*Snowchange Discussion Paper #18:*

# Report from the 2018 Arctic Biodiversity Congress, Rovaniemi

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The second Arctic Biodiversity Congress was held in the "Arctic" city of Finland 9th to 12th October 2018. Built on the success of the first event held in Trondheim in 2014, the Rovaniemi Congress brought once again together nearly 500 leaders, experts and practitioners from all over the Arctic region to discuss critically and advance major conservation issues facing the Arctic and the world. It featured keynotes from prominent experts in Arctic science and global environmental policy and cooperation but also people from diverse backgrounds such as government representatives, Indigenous Peoples, NGOs, youth and industry.


*"There is no time to waste!"*
(Finnish President Sauli Niinistö)

As part of Finland's Chairmanship of the Arctic Council from 2017 to 2019, the congress was jointly organized by the Conservation of Arctic Flora and Fauna (CAFF) working group of the Arctic Council and the Ministry of the Environment of Finland. To underline the importance of the event, the biodiversity congress was opened by Mr. Sauli Niinistö, President of the Republic of Finland. Along the conference itself, the Finnish Chairmanship organized for the first time in five years an Arctic Environment Ministers' meeting. Focusing on climate change, biodiversity and pollution prevention, the high-level meeting gathered delegates from the eight Arctic States and six Permanent Participant organizations

representing the indigenous peoples of the Arctic.

The Congress was articulated around six main themes, identified in the Arctic Biodiversity Assessment (ABA) recommendations for policy:

1. climate change
2. ecosystem-based management
3. mainstreaming biodiversity
4. addressing individual stressors on biodiversity
5. identifying and safeguarding important areas for biodiversity
6. improving knowledge and public awareness.

Being particularly involved in the promotion of traditional knowledge for solving environmental crisis, the Snowchange Cooperative was being represented in the Community-based monitoring of Arctic biodiversity session, with a talk on Community-led Monitoring and Ecological Restoration in the North (see details below, http://enb.iisd.org/biodiv/arctic/congress/2018/11oct.html).

Spanning the entire globe, the Arctic region is home for a highly specialized and diverse cold-adapted biodiversity upon which local hunter-gatherer-fisher communities are closely dependent for their livelihood and cultural identity. On repeated occasions, the importance of the resource-based traditional knowledge of those communities has been put forward as central to the ecologically sound management of the Nordic resources.

In her opening talk, Tiina Sanila-Aikio, President of the Sámi Parliament of Finland, emphasized the role of Indigenous People as "vital stewards of global biodiversity conservation", calling for an increasing inclusion of traditional knowledge holders in environmental decision-making.

Worldwide however, the rights of those Indigenous and local communities are not always respected despite the existing United Nations Declaration on the Rights of Indigenous People adopted in 2007, a situation, as described by Dalee Sambo Dorough (the Chair of the Inuit Circumpolar Council), that undermines the UN Sustainable Development Goals.

> *Each contracting Party shall…respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices…*
>
> Article 8(j), Convention on Biological Diversity

Particularly concerned about how already visible the negative impacts of climate change are in the North, the young generations from various Arctic territories were especially well represented during the meeting and associated discussions in parallel to an Arctic Youth Summit. Their vibrant request for a living future took the form of a collective "Arctic Youth Summit Rovaniemi Declaration"

(https://caff.is/images/_Organized/Strategies/Youth/Summit2018/115111.pdf) delivered to the ministerial panel participants. In the statement, the young voices reminded us that limiting climate change should be a worldwide priority by urging leaders to incorporate the youth's views in decision-making and step up their actions to tackle climate change.

On another level, knowledge holders that are scientists, and Indigenous Peoples and local communities were asked if, with their expertise from the field, they could possibly contribute to the development of a new TV series on the cryosphere regions produced by the British Broadcasting Corporation (BBC) Natural History Unit. Any new input welcome (contact info: Sarah.Conner@bbc.co.uk, Usha.Amin@bbc.co.uk)!

