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Arctic Resilience Action Framework (ARAF) Progress Report 2017 - 2019¹ -- final draft --

Executive Summary

The Arctic is warming shockingly fast, twice as fast as the rest of the planet, and this warming is bringing dramatic transformation around the circumpolar region. Arctic communities are adapting where possible, but the rate of change and the threat of unexpected surprises or unforeseen thresholds of change pose unprecedented challenges, even for the Indigenous people of the North who have weathered change for many millennia in the region. The same is true of the ecosystems upon which the Arctic communities depend for their livelihoods, and these linked systems, known as social-ecological systems, are extremely vulnerable during this time of transformation.

For this reason, Arctic experts have been working hard to understand how to improve resilience – the ability to bounce back and thrive during and after disturbances or shocks – across the circumpolar Arctic. The Arctic Council sponsored an assessment of Arctic resilience in 2011, and the resulting Arctic Resilience Report (ARR), delivered in 2016, noted numerous dangerous tipping points and thresholds. Other Arctic Council efforts, such as the Adaptation Actions for a Changing Arctic (AACA) project and the Arctic Biodiversity Assessment, have also provided insights about the nature of the changes taking place. It became clear from this work that building resilience and accelerating efforts to adapt to climate change should be top priorities for communities, organizations, and governments operating in the region.

To be effective across the Arctic, however, it would take more than “random acts of resilience”; success in the face of such uncertainty would require a coordinated, collaborative, multi-sectoral approach. In the Spring of 2016, the Senior Arctic Officials of the Arctic Council requested a framework to advance a coordinated, regional approach to building resilience and adapting to rapid change. The resulting document, the Arctic Resilience Action Framework (ARAF), was approved by the Ministers at the 2017 Ministerial in Fairbanks, Alaska and quickly became an example of coordinated resilience action on a regional scale. The ARAF Implementation project (2017-2019) was led by the Sustainable Development Working Group (SDWG), in collaboration with the five other Arctic Council Working Groups. The project included the collection of resilience examples from across the Arctic, the convening of the first Arctic Resilience Forum, and continued discussion about resilience across the Arctic Council.

This report describes implementation of the ARAF from 2017-2019 and presents a set of recommendations for adapting and improving both the framework and its implementation among Arctic partners. It also provides a summary of the resilience examples and a brief assessment of the first Arctic Resilience Forum, hosted by the Finnish Chairmanship in Rovaniemi in September 2018. The Forum

¹ This report was drafted by the ARAF Co-Leads (Sarah Abdelrahim, USA; Heidi Alatalo and Saara Lilja-Rothstein, Finland, and Jeanette Krantz and Marcus Carson, Sweden; with valuable input and feedback from the project Implementation Team (listed in Annex 1). We wish to convey a special thanks to reviewers who provided input during the holiday season!).

provided an unprecedented opportunity for enhancing Arctic partnerships, and to share lessons learned, understand important gaps in understanding and practice of resilience, and press the advantages of a more collaborative Arctic approach.

As described in this report, the ARAF has:

- Provided the missing structure that can be utilized by States, PPs, Working Groups, Observers, and non-Arctic Council stakeholders. The ARAF suggested common resilience-building priorities, and encouraged innovation and the scaling up of resilience approaches that have proven effective.
- Created a mechanism to more systematically share best practices, methods, and approaches for putting knowledge into practice (e.g., through the ARAF Implementation Team, Arctic Resilience Forum and collection of case examples).
- Emphasized the importance of Indigenous practices/approaches and provided a platform for Indigenous communities to learn from one another and scale up approaches quickly to meet the pace of change that is occurring.
- As the first politically sanctioned, regional resilience framework in the Arctic, the ARAF offers a model for regional coordination on resilience.
- Ensured that the urgent issue of regional resilience is officially on the Arctic Council agenda during a time of regional transformation.
- Contributed to the goals of the Arctic Council, even with limited resources, by helping to strengthen cooperation between diverse actors. ARAF implementation provided an important additional platform for cooperation for Arctic actors, including Working Groups, indigenous peoples, Arctic countries and observers. The ARAF also provided a vehicle to enhance collaboration focused on social-ecological systems across Working Groups.
- Provided a concrete approach for putting knowledge into practice, including strengthening risk management and preparedness in the Arctic. Knowledge is reflected in the ARAF priorities and guiding principles.

Conclusions

While it is easy to get entangled in the theoretical and definitional aspects of resilience, the ARAF implementation project managed to set aside those abstract issues to focus on resilience needs on the ground by operationalizing the insights that came out of the Arctic Resilience Report and other resilience-related work within the Arctic Council.

The ARAF Implementation project brought more Arctic resilience stakeholders together, while demonstrating the cross-cutting nature of resilience-related work. The collection of resilience examples was an opportunity to share resilience best practices and expertise across many levels of governance. The Arctic Resilience Forum provided an important opportunity to convene, inspire, and inform resilience stakeholders. The ARAF project provides an opportunity for the Arctic Council to play a leading role in building resilience in the Arctic region and beyond.

After almost two years of ARAF implementation it has become clear that there is both an appetite and a need to more collaboratively address urgent resilience needs in the Arctic by building a community of practice, sharing best practices more widely in the region, and leveraging knowledge and investments. By gaining a reputation for collaborative, well-researched, and widely shared approaches, stakeholders

in the region will be far better positioned to attract investments that build resilience and also advance the sustainability goals of the Arctic Council.

While this first phase of implementation successfully laid the groundwork for this outcome, the coming years, generally the period of the Icelandic and Russian Chairmanships, are pivotal for gaining ground and establishing a world-class community of practice that will ensure that communities, economies, governments, and cultures are better prepared to address the rapid transformations taking place in the Arctic.

1. Introduction and Background

1.1 Importance of Resilience

The Arctic has been warming at double the global rate.² In addition to dramatically warming temperatures, the Arctic is experiencing other substantial social, environmental, and economic changes. These developments have increasingly been cited by researchers, policymakers, and other Arctic stakeholders to emphasize that the Arctic is a bellwether of the impacts of climate change across the rest of the world. The Arctic is home to over 4 million people³, many of them Indigenous peoples who have lived in the Arctic for centuries and have a long history of navigating environmental changes. However, the current rate of change and the potential for surprises and shocks creates unprecedented challenges for Arctic residents. As a result, it is more important than ever to build resilience to a range of potential changes – both foreseen and unforeseen.

Resilience is often defined in its most basic form as the ability to bounce back and thrive during and after disturbances and shocks. A central aspect of the concept in the context of this report is how resilience expresses the human capacity to effectively navigate change. The resilience approach emphasizes the inter-connected nature of social and ecological systems, which is particularly important in the Arctic region given that the sustainability of these systems is mutually dependent.

Measures to build resilience are often carried out at the local level but frequently require policies and support at the regional, national, and international levels. The Arctic Council has a particularly important role to play in building our collective understanding of Arctic change and resilience, promoting dialogue and information-exchange around resilience, and raising ambition for urgent risk management and resilience-building around the Arctic region, especially in connection with climate-related risks.

1.2 Development of the ARAF

The Arctic Council, especially in recent years, has sought to improve the ways it puts knowledge into practice. The ARAF was developed with input from the Arctic Council States, Permanent Participants, and all six of the Arctic Council Working Groups (WGs). In March 2016, the U.S. hosted the Arctic Council Resilience Workshop in Fairbanks, Alaska. The workshop brought together resilience experts and policy makers representing Arctic Council States, Permanent Participants, WGs, and Observers. Participants agreed that a cross-cutting framework that identified a set of shared resilience priorities was an important next step for the Arctic Council. Following the Arctic Council Resilience Workshop, the Arctic Council Senior Arctic Officials formally requested that a team of experts develop and propose a regional resilience framework to address the urgent need to collaboratively build arctic resilience.

The request for such a framework was timely on the global stage as well, because the UN member states had recently signed several global agreements that prominently featured resilience actions. The Sendai

² Overland, J.E., Hanna, E., Hanssen-Bauer, I., Kim, S. -J., Walsh, J.E., Wang, M., Bhatt, U.S., and R.L. Thoman (2018). Surface Air Temperatures [in Arctic Report Card 2018]. U.S. National Oceanic and Atmospheric Administration (NOAA). <https://www.arctic.noaa.gov/Report-Card/Report-Card-2018>.

³ Larsen, J. N., and G. Fondahl (2014). Major Findings and Emerging Trends in Arctic Human Development. In J.N. Larsen and G. Fondahl (Eds.), *Arctic Human Development Report II*. Nordic Council of Ministers, Copenhagen.

Framework for Disaster Risk Reduction, 2030 Agenda for Sustainable Development, and Paris Climate Agreement were all adopted by the United Nations in 2015. Developing an Arctic resilience framework was an opportunity for the Arctic Council to show regional leadership on the global stage by demonstrating how to translate the scientific insights of the Arctic Resilience Report (ARR), and other Arctic Council assessments, into tangible and meaningful actions that would in turn inform engagement with these other international agreements.

The Arctic Resilience Action Framework (ARAF) was subsequently developed by a drafting committee that was chaired by the United States, with participation from many State, Permanent Participant, WG, and Observer representatives. A review committee, co-chaired by Finland and the Saami Council, organized additional feedback to the process.

1.3 ARAF at a Glance

The ARAF is an organizing framework to improve coordination and shared learning around the resilience approach and demonstrate the suitability of Arctic resilience efforts for additional public and private investment. It provides guidance and support for the Arctic Council and Arctic Council stakeholders as they work to advance resilient practices and investments. It is also intended to serve as a foundation for additional dialogue on resilience issues. By providing a platform for sharing successes and failures, identifying important gaps in action and knowledge, and improving collaboration, the ARAF will help Arctic Council stakeholders attract funding and support for their efforts.

The ARAF is organized around four overarching priorities. They include:

- 1. Analyzing and Understanding Risk and Resilience in the Arctic**
- 2. Building Resilience and Adaptation Capacity**
- 3. Implementing Resilience with Policy, Planning and Cooperation**
- 4. Encouraging Investment to Reduce Risk and Build Resilience**

History of Resilience in the Arctic Council

In 2004, the release of the Arctic Climate Impact Assessment (ACIA)¹ was a monumental step in understanding the rapid changes occurring in the Arctic, and received global attention. Since then, the Arctic Council has continued to study the physical, ecological, and social changes that are impacting the people and the natural systems of the Arctic. Permanent Participants have played a crucial role in these initiatives, ensuring that Indigenous perspectives, knowledge and insights are brought to the table.

During the Swedish Chairmanship of the Arctic Council (2011-2013), the Arctic Council, deeply concerned about climate impacts and other transformations happening in the region, initiated the Arctic Resilience Report (ARR) project. The final report, co-chaired by the United States and Sweden and released in November 2016, presented a comprehensive, scientific assessment of resilience in the Arctic.¹ It identified several likely or potential “regime shifts”, or large, abrupt changes in social-ecological systems, and evaluated characteristics of resilient Arctic communities. The Adaptation Actions for a Changing Arctic (AACA) project projected potential adaptation responses in three regions and complemented the work of the ARR project. The regional reports were finalized in 2017.

Supporting Arctic resilience and climate adaptation was a priority of the U.S. Chairmanship (2015-2017), and several Arctic Council projects, addressing a range of related issues such as health, indigenous knowledge, and invasive species, began to converge around the urgency of building resilience across all sectors in the region. Arctic Council partners increasingly recognized that there were opportunities to put resilience insights into practice, enhance opportunities for dialogue and

Each of these four priorities includes four to six “Action Areas” – more specific areas of action where emphasis is needed. Arctic States, Permanent Participants, Observers, and all six Arctic Council WGs are addressing many of these Action Areas independently, and the ARAF provides a platform and framework to improve collaboration and demonstrate the rigor and level of urgency required to attract additional investments in the region. The ARAF also provides nine principles to guide action, including, for example, valuing and drawing on Indigenous/Traditional Knowledge and local knowledge, empowering local communities, addressing multiple risks together and looking for co-benefits, and building upon existing global, regional and national strategies for sustainable development, climate change adaptation and mitigation, and disaster risk reduction.⁴ The ARAF reflects the interdisciplinary nature of resilience-building, which is why a multi-stakeholder approach to implementation is especially crucial.

