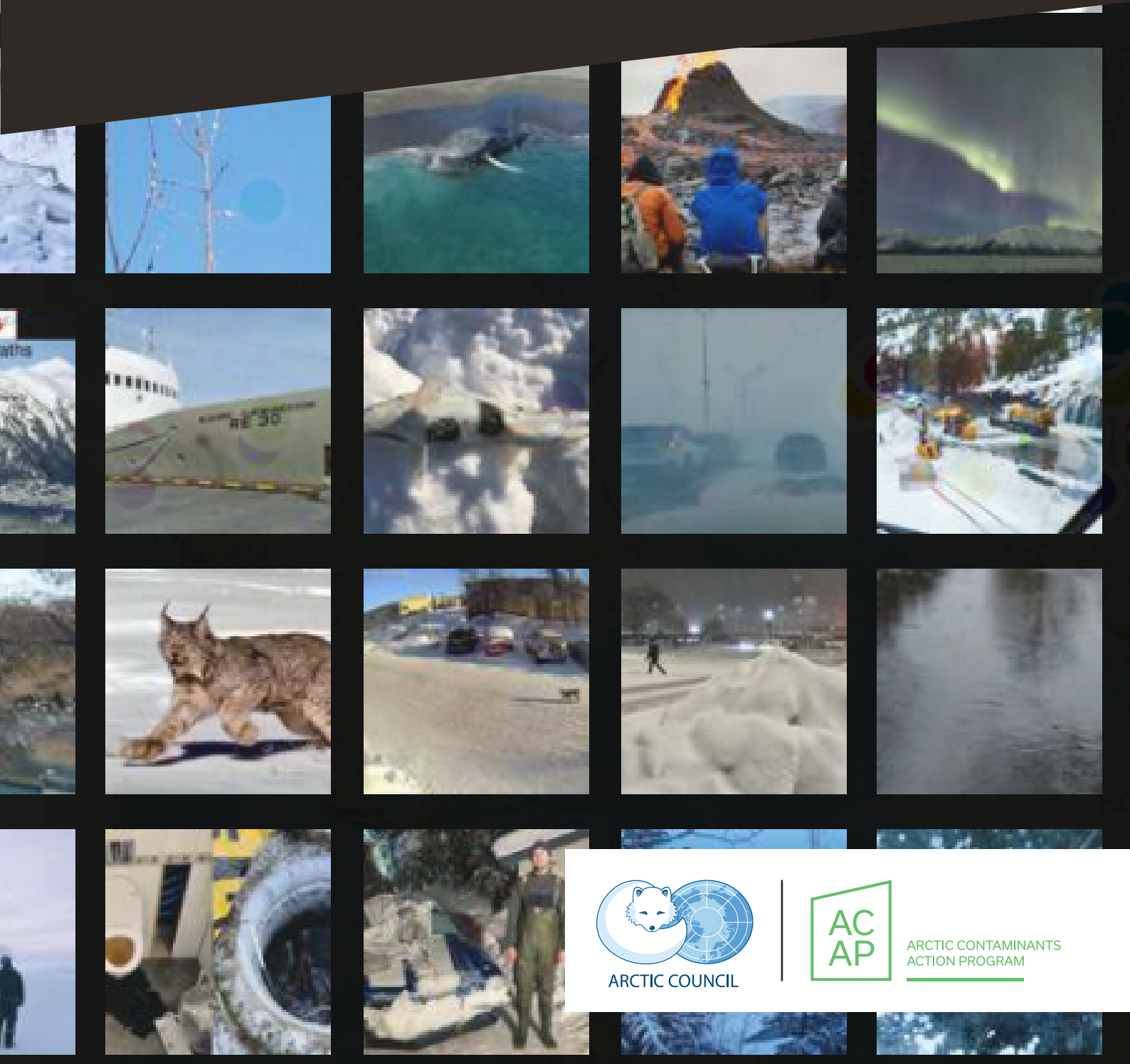
CIRCUMPOLAR LOCAL ENVIRONMENTAL OBSERVER NETWORK

REPORT

2021



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Circumpolar Local Environmental Observer Network: Summary for Policymakers