During the congress, the group of almost 500 participants divided itself among numerous parallel sessions covering a wide array of critical topics when it comes to the Arctic terrestrial and marine environments such as:

- the impact of reduced ice cover;
- the role played by large herbivores as agents of ecosystem-based management;
- trends in circumpolar Arctic freshwaters;
- biodiversity, cultural heritage and land-use planning;
- approaches to assessing and measuring change in biodiversity;
- reducing the effects of commercial fishing on biodiversity;
- understanding large-scale patterns and processes of Arctic herbivory;
- Arctic biodiversity education and outreach;
- promoting ecosystem services of Arctic wetlands for sustainable development;
- hot spots, connectivity and sensitive areas for biodiversity conservation benefit;
- the Arctic Migratory Bird Initiative;
- building long-term ecosystem monitoring programs to feed Arctic and international biodiversity assessments;
- Arctic ocean acidification;
- making Arctic data accessible and reusable;
- the Circumpolar Biodiversity Monitoring (START report):
- biodiversity in the high seas of the Central Arctic Ocean;
- technologies and techniques to advance biodiversity monitoring;
- oil spill prevention;
- the Arctic Invasive Alien Species Action Plan;

- Arctic marine protected areas;
- pan-Arctic assessments of plant diversity;
- community-based monitoring of Arctic biodiversity;
- monitoring changes in the biodiversity of Arctic coastal ecosystems;
- effects of persistent organic pollutants and mercury on Arctic wildlife;
- transboundary management of Arctic biodiversity;
- ideas from Alaskan Native women about enhanced science communication and outreach;
- species-specific conservation actions;


Already, the different presentations can be found online at the Congress website in PDF format (https://www.arcticbiodiversity.is/index.php/program/presentations2018). In addition to numerous plenary talks and a rich poster session, almost 200 presentations were given during the four days. The scope of research interests being discussed was particularly broad and complementary, from organism level to species interactions, communities and ecosystem functioning, with a strong emphasis on nature conservation in interdependent connection with the traditional livelihood and identity of the Arctic people. Here are a few examples of topics of particular interest developed during the meeting.

**The impact of reduced ice cover**

Along with the earlier ice retreat and the prolonged open water season that result from anthropogenic global climate change, an increasing number of arctic species face problems in their daily habits. As a result, rapid changes in species interactions, behaviours, distributions, and even genetics are taking place, with cascading effects for the whole ecosystem and human use.

Facing an uncertain future, the polar bear is certainly the most charismatic Arctic species of all, split into 19 relatively discrete subpopulations. In Russia, the particularly extensive work made by Andrei Boltunov (Marine Mammal Research and Expedition Center LTD) and his team from 216 days-long complex expeditions has revealed new insights into the Russian bear population functioning and genetic structure. Depending on the annual ice movements and the distribution of food resources, the propensity for bears to move over large distances varies from a region to another. Based on spatial changes in the level of haplotype and nucleotide diversity, it is suggested that the proportion of resident bears is higher in the Kara

Sea (lower diversity) while the Chukchi Sea, being a reach feeding area, seasonally attracts considerable numbers of bears from adjacent regions (higher diversity). The vast marine area between these two distinct habitats would act as an intermediate zone. The findings imply future changes in the genetic structure of the Russian polar bear population as the retreating sea ice cover is expected to alter their historical dispersal routes. The important role of habitat connectivity for the genetic population structure of species was also found from a study by Deborah Jenkins et al. (Trent University) on caribou living in the Canadian Arctic Archipelago, where Island caribou were less genetically diverse than mainland herds.

In the Canadian Arctic Archipelago, Allison Patterson (McGill University) and co-workers have studied how the earlier ice melt causes an increase in the egg predation of common eiders (*Somateria mollissima borealis*) by polar bears. In response, female eiders have started to adjust their nesting distribution, from larger localized to smaller, more dispersed colonies, as a concealment strategy to reduce the predation risk. Predictive models suggest that polar bear predation of common eider nests will increase as sea-ice continues to decline. Even if this higher nest predation should not affect the eider population sizes over the next 25 years because of a climate-driven increase in the duck breeding propensity, there may be negative consequences for the northern people. By changing their spatial distribution, female eiders shall make it harder to harvest eggs and down from their colonies.