Figure 1: The ARAF at a Glance (from the Arctic Resilience Action Framework, May 2017)

Outcome			
A measurable increase in the capacity of Arctic States and Arctic communities to understand and respond to risks and changes in ways that support social-ecological development and healthy, functioning ecosystems and ecosystem services.			
Goal			
To mobilize and use the broad competence and expertise of all Arctic Council Member States, Permanent Participants, Working Group secretariats and Observers, along with other Arctic stakeholders, to provide the information, tools, analysis, and capacity necessary to address immediate and future resilience and adaptation needs in the circumpolar Arctic.			
Priority Areas and Action Areas			
Priority Area 1: Analyzing and Understanding Risk and Resilience in the Arctic	Priority Area 2: Building Resilience and Adaptation Capacity	Priority Area 3: Implementing Measures that Build Resilience with Policy, Planning and Cooperation	Priority Area 4: Encouraging Investment to Reduce Risk and Build Resilience
<p>Increase the effectiveness of existing monitoring systems and include social-ecological indicators and their interactions</p> <p>Substantially enhance our understanding of ecologically vulnerable areas and areas in which Arctic-adapted biodiversity can persist under a changing climate</p> <p>Improve short and long-term projections for the Arctic under different future greenhouse gas emission and development scenarios, using natural and social sciences and indigenous/Traditional Knowledge and local knowledge</p> <p>Expand the documentation of adaptation responses to changing threats in the Arctic</p>	<p>Increase the co-production of knowledge using science, Indigenous/Traditional Knowledge and local knowledge</p> <p>Expand the ability of community-based observation networks to collect critical data for monitoring change and integrate with Earth observations</p> <p>Improve tools for assessing management strategies in changing Arctic ecosystems</p> <p>Ensure data and tools are equitably distributed and easily accessible for local communities, decision makers, and policy makers at all levels</p> <p>Substantially increase the number of communities, youth and emerging leaders that understand Arctic change using a variety of knowledge approaches</p> <p>Increase administrative and planning support to communities, governments and decision-makers at all levels, including support for applying resilience knowledge to decision-making</p>	<p>Increase the inclusion of local perspectives in local and sub-regional decision-making</p> <p>Enhance the development and deployment of resilient infrastructure, telecommunications, and technologies to deal with emerging challenges that are unique to the Arctic (e.g., waste, water security, energy, food security, health, etc.)</p> <p>Expand the use of ecosystem-based management in the Arctic</p> <p>Substantially expand the use of transdisciplinary approaches for understanding change and implementing strategies to enhance resilience</p> <p>Encourage consistent practices and for ensuring public participation and the integration of Indigenous/Traditional Knowledge and local knowledge in environmental impact assessments and other decision-making processes</p>	<p>Improve our understanding of best practices for resilient or “climate proof” investments in the Arctic</p> <p>Substantially increase private sector investments that support resilient communities</p> <p>Expand the use of innovative financial mechanisms for improving resilience</p> <p>Encourage the identification of specific funding gaps and resilience priorities, as a way to provide guidance to potential donors and catalyze new investments</p>
Guiding Principles			
<ul style="list-style-type: none"> • Build on the strengths of the Arctic Council as a regional mechanism for cooperation • Value and draw on Indigenous/Traditional Knowledge and local knowledge • Build upon existing global, regional and national strategies for sustainable development, climate change adaptation and mitigation, and disaster risk reduction • Support multi-stakeholder engagement 		<ul style="list-style-type: none"> • Empower local communities • Address multiple risks together and look for co-benefits • Consider risk and resilience across temporal and spatial scale • Encourage innovative investments that prevent and proactively mitigate risk • Monitor progress and adjust strategies as needed 	

The ARAF also suggested a few next steps for implementing the framework, including cataloguing actions that are being taken across the Arctic to address resilience, cataloguing indicators and other tools for measuring resilience, and organizing an Arctic Resilience Forum to expand and support the arctic resilience community of practice.

1.4 Adoption of the ARAF by the Arctic Council

The final ARAF was adopted by the Arctic Council Ministers at the 10th Arctic Council Ministerial meeting on May 11, 2017 in Fairbanks, Alaska. In the Fairbanks Declaration, the eight Arctic Council Ministers and

⁴ Arctic Council (2017). Arctic Resilience Action Framework. <https://oaarchive.arctic-council.org/handle/11374/2019>

representatives of the six Permanent Participants agreed to “adopt the Arctic Resilience Action Framework to track suggested circumpolar resilience priorities and to coordinate such efforts, and welcome actions as appropriate to address those priorities”.⁵

Further guidance was noted in the SAO Report to Ministers. It entrusts the leadership of the Sustainable Development Working Group (SDWG) with ARAF implementation, with input from the five other Arctic Council WGs. It also provides support for the implementation activities of the ARAF through the Arctic Council Secretariat. The SAO Report to Ministers also acknowledged that the ARAF largely builds on the important lessons of the ARR initiative. Finally, the SAO Report to Ministers sets an expectation that this work will be reviewed by the SAOs after two years.⁶ This report reviews ARAF implementation activities in 2017-2019, and the benefits, challenges, and insights associated with them.

2. ARAF Implementation 2017-2019

2.1 Overview of the 2017-2019 effort

Using the ARAF document (2017) as a starting point, the ARAF Implementation project (2017-2019) sought to advance Arctic Council engagement in strengthening the links between insight and action in its resilience work. Finland, Sweden, and the United States offered to co-lead the ARAF Implementation project in 2017-2019. The co-leads proposed a project plan to the SDWG, which was formally discussed and accepted in September 2017.

Building resilience in the face of unprecedented and rapid change is crucial to the well-being of Arctic residents and essential to attracting additional public and private investments in the region. A primary goal of the ARAF Implementation project has therefore been to facilitate sharing of current practices and activities that build resilience in the Arctic, and to do so in part by recognizing and bringing attention to the inspiring work currently underway.

Implementation of the ARAF aimed to collect, share and inspire action by the Arctic States, Permanent Participants, WGs, and Observers around the four ARAF priorities, share best practices for building resilience in the region, and identify ways to measure progress towards greater resilience in the region, including identifying gaps and challenges.

Implementation of the Arctic Resilience Action Framework involved *three major activities*:

- 1. Identify actions that are being taken by the Arctic Council States, Permanent Participants, and Working Groups, in 2017-2019, that build resilience.**
- 2. Develop a catalog of protocols and indicators that can measure progress towards building resilience.**
- 3. Plan an Arctic Resilience Forum to share and discuss “best” practices⁷ and challenges around building resilience. Finland offered to host the first Arctic Resilience Forum on September 10-11, 2018 in Rovaniemi, Finland.**

⁵ Arctic Council (2017). Fairbanks Declaration. <https://oaarchive.arctic-council.org/handle/11374/1910>

⁶ Senior Arctic Officials’ Report to Ministers, 2017, <https://oaarchive.arctic-council.org/handle/11374/1909>

⁷ In this report, “best” practices means “good” or “effective” practices. The terms are used interchangeably.

Each Arctic Council State and Permanent Participant was invited to nominate a representative to an ARAF Implementation Team. The ARAF Implementation Team helped guide the overall ARAF Implementation Project and share input and resilience examples from their respective States and organizations. All eight Arctic Council States, five Permanent Participants, and one Observer organization nominated representatives to the Implementation Team (See Annex 1).

The ARAF Implementation Team convened regularly with support from the Arctic Council Secretariat. With its broad representation and high level of engagement, the ARAF Implementation Team itself formed a new and important resilience “community of practice” that served to advance the resilience conversation within the Arctic Council and ensure group learning around its complex and urgent goals.

Table 1: 2017-2019 ARAF Implementation Project: Summary Timeline

Date	Activity
May 2017	<ul style="list-style-type: none"> • ARAF is formally adopted by the Arctic Council Ministers in the Fairbanks Declaration • SAOs direct ARAF implementation to take place in SDWG, in coordination with other Arctic Council WGs
June 2017	<ul style="list-style-type: none"> • Co-leads (Finland, Sweden, USA) identified • Co-leads draft formal project plan for consideration by the SDWG
September 2017	<ul style="list-style-type: none"> • SDWG Meeting in Inari, Finland - Project plan discussed and accepted; States and PPs agree to nominate representatives to an ARAF Implementation Team
October 2017	<ul style="list-style-type: none"> • SAO Meeting in Inari, Finland – Finland formally offers to host the first Arctic Resilience Forum in September 2018 and presents initial ideas
January 2018	<ul style="list-style-type: none"> • First ARAF Implementation Team teleconference held; Implementation Team continues to meet virtually every 1-2 months • Finland develops online discussion platform to facilitate preparations for the Arctic Resilience Forum; all Implementation Team members invited to join
February 2018	<ul style="list-style-type: none"> • Finland develops pre-study of resilience practices in Finland, as input for Arctic Resilience Forum planning
March 2018	<ul style="list-style-type: none"> • SDWG Meeting in Levi, Finland • Meeting (immediately following the SDWG meeting) with all Arctic Council WGs; input gathered for Arctic Resilience Forum planning • SAO Meeting in Levi, Finland – key outcomes from meeting with the WGs are presented • List of WG activities that build resilience developed (by co-leads); distributed to WGs for additional review • Suggested guidance for submitting case examples distributed to ARAF Implementation Team
May 2018	<ul style="list-style-type: none"> • Initial deadline for case examples
June 2018	<ul style="list-style-type: none"> • Invitations to Arctic Resilience Forum sent to SAOs and HoDs
September 2018	<ul style="list-style-type: none"> • First Arctic Resilience Forum held in Rovaniemi, Finland • Draft Arctic Resilience Forum report developed
October 2018	<ul style="list-style-type: none"> • SDWG Meeting in Rovaniemi, Finland • SAO Meeting in Rovaniemi, Finland – Key insights from Arctic Resilience Forum are presented

November – December 2018	<ul style="list-style-type: none"> • Final deadline for case examples • Drafting of final report and case example compilation (co-leads, with input from the ARAF Implementation Team)
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Each of the main project elements is taken up in greater detail in the sections below.

3. Putting Resilience into Practice: Illustrative Case Examples and Analysis

3.1 Introduction

A core goal of the ARAF Implementation project is to facilitate the sharing of good examples and best practices that build resilience in the Arctic. One of the important facts about converting into concrete action the insights developed through resilience thinking is that there are many good examples of such work. The activities reflected in these examples aim to build and strengthen communities' capacity to effectively navigate changing conditions, protect and stabilize the ecosystems upon which people depend, or ensure that infrastructure is robust and able to withstand even unexpected stressors. These efforts may not always use the terminology of resilience, yet they share an appreciation of the sometimes abrupt and unexpected nature of change, of system complexity and interconnectedness, and of the central role played by people in any social-ecological system. They also share key principles in common in their approaches to building resilience, including understanding the importance of communities' engagement, of diversity of expertise, background, and response options, and of an appreciation of communities' dependency on functioning ecosystems.

Even with the many good examples of resilience-building work currently underway, it is clear that the pace and scope of Arctic change significantly increases the need for such work - and in particular, for replicating, scaling up and fine tuning the kinds of innovative efforts that are proving successful.

Even with the many good examples of resilience-building work currently underway, it is clear that the pace and scope of Arctic change significantly increases the need for such work, and in particular, for replicating, scaling up and fine tuning the kinds of innovative efforts that are proving successful. The ARAF adopts one of the most effective approaches to such an expansion in building a network around these diverse efforts, and through such a network, to share transferable insights, provide mutual support and generate enthusiasm and momentum. The first Arctic Resilience Forum provided an introductory opportunity for practitioners to connect with one another, while the case examples provide a broader sample of resilience-building work and an opportunity to analyze those examples for key insights.

The ARAF emphasis on case examples derives from two different sources. One is that communities at any scale (local, regional, national) often learn best from one another, from good ideas and good practices that have been tested and piloted elsewhere. A second source is the energy and inspiration that can come from the sharing of insights and supporting one another in problem-solving through what has been described as a "community of practice." A community of practice can develop spontaneously, but in a region as diverse and often distant as the Arctic, it helps to have a catalyst and facilitator. The ARAF is intended to play that role.

3.2 Gathering case examples

As part of the implementation of ARAF and the preparations for the Arctic Resilience Forum, Finland's Ministry for Agriculture and Forestry issued a pre-study on best practices of Arctic resilience in Finland⁸ conducted by the Arctic Centre of the University of Lapland, in cooperation with Gaia Consulting. While the pre-study draws from the Arctic Resilience Report and other related key publications, it has a focus on climate resilience, highlighting resilience strengthening actions in Finland. Cases of good practices of Arctic resilience from Finland were presented in the pre-study and used to encourage gathering of similar cases from other Arctic stakeholders. The Finnish cases were distributed to Arctic Council States, Permanent Participants and WGs through an interactive online platform where representatives of more than 50 Arctic Council stakeholders were provided access.