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CONTENTS

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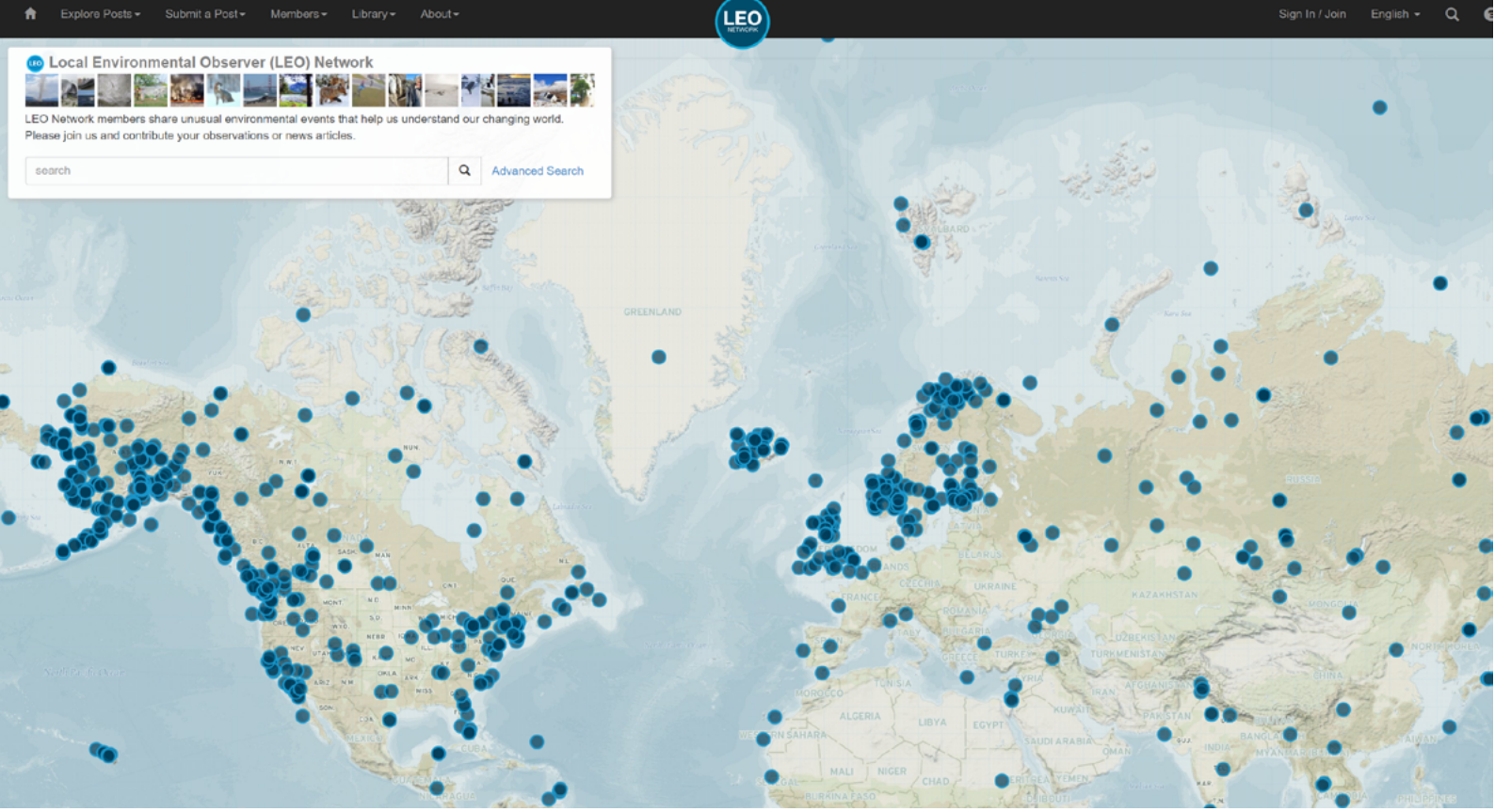

THE LEO NETWORK | LEONETWORK.ORG

The Arctic is warming faster than any other region on Earth, and the Arctic's temperatures have risen more than twice the global average[1]. Climate changes are having acute impacts on our landscapes, permafrost and ecosystems that communities rely upon.

Increasing temperatures accelerating sea ice loss, ocean acidification, thawing of permafrost and increasing presence of alien invasive species are among the greatest threats. Understanding these changes at a local scale is critical for individuals and communities to respond and adapt. Adaptation to a changing climate must also be understood in the context of compounded global and regional socio-economic drivers in Arctic countries[2] .

Observation networks fill a critical gap in understanding and adapting to climate change in dynamic and effective ways. In 2009, the Alaska Native Tribal Health Consortium (ANTHC) established the Center for Climate and Health to help describe connections between climate change, environmental impacts, and health effects. Recognizing the value of traditional and local knowledge and the need for a tool to document and share environmental observations, the Alaska Native Tribal Health Consortium (ANTHC) developed the Local Environmental Observer (LEO) Network with funds from the US Environmental Protection Agency (US EPA). The LEO Network was launched as a tool to help the tribal health system and local observers to share information about climate and other drivers of environmental change.

LEO Network (leonetwork.org) is a web-based platform with an original concept, where first person observations and news articles about unusual environmental events are published to raise awareness about the impacts of climate change.

The focus is on specific, geo-located events which are considered symptoms at the local level and signals of potential trends regionally. To encourage inclusion of traditional knowledge and local knowledge, the LEO Network is open for anyone. This way LEO has grown to over 3000 members and is helping to increase understanding of the emerging effects

1 AMAP 2017, Snow, Water, Ice and Permafrost in the Arctic. Summary for policy makers, Arctic Monitoring and Assessment Programme (AMAP), Oslo; AMAP 2019, AMAP Climate Change Update 2019: An Update to Key Findings of Snow, Water, Ice and Permafrost in the Arctic (SWIPA) 2017, Arctic Monitoring and Assessment Programme (AMAP), Oslo

2 AMAP 2017, Adaptation Actions for a Changing Arctic (AACA) - Barents Area Overview report, Arctic Monitoring and Assessment Programme (AMAP), Oslo;AMAP 2017, Adaptation Actions for a Changing Arctic (AACA) - Bering/Chukchi/Beaufort Region Overview report, Arctic Monitoring and Assessment Programme (AMAP), Oslo

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of climate change. As a result, remote communities have increased awareness of vulnerabilities to the impacts of unusual changes in the environment. This local surveillance in remote communities has served as an early warning system that has informed policy and bridged communications across levels of government and among institutions. In practical terms, LEO members have recognized observed changes based on local knowledge and traditional knowledge and have been able to connect with other knowledge experts. Thus, good potential exists to interconnect communities and share experience and observations, for instance between schools and administrations.

