Finn Danielsen
Lisbeth Iversen
Martin Enghoff
Michael K. Poulsen
Peter Voss
Mathilde V. Sørensen

Communities and Environmental Monitoring in the INTAROS Project

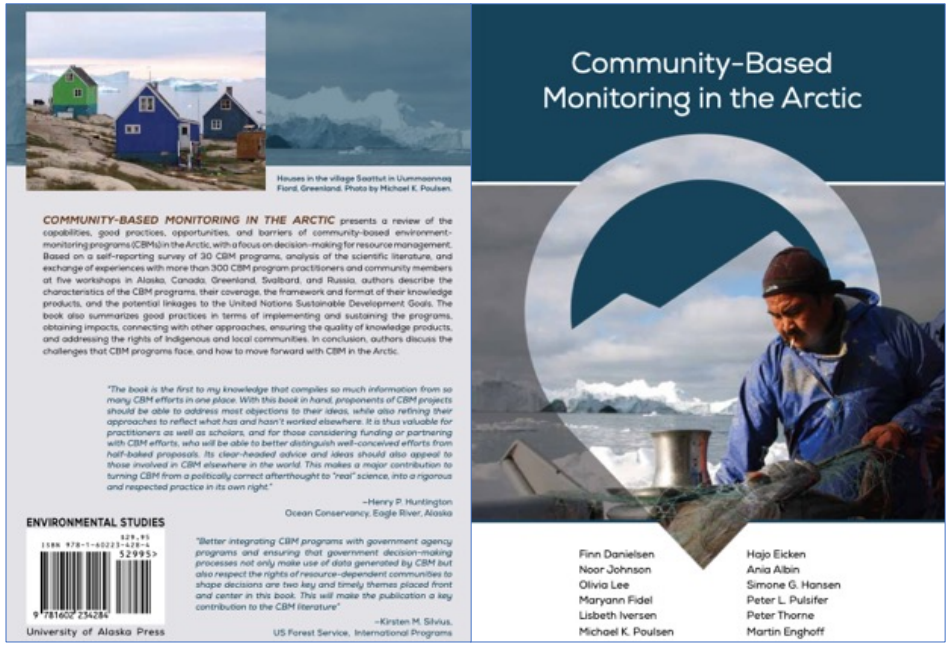
Inputs to the synthesis

Photo by M. Enghoff

WP4: “To enhance community-based observing programs for participatory research and capacity building”

Task 4.1 Survey and analyze existing community-based observing programs in the Arctic to identify capabilities, ‘best practices’ and challenges

Based on dialogue and experience exchange with 30 CBM programs, incl. 40 workshops >600 people and 5 IP groups, we published and widely circulated a monograph: “*Community-Based Monitoring in the Arctic*” (University Alaska Press 2021)



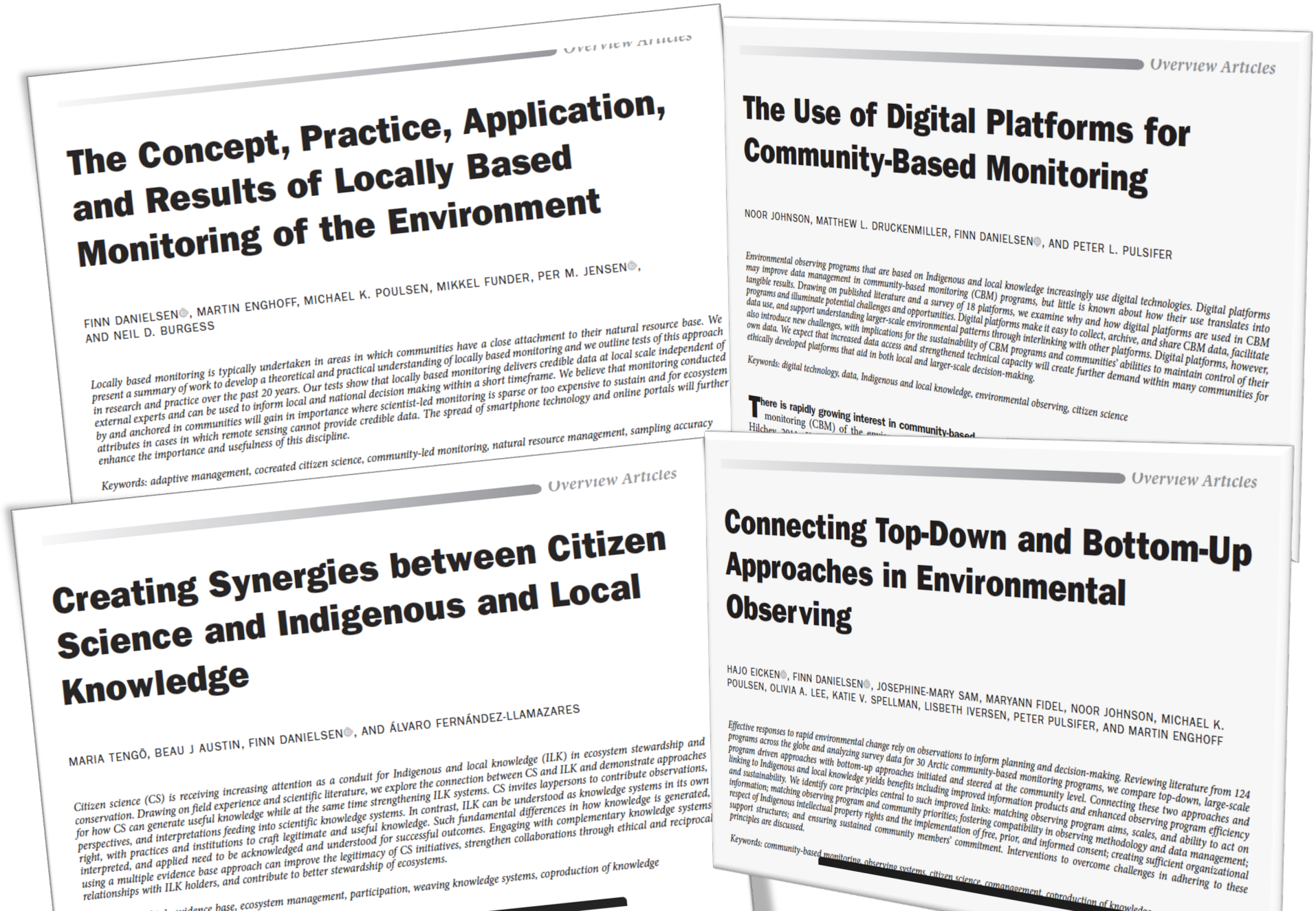
Task 4.2 Advance tools for cross-fertilizing indigenous and local knowledge with scientific knowledge.