The Arctic Council Secretariat subsequently coordinated the collection of good practices from the whole Arctic region. The project co-leads proposed a template to the ARAF Implementation Team, which provided guidance on information that could be included in a written case example (see Annex 2a). Implementation Team members were asked to select at least four actions, programs, or mechanisms that highlight innovative and/or exemplary practices. For each action they wished to highlight, Implementation Team members completed a template developed by the co-lead team that summarizes the key characteristics of the case example. Overall, the team sought to achieve a diverse representation of case examples, with an aim to assemble examples in each of the four Priority Areas. Cases were provided by Arctic States, Permanent Participants and one Observer (IASSA), which also informed preparations for the Arctic Resilience Forum. These examples represented actions that could be highlighted at the September 2017 Arctic Resilience Forum as part of the process of sharing project experience and insights with other Forum participants. The complete list of 44 collected cases can be found in Annex 2b to this report and can serve as basis for follow-up. The full compilation of case examples will be posted on the SDWG website in early 2019.

3.3 Take-home lessons from case examples

Upon review of the submitted case examples, one central question is what do these cases – these practical examples – have to teach us about building resilience? A number of key themes can be identified in the roughly 50 cases submitted. These include commonalities across all the cases, as well as themes related to the basic resilience “ingredients” identified in the Arctic Resilience Final Report (2016), the Synthesis for Arctic Leaders (2017), and the resilience chapter in the AACA Barents Region report. These key elements of resilience include:

- Capacity for self-organization
- Diversity of response options
- Integration of different knowledge types and systems
- Sustainability of livelihoods
- An orientation to change as the norm

⁸ Pre-Study for the Arctic Resilience Forum (2018). Timo Koivurova and Juho Kähkönen. Rovaniemi 2018. ISBN 978-952-337-095-1 (Pdf)

Overall, the cases reflect diverse ways of defining resilience. Common to all the cases, however, is that they center around people, so that improving the resilience of infrastructure, ecosystems, livelihoods or organization, all contribute to improving a community's resilience - i.e. people's capacity to learn and work together to effectively navigate rapid and sometimes unpredictable change. With this in mind, we can identify a variety of take-home lessons:

1. Nearly 40% of the cases highlight efforts to assess risks to people driven by ecosystem change, natural hazards or specific kinds of human activities. These cases either seek to evaluate communities' capacity to weather these changes should risk become reality, or to strengthen that capacity by taking action to mitigate those risks or by engaging communities in planning for and preparing for change.
2. Over half the cases involved efforts to build the resilience and adaptive capacity of communities. Several case examples highlight a process of community level consultation to guide preparations for adapting to anticipated disruptions driven by climate change. One program, for example, uses workshops to both gain communities' input and as a tool for supporting these communities in strengthening their capacity to respond.
3. While some cases illustrate work to manage human impacts on ecosystems to make them more robust, other cases highlight the ways in which communities are grappling with substantial ecosystems changes that are already underway. In multiple cases, climate change is pushing northern ecosystems outside of their normal range of variability, requiring specific adaptations by communities pursuing northern livelihoods such as reindeer herding and farming. In some instances, technological innovations provide space for continuing these ecosystem-dependent livelihoods. In others, practical adaptations such as changing crop species or breeding strategies, or modifying seasonal routines. In these instances, a key element of resilience lies in practitioners' capacity to monitor ongoing ecosystem changes and adapt to changing conditions – even when variation is outside of previous experience.
4. Resilient infrastructure contributes to communities' resilience by reducing potential stressors. Making infrastructure more resilient is therefore a recurring theme, being applied, for example, to housing, energy systems, and flood control where steps are being taken to develop more resilient infrastructure.
5. The policy, planning and cooperation theme is often exemplified in engagement across scales, with national, regional and local levels interacting and making contributions to resilience based on their particular roles. More than 40% of the cases included these kinds of activities and often involved engagement of local communities in reporting on observed developments (monitoring), considering what local actions might be needed (planning), and interacting with regional or national authorities to coordinate, enlist technical or scientific expertise, and secure necessary resources.
6. Many of the examples of resilience building efforts focus primarily on strengthening community capacity to engage in problem solving. Several of these involve monitoring, anticipating or responding to environmental change. Others focus on building people's capacity to share and integrate different types of knowledge, and these include bridging science and local level knowledge, international cooperation on interdisciplinary science, and scientific and Indigenous Knowledge.
7. Where ecosystems pass a tipping point and shift from previously stable configurations to something new, the capacity of people to navigate effectively is paramount. Ecosystem change

is more successfully navigated by communities that have made themselves flexible by developing potential alternatives and engaging with one another in ways that facilitate shared decision-making and implementation of planned actions.

8. Based on the case examples contributed, investment from the private sector in resilience building appears to be a weak link. While public sector investment appears to be most common to date, the increasing perception of economic opportunity in the Arctic suggests good potential, yet can be expected to require creative effort to ensure that new investments are targeted in activities that emphasize both social and ecological sustainability.

In addition to cases reflecting a diversity of key ingredients, it is relevant to note that they also reflect action at different scales, including community, regional and national scales. Several cases focus on key themes for strengthening organizational capacity to address important issues across the region. Overall, it was clear from these examples that work remains to be done to tighten up and leverage resilience action around the Arctic, both in order to scale up actions quickly enough to meet the pace of Arctic changes and also to attract the necessary investment.

4. Arctic Council Working Groups' (WGs) Contribution to Resilience

Based on the enumeration of projects and initiatives that Arctic Council WGs have contributed to the efforts, WGs are engaged in a variety of projects and activities that enhance resilience, though not all of these activities use the term or the overall conceptual framework explicitly. WGs are also working systematically to increase the level of coordination, collaboration and knowledge integration across WGs – one of the crucial elements of a resilience approach. Although these efforts are arguably underappreciated, they contribute to the goals articulated in the ARAF in a variety of important ways – not least strengthening interdisciplinary collaboration, incorporating Indigenous Knowledge, and increasingly, taking a social-ecological systems perspective that considers human activities as an integral part of, rather than independent of, Arctic ecosystems.

A discussion on resilience in WG projects was organized in connection with the Senior Arctic Officials meeting and the meeting of the SDWG in Levi, Finland in March 2018. All WGs were invited to participate. A list of actions that WGs are taking to build resilience was prepared by the ARAF co-leads in advance of the meeting and distributed to the WGs for feedback (see Annex 3a). It was noted that all six of the Arctic Council WGs are already taking actions that build resilience and they are also aware of the need to accelerate further action to help build resilience.

Projects implemented in conjunction with multiple WGs and projects of potential relevance for multiple WGs were specifically highlighted during the meeting in Levi. These projects were specifically highlighted, in part, because a resilience approach is cross-cutting and multi-disciplinary, and projects implemented across multiple WGs have a greater potential to incorporate diverse types of knowledge. WGs have since proposed additional or strengthened collaborations that could build resilience. For an overview of these suggested collaborations, coordinated by the Arctic Council Secretariat, see Annex 3b to this report.

Several WG projects include key resilience elements, and ongoing development promises valuable insights. For example, the Resilience and Management of Arctic Wetlands project under CAFF uses the

social-ecological systems framework seeking to integrate insights from the biophysical sciences, social sciences and Indigenous Knowledge with the goal of not only understanding the role and status of wetlands in the Arctic, but to also like this with knowledge of management and policy initiatives and their outcomes. AMAP's AACA project included a resilience perspective and examined both human-caused drivers of Arctic change and the social consequences of those changes. Further development of the project is likely to build on the regional reports that took on the challenging task of integrating insights from the biophysical sciences into response options for local, regional and national level actors concerned with practical implications of ecosystems change. PAME's work related to Marine Protected Area Networks and shipping lanes has important implications to which a resilience perspective can contribute. ACAP and EPPR are in many ways organized around a social-ecological systems logic, with an emphasis on remediating problems caused by human activities, and on strengthening the capacity to navigate current or potential developments that have urgent social consequences. Finally, SDWG is home to the ARAF and has hosted previous projects with a resilience focus. An important aspect of the ARAF for SDWG is how it raises the bar for interdisciplinary collaboration with other WGs, and for the challenge of translating scientific and Indigenous Knowledge insights into actionable steps.

Potential for productive ongoing involvement with the WGs lies along three distinct tracks. Where resilience has been or is being mainstreamed through existing projects, sharing project insights via the ARAF offers an opportunity to highlight interdisciplinary collaborative work and provide additional visibility – and potentially, funding for those efforts. Where suitable projects are being developed, the ARAF offers a sounding board for project development. And where eventual recommendations are being considered, the implementation aspects of the ARAF could provide theoretical and methodological tools for developing those recommendations in ways that increase the likelihood that they can be implemented. As with almost all scientific endeavors, progress opens many new questions even as it resolves old ones.

5. Catalog of Protocols and Indicators that can Measure Progress towards Building Resilience

A component of the ARAF Implementation project was to consider existing indicators and approaches for measuring resilience. The ARAF notes the importance of monitoring different systems, including ecosystems, physical systems such as ice and climate, and social systems (i.e., communities and their well-being). In particular, the ARAF notes the significance of such monitoring for better assessing and understanding risk to people both within and outside of the Arctic, and to the value of such knowledge as a basis for planning and preparation to navigate both changes that are anticipated, and those that come as a surprise. However, monitoring these systems independently will result in vastly different types of measurements, underlying assumptions, and suitability for being quantified. Developing a suite of composite indicators for resilience of social-ecological systems that reflect the linkages and interdependencies of developments in both social and ecological systems is therefore an important, yet significant challenge.

From scientific, policy and practitioner perspectives, it is extremely useful to have good feedback that properly describes both current status and ongoing trends of social, ecological and geophysical systems – not least for assessing the degree and types of risk with which communities will have to navigate. It is hard to imagine flying in a plane without the access to critical indicators such as altitude, ground speed and fuel level. Similarly, it is very valuable to have tools for assessing whether policy or management actions are having the desired effects, undesired effects, or little or no impact at all. Having a feedback system in place that supports ongoing assessment of how actions being taken to build resilience are

delivering in practice makes it possible to make necessary adjustments as conditions change and as new knowledge is developed.

Yet, there are well-known challenges to developing useful indicators. They are at best an approximation of the social or ecosystem conditions of concern. Collecting the relevant information and data also requires resources – an ongoing challenge for not only scientists, but also for communities whose human and financial resources are already stretched. There are also legitimate objections to current trends toward measuring and quantifying almost everything imaginable, making the thoughtful development of robust indicators an important activity in and of itself.

For these reasons, the ARAF highlights the importance of identifying and establishing effective means of monitoring progress in strengthening Arctic resilience. It suggests that to the extent possible, use should be made of existing efforts in the areas of ecosystem monitoring, sustainable development, human well-being, climate change adaptation and mitigation, emergency preparedness and disaster risk reduction. A suitable basket of physical, ecological, or societal indicators could be used to both measure the initial states and to understand how socio-ecological conditions are changing in the Arctic, assess risks and vulnerabilities, and help inform resilience and planning for climate impacts. Such indicators need to provide information at a scale relevant for making decisions and/or implementing actions.

A key challenge is that indicators that can provide useful measures of social-ecological resilience are mostly in their early stages of development, although there are important examples of such efforts underway. Two good examples are the Economics of Ecosystems and Biodiversity (TEEB) for the Arctic: A Scoping Study (CAFF, 2015) (provide reference in footnote), and a pending report on freshwater capital accounts (provide citation) that examines the usefulness of integrated ecosystems and economic accounts for decision making about and management of Arctic freshwater resources. In addition, a framework for community-based development of resilience indicators is included in the Adaptation Actions for a Changing Arctic (AACA) Barents Region report produced by AMAP (reference in footnote), and several initiatives for composite indicators are underway in work with the 2015 Sustainable Development Goals (ref).