In eastern Greenland, Fernando Ugarte (Greenland Institute of Natural Resources) and colleagues have interviewed subsistence polar bear hunters from around Tasiilaq and Ittoqqortoormiit and used their Traditional Ecological Knowledge (TEK) in an effort to involve Arctic peoples and their knowledge in the survey, monitoring and analysis of Arctic biodiversity. In particular, they were interested to hear their opinion about existing polar bear subsistence quotas (established in 2006) and hunting strategies, understand how climate

change is affecting the polar bear subsistence hunt, and document observed changes in polar bear distribution, abundance, and biology. Hunters noted large changes to the climate in the areas where they hunt polar bears (loss of sea ice, receding glaciers, unstable weather, and warmer temperatures). Implications for bear hunting are considerable, they said, as sea ice loss has created more areas of open water so dog sledges have become unsafe for hunting transportation compared to 10-15 years ago. In recent years, there has also been an increasing number of polar bears approaching or even entering their communities, pointing to the introduction of quotas and loss of sea ice as potential reasons.

Looking at the deep seafloor, Peter Harris (GRID-Arendal) reminded us that only around 2.5% of the Arctic Ocean (173000 $km^2$) is currently protected, leaving the vast majority of associated habitats open to industrial exploitation (un-tapped oil, gas and fisheries resources). For example, only 0.08% of submarine canyons and none of the poorly studied plateaus and abyssal plains are situated within existing Marine Protected Areas (MPA) while negligible protection is provided to slope habitats. This is especially worrying as their accessibility is continuously improving with the year by year area reduction in the summer minimum Arctic sea ice cover. Such globally unique pristine environments, true biodiversity hotspots for Arctic species, are invaluable as reference points for conservation monitoring and assessment. Their increasing vulnerability demands a consequent expansion of the existing Arctic marine protected area network.

Incidentally, a "Marine Fishes of the Arctic Region" book (in two volumes) was published in 2018 at the CAFF website where it can be downloaded for free. It presents fishes from both the Atlantic and Pacific Arctic over 749 pages and provides key knowledge on their distribution and species identity. "Marine Fishes of the Arctic Region" is the product of a three years collaborative project between USA, Norway, Russia and Denmark. By presenting the

fish fauna from both sides of the Arctic, "Marine Fishes of the Arctic Region" will help researchers to become aware of the fauna from the opposite side of the Arctic and, for example, better assess the on-going changes in species distribution caused by climate change.

**The role played by large herbivores as agents of ecosystem-based management**

Whether they are reindeer/caribou, bison, muskox, moose or, more recently, semi-domesticated and domesticated herds of livestock, large herbivores have always played a central role in shaping diversity, structure and function in ecosystems across the circumpolar Arctic. By managing their populations, it is possible to modify the woody plant diversity and ground cover to suit collective needs and mitigate the effects of climate change on the tundra vegetation, as shown by recent participatory research with modern Indigenous people.

Given the close connection they have with their land for their daily activities, Indigenous Peoples are in a privileged situation of making detailed observations of any new and visible changes in their environment. Across northern Fennoscandia, the progressive greening of the tundra with the advance of the mountain birch tree line is a recent phenomenon that Tim Horstkotte (Umeå University) and colleagues have been addressing based on the Sámi reindeer herders' own observations.

From the ecosystem based management point of view, the researchers were interested in the capacity of reindeer impacts on vegetation as a conservation tool to counteract a potential encroachment of the tundra by woody plants in response to climate change. Although Sámi herders did not confirm the scientific measurements of a substantial, rapid, or large-scale encroachment of open tundra landscapes, when it did occur, the herders pointed out a list of possible reasons such as abiotic drivers, former land use, and the direct and indirect effects of reindeer. Their observation that the advance of the tree line was in some cases associated with reduced or discontinued grazing and fire-wood cutting is relevant. It supports the view that reindeers and associated human activities could help limiting to some extent the predicted widespread expansion of shrubs and trees around the tundra biome.