CIRCUMPOLAR LEO EXPANSION

During the U.S. Chairmanship of the Arctic Council (2015-2017), the Arctic Contaminants Action Program (ACAP) and its Expert Group, the Indigenous Peoples' Contaminants Action Program (IPCAP), worked to expand the LEO Network and create the new initiative Circumpolar Local Environmental Observer (CLEO) Network to be used by and benefit communities across the Arctic. Working with US EPA, Indigenous partners, academia, and community members in Canada, a project through the Commission for Environmental Cooperation (CEC) allowed the First Nations Health Authority in British Columbia to set up their own LEO Network program. Similar LEO Network activities were established by the Government of Northwest Territories. The development of regional partnerships in Canada allowed greater interaction among local and regional experts and for more tailored feedback and content.

An important foundational CLEO workshop took place at the University of Victoria, BC, Canada in November 2016, which led to the development of a dedicated LEO

Network program at the First Nations Health Authority.

Following the success in Alaska, LEO partners broadened outreach to Europe in 2016, taking an important next step in establishing a Circumpolar LEO Initiative or CLEO. The first CLEO workshop held outside North America took place in June 2016 in Anár/Inari, Finland, with a second workshop in January 2017 in Giron/Kiruna, Sweden. It was during these engagements that the CLEO Initiative was introduced in Sápmi (Fig. 1) and this initiative has since been focused on increasing activity in the Network in Sápmi.

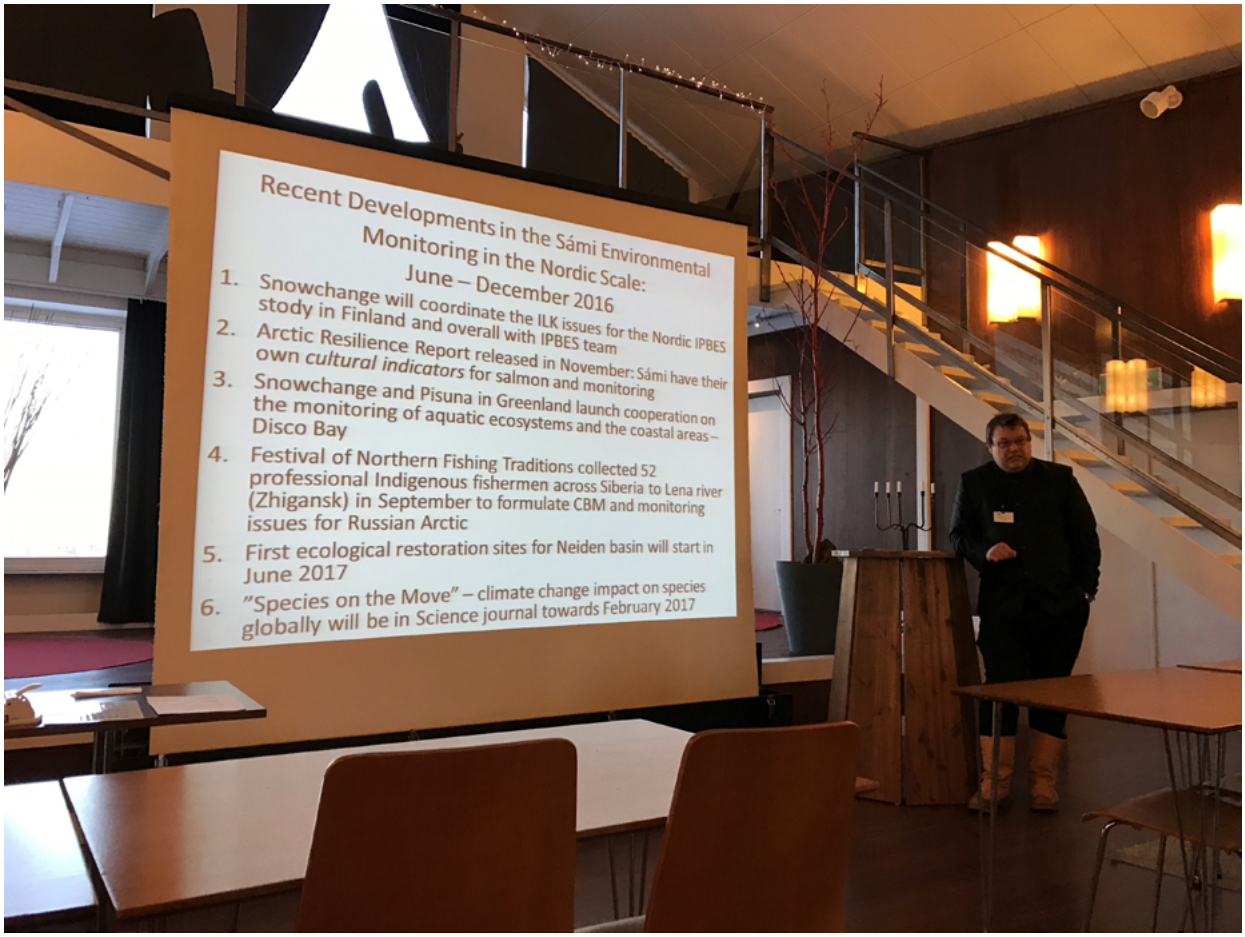
These workshops brought together technical experts and community leaders from the region and resulted in the agreement to develop the *Framework for the Circumpolar Expansion of the LEO Network*, a ministerial deliverable to the Arctic Council in 2017, that committed ACAP and LEO partners to continue to expand and develop the network.