There is a variety of potentially useful systems of indicators that are either in use or are under development. These efforts can be broadly organized in terms of sustainable development, emergency preparedness and disaster risk reduction, climate mitigation and adaptation, and ecosystems, although the categories could also be organized following other types of logic. Especially relevant efforts that are being developed outside of the Arctic are outgrowths of the Sendai Framework for Disaster Risk Reduction (2015), the UN Sustainable Development Goals (2015), and the Paris Climate Agreement (2015). In each instance, efforts are being made to link natural systems with societal efforts to reduce risk and exposure to unavoidable risks, or to chart a positive path for human development with consideration for societies' dependencies on nature. As such, they represent an effort to develop indicators which account for the links between social and ecological systems. As with all indicators intended to be useful in practical terms, these indicators are hoped to be able to provide ongoing status updates and meaningful feedback on the effectiveness of policy initiatives to provide for further actions informed by the best evidence available. Potentially valuable avenues to explore further are briefly discussed in section 8 under specific recommendations. These highlight in particular the value of indicators developed at the local level through participatory approaches and also current efforts to

develop meaningful composite indicators for the Sustainable Development Goals that could apply in the Arctic context.

6. A First Arctic Resilience Forum

The first Resilience Forum (10-11 September 2018 in Rovaniemi, Finland) was a cornerstone of ARAF implementation. In addition to Finland's Ministry of Agriculture and Forestry and the Ministry of Foreign Affairs, the conference committee included expertise from the Ministry of the Environment, and the Ministry of Education and Culture. It was organized in close cooperation with the Co-Leads (USA, Sweden and Finland) of the ARAF project, the full ARAF Implementation Team, as well as Arctic Council WGs and other key stakeholders. As noted above, the Forum was organized under the auspices of the 2017-2019 Finnish Chairmanship Program of the Arctic Council.

The Forum was conceived and organized in order to develop a better understanding of the opportunities for cooperation connected to Arctic resilience. In particular, an important strategy of holding such a forum was to showcase and learn from concrete good practices in the Arctic region, with a particular focus on strengthening climate resilience through climate adaptation and mitigation actions. In addition to convening a diverse mix of participants, the Forum served as a catalyst to identify, collect and share actions that Arctic States, Permanent Participants, WGs, and Observers are taking (or will take) to address the ARAF priorities; and develop an inventory of existing and emerging measurement protocols – including self-assessment protocols – as well as existing and emerging indicators, in order to measure and compare progress building Arctic resilience over space and time.

The two-day Forum gathered nearly 100 Arctic experts, policymakers, and various key stakeholders, with representatives from the Arctic Council States, WGs, Permanent Participants, and Observers; national, regional and local government; indigenous organizations; academia; industry; and non-governmental organizations; as well as local youth that participated in a side event.

With the ARAF providing structure for the discussions, the sessions helped generate a joint understanding of how to operationalize resilience and catalyze funding for action in a uniquely vulnerable, rapidly changing, and extremely diverse region.

During the 1st Day, around twenty international keynotes and commentary presentations were delivered around the *four ARAF priority areas*: analyzing and understanding risk and resilience; building resilience and adaptation capacity; implementing measures that build resilience through policy, planning and cooperation; and encouraging investment to reduce risk and build resilience.

During the 2nd Day, representatives of the Arctic Council WGs (EPPR, AMAP, ACAP, CAFF, SDWG and PAME) presented cases of their resilience related work, showcased good practices and lessons learned as well as highlighted opportunities for strengthening resilience. Building upon the working group presentations, breakout sessions were formed to identify further opportunities to accelerate WGs' resilience-related work and enhance collaboration between other Arctic stakeholders. Additional breakout sessions highlighted good practices of local stakeholders in the Finnish Arctic.

The Arctic Resilience Forum resulted in several key takeaways:

- 1. Resilience can be understood from a variety of different perspectives, yet the perspectives represented at the Forum all included two key dimensions: 1) the emphasis on the human capacity to*

effectively navigate change and 2) the capacity to bounce back (or bounce forward) and thrive in the face of disturbances.

Core elements of resilience approach expressed at the Forum include the social-ecological systems perspective that understands people to be a fundamental part of ecosystems. Connected with this concept of people as an integral part of nature is the need for interdisciplinary collaboration within the sciences, collaboration across knowledge systems, and close collaboration between knowledge policy and practice to increase the likelihood that new insights can be put into practice. Resilience approaches also understand change as an uneven process, with tipping points, unexpected shifts and the need for both assessing risk and preparing people to successfully navigate both expected and unexpected changes. This also makes risk management an important part of resilience work.

2. *There is a wealth of information, expertise, and experiences in building resilience across the Arctic that should be actively shared:*

The forum highlighted the existence of a wealth of information and expertise as well as already existing experience in building climate resilience that can and should be actively shared. In particular, Arctic indigenous peoples have long histories and experience with adapting to changes in the Arctic. While noting the leadership and mandates of the Arctic Council and its WGs, the forum highlighted also the need to build partnerships across all relevant stakeholders in the Arctic.

The need for cooperation in environmental monitoring, sharing data, making climate information more user-friendly and building bridges between climate science and indigenous knowledge were recurrent themes during the two-day forum. The forum provided ample examples of how these needs can be addressed and allowed participants to identify potential new partnerships for doing so.

The intensified collaboration between the Arctic Council WGs provides an important basis for strengthening efforts to build resilience. The WG's presentations highlighted several activities they are engaged in that contribute to resilience and in a few instances, projects are specifically organized around the social-ecological systems perspective that is central to resilience work. These offer an important and instructive examples of constructive paths forward.

3. *There are several challenges in the sustainable and equitable management of natural resources in the Arctic, which are compounded by climate change:*

The forum also noted major challenges in sustainable and equitable management of natural resources. Climate change will increase pressures on natural resources and strengthening resilience will require improved capacities to deal with and reconcile these pressures. The forum highlighted that local participation, transparency and mutual respect are obligatory ingredients for reconciling conflicting interests in a sustainable manner.

4. *Climate change resilience should be dealt with in the context of sustainable and inclusive development at all levels (i.e., local, national, regional):*

The forum noted the multiple climate risks posed on Arctic livelihoods, including agriculture, forestry, fishery, food production, tourism, herding, etc. and the need to strengthen the resilience of these livelihoods. In some cases, the change caused by climate change in the physical environment is already so dramatic and unavoidable that transformation of livelihoods remains the sole option. The forum also highlighted critical aspects of human well-being and health as well as awareness and

capacity, through examples related to health impacts caused by climate change as well as the need to transform education. The forum strongly identified a need to climate screen and proof all investments in the Arctic, to reduce and manage risks caused by climate change.

However, there were strong opinions about dealing with climate change as a separate issue of its own. It was recommended that addressing climate change must be dealt with as part of sustainable and inclusive development at the local, national and regional Arctic level.

5. *Building resilience in a way that meets the urgency of climate change requires partnerships across the Arctic region and other regions of the world. Effectively building resilience requires engagement of multiple stakeholders, including scientists, policy makers, indigenous peoples, the private sector and civil society:*

The forum stressed the need for partnerships. There are opportunities to expand partnerships across the circumpolar Arctic and across different types of stakeholders. There are also opportunities to form partnerships with stakeholders in other regions of the world and make use of their experiences with building resilience, especially in accessing resources and funding. Currently, investment in building resilience in the Arctic is limited. However, other regions of the world offer lessons learned that could be applied to and scaled up in the Arctic.

Overall, the feedback from the 1st Arctic Resilience Forum was highly positive. Both informal and formal feedback (e.g., through an anonymous survey) revealed that participants found value in hearing about concrete examples of resilience-building. Appreciation was also expressed for the diversity of speakers and participants. Several participants suggested that more breakout groups and smaller discussion be considered as ways to improve the Arctic Resilience Forum in the future. Several participants expressed a strong interest in convening such a forum on a regular basis to ensure that resilience implementation and learning keeps pace with the rapid changes taking place in the region.

The 1st Arctic Resilience Forum was organized by the Ministry of Agriculture and Forestry of Finland in cooperation with the Ministry of Foreign Affairs of Finland and the Arctic Resilience Action Framework's (ARAF) Implementation Team, and with support from the Arctic Council Secretariat and inputs from the Arctic Council WGs.

7. Overall Project Benefits

7.1 Evaluation of Project Logistics

The ARAF Implementation project (2017-2019) was carried out in conjunction with many Arctic Council entities. Broad engagement was crucial to the success of the project. The project was carried out primarily with in-kind resources, with Finland contributing additional resources for the first Arctic Resilience Forum. The main project actors and their roles are described below.

Role of SDWG

The ARAF Implementation project (2017-2019) was entrusted to the SDWG, with the project proposal discussed and approved by the SDWG in late 2017. The SDWG also maintains an ARAF project webpage. Formalizing the ARAF as an SDWG project likely supported greater engagement from the Arctic Council PPs, which are often highly involved in SDWG projects (considering the human dimensions focus of the

SDWG). This was important for the ARAF because of the crucial importance of resilience-building to Indigenous communities across the Arctic. In addition, working through the SDWG facilitated connections with the other Arctic Council WGs, especially where there were existing relationships between the SDWG Chair and Executive Secretary and other WG Chairs and Executive Secretaries. In the future, there is potential to further strengthen connections between the ARAF work and other important SDWG resilience-related initiatives.

Engagement with other WGs

The relevance of resilience has been acknowledged by each of the Arctic Council WGs, with the WGs noting that elements of resilience work are currently incorporated into multiple projects and activities. The documentation of all Arctic Council WG initiatives that build resilience, along with additional discussion (e.g., through the WG resilience session in Levi in March 2018, the Arctic Resilience Forum Day 2 discussions, etc.) has contributed to WGs' awareness of what others are doing that contributes to resilience. These discussions also brought to light potential opportunities for cross WG collaboration around resilience. WG coordination and collaborations have increased in recent years, and the ARAF provides another framework for enhancing such collaboration. This is particularly important considering that a resilience approach is inter-disciplinary, and WGs contribute often complementary types of knowledge and expertise.

However, there are many demands that are placed on the WGs, especially their Secretariats, and at times, deeper engagement in the ARAF was a challenge. While the recognition that all WGs are implementing initiatives that build resilience, Working Groups often sought greater clarity about how ARAF implementation could add value to their work, beyond the documentation of their resilience efforts. In practice, such clarity may be best achieved through the insights gained from projects that actively apply a resilience perspective.

Role of Co-Leads

The ARAF Implementation project (2017-2019) was led by Finland, Sweden, and the United States. Project co-leads managed most of the day-to-day operations of the project, including collection and analysis of case examples and reporting to the SDWG. The co-leads also co-chaired the ARAF Implementation Team. Finland hosted the first Arctic Resilience Forum and prepared the program in collaboration with the project co-leads and ARAF Implementation Team. Finland contributed additional resources to support the Forum.

In the future, project co-leads could continue to oversee implementation of the ARAF using mostly in-kind resources, although project activities may be limited as a result. Additional resources could enhance ARAF project activities, especially if resilience were to be established a strategic priority of the Arctic Council (see Section 8 for potential future ARAF activities). Additional resources would still be needed to organize a future Arctic Resilience Forum.

Role of ACS

Considering the resource limitations of the SDWG Secretariat and the cross-cutting nature of the ARAF, the Arctic Council Secretariat provided key support to the project. The ACS also served as a neutral convener, collecting input and feedback from the six Arctic Council WGs. The ACS supported the effort

by organizing logistics for ARAF Implementation Team teleconferences and provided cross-cutting glue to ensure successful implementation. As expected, its role turned out to be extremely important.

Role of ARAF Implementation Team

In late 2017, the SDWG HoDs were invited to nominate representatives to an ARAF Implementation Team. Ultimately, the ARAF Implementation Team included representatives from all eight Arctic Council States, five Permanent Participants, and an Observer. The ARAF Implementation Team was an extremely important mechanism to ensure perspectives and expertise were incorporated into the ARAF project from across the Arctic. All ARAF Implementation Team members were invited to submit case examples, provide input to the development of the Arctic Resilience Forum program, and provide general input on the ARAF Implementation project. The role of the PPs was particularly important in ensuring that the project was relevant to Indigenous communities. Considering the competing demands of many projects, the level of participation in the ARAF Implementation Team varied widely and was an important consideration of the project co-leads. The ARAF Implementation Team met via teleconference, and many ARAF Implementation Team members attended the Arctic Resilience Forum.

