of health effects. Exposure to certain PFAS has been proven to, for example, cause an increased risk of cancers, liver damage, higher cholesterol levels, increased risk of obesity, depressed immune system function, fertility problems and developmental concerns, such as low birth weight and accelerated puberty.

Aqueous film-forming foams are used to extinguish liquid fires and often contain PFAS.
Photo: Shutterstock

PFAS are often found in nonstick frying pans.
Photo: Rob Wicks / Unsplash

3. PFAS are usually used where low surface energy or tension and/or durable water- and oil-repellency are needed.
Most people in the world have been exposed to some PFAS through touching, drinking, eating, or inhaling particles or vapors from materials containing these chemicals. PFAS are widely used in industrial and consumer applications, usually where extremely low surface energy or surface tension and/or durable water- and oil-repellency are needed, for example in surface treatments of textiles, in electronics, fire-fighting foams, candy wrappers and microwave popcorn bags, and even some personal care products.

4. The Arctic Monitoring and Assessment Programme has contributed to the Stockholm Convention negotiations and continues to provide important updates.
The Arctic Monitoring and Assessment Programme (AMAP) has played a pivotal role in the development and ongoing implementation of the Stockholm Convention on Persistent Organic Pollutants. AMAP's comprehensive pollution assessments provided critical input for the treaty negotiations, highlighting the dangers of PFAS and advocating for their regulation. The Arctic Council Working Group continues to contribute by assessing emerging threats and offering scientific support to ensure the Convention adapts to new challenges.

5. Aqueous film-forming foam, used to extinguish flammable liquid fires, is one of the major sources of PFAS.
Aqueous film-forming foams (AFFF) are fire suppression agents used to extinguish liquid fires – where water alone cannot be used effectively and in fact could escalate the consequences. Instead, foam is used, which will float on a liquid fuel surface. This foam separates the fuel from oxygen and extinguishes the fire while preventing reignition. AFFF is used by industry and government sectors for incidents such as fuel storage tank fires, aircraft crash fires, vehicle accidents (including shipping) where fuel spill occurs, and in marine facilities handling fuels.

6. The Arctic Contaminants Action Program supports transitioning from firefighting foam agents containing PFAS to safer alternatives.
As an important step in addressing the issue of PFAS, the Arctic Council's Arctic Contaminants Action Program (ACAP) has initiated a project to transition away from firefighting foam agents.

The project has produced a transition manual for AFFF and training modules. The manual identifies main AFFF users and applications, as well as provides cost effective and appropriate recommendations for the removal of PFAS-based firefighting foams for all applications within the Arctic region. It also suggests replacements which do not have the same environmental and health effect – without jeopardizing levels of risk reduction.

A New Tool to Aid Oil Spill Clean Ups on Arctic Shorelines

HOW EMERGENCY RESPONDERS CAN USE A NEW ANALYSIS TOOL FOR MORE EFFICIENT RESPONSE

Jessica Cook / Arctic Council Secretariat

As activity in the Arctic increases, so does the risk of oil spills. To improve oil spill response in the Arctic, the Arctic Council's Emergency Prevention, Preparedness and Response (EPPR) Working Group launched the Circumpolar Oil Spill Response Viability Analysis (COSRVA).

The COSRVA has been an important project for EPPR to better understand the potential for different oil spill response systems to operate in the Arctic marine environment. Now, EPPR is adding a shoreline remediation component to the tool – the Shoreline COSRVA, or S-COSRVA for short.

How does the tool work and who can find it most useful? Two experts involved with its development, Synnøve Lunde, Senior Advisor at the Norwegian Coastal Administration and Odd Willy Brude, Senior Principal Consultant at DNV, explain in this Q&A.

What special considerations are there for oil spills on shorelines?

Synnøve Lunde: Shorelines can vary a lot in the substances and characteristics that it's made up of. There are various types of stone, sand, vegetation, as well as differing terrain that may be steep or flat. Shorelines may be shallow or deep. There are some that can only be reached from the sea or only from land. Shorelines may be close to or far from infrastructure and communities. This will vary a lot throughout the circumpolar Arctic. Shoreline cleanup is very time consuming and also a challenge because oil might hide between stones or in the vegetation.

What is the S-COSRVA, and why is there a need for it?

Synnøve Lunde: In the event of an oil spill, the S-COSRVA is meant to guide the user in finding the best equipment and system for the shoreline that's affected. The tool includes 22 accepted and commonly used shoreline treatment options that it analyzes with respect to feasibility based on environmental factors of a particular location. It was developed for EPPR by DNV and Owens Coastal Consulting.