Since the Circumpolar LEO initiative was launched, it has helped spur steady growth in LEO membership, a significant increase in contributions from observers in the Arctic, and major improvements to the online platform that have strengthened its usability and increased access to Arctic communities.

Since 2019, over 900 posts from the North were shared through the LEO Network, with new observations being posted daily. The overarching themes that have emerged have included observed changes in seasonal timing, extreme temperatures, and unusual range sightings of plants and wildlife in Arctic and sub-Arctic regions.

Tero Mustonen (Snowchange Cooperative) speaking at the CLEO Workshop in Giron/Kiruna, Sweden (2017).

PHOTO BY PATRICK HUBER



NORDIC/SÁMI EXPERIENCE

While there are many specialized platforms that work very well for collection of environmental measurements and different media, few are focused specifically on collection of first-person observational data. This is the focus for LEO Network with the mission to highlight the importance of observation data, raise awareness about local environment change, amplify local voices, and to seek constructive and respectful ways for sharing information and collaboration between different knowledge systems. It is these qualities that make LEO a unique space for sharing information and one of the key drivers for the CLEO initiative.

ENGAGEMENT WITH ARCTIC ACADEMIC AND INDIGENOUS INSTITUTIONS AND LOCAL COMMUNITIES

Following the plan set out in the Framework for the Circumpolar Expansion of the LEO Network, the initiative partners from Finland, Norway and Sweden reached out to their Arctic academic and Indigenous institutions, other observation networks, and Sámi communities across Sápmi. For instance, a feasibility study was carried out in Norway in 2017 with the purpose to map interest for joining Circumpolar LEO Initiative and look for possible partners from Sápmi to cooperate with[3].

Cooperation with Arctic academic and Indigenous institutions has provided an opportunity to increase Circumpolar LEO activity, to engage students, and explore research opportunities. Educational institutions of different levels (schools, vocational schools, colleges, universities) were engaged and trained. In accordance with the *Framework for the Circumpolar Expansion of the LEO Network,* this engagement will be developed in future activities to mobilize communities in the Arctic. These activities are also in line with the *Ottawa Traditional Knowledge Principles*, especially the Fundamental Principle 13, encouraging "bridging of knowledge systems, including leveraging existing Indigenous knowledge networks, institutions and organizations, as well as developing education strategies to broaden mutual understanding"[4].

Circumpolar LEO Initiative partners have been working to build on the success of LEO Network in

3 Johnsen, V 2018, Forprosjekt om Circumpolar Local Environmental Observer Network (CLEO) i Norge, FMFI Report nr: 2018:1, Fylkesmannen i Finnmark, Vadsø

4 IPS 2015, Ottawa Traditional Knowledge Principles, Arctic Council Indigenous People's Secretariat (IPS), Tromsø

North America and develop a regional Arctic network that connects Arctic communities and observers. During 2016-2019, the following workshops on CLEO were conducted:

- June 2016, CLEO Workshop in Anár/ Inari, Finland;
- January 2017, CLEO Workshop held back-to-back with the ACAP WG meeting in Giron/ Kiruna, Sweden;
- August 2017, CLEO Workshop held in connection with the 6th World Reindeer Herders Association Congress in Jåhkåmåkke/ Jokkmokk, Sweden;
- May 2018, an outreach activity on CLEO in connection with the 49th meeting of the Barents Euro Arctic Working Group on Environment, BEAC WGE in Bihtám/ Piteå, Sweden;
- June 2018, CLEO Workshop in Roavvenjárga/ Rovaniemi, Finland;
- September 2019, CLEO Workshop in Romsa/ Tromsø, Norway.

Left: Feeding reindeer in Anár/Inari, Finland.

FRANCESCO UNGARO ON UNSPLASH

Below: Not just livestock. Jåhkåmåkke /Jokkmokk, Sweden.

NIKOLA JOHNNY MIRKOVIC ON UNSPLASH

During these workshops, opportunities for collaboration and sharing have become clear. Among these are: joint monitoring of climate change by reindeer herders and researchers (Laevas Reindeer Herding Community and Tarfala Research Station); joint management of protected areas by local Sámi communities and state authorities (World Heritage Laponia); environmental observations and waste monitoring in a Kiruna school project; community-based water quality observations (Finland); Snowchange Cooperative established in late 2000 to document and work with local and Indigenous communities of the Northern regions. Some impressive follow up activities have occurred as a result.

