



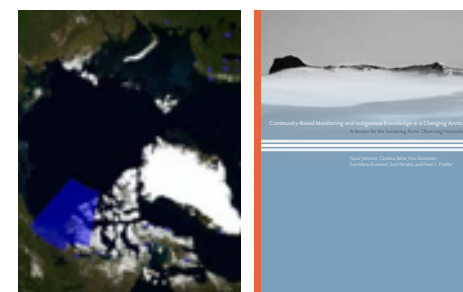
Community-Based Monitoring and Indigenous Knowledge in a Changing Arctic:
A Review for the Sustaining Arctic Observing Networks

Noor Johnson, Carolina Behe, Finn Danielsen,
Eva-Maria Krümmel, Scot Nickels, and Peter L. Pulsifer

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* This document only contains the "executive summary."
To see the Atlas and the full report please go to www.arcticcbm.org

Executive Summary

This review of community-based monitoring (CBM) in a changing Arctic is based on a multi-year initiative launched in 2012 as a task under the “Sustaining Arctic Observing Networks” (SAON), a network of Arctic observing networks. The goal of the task was to better understand the current state of CBM in the Arctic, with a particular interest in monitoring and observing based on Indigenous Knowledge (IK), and to make recommendations to SAON and the Arctic observing community more broadly about how to support engagement and development of CBM.

The task began with the creation of a searchable, online inventory of CBM and IK programs, projects, and initiatives: the Atlas of Community-Based Monitoring and Indigenous

Knowledge in a Changing Arctic (www.arcticcbm.org). The Exchange for Local Observations and Knowledge of the Arctic (ELOKA) developed this web-based atlas infrastructure on the Nunaliit Atlas Development Framework (<http://nunaliit.org>). The Atlas geolocates these various initiatives, visualizes the networks of communities that are involved, and shares metadata provided or verified by program staff.

Identification and recruitment of CBM and IK initiatives to join the Atlas involved a number of strategies. We intentionally did not pre-define CBM, but adopted an inclusive approach that encompassed programs with different levels of community involvement as well as IK projects with relevance to long-term observing. We conducted initial outreach to a



The Sami people, also spelled Sámi or Saami, are the indigenous Finno-Ugric people inhabiting the Arctic area of Sápmi. This is a small siida, a reindeer foraging area. Credit: Harvey Barrison

number of Indigenous organizations and government and academic researchers engaged in monitoring and observing activities. At the pan-Arctic level, Arctic Council Permanent Participants (PPs), and the SAON and Conservation of Arctic Flora and Fauna (CAFF) boards were briefed and asked to refer programs. Once programs were identified, program staff were asked to fill out a questionnaire to provide metadata about their initiative. In some cases, phone interviews were conducted and program staff were asked to approve a pre-filled questionnaire. Completed questionnaires were reviewed and entered into the Atlas by a trained member of the research team to ensure consistency of entries. As of September 2015, the Atlas included 81 program entries.¹

The second component of the SAON task was to analyze these entries alongside information gathered from participation of several of this review’s authors in a series of workshops on CBM and IK held in 2013 and 2014²; this analysis informed the development of the review. The goal of the review is to provide a snapshot of the methods, approaches, and practices of CBM and IK initiatives, and to present recommendations for next steps in supporting the continued development of CBM as an important approach to Arctic observing. The intended audience of this review includes CBM and IK program practitioners

and interested community members, scientists and researchers interested in different approaches to Arctic observing, individuals engaged in developing approaches and networks for data sharing and coordination, and municipal, state/territorial, and national government agencies interested in community-based approaches to monitoring. The review contains the following sections: General overview of programs in the Atlas; Specific issue areas; Good practices; and Next Steps.

1. We continue to recruit and add new programs to the Atlas; if your program would like to be included, please contact: arcticcbm@inuitcircumpolar.com.

2. Workshops included: “From Promise to Practice: Community-Based Monitoring in the Arctic” organized by Oceans North, held in Cambridge Bay, Nunavut, 19-21 Nov. 2013; “Symposium on the Use of Indigenous and Local Knowledge to Monitor and Manage Natural Resources”, organized by Greenland Department of Fisheries, Hunting and Agriculture, NORDECO and ELOKA, held in Copenhagen, Denmark, 2-3 Dec. 2013; “Global Change, Indigenous Community-Based Observing Systems, and Co-Production of Knowledge for the Circumpolar North”, organized by UNESCO, CNRS/MNHN and the International Centre for Reindeer Husbandry, held in Kautokeino, Norway, 25-27 Mar. 2014.