In the future, the crucial role of the ARAF Implementation Team should be recognized. To gain a comprehensive understanding of resilience practices across the Arctic, broad input from States, Permanent Participants, and Observers is extremely important. There is continued recognition of the challenges (e.g., limited resources and bandwidth) that many ARAF Implementation Team members face, especially Permanent Participants. For this reason, it is important to make every effort to improve regular communication with the ARAF Implementation Team, provide ample time to the Implementation Team members to provide input and feedback, and provide flexibility with deadlines. In addition, there are opportunities to expand Observer representation on the ARAF Implementation Team. Many Observer countries and organizations are involved in activities that build resilience and contribute important, relevant expertise to the Arctic Council WGs.

Cross-cutting benefits of ARAF

The ARAF and ARAF Implementation provide many benefits to the Arctic Council and stakeholders across the Arctic. These benefits include the following:

- ARAF priorities, in conjunction with concrete case examples, provide a structure for approaching resilience-building that can be utilized by States, PPs, WGs, Observers, and non-Arctic Council stakeholders. Priorities and case examples can encourage innovative approaches and the scaling up of approaches that have proven effective. The ARAF initiative also provides a vehicle to enhance collaboration focused on social-ecological systems across WGs.
- The ARAF creates a mechanism to share best practices from across the Arctic (e.g., through ARAF Implementation Team, Arctic Resilience Forum, collection of case examples) and share methods and approaches for putting knowledge into practice.
- Resilience is largely about people, and thus in the Arctic, largely about Indigenous communities. ARAF emphasizes the key role of Indigenous peoples in regional collaborations to build resilience. ARAF provides a platform for Indigenous communities to share their knowledge and experiences, in order to scale up approaches quickly to meet the pace of change that is occurring.

- The Arctic Resilience Forum provides an important opportunity to convene, inspire, and inform resilience stakeholders face-to-face. Feedback from the Arctic Resilience Forum evaluations was very positive, yet many participants indicated that for a second forum, more time and space for interactive discussion could contribute significantly to practical lessons and strong connections.
- ARAF is the first politically sanctioned, regional resilience framework in the Arctic. With continued development, the ARAF could offer a model for other regions of the world dealing with rapid changes. The Arctic is changing more rapidly than most other regions of the world, so it should be at the forefront of resilience-building. The Arctic Council is consistently viewed as a model for productive international collaboration and resilience collaboration is especially important and timely
- The ARAF ensures that the urgent issue of regional resilience is officially on the Arctic Council agenda during a time of regional transformation.
- The ARAF is a platform for putting knowledge into practice. Important knowledge about building resilience is reflected in the ARAF priorities and guiding principles.

8. Recommendations for the Way Forward

Translating insights into policy recommendations then to actual change on the ground is often a significant challenge. Yet the Arctic Resilience Forum and written case examples demonstrated clearly that there is extremely innovative and valuable work already underway across the Arctic – work that makes use of a resilience perspective and critical elements it contains. These elements include alertness to the presence of tipping points and the potential for runaway change, and extremely importantly, communities’ capacity to effectively engage in navigating change. While it is easy to get entangled in the theoretical and definitional aspects of resilience, the ARAF implementation program managed to set aside those theoretical aspects to focus on resilience needs on the ground by operationalizing the insights that came out of the Arctic Resilience Report and other resilience-related work within the Arctic Council and SDWG.

ARAF Implementation (2017-2019) has brought more Arctic resilience stakeholders together, while demonstrating the cross-cutting nature of resilience-related work. The ARAF project provides an opportunity for the Arctic Council to play a leading role in building resilience in the Arctic region.

Below are a few broad ideas for carrying the resilience work forward. The ideas below are the product of discussions with Forum participants, project co-leads, members of the implementation team, and others.

8.1. General conclusions regarding resilience work in the Arctic Council

1. Finland, Sweden, and the U.S. led initial implementation of ARAF in 2017-2019, during Finland’s Chairmanship of the Arctic Council. Activities took place with a broad-based implementation team, and with support from the Arctic Council Secretariat. Implementation became most concrete in collection of resilience examples, and the preparation and implementation of the first Arctic Resilience Forum, and therefore a well-established process would make a valuable contribution to

coordinating the specific features and the challenges in the Arctic region in the future. Environmental protection and sustainable development and in particular, risk management would be highlighted from the community level to country-specific actions.

2. The ARAF provides an important additional organizing mechanism for strengthening resilience and adaptation efforts across the Arctic. Even with limited resources, the ARAF has contributed to the goals of the Arctic Council by helping to strengthen cooperation between diverse actors. ARAF implementation has provided an important additional platform for cooperation for Arctic actors, including WGs, indigenous peoples, Arctic countries and observers.
3. Resilience and sustainable development are conceptually close to each other yet are not the same thing. Sustainable development assumes relative stability and speaks to specific needs in pursuing improvements in human well-being in the context of ecosystem limitations. Resilience approaches seek to build capacity to navigate diverse and changing conditions by either adapting where possible, or by actively engaging in transformative change.
4. The ARAF offers a platform for strengthening risk management and preparedness in the Arctic region, in part by focusing on capacity to navigate slow and fast-moving risks and stressors. The ARAF strengthens capacity of Arctic stakeholders to put research-based knowledge into practice, and to share and showcase good practices. Strengthening dialogue and engagement between research and practice is a core priority.
5. Education and knowledge-sharing are key, both for pursuing sustainable development and building resilience in Arctic communities. Organizing the next resilience forum with an emphasis on putting into practice scientific insights and Indigenous Knowledge as well as active sharing of sustainable practices in the Arctic region will strengthen the capacity to achieve Arctic Council goals related to sustainable development and environmental protection for the future.

8.2. Specific recommendations

A. Continue to identify existing good practices and build a “Community of Practice”

An increasingly large catalog of projects and activities is being developed that highlights how people are actively engaged in strengthening resilience in the Arctic. This catalog provides examples of important efforts and activities already underway that others can learn from. It also provides a basis for developing a network of people who can share insights and engage with one another to support problem solving efforts. The Forum provided an excellent start by bringing many of these people together. A continuation of the efforts through the ARAF would work to strengthen the links among practitioners, support efforts to expand or scale up successful project activities, strengthen the community of practice, and thereby further contribute to building resilience. Meanwhile, it is important to find ways to share examples widely so that practitioners in the Arctic (and even around the world) can benefit. The urgency of anchoring establishing and expanding this community of practice during a time of transformation in the Arctic cannot be overstated.

A community of practice could be engaged in one or more of the following ways:

- Online platform that displays case examples and allows users to interact in a virtual space (this could build on current or past platforms, or model a new platform after existing platforms)
- Webinars that showcase examples and allow for discussion

- ARAF listshare that shares profiled case examples and resilience-related WG activities; highlights events/developments from the rest of the Arctic community
- Mini-workshops on resilience on the margins or in between Arctic Resilience Fora, with a focus on discrete topics that contribute to on-the-ground resilience work

In addition to fostering a community of practice, the following activities could further focus discussion and dissemination of good practices/activities:

- Develop an in-depth catalog of resilience funding opportunities and promising financing approaches from the Arctic or other regions
- Identify emerging priorities that the original ARAF document does not capture
- Produce education/communication materials about resilience, which could be useful for the Arctic Council, other Arctic stakeholders and other regions of the world

B. Plan a second Arctic Resilience Forum

The first Arctic Resilience Forum provided an opportunity for people engaged in resilience-building to meet, to share their efforts and insights, and to engage with one another. It was a fantastic first pioneering step. A second Forum would be most valuable if it would support taking these initial steps forward and also serve as second check-in point to review and share progress. To serve this purpose, several participants have suggested that a second Forum be workshop oriented, focus on more hands-on discussions and sharing, and would seek to engage participants in the nuts-and-bolts work of resilience building. A second Forum should also focus on how the ARAF can help Arctic partners to demonstrate the collaboration and rigor necessary to encourage additional public and private investment in Arctic resilience-building.

C. Invite Arctic Council WGs to participate in activities to “Mainstream Resilience” in Arctic Council WGs

The WGs of the Arctic Council have identified ongoing projects that include resilience-building and the scientific elements that resilience offers. They have also identified specific projects where there would be an interest in collaboration with another WG in order to gain the important insights that come from transdisciplinary work. An important possibility for further mainstreaming resilience in the WG context is to invite WGs to develop selected projects as a test case for leveraging additional insights through applying resilience principles. Key principles here would include the social-ecological systems perspective, knowledge integration, and expanded collaboration across WGs. Participation is optional and based on an expectation that a resilience approach would make a valuable contribution to the project in question. Most importantly, these projects should demonstrate how the resilience approach can add value, add partners, and encourage investment. In some instances, such projects are already underway.

D. Further develop frameworks of resilience indicators: How can results be monitored and assessed?

While the ARAF highlights the importance of resilience indicators for guiding policy, action and investment, there is no ready-made suite of indicators currently available that provides the kind of feedback system needed. The ARAF is an opportunity to highlight existing indicators and indicators

under development. It is clear there is a wealth of indicators work available to draw on, and these indicators may be relevant to communities and other Arctic stakeholders.

Even though the development of composite indicators of resilience remains in its early stages, many of the building blocks are available. As examples, a framework for developing community-based indicators of social-ecological resilience has been outlined in work by AMAP (the AACA Barents Regional report), and ongoing work to develop robust indicators in conjunction with the Agenda 2030 Sustainable Development Goals is well underway. In addition, the EU Joint Research Center (JRC) is considering potential JRC contributions to developing a system of indicators for Arctic Resilience. Several potential actions are underway or possible for understanding and developing Arctic resilience indicators:

- Complete the existing resource list – especially on ecosystem monitoring and climate mitigation and adaptation indicators – so as to more clearly define a potential set of resilience indicators, focusing on the aspects which are the most relevant from an Arctic perspective (i.e. also considering ARAF priorities and action areas, as well as possible shocks and regime changes).
- Refine existing indicators to increase their strength and suitability/applicability to reflect the impact of global change and of the complex interactions between bio-physical and human systems in the Arctic. The activity could start with a workshop, bring together relevant practitioners with experience in indicators and or the Arctic to review the eventual lists of individual indicators and methods, with the goal of coming up with a work-plan/project proposal.
- The scalability of a model such as the Index for Risk Management (INFORM)⁹ could be particularly interesting as it can in theory be adapted to Arctic conditions. This would involve changing some of the indicators across the three dimensions of its risk index: *Natural and human hazards* categories would need to be adapted to the Arctic; *Vulnerability* categories less so; while for the *Coping capacity* we could also look at aspects of institutional and infrastructural capacity that are more relevant to the Arctic. This is one example of a model that might usefully be adapted to the Arctic context.
- Identify communities where there is an interest in developing resilience indicators through locally-based participatory methods, using the framework suggested in the AACA Barents Region report. Seek funding for the project(s) from interested foundations and research funding agencies.
- Look for other funding opportunities, if reasonable progress is made on the above tasks, then the timing may be right to feed a suitable proposal into Horizon Europe Planning and the North American equivalents via the regular dialogues of the EU-US-Canada Arctic WG (DG RTD).

9. Conclusions

The Arctic Council's focus on the science and practice of resilience dates back to 2011, when the Nuuk Ministerial observed the “accelerated change in major components of the cryosphere and the profound local, regional and global effects of observed and expected changes”, and also the “need for forward looking Arctic cooperation with a view to increase Arctic resilience and to enhance Arctic Council leadership to minimize the human and environmental impact of climate change” (Nuuk Declaration 2011). With a pace of Arctic change that appears, if anything, to be further accelerating, important

⁹ <http://www.inform-index.org/>

elements of that forward-looking Arctic cooperation are embodied in the ARAF, are being implemented, and being further developed. As with all types of knowledge development, scientific investigation of social-ecological systems such as the Arctic is an unending process. So too is the process of using the insights gained to inform changes in policy and new courses of action.

The ARAF provides a structure for implementation that is grounded in not only interdisciplinary knowledge, but an approach to knowledge that can integrate the social and natural sciences along with important insights from Indigenous Knowledge. Given the potential – even likelihood – of multiple tipping points in social-ecological systems identified in the ARR, it is clear that Arctic communities will need strengthened capacity to navigate change that could be rapid, disruptive and unpredictable.

In the nearly two years since the ARAF was adopted, Arctic Council partners have demonstrated the need, the desire and the enthusiasm to more collaboratively address urgent resilience needs in the Arctic. By building and strengthening a community of practice, sharing lessons-learned more widely and systematically across the region, and leveraging both knowledge and investments, communities can be far better positioned to navigate change. Through earning a reputation for developing collaborative, well-researched, and widely shared approaches, stakeholders in the region will be far better positioned to attract investments that build resilience and also advance the sustainable development goals of the Arctic Council. The first Arctic Resilience Forum provided an important opportunity to convene, inspire, and inform resilience stakeholders face-to-face and the overall ARAF Implementation brought more Arctic resilience stakeholders together, while demonstrating the cross-cutting nature of resilience-related work.