Environmental observations systems existing in the Nordic countries were presented at the workshops, potential synergies with the LEO Network were examined, and national projects for CLEO development in Sápmi were initiated. For example, possible linkages between LEO and Järviwiki system (Finland) were explored. Järviwiki was built and maintained in cooperation by authorities and common people, and was created with the aim of sharing information on Finland's lakes. In general, all nationally initiated CLEO associated projects from Finland, Norway and Sweden revealed that different nature observations systems in these countries could benefit from interlinkages with the LEO Network because of the opportunities it provides to use and document Indigenous knowledge.

What is Sápmi?

Sápmi is the region traditionally inhabited by the Sámi people. It extends over the Northern parts of Norway, Sweden, Finland and Northwest Russia.

Fig. 1: Location of Sápmi in Europe

Credit: GRID-Arendal

Above: Youth of the Sámi High School and Reindeer Husbandry School in Guovdageaidnu/ Kautokeino, ACAP members and other participants at the CLEO Workshop in Romsa/Tromsø, Norway (2019).

KRISTINA BAER.

Right: Alaska, USA.

TAYLOR MURPHY / UNSPLASH

On the occasion of the 6th World Reindeer Herders' Congress in Jåhkåmåhkke/Jokkmokk, Sweden (August 16-20, 2017), organized by the Association of World Reindeer Herders in cooperation with the International Centre for Reindeer Husbandry, CLEO Initiative partners from Alaska, Finland and Sweden presented their work at a CLEO workshop and the Congress "welcome[d] local observer networks such as LEO as valuable tools for reindeer herders in sharing observations, raising awareness, and identifying answers about significant environmental challenges and possible actions" in its declaration[5].

YOUTH ENGAGEMENT

Many of the projects within the CLEO Initiative in Finland, Sweden and Norway have been focused on youth and educational institutions of different levels, as they formed a good platform to learn about and learn from the LEO Network.

For example, one of the main goals of the Finnish AHA (Arctic Environmental Observers) project was raising environmental awareness among Sámi youth through a special course "Environmental Competence" at the Sámi Education Institute. One of the most concrete results of the AHA project is a film *Changing Environment: Stories Above the Arctic Circle* demonstrating water and snow measurements made by the teachers and students of the Institute.

In Sweden, a series of school projects formed the CLEO School Process 2016-2021. The example of Övre Soppero school with its focus on the river, salmon and waste was used as a local case study for the further development of the CLEO Initiative in Sweden. Some of the most significant results came out of a Sámi-Inuit Youth Exchange project. This cross-cultural, community and school-based research project named BOAZU-CLEO included cooperation with the Sámi school in Jokkmokk, Sweden, and a team from Inuit community Baker Lake, Nunavut, Canada. In addition, a *Rajd Talks* concept and collaboration with the "Map of Us" app were developed.

A Reindeer Herders Arctic Council CLEO Hub was established in Guovdageaidnu/ Kautokeino in September 2019 with an aim to increase Indigenous youth's knowledge about sudden environmental changes in the Arctic, financed by Norway. The leading partners are the International Centre for Reindeer Husbandry and Sámi High School and Reindeer Husbandry School in Guovdageaidnu/ Kautokeino in close collaboration with Fram Centre, Tromsø; University of the Arctic Institute for Circumpolar Reindeer Husbandry (UArctic EALÁT Institute); and Norwegian Institute for Water Research (NIVA).

By use of the LEO Network and participation in the CLEO Initiative, the project partners aimed to build capacity and awareness of Sámi youth of environmental and biodiversity changes in the Arctic. Community-based workshops on environmental changes and the LEO Network with Indigenous herders and youth were organized at the hub. They followed up on the initial surveillance, with monitoring in the field, by starting a simple monitoring procedure for snow.

In autumn 2020, under the Icelandic Chairmanship and with support from the Swedish Environmental Protection Agency, the Saami Council joined CLEO Initiative in Sápmi. The Saami Council has been encouraged by the strong work that has been completed by the International Centre for Reindeer Husbandry, and the various CLEO Initiative efforts in the Norwegian, Swedish, Finnish and Russian regions of Sápmi.

5 WRH 2017, Jåhkåmåhkke Declaration On the Occasion of the 6th World Reindeer Herders' Congress, Jåhkåmåhkke/Johkamohkki, Sweden, August 16-20, 2017, Association of World Reindeer herders (WRH), Johkamohkki