The purpose of the S-COSRVA project is to better understand the viability and feasibility for different oil spill response options for various Arctic coastal environments and shorelines. By having this tool, the user can become familiarized with the shoreline in the area of responsibility and more quickly find the right clean up method based on its unique characteristics.

Odd Willy Brude: The S-COSRVA is meant as a planning and decision support tool. It involves five separate analyses and outputs:

1. Feasibility Analysis for Shoreline Treatment (FAST): feasible treatment options based on shore type and oil type scenarios
2. Remote Viability Analysis (RVA): logistics and deployment viability from support centers to coastal locations
3. Operational Systems Viability Analysis (OSVA): favorability of environmental parameters for operational systems for shoreline cleanup

Shoreline in Alta Norway. *Photo: Yannick Schutz, Arctic Council Secretariat*

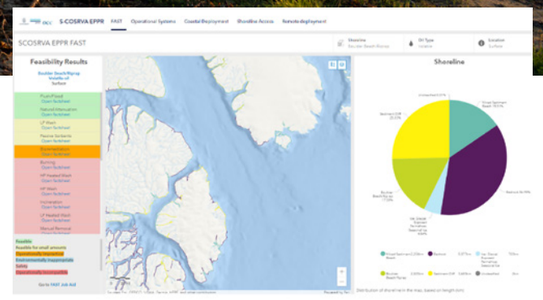
4. Coastal Deployment Viability Analysis (CDVA): environmental constraints to deploy operations support to a coastal location
5. Shoreline Access Viability Analysis (SAVA): access and deployment favorability/constraints to a shoreline location

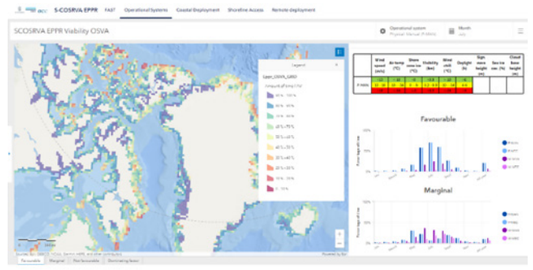
The outputs from each of these analyses create a science-based rationale for planners and decision-makers that includes considerations of the consequences and tradeoffs associated with oil spill cleanup and treatment options.

What type of data does the S-COSRVA use?

Synnøve Lunde: The S-COSRVA uses metocean data. This includes data on the wind, windchill, waves, temperature, fog and more. In the COSVRA, we use historical data to find which of the metocean factors will influence a given site during the different months and seasons.

Odd Willy Brude: We've used seven years of data from the Global ERA5 hindcast dataset, an atmospheric reanalysis of the global climate, to analyze the percentage of time that operational conditions in the Arctic are favorable, marginal or not favorable for either access and deployment on a site or shoreline clean-up with different techniques and systems.





SCOSRVA tool

Credit: Odd Willy Brude, DNV

Who are the main users of the S-COSRVA?

Synnøve Lunde: The main users will be the Arctic States and their contingency planners and responders. If there's an oil spill, responders can dig into the tool, find the location of the spill, and it'll show them which kind of substrate the shoreline is, how to best access the site and information on which of the cleanup systems will be best utilized for their operation.

An Introduction to the Permanent Participants

The Aleut International Association

The Aleut International Association (AIA) is a not-for-profit corporation that represents the Indigenous Peoples of Unangan/Unangas (Aleut) descent in the United States and the Russian Federation. It was created by the Aleutian Pribilof Islands Association (APIA) and the Association of the Indigenous Peoples of the North of the Aleut District of the Kamchatka Region of the Russian Federation (ANSARKO). AIA was formed to address environmental and cultural concerns of the extended Unangan/Unangas family whose wellbeing has been connected to the rich resources of the Bering Sea for millennia. Its mission is to promote continuity of culture and protect the resources needed to sustain it.

The Arctic Athabaskan Council

The Arctic Athabaskan Council (AAC) was established to defend the rights and further the interests internationally of American and Canadian Athabaskan member First Nation governments. The AAC also seeks to foster a greater understanding of the shared heritage of Athabaskan Peoples of Arctic North America. Peoples of Arctic Athabaskan descent live in Alaska the Yukon Territory, the Northwest Territories and provincial north in Canada.