The first phase of implementation successfully laid the groundwork for this outcome, but the coming years, generally the period of the Icelandic and Russian Chairmanships, are pivotal for gaining ground and establishing a world-class community of practice that will ensure that communities, economies, governments, and cultures are better prepared to address the rapid transformations taking place in the Arctic. In doing so, the ARAF project provides an opportunity for the Arctic Council to play a leading role in building resilience in the Arctic region and beyond.

10. Annexes

1. ARAF Implementation Team Members

2a. Guidance Template for ARAF Case Example Submissions

2b. Overview of ARAF Case Example Submissions

3a. Working Group Resilience-Building Activities

3b. Enhancing Collaborations around Resilience-Building: Working Group Feedback

Annex 1: ARAF Implementation Team Members

First Name	Delegation
Marie-Ève Néron	Canada
Margaret Wren	Canada
Saara Lilja-Rothsten	Finland
Heidi Altalo	Finland
Sigrun Karlsdottir	Iceland
Jon Erlingur Jonasson	Iceland
Catherina Hvistendahl	Kingdom of Denmark
Marianne Kroglund	Norway
Dmitry Verigin	Russia
Anna Sorokina	Russia
Andrey Kichigin	Russia
Jeanette Krantz	Sweden
Marcus Carson	Sweden
Kristian Lindvall	Sweden
Reid Creedon	United States of America
Sarah Abdelrahim	United States of America
Amina Schartup	United States of America
Grant Sullivan	Gwich'In Council International
Gunn-Britt Retter	Saami Council
Bridget Larocque	Arctic Athabaskan Council
Cindy Dickson	Arctic Athabaskan Council
Johanna MacDonald	Inuit Circumpolar Council
Liza Mack	Aleut International Association
Pekka Shemeikka	SDWG
Bernard Funston	SDWG
Cynthia Jacobson	CAFF
Anne Birgitte Hansen	Arctic Council Secretariat

Annex 2a: Guidance and Template for ARAF Case Example Submissions

Arctic Resilience Action Framework (ARAF)

Guidance for Submitting Case Examples of “Implementing Actions” and Effective Practices

Introduction to the ARAF Priorities

The Arctic Resilience Action Framework (ARAF) is an organizing framework for taking new insights and knowledge and putting them into practice to strengthen resilience in the Arctic. To support this goal, the ARAF seeks to develop a community of practice to enhance circumpolar discussion and coordination around resilience. The ARAF identifies common resilience priorities, around which Arctic Council stakeholders can share experience, expertise and best practices, and also more easily identify emerging needs and gaps. The ARAF is organized in four Priority Areas:

1. Analyzing and Understanding risk and Resilience in the Arctic
2. Building Resilience and Adaptation Capacity
3. Implementing Resilience with Policy, Planning and Cooperation
4. Encouraging Investment to Reduce Risk and Build Resilience

Each of the four priority areas include 4-6 “Action Areas” that are more specific.[1]

Phase I: Highlighting Exemplary Practices

A primary goal of the ARAF Implementation Project is to facilitate sharing best practices and good examples of activities that build resilience in the Arctic, and to do so in part by recognizing and bringing attention to the inspiring work already being done.

Implementation Team members are being asked to select at least four sets of actions (including pilot or ongoing programs) that highlight innovative and/or exemplary practices. For each one they wish to highlight, Implementation Team members should complete the **attached template** to provide more detail. Ideally, Implementation Team members will submit at least one case example for each of the four Priority Areas. These examples should represent efforts that could be highlighted at the Arctic Resilience Forum on 10-11th September 2018 in Finland.

As a starting point, you may find it useful to refer to existing compilations of case studies and best practices, such as those listed in Chapter 4 of the Arctic Resilience Report or in the subsequent Synthesis for Arctic Leaders, which contained examples of resilience-building projects and actions.

The template is intended as a guide and will provide for a measure of consistency across the listings submitted. Some questions may not be relevant, and there may be information you feel is important to include that is not explicitly requested.

7. Existing expertise from your country/PP/organization related to the case example (100 words or less):

8. The Arctic Resilience Report identified “key ingredients” for resilience including:
- a. Capacity for self-organization
 - b. Diversity of responses to change
 - c. The ability to integrate different types of knowledge
 - d. The capacity to navigate surprise and uncertainty

Which of the key ingredients above does the example demonstrate and how? (200 words or less)
(See Explanation B, below, for more information)

9. Relevant weblinks or other additional information:

Explanation A: ARAF Priority Areas

The ARAF is organized around four broad Priority Areas. Each Priority Area includes a subset of Action Areas, described in the ARAF document, to further focus resilience efforts in the Arctic. The four Priority Areas are briefly described below.

Priority Area 1: Analyzing and Understanding Risk and Resilience in the Arctic

As the Arctic changes, an improved understanding of risks and opportunities can help communities and governments make better decisions and more effectively enhance their resilience, especially in the face of uncertainty. Documenting and sharing adaptation experiences can help to identify and foster effective responses and best practices.

Priority Area 2: Building Resilience and Adaptation Capacity

Encouraging processes that include the co-producing knowledge, co-developing tools for self-assessment and decision-making, facilitating access and integration of scientific knowledge at the community level, and supporting the education and training of local leaders can all contribute to adaptive capacity and enhanced resilience to disruptive changes.

Priority Area 3: Implementing Measures that Build Resilience through Policy, Planning and Cooperation

Sound planning and policy processes are essential for implementing measures that build resilience. To be effective, such processes require the bridging of multiple knowledge systems, and the engagement and cooperation of a range of stakeholders, especially local and Indigenous communities.

Priority Area 4: Encouraging Investment to Reduce Risk and Build Resilience

Financial resources that enable effective resilience planning and implementation have thus far been limited. Arctic leaders need to explore new, innovative financial mechanisms in order to address near-term and long-term challenges associated with changes in the Arctic.

For additional information about the Priority Areas, subset of Action Areas, and examples, see Section IV of the ARAF: <https://oaarchive.arctic-council.org/handle/11374/2019>.

Explanation B: Key “Ingredients” for Resilience

The Arctic Resilience Report (ARR) analyzed a number of case studies to identify key “ingredients” of resilience. These “ingredients” are described below.

1. **Capacity for self-organization:** The ability to make decisions and implement responses to change. This “ingredient” is particularly crucial. A resilient community has the ability to come together to effectively identify and respond to challenges, and can resolve conflicts or disagreements.
2. **Diversity of responses to change:** Identifying and implementing a diversity of strategies for enhancing resilience, given the diverse set of drivers of change that Arctic communities face.
3. **The ability to integrate different types of knowledge:** The ability to connect and encourage complementarity between Indigenous, scientific, local, and other types of knowledge in a context of equity and transparency.
4. **The capacity to navigate surprise and uncertainty:** The ability to deal with unidentified or unanticipated Arctic regime shifts that will surprise both scientists and communities.

For additional information, see the ARR Executive Summary and/or Chapter IV of the ARR: <https://www.sei-international.org/mediamanager/documents/Publications/ArcticResilienceReport-2016.pdf>

[1] For the full list of Priority Areas and Action Areas, see the Arctic Resilience Action Framework document, with Appendix A serving as a quick summary reference.

Annex 2b: Overview of ARAF Case Example Submissions

*Full compilation of case examples will be posted to the SDWG website in early 2019

Submitting Entity	Title	ARAF Priority ¹⁰
Canada	Crown Indigenous Relation and Northern Affairs (CIRNA)	3
Canada	Nunavut Housing Corporation - Geotechnical Site Investigations	2
Canada	Climate Change Geoscience Program: Beaufort Sea Coastal Zone Studies for Safe and Sustainable Community Development	1
Canada	Guide to Integrate Climate Change Measures into Municipal Planning and Decision-Making of Northern Communities	1-4
Finland	Climate Resilient Agriculture	2
Finland	Reindeer Herding	2
Finland	Animal Husbandry	2
Finland	Protecting Fish Populations	2
Finland	Fish Farming in the Arctic	2
Finland	Climate Resilient Tourism	1
Finland	Pedestrian Safety in Changing Climate	1
Finland	Flood Protection	1
Finland	Green Buildings and Runoff Water Mitigation	1
Finland	Security of Critical Infrastructure	1
Finland	Maritime Safety	4
Finland	Safety Promoting Innovative Technologies	2
Finland	Funding	4
Finland	Demand Driven Weather Services	2
Finland	Climate Education and	2

¹⁰ Case Examples may correspond to one or more of the four ARAF Priorities: 1) Analyzing and Understanding Risk and Resilience in the Arctic; 2) Building Resilience and Adaptation Capacity; 3) Implementing Measures that Build Resilience with Policy, Planning and Cooperation; 4) Encouraging Investment to Reduce Risk and Build Resilience

	Awareness with an Arctic Touch	
Finland	Empowerment of Indigenous People	1
Iceland	The Nordic Welfare Watch - in Response to Crisis	1, 2, 3
Iceland	The Burfell Hydropower Capacity Expansion Project	2, 3
Iceland	The Icelandic Electric Grid Emergency Management Forum NSR	2, 3
Iceland	Risk Assessment of Natural Hazards in Iceland	1
Iceland	NORDRESS - Nordic Centre of Excellence on Resilience and Societal Security	1, 2, 3
USA	Traditional Ecological Knowledge Mapping of the Mulchatna Caribou Herd	1, 2
USA	Training the Next Generation: Resilience Programs at the University of Alaska Fairbanks	2
USA	Anchorage: Welcoming and Resilient. Building Resilience in the American Urban Arctic	2
USA	The Interagency Arctic Research Policy Committee (IARPC) - A Model for Research Collaboration	3
USA	Cold Climate Housing Research Center (CCHRC) Sustainable Northern Communities: Housing Research for the Circumpolar Region	3
USA	The Alaska Coastal Community Protection Project	2, 3
USA/Aleut International Association	Community-Based Ecological Monitoring through the BeringWatch Sentinel Program	1, 2
USA/Aleut International Association	Enhancing Dialogue and Action on Coastal Resilience in Alaska	2
Arctic Athabaskan Council	Treaty and Aboriginal Rights Implementation in Denendeh (Northwest Territories): A paper for the Indigenous Nations Studies Journal	1, 2, 3
Arctic Athabaskan Council	United Nations Framework Convention on Climate Change	2, 3

Arctic Athabaskan Council	Arctic Peoples, Culture, Resilience and Caribou	1, 2
Arctic Athabaskan Council	A Guide to Community-based Monitoring for Northern Communities	1, 2, 3
Gwich'In Council International	Land Use Plans	3
Inuit Circumpolar Council	Development of a Circumpolar Inuit Wildlife Management Committee and Network	2, 3
Inuit Circumpolar Council	Circumpolar Inuit Economic Summit and Development of an International Inuit Business Association	3, 4
Inuit Circumpolar Council	Inuit Education Summit: Sharing Resources for Resilient Culture, Language, and Learning	2, 3
Inuit Circumpolar Council	Pikialasorsuaq Commission: Supporting the Inuit-led Conservation of a Critical Marine Ecosystem	2, 3
Inuit Circumpolar Council	Circumpolar Resilience, Engagement and Action through Story (CREATeS)	1, 2
IASSA	Teriberka, Russia: Understanding Changes and Resilience in Coastal Social-Ecological Systems	1
IASSA	Implementing Arctic Resilience through Strengthening International Cooperation in Interdisciplinary Science, Traditional Knowledge and Education	3

Annex 3a: Working Group Resilience-Building Activities and feedback

Arctic Council Working Group Actions that Build Resilience

2017-2019

I. ARAF Priorities and Action Areas[1]

Priority Area 1: Analyzing and Understanding Risk and Resilience in the Arctic

Action Area 1.1: Increase the effectiveness of existing monitoring systems and include social-ecological indicators and their interactions.

Action Area 1.2: Substantially enhance our understanding of ecologically vulnerable areas and areas in which Arctic-adapted biodiversity can persist under a changing climate.

Action Area 1.3: Improve short and long-term projections for the Arctic under different future greenhouse gas emission and development scenarios, using natural and social sciences and Indigenous/Traditional Knowledge and local knowledge.