Interested in how Rangifer (caribou/reindeer) management could mitigate the temperature-driven transition of arctic tundra into a shrubland state, Kari Anne Bråthen (The Arctic University of Norway) and colleague Virve Ravolainen found smaller and less abundant encroaching early shrubs with Rangifer densities above 5 animals/km2. Depending on the size of the reindeer herds, Howard Epstein (University of Virginia) confirmed that, on average, grazing is constraining the "greening" of the arctic tundra by approximately 5% (greater in areas with dense herds such as the Nenets-occupied regions in Russia).

Although traditionally vegetation consumption by ungulates and the consequent excretion of plant material have been considered as the main drivers of ungulate-induced ecosystem shifts in the circumpolar tundra, it is unclear how herbivores affect soils in the Arctic. In that respect, Maria Väisänen (University of Oulu) and colleague Henni Ylänne argued that trampling may be the most dominant ungulate mechanism of changes by exerting impacts on the environment either alone or in combination with consumption and excretion. Unlike the effects on soil, the effects of trampling on the vegetation are relatively well known: trampling directly damages the vegetation, decreases plant biomass, promotes soil compaction,

decreases soil faunal and fungal biomass and alters soil food web. As a result, trampling appears as a strong driver for longer-term vegetation community shift.

Over the last 30 years of climate change, the distribution and composition of bird and mammal populations have changed substantially in East Siberia. Changes in species distribution in turn make it increasingly difficult for indigenous local communities to maintain their traditional hunting livelihood such as with the wild tundra reindeer in the western part of the republic of Sakha (Yakutia).

The radio-tracking follow-up of 30 of those reindeers by Shirow Tatsuzawa (Hokkaido University/North-Eastern Federal University) and co-workers has revealed that their traditional migration routes had radically changed over that period. While in the 1980s reindeers spent their summer in the tundra and overwintered in the southern Taiga, they have nowadays decreased their utilization of the tundra and shifted their distribution to the south. Such unexpected changes in their migratory routes towards southern latitudes has created new challenges for the species conservation and the maintenance of traditional hunting livelihood. Along with an increasing mixing of existing populations and modifications in the wintering range, conflicts with local reindeer herding and disturbances from large-scale land development plans are also on the rise.

**Biodiversity, cultural heritage and land-use planning**

There are different ways traditional knowledge and/or cultural practices play an important role in achieving conservation objectives and implementing sustainable development goals in the Arctic, including in various protected areas networks.

In a general effort to better understand the main factors underlying biodiversity dynamics in the Arctic, it has become more and more apparent to researchers like Erica Oberndorfer (Labrador Institute of Memorial University) and co-workers that the cumulative historic and contemporary effects of Indigenous cultural practices should also be taken into account. In the Canadian Nunatsiavut for example, habitats with visible built environment legacies have unique plant communities with more native species that differ in species composition and abundance as compared to areas without visible structural histories.

Covering an area of 9.3 million hectares, Tsá Tué is the largest biosphere reserve in North America, situated in the central Northwest Territories of Canada. It is the only biosphere reserve anywhere whose establishment was led by the resident Indigenous people, in this case the Sahtuto'ine, based on the recognition of their enormous stewardship responsibilities. It is a fine example showcased by David Livingstone (Holarctic Environmental) where Indigenous traditional knowledge and cultural practices continue to play a critical role in achieving conservation objectives and implementing sustainable development goals in the Arctic.

Today, there is a Tsá Tué Biosphere Reserve Stewardship Council, the Biosphere reserve office and staff is in place, and research and monitoring programs to help safeguard the ecological and cultural integrity of Tsá Tué are in development. The community research and monitoring priorities concern the presence of contaminants in the environment, wildlife, water quality and quantity change, terrain and land cover change, fisheries and aquatic ecology, conservation and cultural areas, and socio-economics and governance.

In northern Finland, Pekka Sulkava (Parks & Wildlife Finland - Metsähallitus) explained the existence of a special Wilderness Act "Erämaalaki" (1991), aiming to protect natural landscape, preserve indigenous Sámi culture and promote traditional livelihoods. The local communities maintain many rights to pursue traditional nature-based occupations such as reindeer herding, including in protected areas.