Opposite pages: Icebergs drift in a mountain-ringed Greenland fjord. Ice covers over three-quarters of Greenland, the world’s largest island. The mainland is mainly permafrost, a thick subsurface layer of soil that remains frozen yearlong. With only the coasts free of ice, a sparse population manages to thrive. Credit: Frans Lanting



Using traditional fishing techniques, a fisherman pulls in a vendace fish trap, Lake Puruvesi, North Karelia, Finland. Credit: Chris McNeave

General overview of programs in the Atlas

We analyzed metadata from the 81 programs across the circumpolar region that were in the Atlas as of September 2015 to provide a snapshot of the state of CBM and IK programs relevant to observing and monitoring.³ The analysis includes a discussion of the program start date and current status (active/inactive), program objectives, issues of concern, the role of IK, involvement of community members, data collection methods and approaches, intended scale of information use, and data management. The main findings of the analysis are:

- ✧ Thirty-four programs were based in North America, 37 in Europe, and 9 in Russia, with one additional program co-located in Europe and Russia.
- ✧ More than half of the programs had multiple community sites within a single country, and some had multiple locations in more than one country.
- ✧ Nearly three-quarters were started within the last decade (2005-2014), the remaining between 1917 and 2004.
- ✧ Nearly three-quarters of programs are currently active (either “ongoing” or “in progress”), with around one quarter complete and a few “on hold” due to lack of funding.
- ✧ Programs monitored a wide variety of attributes that we clustered into five broad areas of focus: management of land and resources; wildlife; vegetation; abiotic phenomena such as ice, snow, and water; and socio-cultural attributes such as language transmission, health, and wellness.
- ✧ Sixty-nine percent engaged IK in some capacity, with methods that included interviews, focus groups, and participatory mapping.
- ✧ Twenty-eight percent of programs reported involving both IK and science for supporting decision-making based on multiple evidence bases.
- ✧ Forty-seven percent involved community members in design, data collection, and analysis, while the remaining programs engaged community members in one or two of these phases, or in project design. Thirty percent involved community members in data collection only.
- ✧ Programs used a variety of data collection methods, including collection of physical or biological observations/samples/measurements (47 percent) as well as qualitative approaches such as interviews, surveys, workshops, and literature review and documentary analysis (34 percent). Some programs combined physical observations and sample collection with qualitative methods (19 percent).

- ✧ Fifty-four percent of programs reported making their data accessible to the public, but in most cases this was by request only; thirty-four percent made a data synthesis available.

Specific issue areas

Many of the programs in the Atlas were initiated based on a perceived need for data and observations that could support decision-making in the context of socio-environmental change. In this section, we highlight several issue areas that illustrate some of the underlying matters of concern to communities that have led to the creation of CBM initiatives, including:

- ✧ Monitoring the impacts of development and extractive industry, including land use change and hydro-electric development
- ✧ Contaminants, including from industry and military installations located near communities, as well as long-range transport from outside the Arctic
- ✧ Species population monitoring, biodiversity, and food security

Under each of these issue areas, we share examples of programs from the Atlas that are using CBM and IK documentation to help equip communities with information they need to respond.

Good practices

We identify and highlight eight good practices, drawn from discussions held at the three workshops as well as our analysis of practices reported by programs in the Atlas. Because we believe the field of CBM would benefit from additional processes to identify best practices that should involve community members, IK holders, CBM practitioners, and scientists, we choose to call these “good practices” rather than “best practices.” Good practices discussed in the review include:

1. *Build capacity:* Communities have very different levels of capacity to initiate, participate in, and benefit from monitoring initiatives. CBM initiatives benefit from strong local

3. With a few exceptions, we use the word “programs” rather than “projects” in this review to reflect the idea that monitoring initiatives are intended to collect data and information over a long period (monitoring). However, we did not adopt a strict categorization in our methodology (see below); the Atlas includes a number of shorter-term research projects whose results/data can be useful to informing longer-term monitoring initiatives.



(Left & Right) A reindeer stands apart from the herd of Nenets reindeer in Siberian Russia. Credit: Evgeniy Volkov; (Center) A small Sami village in Saltdal, Nordland, Norway. The door is purposefully built high and on a slant to allow for heavy snowfall. Credit: Maria Victoria Rodriguez

institutional capacity and can also contribute to capacity building and knowledge transfer by providing training and support for Indigenous and local institutions.

2. Co-produce observations and utilize IK: Many CBM programs draw on both IK and conventional scientific approaches and technologies. IK can contribute in a variety of ways, such as building a conceptual framework, contributing and analyzing observations, and helping identify monitoring priorities as well as the best sites for monitoring stations. Co-production approaches draw on IK and scientific methods to develop novel questions and document and interpret observations based on two ways of knowing.

3. Recognize and engage diversity within communities: Although Arctic communities are internally diverse, there is a tendency for CBM programs to focus more on involvement of men's knowledge and land-based activities. Only two projects in the Atlas, for example, focused specifically on women's knowledge and activities. Additionally, greater involvement of youth would create opportunities for skills building in environmental research and management and for transmission of IK between generations.