Action Area 1.4: Expand the documentation of adaptation responses to changing threats in the Arctic

Priority Area 2: Building Resilience and Adaptation Capacity

Action Area 2.1: Increase the co-production of knowledge using science, Indigenous/Traditional Knowledge and local knowledge.

Action Area 2.2: Expand the ability of community-based observation networks to collect critical data for monitoring change and integrate with Earth observations.

Action Area 2.3: Improve tools for assessing management strategies in changing Arctic ecosystems.

Action Area 2.4: Ensure data and tools are equitably distributed and easily accessible for local communities, decision makers and policy makers at all levels.

Action Area 2.5: Substantially increase the number of communities, youth and emerging leaders that understand Arctic change using a variety of knowledge approaches.

Action Area 2.6: Increase administrative and planning support to communities, governments and decision-makers at all levels, including support for applying resilience knowledge to decision-making.

Priority Area 3: Implementing Resilience through Policy, Planning and Cooperation

Action Area 3.1: Increase the inclusion of local perspectives in local and sub-regional decision-making.

Action Area 3.2: Enhance the development and deployment of resilient infrastructure, telecommunications, and technologies to deal with emerging challenges that are unique to the Arctic (e.g., waste, water security, energy, food security, health, etc.).

Action Area 3.3: Expand the use of ecosystem-based management in the Arctic.

Action Area 3.4: Substantially expand the use of transdisciplinary approaches for understanding change and implementing strategies to enhance resilience.

Action Area 3.5: Encourage consistent practices and for ensuring public participation and the integration of Indigenous/Traditional Knowledge and local knowledge in environmental impact assessments and other decision-making processes.

Priority Area 4: Encouraging Investment to Reduce Risk and Build Resilience

Action Area 4.1: Improve our understanding of best practices for resilient and “climate proof” investments in the Arctic.

Action Area 4.2: Substantially increase private sector investments that support resilient communities.

Action Area 4.3: Expand the use of innovative financial mechanisms for improving resilience.

Action Area 4.4: Encourage the identification of specific funding gaps and resilience priorities, as a way to provide guidance to potential donors and catalyze new investments.

II. Working Group Actions that Build Resilience (2017-2019)

All six of the Arctic Council Working Groups are taking actions that build resilience. Below are suggested lists of actions (by Working Group) that are drawn from the 2017-2019 Work Plans of the six Working Groups. The ARAF Action Item(s) that these actions correspond to are indicated in parenthesis. In some cases, Working Groups are taking actions that could build resilience that may not directly correspond to an ARAF Action Item. These are also listed below.

Several of the activities below are being implemented in conjunction with multiple Working Groups. Because bridging different knowledge types is a key ingredient of building resilience, the ARAF project will encourage opportunities for cross Working Group collaboration on the resilience topic.

A. Arctic Contaminants Action Program (ACAP)

Actions that Correspond Directly to ARAF Action Items:

Continue to develop the Black Carbon Case Studies Platform on the ACAP website by adding 40 case studies. **(1.4)**

Bring new communities of observers and experts into the Circumpolar Local Observer (CLEO) network and establish CLEO hubs within Arctic States across the region. **(2.1, 2.2)**

Assess, on a pilot basis, local sources of black carbon emissions from a number of Alaskan, Russian and Saami villages. The project will provide a broad characterization of associated public health risks; explore short and long-term mitigation options; assess and, where possible, strengthen local capacities to identify, mitigate and prevent black carbon pollution; draft a framework tool for community-based assessments of black carbon emissions and health risks; and educate local communities about black carbon emissions and risks. **(2.1, 2.5, 2.6)**

Follow-up on implementation of off-grid upgrades to wind-diesel solutions in the Republic of Karelia in the Russian Federation. The replacement of old diesel generators has reduced releases of black carbon and other greenhouse gases, decreased dependence on transported fossil fuels, reduced electricity and heating costs, increased reliability and quality of electricity and heating supply, and strengthened expertise of local institutions. **(4.1, 4.4)**

Implementation of the Syktvkar Svrnos Landfill project which aims to close the existing landfill and install a methane gas collection system and construct a new sanitary plot with waste sorting facilities. The project will take important steps to reducing adverse environmental and health impacts. These steps will contribute to the exclusion of a Barents Hot Spot. Best practices will be documented, demonstrating improvement to municipal solid waste systems that can be replicated in Arctic communities. **(2.6, 3.2, 4.1, 4.4)**

Assess adverse environmental impacts of the Dudinka city landfill on the Arctic environment and develop remediation technology in the remote Arctic permafrost zone. The work will include a survey of existing approaches, implementation of remediation, identification of other sites to replicate the methodologies and introduction of best available technologies for rehabilitation of municipal solid waste landfills. **(3.2, 4.1, 4.4)**

Continue to promote the decrease of pollution in the Barents region through the introduction of best available technologies with enterprises and universities. This will facilitate future environmental investments in the region. Products will include a feasibility study, development of curriculum for experts and authorities, and workshops/seminars to distribute findings. **(1.2, 2.6, 3.1, 3.2, 4.1, 4.2, 4.4)**

B. Arctic Monitoring and Assessment Programme (AMAP)

Actions that Correspond Directly to ARAF Action Items:

Implement the AMAP coordinated trends and effects monitoring program **(1.1, 2.1)**

Follow up the Snow, Water, Ice and Permafrost in the Arctic (SWIPA) report. This includes outreach work such as making the results available for use by others, such as IPCC special reports on cryosphere/hydrological impacts of a global warming of 1.5 degrees C above pre-industrial levels (due in 2018), and climate change and the oceans and the cryosphere (due in 2019). It will also include work on extremes and abrupt change. **(1.2, 1.3)**

Follow up the three regional Adaptation Actions for a Changing Arctic (AACA) reports, where some of these reports contain separate chapters on resilience, and also discusses resilience indicators. **(1.3, 1.4, 2.1, 3.4)**

Complete and follow up the ongoing assessment of Arctic Ocean acidification, including work on biological responses and socio-economic impacts based on five case studies **(1.2, 1.3, 1.4?, 3.4?)**.

Update on the assessment of mercury in the Arctic (due in 2021). **(1.2)**

Assessment of biological effects of POPs and mercury. **(1.2)**

Follow up on the assessment of chemicals of emerging concern, including provision of relevant data and information to bodies responsible for chemical regulation. **(1.2)**

Assessment of scientific knowledge regarding SLCP impacts on Arctic climate (due in 2021), including emissions scenarios and modeling as well as air pollution issues such as health effects. **(1.2, 1.3)**

Complete a report on the impacts of climate change on contaminant release and fate. **(1.2)**

Begin the development of a new assessment of human health in the Arctic. **(1.2)**

Together with IASC, provide secretariat support to the Sustaining Arctic Observing Networks (SAON) initiative **(1.2, 2.2?)**

Enhanced meteorological cooperation will improve observation networks, increase data availability and strengthen the foundation for adaptation and risk management. **(1.1, 1.3)**

C. Conservation of Arctic Flora and Fauna (CAFF)

Actions that Correspond Directly to ARAF Action Items:

Follow-up on the Actions for Arctic Biodiversity, 2013-2021: Implementing the recommendations of the Arctic Biodiversity Assessment (priority areas 1-4)

Implement the Circumpolar Biodiversity Monitoring Program, Arctic Marine/Freshwater/Terrestrial Biodiversity Monitoring Plans, Arctic Coastal Biodiversity Monitoring Plans. **(1.1, 1.2, 1.3, 2.1, 3.4)**

Complete the Coastal Biodiversity Monitoring Plan. **(2.2)**

Continue development of the CBMP headline indicators

Implement the Arctic Invasive Alien Species strategy and Action plan (ARIAS) 2017-21, in collaboration with PAME, to reduce the threat of invasive alien species **(1.2, 2.1, 3.4)**

Generate map and data products from the Community Observation Network for Adaptation and Security (CONAS) to inform decision making. **(1.2, 2.2)**

Complete the Circumpolar Boreal Vegetation Map and the Arctic Flora Inventory. **(1.2, 2.3)**

Convene and report the results of the second Arctic Biodiversity Congress **(1.4, 2.1)**

Implement the Circumpolar Biodiversity Monitoring Program, Arctic Marine/Freshwater/Terrestrial Biodiversity Monitoring Plans, Arctic Coastal Biodiversity Monitoring Plans. Including completing the State of the Arctic (freshwater, terrestrial, coastal) biodiversity reports and following up on the 2017 State of the Arctic's Marine Biodiversity Report **(2.2)**

Facilitate access, integration, analysis and display of biodiversity information through CAFFs Arctic Biodiversity Data Service (ABDS) and partners. **(2.3, 2.4)**

Follow-up on recommendations of the Ecosystem Based Management expert group **(3.3)**

Continue implementation of the Arctic Migratory Bird Initiative (AMBI) to improve the status and secure the long-term sustainability of declining Arctic breeding migratory bird populations **(3.4)**

Complete project on enhancing engagement in relation to the roles and functions of Arctic wetlands as a resource to support sustainable development and resilience in the Arctic.

Conduct a mainstreaming case study: The incorporation of biodiversity provisions into the work of a select industry Complete Nomadic Herders: Enhancing the resilience of pastoral ecosystems and livelihoods of nomadic reindeer herders, an international indigenous peoples' project.

Implement Inspiring Arctic Voices through Youth Engagement: including the Arctic Youth Exchange Programme and the Arctic Youth Summit scheduled for October 2018.

Implement CAFF species conservation strategies

D. Emergency Prevention, Preparedness, and Response (EPPR)

Actions that Correspond Directly to ARAF Action Items:

Conduct a technical exchange, including best practices, on cross-border prevention, preparedness and handling of maritime incidents/accidents which may involve radioactive substances **(2.6)**

Engage in Search and Rescue (SAR) and Oil Spill Response exercises. Collaborate with other bodies, fora, working groups, and academia to compile, identify, analyze and disseminate recommendations and needs identified in after-action reports. **(2.6)**

Develop a Lessons Learned portal from MOSPA and SAR exercises in order to track and account for process, and expand offerings for various training opportunities across the Arctic. **(2.6)**

Continue work under the Prevention, Preparedness and Response in Small Communities project, which includes development of short awareness videos on risk and impact, planning and training, and response principles. The audience for the videos are decision makers, youth people and educators. **(1.4, 2.1, 2.4, 2.6, 3.1, 3.2, 3.5)**

Continue and develop the work related to marine environmental risk assessments – including the project on developing of a guideline and tool for risk assessment methods and metadata. **(1.2, 2.3, 2.4, 3.3, 3.5)**

Identify gaps in follow-up on objectives outlined in the Framework Plan on Oil Pollution Prevention (FP-OPP). This action is co-lead with PAME, and will include input from Arctic States, PPs, AC Working Groups, Observers and other relevant stakeholders.

E. Protection of the Arctic Marine Environment (PAME)

Actions that Correspond Directly to ARAF Action Items:

Conduct a Desktop Study on Marine litter, including microplastics in the Arctic, to evaluate the scope of knowledge on marine litter in the Arctic, and its effects on the marine environment. **(1.2)**

Review and analyze the existing guidance and requirements in the region for engagement of indigenous peoples and local communities in marine activities to inform the Arctic Council on whether more or consolidated recommendations need to be made. (As part of the Meaningful Engagement of Indigenous Peoples and Local Communities Marine Activities, or “MEMA II”, project) **(3.1, 3.5)**

Continue work on promoting the Ecosystem Approach/Ecosystem Based Management Approach (EA/EBM) in the Arctic. Prepare guidelines addressing EA/EBM implementation in Arctic (marine) ecosystems; hold 6th EA workshop in late autumn 2017/spring 2018, with a focus on Integrated Ecosystem Assessment; hold 2nd International EA Conference 2018 on Integrated Ecosystem Assessment in the Arctic, Marine Protected Areas in Implementation of EA, and Review status of implementation EA and EA framework elements. Continue to promote common understandings and share knowledge and experiences on EA.; Continue to promote common understandings and share knowledge and experiences on EA **(3.3)**

Continue work on a Pan-Arctic Network of Marine Protected Areas within the “Framework for a Pan-Arctic Network of MPAs (2015)” including the convening of the following workshops on connectivity and resilience in the Arctic **(3.3)**:

- 1st MPA Workshop: Science and Tools for Developing Arctic Marine Protected Area (MPA) Networks: Understanding Connectivity and Identifying Management Models (22-23 September 2016)
- 2nd MPA Workshop: *Understanding MPA Networks as Tools for Resilience in a Changing Arctic* (2-3 February 2017).
- 3rd MPA Workshop: *marine protected area (MPA) networks in a changing Arctic climate* (21-22 September 2017)

PAME/CAFF Joint Coordination Group to guide implementation of ARIAS and provide recommendations to the CAFF and PAME Working Groups regarding potential implementation actions and progress on activities. **(3.4)**

Follow-up on the implementation status of the forty Strategic Actions of the Arctic Marine Strategic Plan (2015-2025) as per its implementation plan (priority areas 1-3)

Other Actions that Can Build Resilience:

Collect information on on-shore use by indigenous people and local communities of Heavy Fuel Oil and identify the environmental, economic, and technical feasibility of alternative fuel use.