The planning process for the management and land use of protected areas is participatory: the local stakeholders and the public have the opportunity to influence the plan through meetings, public hearings and map-based internet enquiries. In the Sámi homeland, a special Akwé: Kon planning process has been implemented since 2013, following the guidelines based on the Article 8(j) of the Convention on Biological Diversity. An independent working group has been appointed by the Sámi Parliament to support and evaluate the planning process, with guidelines to be updated in the near future.

According to Sirpa Rasmus (University of Lapland), the reindeer management area in Finland covers 36% of the country, with 65% of the area also devoted to forestry activities. Some 75% of reindeers (193000 wintering individuals) graze in the boreal forest zone. As a result, forestry can affect reindeer herding substantially, which is regulated by the Reindeer herding act (1990) that specifies that "land should not be used in a way detrimental to herding". For that reason, the Finnish forest agency Metsähallitus, the main landowner in the north, is obligated to negotiate with herding districts about the forest management within the reindeer management area.

**Arctic biodiversity education and outreach**

Communicating about the importance and value of Arctic biodiversity and the changes it is undergoing is central to a better understanding of climate change implications among people, a necessary condition for changing attitudes and finding solutions. It can be achieved using various and complementary communication tools such as presentations on interactive exhibitions, youth programs, narrative forms, fiction and poetry, musical performance, and artistic collections.

A beautiful and concrete example of it is the recent success of the "Climate Change in Lapland's Nature - What can we do?" multilingual and interactive travelling exhibition set up by Stéphanie Lefrère (The Finnish Environment Institute - SYKE). Developed in 2013 as a climate change educational tool, this exhibition has been shown in several countries already and is open for request from interested Museums, Municipalities or Institutions (contact: sclefrere(at)climatechangeinlapland.org).

It aims to raise public awareness about climate change and its effect on biodiversity and ecological balance in Lapland, while offering examples of what people can do to lower their impacts. In the exhibition, the latest scientific results related to the impact of climate change on animal and plant species characteristic of the Arctic are displayed in panels with the help of figures and graphs, along with photos, movies, music, slideshows and pedagogical quizzes. There is also a presentation of existing products that people could use to reduce their ecological footprint.

With their valuable ideas, enthusiasm, and first-hand lived experiences, the young generation of Canadian Northerners is increasingly acknowledged for its contribution in biodiversity and climate change initiatives. As a result, there is nowadays a growing number of opportunities for them to be involved with the projects and processes of various organizations and institutions. A summary of successful initiatives of northern youth engagement (from local to national scale) was given by Shailyn Drukis (Canadian Committee for IUCN).

Examples include the establishment of the "Ecology North" charitable, non-profit organization to support sound environmental decision-making on an individual, community and regional level or the active youth participation to the Canadian Commission for UNESCO and the Model Arctic Council (MAC) academic program. The work of graduate and undergraduate students from institutions across the Arctic and the world taking part in the MAC is of first importance as they convene to represent and simulate the work of Member States, Permanent Participants, and Observers of the Arctic Council.

Particularly active in the various representations of the Arctic and what it represents for science and the society, the Canadian Museum of Nature in Ottawa (Canada's national natural history museum) holds over 300,000 Arctic natural history collections. In the face of increasing commercial interests and activities in the North, the museum is actively working to increase knowledge of, and appreciation for, the Canadian Arctic in Canadians, through compelling storytelling about our Arctic research and collections, and by providing a venue in the museum, in the heart of Canada's capital, for northerners to tell their own stories.

At the museum, the botany team for example, represented by Paul Sokoloff (Canadian Museum of Nature) and colleagues, has been engaging with Canadians about Arctic plant and lichen biodiversity. Communicating about the Arctic is promoted through museum exhibits (e.g., the permanent Canada Goose Arctic Gallery, the Arctic Voices traveling exhibit), diverse online and media, and interactive events (Science by Night festival and Collections Open House). It is even possible for adults and youth to join ship-based Arctic expeditions and get firsthand experience with ecological research, thanks to an ongoing partnership with the Students on Ice Foundation. Not to mention the recent creative partnerships with local breweries and entertainment organizations, allowing Arctic biodiversity science communication to be sneaked in everyday life.