The Gwich'in Council International

The Gwich'in Council International (GCI) is a non-profit organization that represents 9,000 Gwich'in in Alaska, United States and the Yukon and Northwest Territories in Canada. GCI's mission is to amplify the voice of the Gwich'in Nation on issues of sustainable development and the environment in international fora, predominantly the Arctic Council. GCI's membership consists of two representative bodies in Canada and one in the United States: Gwich'in Tribal Council (GTC), who represents the beneficiaries of the Gwich'in Land Claims Settlement Act in Canada's Northwest Territories; the Vuntut Gwitchin First Nation (VGFN), which is a self-governing First Nation in Old Crow, Yukon; and the Council of Athabascan Tribal Governments (CATG), for the eight Gwich'in communities in Alaska – Fort Yukon, Venetie, Arctic Village, Chalkyitsik, Birch Creek, Circle, Canyon Village and Beaver.

The Inuit Circumpolar Council

The Inuit Circumpolar Conference (now Inuit Circumpolar Council, ICC) was founded in 1977. The international organization represents Inuit of the Arctic regions of Greenland, Canada, Alaska and Chukotka. ICC's principal goals are to: strengthen unity among Inuit of the Arctic region; promote Inuit rights, interests and values on an international level; develop and encourage long-term policies that safeguard the Arctic environment; and seek full and active partnership in the political, economic and social development of the Arctic region. The ICC has for years globally advocated processes that consider social and economic as well as environmental impacts. ICC collaborated with the Saami Council and other Indigenous Peoples to draft the United Nations Declaration on the Rights of Indigenous Peoples, lobbied for the creation of the UN Permanent Forum on Indigenous Issues, and helped draft the Stockholm Convention on the Elimination of Persistent Organic Pollutants.

Meeting between the Chair of the Senior Arctic Officials, Morten Høglund, and the six Permanent Participants organizations and their youth delegates in Tromsø, Norway, January 2024 *Photo: Kristina Bär / Arctic Council Secretariat*

The Russian Association of Indigenous Peoples of the North

In 1990 the First National Association of Indigenous Peoples of the Soviet Union (now RAIPON) was established. Since its inception, RAIPON's goal is to protect Indigenous Peoples' human rights, defend their legal interests, assist in solving environmental, social, economic, cultural and educational issues and to promote their right to self-governance. RAIPON works with the State Duma and the Government of the Russian Federation regarding legislation related to Indigenous Peoples' issues. In addition to its status as a Permanent Participant in the Arctic Council, RAIPON participates in international structures such as the United Nations Economic and Social Council with a special consultative status and the Governing Council, as well as the Global Ministerial Environment Forum of the United Nations Environment Program as an observer.

The Saami Council

The Saami Council was founded in 1956, making it one of the oldest Indigenous NGOs in the world. Today, it represents Sámi and their way of life in Finland, Sweden, Norway and the Russian Federation. The Saami Council's core missions are to: promote Sámi rights and interests in the four countries where the Sámi are living; consolidate the feeling of affinity among the Sámi people; attain recognition for the Sámi as a nation; and maintain the economic, social and cultural rights of the Sámi in the legislation of the four states. The Saami Council is active internationally on Indigenous rights and worked towards the founding of the UN Permanent Forum on Indigenous Affairs. It is also a non-governmental organization (NGO) with consultative status with the UN Economic and Social Council (ECOSOC) and the International Labour Organization (ILO).

The Indigenous Peoples' Secretariat

The Indigenous Peoples' Secretariat (IPS) was established under the Arctic Environmental Protection Strategy in 1994. IPS is a support secretariat for all Permanent Participants (PPs). The IPS assists in creating opportunities for the PPs to present their causes, support the provision of necessary information and materials, and communicate information about their work in the Arctic Council and beyond.

The Arctic Council Working Groups

Arctic Contaminants Action Program (ACAP)
acap.arctic-council.org

ACAP works to prevent and reduce pollution and environmental risks in the Arctic. ACAP carries out demonstration projects to raise awareness and show possibilities to cut pollution in the Arctic and clean up. The Working Group encourages nations to strengthen policies and take actions to reduce pollutants and mitigate associated environmental, human health and socio-economic risks.

Arctic Monitoring and Assessment Programme (AMAP)
amap.no

AMAP's mandate is to monitor and assess the status of the Arctic region with respect to pollution and climate change issues by documenting levels and trends, pathways and processes, and effects on ecosystems and people, and by proposing actions to reduce associated threats for consideration by governments.