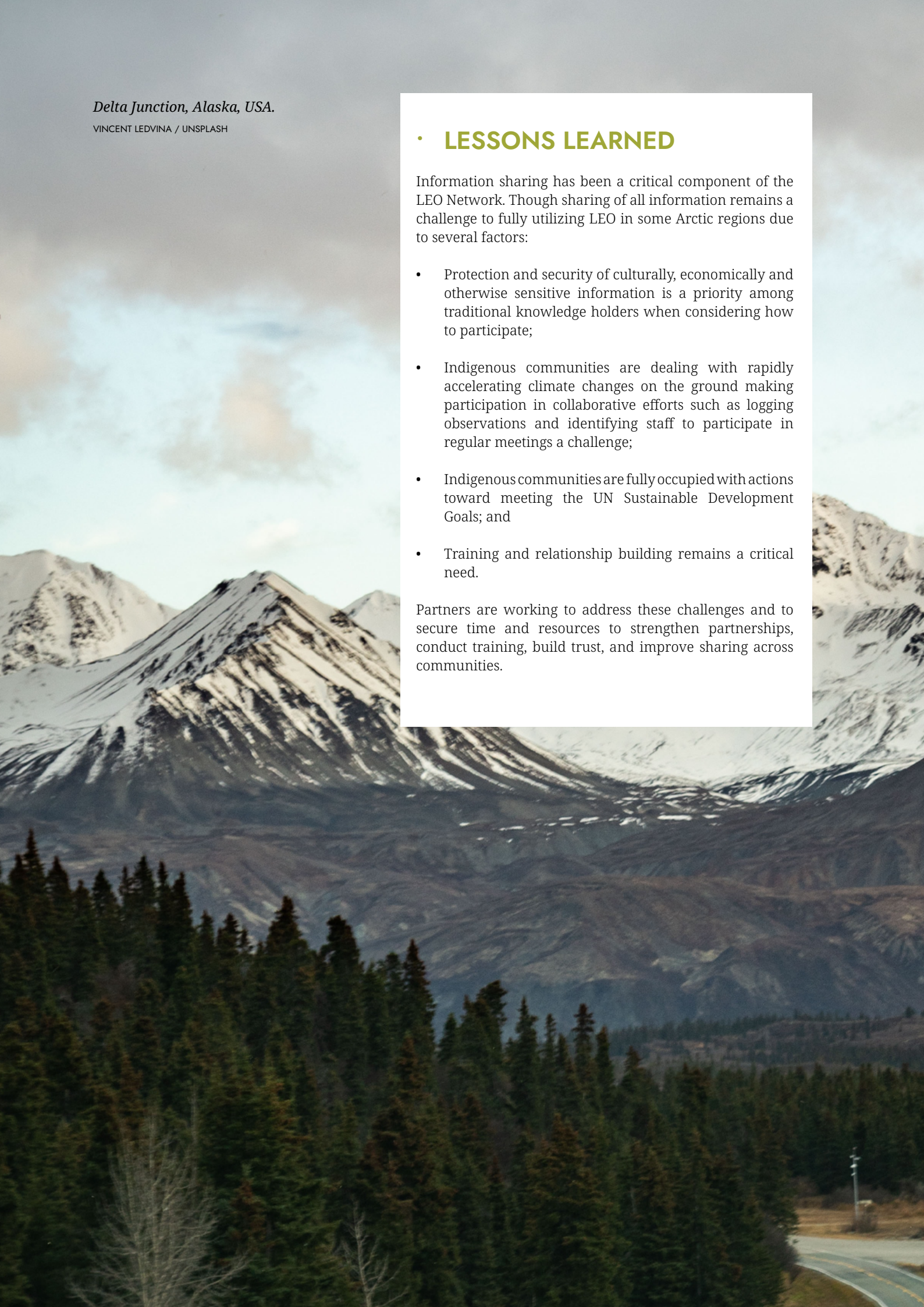
CONTINUED NORTH AMERICAN DEVELOPMENTS

The Alaska Native Tribal Health Consortium has continued to improve on the features in the LEO Network platform that have enabled better circumpolar participation and that have helped spur the CLEO initiative. LEO Network remains a viable and active Alaska-based program of the Center for Climate and Health, a collaboration between the Alaska Native Tribal Health Consortium and Alaska Pacific University. The LEO Network is supported by the US Environmental Protection Agency and other important agency partners. Monthly LEO Alaska Webinars continue as an important forum that brings hundreds of LEO members in Alaska together to share observations, and learn new observational skills. These webinars are recorded and available on the LEO Network website. Additionally, the on-going quarterly One Health Group Meetings, a joint initiative between ANTHC and the US Center for Disease Control (CDC) Arctic Investigations Program, provide a regular opportunity for reviewing important One Health related events using LEO Network. This forum provides a way to monitor emerging threats and transboundary trends related to One Health. Hot topics include vector borne diseases, harmful algal blooms, wildlife die off events, and food security. The quarterly webinars are archived and available on the One Health Group page of the Leo Network website. Important deliverables have included:

- **The Northern Climate Observer (NCO) e-journal:** ANTHC developed the Northern Climate Observer (NCO) e-journal to supplement information gathered in the LEO Network.
- **In-Person Delegation to the US:** A distinguished delegation of guests from Sweden, Finland, and Norway travelled to Alaska to participate in the Alaska Forum on the Environment, 2018.
- **Kiosk Project:** ANTHC and the Qawalangin Tribe of Unalaska initiated the LEO Kiosk Project. The concept was to develop physical Kiosks in different locations where local community members could gather to view LEO maps and data relevant to their culture, climate, and community issues. Museum interviews were conducted in Sweden and Norway to discuss digital strategy.
- **Alaska LEO Almanac and Calendar:** In 2020 ANTHC completed an Alaska LEO almanac and calendar.