When it comes to communicating and educating on biodiversity, Marcel Robischon (Humboldt Universität zu Berlin) stressed the need to go beyond the pure science and speak to both the cognitive and emotional domains in order to reach a broader audience. Not everyone has a background in sciences and narrative forms such as fiction, when inspired by the natural world, can offer a valuable tool to both engage and inform, and to build a bridge into more science-based forms of learning.

Often, people will only protect what they love and including emotions or even beliefs in a message can also help supporting environmental education and attitudes through the acquisition of biological content knowledge. It is the approach privileged by the “Dialogus Arctica” project presented by Frode Aarvik (Steinkaret Scene) and colleagues. This interdisciplinary performance experiment brings together paintings, contemporary music, and multimedia that focus on a selection of iconic Arctic species. The aim of the project is to initiate an Arctic dialogue by introducing its audience to a conceptual experience and inspiring people's holistic perception, reflection, and understanding of the environmental values in play.

**Traditional Knowledge and science under a co-production of knowledge**

Both Traditional Knowledge and scientific knowledge have unique ways of conceptualizing and understanding the environment and Arctic biodiversity. While conventional science relies on a standardized scientific process and peer review, Indigenous knowledge relies on cultural practice, Indigenous knowledge, and intergenerational exchange. Connecting them together to converge information allows a co-production of knowledge that can help science securing biodiversity through adapted conservation planning with human dimensions. This information partnership requires however an understanding of the systems and processes that support Indigenous knowledge, as explained by Victoria Buschman (University of Washington).

The ways the co-production of knowledge is beneficial for conservation planning are by facilitating collaboration over large region, ensuring stakeholder-driven process from beginning, supplying time critical information, fostering co-management, providing biodiversity and cultural benefits, supporting place-based and landscape-scale efforts, and aiding in how we evaluate and apply knowledge systems. According to Carolina Behe (Inuit Circumpolar Council) and her colleagues, a co-production of knowledge framework would provide the holistic view and comprehension needed to inform effective and adaptive policies and practices upon the condition that the concept is correctly applied. Adopting collaborative approaches between different knowledge systems with different methodologies could help in the identification of relevant research questions.

Still, many scientists are skeptical to use that traditional knowledge, since it has been created with methods that differ from those taught in western science education. In Alaska, the TEKAD project run by Statoil and presented by Jürgen Weissenberger (Statoil ASA) tried to bridge this gap in an Environmental Impact Assessment study of underwater sound disturbance on marine mammals and subsistent hunting. In addition to scientific information, knowledge of marine mammal responses to noise was collected from interviews with Traditional Knowledge researchers and Alaskan Native Organizations including co-management groups, community leadership and elders.

Care was taken to follow the Alaska Federation of Natives Guidelines for Ethical Research, with video and voice interviews returned to the communities. Benefits of using traditional knowledge were the possibility to collect information from all seasons, its affordability (no dedicated field work required), the spatial and temporal scales under scrutiny that are better suited for long living animals such as whales, and the large number of species being covered.

Comparatively, a scientific approach was better at providing a quantitative description of stimuli and reaction under strictly controlled scenarios (important for the comparability of the data) and gathering information from areas outside normal human presence.

Problems using Traditional Knowledge in managing biodiversity may arise because, often, that kind of knowledge has not been gathered in a systematic manner that allows for its meaningful inclusion in decision-making. Furthermore, documentation is often lacking, making Traditional Knowledge inaccessible to most policy makers.