Conservation of Arctic Flora and Fauna (CAFF)
caff.is

CAFF's mandate is to address the conservation of Arctic biodiversity, and to communicate its findings to the governments and residents of the Arctic, helping to promote practices which ensure the sustainability of the Arctic's living resources. It does so through various monitoring, assessment and expert group activities. CAFF serves as a vehicle to cooperate on species and habitat management and utilization, to share information on management techniques and regulatory regimes, and to facilitate more knowledgeable decision-making.

Emergency Prevention, Preparedness and Response (EPPR)
eppr.org

EPPR is mandated to contribute to the prevention, preparedness and response to environmental and other emergencies, accidents and search and rescue. While not an operational response organization, EPPR conducts projects to address gaps, prepare strategies, share information, collect data, and collaborate with relevant partners on capabilities and research needs that exist in the Arctic.

Protection of the Arctic Marine Environment (PAME)
pame.is

PAME is the focal point of the Arctic Council's activities related to the protection and sustainable use of the Arctic marine environment. PAME addresses marine policy measures in response to environmental change from both land and sea-based activities. It develops and coordinates strategic plans, programs, assessments and guidelines, complementing existing legal arrangements aimed at protection of the Arctic marine environment.

Sustainable Development Working Group (SDWG)
sdwg.org

SDWG focuses on the human dimensions of the Arctic. It works to safeguard and strengthen the environment, economy, social well-being, and health of Indigenous communities and Arctic residents. The guiding tenet of SDWG's work is to pursue initiatives that provide practical knowledge and contribute to building the capacity of Indigenous Peoples and Arctic communities to respond to the challenges and benefits from the opportunities in the Arctic region.

Photo: Istock

Observers in the Arctic Council

Observers are non-Arctic States, intergovernmental and interparliamentary organizations and non-governmental organizations with demonstrated expertise in Arctic Council issues. Their contributions are essential to the Arctic Council's success, supporting projects at the Working Group and Expert Group levels levels and advancing its unique mandate regionally and on the global stage.

The Arctic Council Chair, Norway's Foreign Minister Espen Barth Eide, addressed the Observers in Tromsø in January 2025.
Photo: Minetta Westerlund / Arctic Council Secretariat

13 Non-Arctic States *

- France
- Germany
- The Italian Republic
- Japan
- The Netherlands
- The People's Republic of China
- Poland
- The Republic of India
- The Republic of Korea
- The Republic of Singapore
- Spain
- Switzerland
- The United Kingdom

13 Intergovernmental and Inter-Parliamentary Organizations

- International Council for the Exploration of the Sea (ICES)
- International Federation of Red Cross & Red Crescent Societies (IFRC)
- International Maritime Organization (IMO)
- International Union for the Conservation of Nature (IUCN)
- Nordic Council of Ministers (NCM)
- Nordic Environment Finance Corporation (NEFCO)
- North Atlantic Marine Mammal Commission (NAMMCO)
- OSPAR Commission
- Standing Committee of the Parliamentarians of the Arctic Region (SCPAR)
- United Nations Development Programme (UNDP)
- United Nations Environment Programme (UNEP)
- World Meteorological Organization (WMO)
- West Nordic Council (WNC)

12 Non-governmental Organizations

- Advisory Committee on Protection of the Sea (ACOPS)
- Arctic Institute of North America (AINA)
- Association of World Reindeer Herders (AWRH)
- Circumpolar Conservation Union (CCU)
- International Arctic Science Committee (IASC)
- International Arctic Social Sciences Association (IASSA)
- International Union for Circumpolar Health (IUCH)
- International Work Group for Indigenous Affairs (IWGIA)
- Northern Forum (NF)
- Oceana
- University of the Arctic (UArctic)
- World Wide Fund for Nature, Arctic Programme (WWF)

* The European Union observes Council proceedings and contributes to projects until a final decision regarding its Observer status has been made.

ARCTIC COUNCIL INSIGHTS

The Norwegian Chairship hosted its third meeting between the Chair of the Senior Arctic Officials and Observers in January 2025.
Photo: Minetta Westerlund / Arctic Council Secretariat

Observer Engagement During the Norwegian Chairship of the Arctic Council

Upon assuming the Arctic Council Chairship, Norway prioritized engaging the Council's Observers. They hosted three hybrid meetings to share updates and learn about Observer-led initiatives and supported two Warsaw Format Meetings. Observers also played a crucial role in the success of the Norwegian Wildland Fires Initiative and the high-level event on the cryosphere at COP29 in Baku, Azerbaijan.