Create a compendium of Arctic shipping accidents and provide information that might be used to reduce risk.

Identify gaps in follow-up to the Framework Plan on Oil Pollution Prevention (FP-OPP).

F. Sustainable Development Working Group (SDWG)

Actions that Correspond Directly to ARAF Action Items:

Contribute to Arctic regional sustainable development through AREA, an online tool that enhances knowledge of the best practices and local adaptation actions on Arctic renewable energy and energy efficiency. This tool will visualize collected renewable energy supply and demand data in addition to Arctic-wide local community success stories. **(1.4, 3.2)**

Continue the EALLU project, which documents Indigenous traditional knowledge on food, through youth engagement, education, training and outreach. The project focuses on food security, food empowerment, and understanding Indigenous peoples' food systems. The project engages Indigenous transboundary knowledge institutions. **(2.1)**

Continue to build ties between human, animal, plant, and environmental health stakeholders in the circumpolar region, as a key strategy for adapting to rapid environmental change. During the 2017-2019, the One Health project will emphasize: 1) continued knowledge and information sharing, 2) further simulation exercises that identify strengths and areas for further capacity building, and 3) cooperative activities to address observed events [such as those identified by the Circumpolar Local Environmental Observers (CLEO) Network]. **(2.1, 2.6, 3.4)**

Create a long-term energy planning process for Arctic communities. The Arctic Sustainability Energy Futures Framework (ASEFF) will be launched in 6-8 communities and will build practice knowledge and capacity around energy. **(2.6, 3.2)**

Through the Arctic Remote Energy Networks Academy (ARENA), build capacity, share knowledge, and establish professional networks to transition from diesel to hybrid and renewable energy systems through a webinar series, on-site program, and workshops. **(3.2)**

Host the 5th Arctic Energy Summit in Sept 2019 in Iceland] to share best practices, emerging technology and process innovation on renewable energy, energy efficiency, and remote energy systems. **(3.2)**

Produce Good Practice Recommendations on Environmental Impact Assessment and public participation in EIA in the Arctic. **(3.5)**

The objective of the Arctic as a Food--Producing Region, Arctic Food Innovation Cluster (AFIC) would be to create value by connecting northern entrepreneurs and southern-based investors and business, stimulate economic development opportunities and help alleviate conditions of food insecurity for northern residents **(3.2, 4.2)**

Assessing the Use of Heavy Fuel Oil (HFO) in Indigenous Communities in partnership with PAME to understand the degree to which communities currently rely on the use of HFO in their daily lives and understand the human dimensions of HFO regulation, including unintended consequences for Arctic residents, in the Arctic **(3.5)**

The Arctic Generation 2030 project aims at forging strong and globally---connected community of future Arctic leaders through an investment in the human capital of the region with focus on training, networking, and partnerships led by the region's primary actors in education, research, public policy, and business **(2.5)**

Through the project Circumpolar Resilience, Engagement and Action Through Story (CREATes) support community and youth engagement towards effective action that reduces suicide and fosters mental

wellness among Arctic Indigenous youth and communities and sustain the circumpolar network already established through the Arctic Council **(2.1, 2.4, 3.4)**

The project on Solid Waste Management in Small Arctic Communities aims at obtaining an overview of current best practices in solid waste management in the Arctic States **(3.2)**

Zero Arctic: Concepts for carbon neutral Arctic construction based on tradition, utilizing both scientific life cycle assessment and energy simulation methods as well as traditional knowledge **(2.1, 3.2)**

[1] The Arctic Resilience Action Framework (ARAF) was adopted by the Arctic Council Ministers in May 2017. The full document can be found here: <https://oaarchive.arctic-council.org/handle/11374/2019>

Annex 3b: Enhancing Collaborations around Resilience-Building: Working Group Feedback

In preparation for the Arctic Resilience Forum, all the Chairs and Executive Secretaries of all six Arctic Council Working Groups were invited to provide input on the following two questions:

1. From the list of Working Group resilience-building activities (see Annex 3a), select 1-2 examples from your Working Group that represent knowledge-sharing and collaboration across more than one Working Group.
2. From the list, select 1-2 projects from other Working Groups that your Working Group may have interest in collaborating on.

The responses to these questions informed further discussion about increasing resilience collaboration across Working Groups.

Response from AMAP:

1) Question 1: examples from the AMAP that represent knowledge-sharing and collaboration across more than one Working Group

- CAFF and AMAP: Joint efforts with CAFF, to communicate assessment results from CAFF and AMAP at the Biodiversity Congress. On AMAP's side, this allows to see projects such as Snow, Water, Ice and Permafrost in the Arctic (SWIPA) and Adaptation Actions for a Changing Arctic (AACCA) in relation to biodiversity and ecosystem change.
- ACAP, TFAMC and AMAP: Assessment of scientific knowledge regarding SLCP impacts on Arctic climate (due in 2021), including emissions scenarios and modelling as well as air pollution issues such as health effects.

2) Question 2: projects from other Working Groups that your Working Group may have interest in collaborating on

- PAME's Desktop Study on Marine litter, including microplastics in the Arctic
- Implementation of:
 - CAFF's Actions for Arctic Biodiversity, 2013-2021: Implementing the recommendations of the Arctic Biodiversity Assessment (priority areas 1-4)
 - PAME's Strategic Actions of the Arctic Marine Strategic Plan (2015-2025) (priority areas 1-3)

Response from PAME:

1) Question 1: examples from PAME that represent knowledge-sharing and collaboration across more than one Working Group

- Implement the Arctic Invasive Alien Species strategy and Action plan (ARIAS) 2017-21, in collaboration with CAFF, to reduce the threat of invasive alien species (1.2, 2.1, 3.4)
- PAME's work on promoting the Ecosystem Approach/Ecosystem Based Management Approach (EA/EBM) in the Arctic. The work is with other AC WGs (AMAP, CAFF and SDWG)

2) Question 2: projects from other Working Groups that PAME may have interest in collaborating on

- SDWG's project on Solid Waste Management in Small Arctic Communities aims at obtaining an overview of current best practices in solid waste management in the Arctic States (3.2) as this may have relevance to the next phase of PAMEs marine litter project (2019-2021).
- ACAP's work on municipal solid waste landfills (3.2, 4.1, 4.4) as this may have relevance to the next phase of PAMEs marine litter project (2019-2021).

Response from SDWG:

1) Question 1: examples from the SDWG that represent knowledge-sharing and collaboration across more than one Working Group

- HFO project regarding community use of HFOs is being undertaken in cooperation with PAME, and on PAME's MEMA project
- Solid waste management in Arctic communities would benefit from collaboration with ACAP

2) Question 2: projects from other Working Groups that your Working Group may have interest in collaborating on

- ACAP's work on Circumpolar Local Observer (CLEO) networks and establishing CLEO hubs within Arctic States across the region.
- AMAP's follow-up work on the three regional Adaptation Actions for a Changing Arctic (AACA) reports, where some of these reports contain separate chapters on resilience, and also discusses resilience indicators
- AMAP's plan to begin the development of a new assessment of human health in the Arctic.
- CAFF's work on generating map and data products from the Community Observation Network for Adaptation and Security (CONAS) to inform decision making
- CAFF's initiative to implement inspiring Arctic Voices through Youth Engagement: including the Arctic Youth Exchange Programme and the Arctic Youth Summit scheduled for October 2018
- EPPR's project work on Prevention, Preparedness and Response in Small Communities, which includes development of short awareness videos on risk and impact, planning and training, and response principles. The audience for the videos are decision makers, youth people and educators
- PAME's work on promoting the Ecosystem Approach/Ecosystem Based Management Approach (EA/EBM) in the Arctic

Response from CAFF:

1) Question 1: examples from CAFF that represent knowledge-sharing and collaboration across more than one Working Group

- Follow-up on the Actions for Arctic Biodiversity, 2013-2021: Implementing the recommendations of the Arctic Biodiversity Assessment (priority areas 1-4)
- Implement the Circumpolar Biodiversity Monitoring Program, Arctic Marine/Freshwater/Terrestrial Biodiversity Monitoring Plans, Arctic Coastal Biodiversity Monitoring Plans
- Implement the Arctic Invasive Alien Species strategy and Action plan (ARIAS) 2017-21, in collaboration with PAME, to reduce the threat of invasive alien species

2) Question 2: projects from other Working Groups that CAFF may have interest in collaborating on

- Continue to work with PAME on a Pan-Arctic Network of Marine Protected Areas within the “Framework for a Pan-Arctic Network of MPAs (2015)” including the convening of the following workshops on connectivity and resilience in the Arctic **(3.3)**:
- Follow up the three regional Adaptation Actions for a Changing Arctic (AACAA) reports, where some of these reports contain separate chapters on resilience, and also discusses resilience indicators. **(1.3, 1.4, 2.1, 3.4)**
- Produce Good Practice Recommendations on Environmental Impact Assessment and public participation in EIA in the Arctic. **(3.5)**

Response from EPPR:

1) Question 1 & 2: Examples from EPPR could benefit from knowledge-sharing and collaboration across Working Groups and from input from PPs, Observer and relevant stakeholders

- “Prevention, Preparedness and Response for small communities”:
- EPPR completed Phase I of the small communities project in May 2017, Phase II of the project seeks to build awareness of the challenges that oil spill incidents may create in small communities and to provide options to prepare appropriate responses during an oil pollution emergency. Three outreach videos are being developed by Flip Studios in Tromsø, under the guidance of the project leads Norway, Canada, the US and AIA, with support from the EPPR Secretariat. The first three movies will be: 1) Basic oil pollution response principles, 2) Planning for an initial community-based pollution response, and 3) Oil pollution risk and impacts to communities. The first video is now under production based on an agreed upon timeline. It is expected that the first video will be finished in time for the Arctic Biodiversity Congress, with an option to make final changes in advance of EPPR II, where it will receive final approval. Production of the second and third videos are an option that will be decided in fall 2018. The videos will be up to 10 minutes long, and the final package will include a trailer for use on social media. The film will also be “chopped” into segments so that viewers have the option of viewing parts of the video independently. These shorter segments are also useful for social media.
- The Prevention, Preparedness and Response in small communities project, while currently focusing on oil spill response, may take on other topics such as Search and Rescue or radiological PPR. The project may also explore the use of social media as a platform of communication with small and remote communities This project would benefit from the input of other AC working groups, PPs, Observers and relevant stakeholders.

Response from ACAP:

1) Question 1 & 2: Examples from ACAP that could benefit from knowledge-sharing and collaboration across more Working Groups and from input from PPs, Observer and relevant stakeholders

- “Establishing a Circumpolar Local Environmental Observer Network”:

- The ACAP project to “Establish a Circumpolar Local Environmental Observer (LEO) Network” is currently in Phase 2 and is aimed at bringing LEO to Arctic communities outside of North America. The County Government of Finnmark has recently completed a feasibility study on the potential for LEO project and hub development in Norway. The results of the study indicate both interest and great potential for both LEO projects and a LEO hub in the region, specifically, through the International Centre for Reindeer Husbandry (ICR) and northern salmon fisheries. The overall objective of CLEO is to increase awareness of vulnerabilities to the impacts of climate change, and to connect community members with technical experts. The LEO app is key to tracking observations and displaying the results in a user friendly and informative way. Observations include a description, photos, expert consultation and links to information resources. LEO contributors are helping to increase the understanding of environmental changes taking place across the Arctic due to climate change and exposure to contaminants.
- CLEO would benefit from input from other AC Working Groups, PPs, Observers and relevant stakeholders.