LEO Network system upgrades, most of which have been undertaken in the last two years, include:

- Arctic languages additions (Skolt Sámi, Unangam Tunuu, Yup'ik, Icelandic, Russian)
- New Smart Phone-Friendly Web Platform
- New Post Reader-Friendly Format
- Geographic Regions Additions (Permanent Participants)
- New category super groups (Natural, Event Type, Community Impact)
- Base maps with Indigenous lands
- Base maps with Indigenous place names (Alaska) and Arctic language translations for content.



Delta Junction, Alaska, USA.

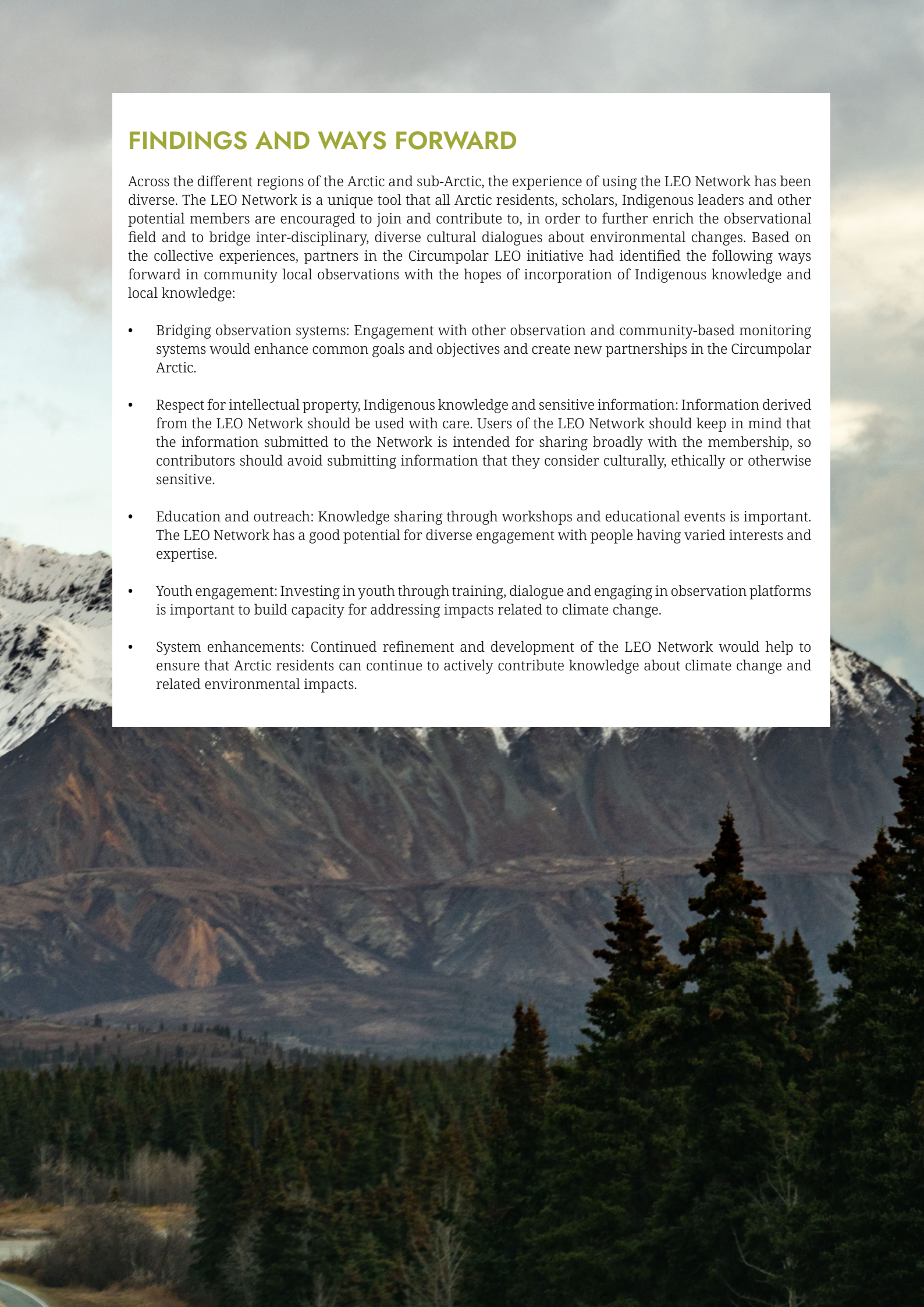
VINCENT LEDVINA / UNSPLASH

LESSONS LEARNED

Information sharing has been a critical component of the LEO Network. Though sharing of all information remains a challenge to fully utilizing LEO in some Arctic regions due to several factors:

- Protection and security of culturally, economically and otherwise sensitive information is a priority among traditional knowledge holders when considering how to participate;
- Indigenous communities are dealing with rapidly accelerating climate changes on the ground making participation in collaborative efforts such as logging observations and identifying staff to participate in regular meetings a challenge;
- Indigenous communities are fully occupied with actions toward meeting the UN Sustainable Development Goals; and
- Training and relationship building remains a critical need.

Partners are working to address these challenges and to secure time and resources to strengthen partnerships, conduct training, build trust, and improve sharing across communities.