4. Adapt technologies to respond to community information needs and infrastructure inequities: Unequal access to information and communications technologies (ICTs) remains a critical challenge across the circumpolar region. ICTs can be used to collect, store, process, and share environmental observations and data, including IK and traditional land use practices. Adapting technologies for CBM can be expensive, however,

and requires a thoughtful approach to ensure that investments contribute to observing capacity over the long term.

5. Scale observations and support network building: One of the characteristics of CBM is that it is often initiated for community monitoring needs and purposes. Because responding to Arctic change requires decision-making across scales, there is a need for monitoring data that can inform regional, national, and pan-Arctic decision-making. The formation of networks is a critical part of disseminating and/or scaling CBM related information. Networks serve as conduits for the flow of knowledge and information both within communities as well as between them, and between community institutions and actors and institutions outside the community. Developing CBM networks will require consideration of information and advocacy needs at different scales and across different regions.

6. Use CBM to inform decision-making and natural resource management: Projects in the Atlas describe a variety of uses for the monitoring information they provide, including informing individual, household, community, and government decision processes. The emphasis can be on providing information for one scale of decision-making or multiple scales simultaneously. Communities may not always be aware of all relevant decision-making venues for sharing CBM-generated data and information. Assessing this and considering the political implications of different scales of action would strengthen community capacity for policy engagement in the long term.

7. Develop data management protocols for CBM and IK: There is no single standard data management protocol that applies to all circumpolar regions and communities, and it is important for CBM programs to follow and support local and regional guidelines for research involving IK and community-based observing. As CBM projects develop systems of collecting, storing, and sharing data, and as interest in CBM grows in the larger Arctic observing community, new protocols are needed that can facilitate transfer and sharing of diverse types of observations. These protocols should facilitate sharing across platforms (interoperability) and between knowledge systems so that they relay IK based observations in the ways that IK holders intend.

8. Sustain CBM Programs: Sustainability challenges for CBM programs include a lack of long-term funding opportunities, as well as challenges posed by staff turnover, communication difficulties, and failures of programs to adequately report back findings or link data to community goals. There is general but not universal agreement that financial compensation of community observers is an important component of sustaining community support. Programs can increase the likelihood that they can be sustained over time by building on locally available human capacity and financial resources. A significant factor for sustaining programs is ensuring their relevance to community priorities and concerns.

Next Steps

As an observing network, SAON can support the further development of CBM. We see a particular role for SAON in the following areas:

1. Supporting identification of best practices and standards for community involvement. This review represents an initial step in examining different approaches to CBM from a circumpolar perspective. The scope of this process was limited, however, and many of the conclusions and findings are based on the interpretation of a relatively small group of authors. There is a need for a broadly inclusive, bottom-up process to identify best practices for community-based monitoring, including standards for community leadership and involvement. Because of differences in approach and varying governance arrangements in different parts of the Arctic, this may be more effective as a series of regional efforts accompanied by strong communication between regions. SAON can play a role in supporting these efforts by recognizing their importance to advancing CBM and by disseminating results within the international Arctic observing community.

2. Promoting data and methods standardization. Although support for CBM should enable diverse approaches to data collection depending on the specific goals of the community, SAON can play a role in promoting greater standardization and coordination of methods for data collection that is culturally appropriate and supports the knowledge system/s from which the data are derived. This may be particularly relevant for those programs that wish to make data available for assessment processes and decision-making at regional and pan-Arctic levels. While data standardization is an important overall goal to facilitate data sharing and use, care must be taken to allow for overall flexibility that can support involvement of diverse methodologies and knowledge sources and nurture the knowledge systems from which the data is derived.

3. Disseminating ethics frameworks for CBM and observing programs based on IK. As discussed in this review, ethical approaches to documenting observations require that all parties involved discuss and agree on protocols for data collection, documentation, ownership, control, access, possession, dissemination, and long-term storage and use. SAON can help raise awareness about ethical issues related to documentation of IK and can promote adoption of ethics frameworks by the observing networks that participate in SAON.

4. Supporting the development of platforms that facilitate connection and network building among CBM initiatives. The Atlas of Community-Based Monitoring in a Changing Arctic is one such platform that will require additional investment to stay up-to-date and to build new services that will facilitate information sharing and network building. Other platforms that can facilitate connection include ArcticHub (www.arctichub.net) as well as regional platforms such as the US Interagency Arctic Research Policy Committee (IARPC) collaborations site (www.iarpccollaborations.org). Each of these platforms has a different intended audience but could be used as a tool to facilitate linkages. SAON can help facilitate connections between platforms (which will also help avoid duplication) and raise awareness about www.arcticcbm.org as a platform dedicated solely to CBM.

5. Ensuring involvement of CBM practitioner perspectives in SAON working groups and processes. While CBM is recognized as an important component of Arctic observing, participation by individuals with significant knowledge of CBM has been limited. Recognizing that SAON is largely a voluntary effort without dedicated funding, it may be possible to work towards the establishment of funding mechanisms and to seek external support to ensure that CBM practitioners are able to participate directly in SAON processes and working groups.

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