In Canada's Arctic, where most terrestrial and marine wildlife is managed by wildlife co-management boards, Gregor Gilbert (Makivik Corporation) shared successful stories where co-management boards have undertaken or supported Traditional Knowledge studies and the collection of scientific data, such as with polar bears and beluga whales. By utilizing Inuit knowledge, those projects were valuable not only for the information that they compiled and synthesized, but also for making Inuit Knowledge as accessible as scientific knowledge for co-management decision-making. For example, on-going cooperation between local hunters and the Canadian Department of Fisheries and Oceans Canada have allowed scientists to test theories on whale stock composition and the timing of migration.

Elsewhere in Canada, Alexandra Hood (De Beers Canada Inc.) reported that the Traditional Knowledge of local elders was put into practice during recent fish tasting events. Organized by the mining company he represented, the purpose of the annual fish tasting event is to allow elders to provide, in complement to existing quantitative measurements of the environment, their observations on fish health and edibility (i.e., aesthetics, flavour, and texture) in the watershed close to the mine compared to what they are accustomed to from

the regional area. This way, fish tasting provides an additional layer of valuable qualitative data collection to ensure the mine is not adversely impacting the environment.

**Community-based monitoring of Arctic biodiversity**

Given their in-depth knowledge of their environment, whether on land or at sea, Arctic residents have the ability to recognize subtle environmental changes. Combined with their ability to follow standard scientific monitoring procedures, this understanding highlights the value and important contributions that their inherent community-based monitoring capacity can make to Arctic biodiversity conservation, such as by supporting citizen science initiatives.

In the Labrador region of Canada for example, Paul MacDonald (Canadian Wildlife Service) illustrated the mutual benefit of collaborative partnerships between federal agencies and Indigenous communities to monitor wildlife populations in logistically challenging remote areas. By involving community members in federal wildlife conservation programmes and supporting community-led initiatives, this project supports the Arctic Biodiversity Assessment Policy Recommendation 14 “better integrating Traditional Ecological Knowledge in the assessment, planning and management of Arctic biodiversity”.

Using a salmon stock co-management initiative with the Skolt Sámi in Finland as an example, Snowchange representatives’ Simone Gress Hansen and Philippe Fayt illustrated the value of community-based resource management. It was argued that, along with the northwards species distribution changes that accompany climate change, there is a growing need for more dynamic conservation approaches and community-based conservation efforts of Nordic landscapes. The presentation emphasized the need to move from the current local in-situ (e.g., national parks) to a larger-scale ecologically meaningful approach of land governance, with traditional knowledge and know-how ideally complementing scientific expertise outside protection areas.

In northern Sweden like in the rest of the Circumpolar North, lichens are a key resource for wintering reindeers whose decline changes the prerequisites for a sustainable reindeer husbandry. It is therefore of prime importance to depict the actual distribution of lichens and secure the ecosystem services they provide. As explained by Henrik Hedenås (Swedish University of Agricultural Sciences), the recent use of community-based lichen monitoring by Sami people has allowed the production of a map depicting predicted cover of reindeer lichens more accurate than if solely based on Swedish National Forest Inventory data and corresponding with the core winter grazing areas traditionally used by the Sami community. Built on the example of lichen monitoring, this project illustrates the value of community-based monitoring to support multi-use landscape planning.

EU-funded, PISUNA is another example of project favouring lesson sharing from community-based monitoring practices. Presented by David Mitchell (International Union for Conservation of Nature - IUCN), it aims to strengthen the capacity of Greenland’s communities and the government to sustainably protect, manage, monitor and use natural resources. In this project, Village Committees establish Local Natural Resource Councils made of hunters, fishers & individuals with an environmental interest. Those data managers decide which species and resource uses should be monitored and compile data on species and

resource uses during field visits. The members of the Local Natural Resource Councils meet then every three months to summarize, discuss and analyse the data collected, with possible management interventions discussed and agreed before being submitted to the government. Altogether, this on-going project has enabled fishers and hunters to have a stronger 'voice' in topics of great importance to them. As a result, the PISUNA approach has become a tool for the communities to adapt their resource uses to the changes in the environment. Such a successful approach systematically documents local knowledge, makes available data gathered by communities, covering a wide geographic area, supports informed decision making, is relatively low-cost, and builds trust between communities and decision-makers by facilitating dialogue and inclusion of user knowledge.