FINDINGS AND WAYS FORWARD

Across the different regions of the Arctic and sub-Arctic, the experience of using the LEO Network has been diverse. The LEO Network is a unique tool that all Arctic residents, scholars, Indigenous leaders and other potential members are encouraged to join and contribute to, in order to further enrich the observational field and to bridge inter-disciplinary, diverse cultural dialogues about environmental changes. Based on the collective experiences, partners in the Circumpolar LEO initiative had identified the following ways forward in community local observations with the hopes of incorporation of Indigenous knowledge and local knowledge:

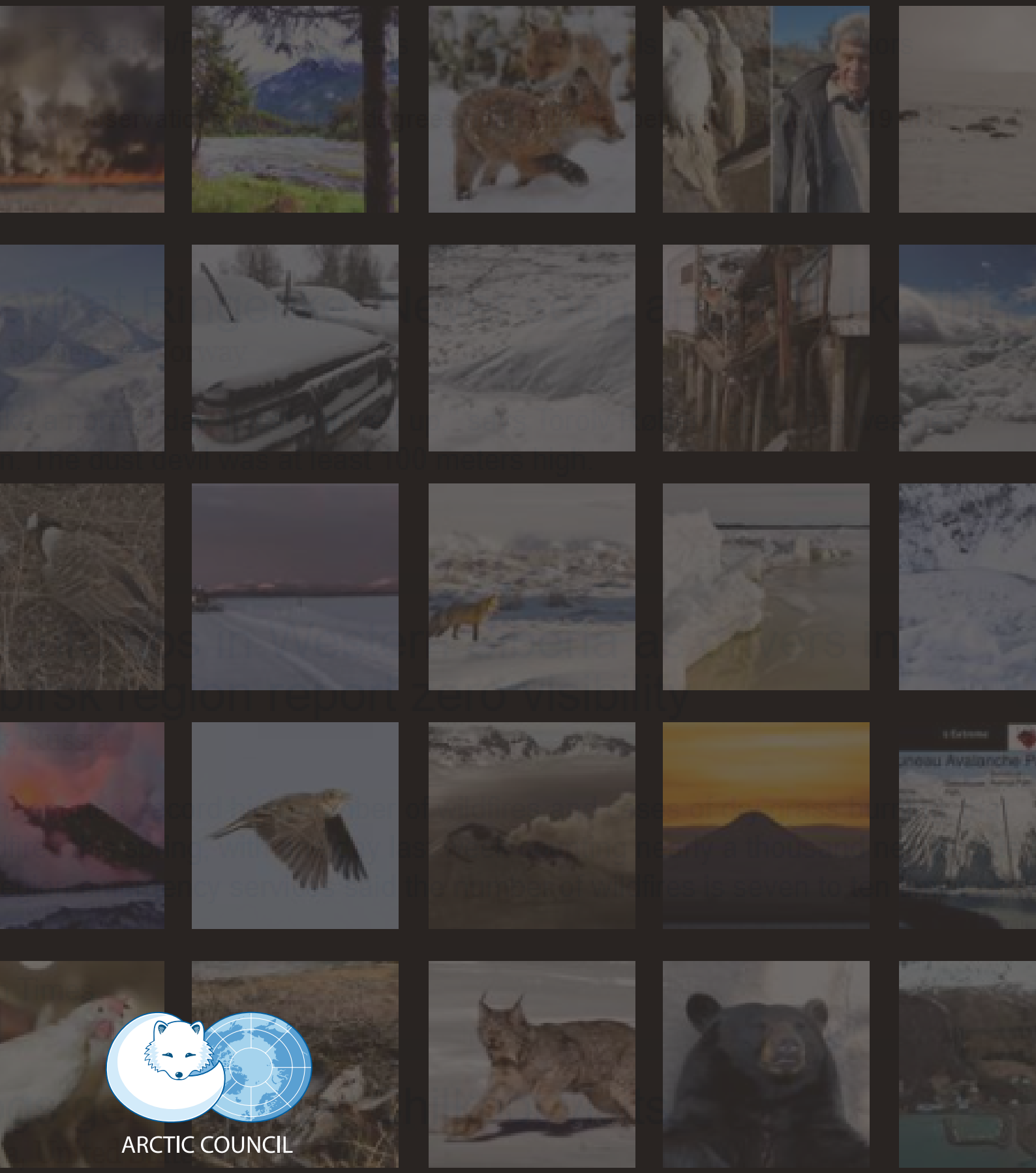
- Bridging observation systems: Engagement with other observation and community-based monitoring systems would enhance common goals and objectives and create new partnerships in the Circumpolar Arctic.

- Respect for intellectual property, Indigenous knowledge and sensitive information: Information derived from the LEO Network should be used with care. Users of the LEO Network should keep in mind that the information submitted to the Network is intended for sharing broadly with the membership, so contributors should avoid submitting information that they consider culturally, ethically or otherwise sensitive.

- Education and outreach: Knowledge sharing through workshops and educational events is important. The LEO Network has a good potential for diverse engagement with people having varied interests and expertise.

- Youth engagement: Investing in youth through training, dialogue and engaging in observation platforms is important to build capacity for addressing impacts related to climate change.

- System enhancements: Continued refinement and development of the LEO Network would help to ensure that Arctic residents can continue to actively contribute knowledge about climate change and related environmental impacts.



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