ARCTIC COUNCIL INSIGHTS

Warsaw Format Meeting 2023.
Photo: Barbara Milkowska MSZ

Bringing Observer States to the Table
The Warsaw Format Meeting

HOW POLAND CREATED A PLATFORM FOR ACTIVE OBSERVER ENGAGEMENT

Kristina Bär / Arctic Council Secretariat

In 2010 Poland hosted the first Warsaw Format meeting, a platform outside the Arctic Council's formal structures that would allow Observer States to engage directly with the Council's Chairship. Since then, the Observer State has hosted eight meetings in its capital and the semi-political format has developed into a valued foreign policy instrument.

Warsaw Format Meeting 2024.
Photo: Konrad Laskowski MSZ

There are two main avenues for Observers to engage in the Arctic Council: true to their status, they are welcomed to observe official meetings, sitting in the rows behind Arctic State and Permanent Participant representatives, having diplomatic chats with the Arctic Council family members during and after deliberations; and through active expert and scientific engagement in the projects and initiatives of the Council's subsidiary bodies, such as the Working and Expert Groups.

One of the non-Arctic States that has had a seat on the Observer bench and been involved in various Arctic Council activities since the Council's early days is Poland. In fact, Poland is one of three non-Arctic States, alongside Germany and the United Kingdom, that were already involved in the Arctic Environmental Protection Strategy (1991-1997) that preceded the establishment of the Arctic Council.

With a long polar history and an active research community, Poland, like many other Observer States and organizations, brings valuable expertise and input to the Council's work, significantly contributing to various projects and initiatives. Yet, Jakub Wolski, the Titular Ambassador of the Polish Ministry of Foreign Affairs and former representative for Poland in the Arctic Council, envisioned a new avenue for Observer States. He proposed a platform outside the Arctic Council's formal structures, enabling Observer States to directly engage with the Council's Chairship.

The idea of the Warsaw Format was born in 2010, when Poland hosted the first meeting between the Council's Observer States, the European Union and the Arctic Council Chairship – the Kingdom of Denmark at the time. Initially, the meetings centered around science and ongoing polar research but the focus has since shifted, as Piotr Rakowski, Senior Advisor for Arctic Policy at the Polish Ministry of Foreign Affairs (2017-2024) shared:

"The growing number of actors that show interest in the Arctic together with recent developments around the region have demonstrated that there is a need for platforms that would share knowledge, increase trust and create mutual understanding between all the stakeholders."

Piotr Rychlik / Ambassador for Arctic and Antarctic Affairs, Poland

"When I took over this portfolio in 2017, I noticed a tendency and perhaps a desire to move away from this science focus. We therefore decided to shift the Warsaw Format towards a foreign policy instrument."

Then, first the pandemic and subsequently the pause of official Arctic Council meetings caused a hiatus in the Warsaw Format Meeting. With the suspension of meetings between Senior Arctic Officials and the limitation of Working Group activities, many Observers felt left in a state of uncertainty. Thus, Poland was eager to reinvigorate the Warsaw Format as Council activities began to resume under the Norwegian Chairship.

"Our need for a space for exchange increased," said Piotr Rakowski, "leading to a more dialogue-oriented format for our most recent Warsaw Format Meeting in June 2024."

The agenda included thematic discussions on wildland fires, the changing cryosphere, gender equality, and cooperation opportunities among Observers – all topics that underscore the importance of collaboration and engagement with both state and non-state Observers.

Handing over the reins of Poland's representation in the Arctic Council to his colleague, Piotr Rychlik, Ambassador for Arctic and Antarctic Affairs, Rakowski reflected on the success of the Warsaw Format Meeting.

"I see significant value in the Warsaw Format Meeting's ability to facilitate more flexible, brainstorming-oriented discussions on current and emerging issues. It allows participants to explore and address topics that might not fit into the more formal agenda of Arctic Council meetings," he noted.

Polish diplomats declare that with the willingness of subsequent Chairships and valued organizational support from the Arctic Council Secretariat, Poland will continue to regularly offer Warsaw Format Meetings as an opportunity to discuss multidimensional contributions from the Observers to the Arctic Council activities.

"The growing number of actors that show interest in the Arctic together with recent developments around the region have demonstrated that there is a need for platforms that would share knowledge, increase trust and create mutual understanding between all the stakeholders," said Piotr Rychlik.

As the transfer of Chairship approaches Poland will work with the Kingdom of Denmark, and it's expected that the next Warsaw Format Meetings will take place in early fall of 2025.

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