We established a web library of Arctic CBM manuals and CBM program organizers' reflections of key lessons learnt

- Based on a dialogue workshop, we developed a Catalogue of Actions to increase the integration of user and hunter knowledge into the way NAMMCO is operating (N Atlantic Marine Mammal Commission)
- We supervised government staff's efforts to identify suitable approaches for interweaving Indigenous and Local Knowledge and scientific knowledge for resource management in the Central Arctic - for the Central Arctic Ocean Fisheries Agreement

We prepared a Special Collection on Community-Based Monitoring in *BioScience.*
In just three months, these papers have been downloaded >2,500 times

In the journal *Science*, we highlighted the importance of CBM to inform resource management during climate change



Overview Articles

The Concept, Practice, Application, and Results of Locally Based Monitoring of the Environment

FINN DANIELSEN, MARTIN ENGHOFF, MICHAEL K. POULSEN, MIKKEL FUNDER, PER M. JENSEN, AND NEIL D. BURGESS

Locally based monitoring is typically undertaken in areas in which communities have a close attachment to their natural resource base. We present a summary of work to develop a theoretical and practical understanding of locally based monitoring and we outline tests of this approach in research and practice over the past 20 years. Our tests show that locally based monitoring delivers credible data at local scale independent of external experts and can be used to inform local and national decision making within a short timeframe. We believe that monitoring conducted by and anchored in communities will gain in importance where scientist-led monitoring is sparse or too expensive to sustain and for ecosystem attributes in cases in which remote sensing cannot provide credible data. The spread of smartphone technology and online portals will further enhance the importance and usefulness of this discipline.

Keywords: adaptive management, cocreated citizen science, community-led monitoring, natural resource management, sampling accuracy

Overview Articles

The Use of Digital Platforms for Community-Based Monitoring

NOOR JOHNSON, MATTHEW L. DRUCKENMILLER, FINN DANIELSEN, AND PETER L. PULSIFER

Environmental observing programs that are based on Indigenous and local knowledge increasingly use digital technologies. Digital platforms may improve data management in community-based monitoring (CBM) programs, but little is known about how their use translates into tangible results. Drawing on published literature and a survey of 18 platforms, we examine why and how digital platforms are used in CBM programs and illuminate potential challenges and opportunities. Digital platforms make it easy to collect, archive, and share CBM data, facilitate data use, and support understanding larger-scale environmental patterns through interlinking with other platforms. Digital platforms, however, also introduce new challenges, with implications for the sustainability of CBM programs and communities' abilities to maintain control of their own data. We expect that increased data access and strengthened technical capacity will create further demand within many communities for ethically developed platforms that aid in both local and larger-scale decision-making.

Keywords: digital technology, data, Indigenous and local knowledge, environmental observing, citizen science

There is rapidly growing interest in community-based monitoring (CBM) of the

Overview Articles

Creating Synergies between Citizen Science and Indigenous and Local Knowledge

MARIA TENGÖ, BEAU J AUSTIN, FINN DANIELSEN, AND ÁLVARO FERNÁNDEZ-LLAMAZARES

Citizen science (CS) is receiving increasing attention as a conduit for Indigenous and local knowledge (ILK) in ecosystem stewardship and conservation. Drawing on field experience and scientific literature, we explore the connection between CS and ILK and demonstrate approaches for how CS can generate useful knowledge while at the same time strengthening ILK systems. CS invites laypersons to contribute observations, perspectives, and interpretations feeding into scientific knowledge systems. In contrast, ILK can be understood as knowledge systems in its own right, with practices and institutions to craft legitimate and useful knowledge. Such fundamental differences in how knowledge is generated, interpreted, and applied need to be acknowledged and understood for successful outcomes. Engaging with complementary knowledge systems using a multiple evidence base approach can improve the legitimacy of CS initiatives, strengthen collaborations through ethical and reciprocal relationships with ILK holders, and contribute to better stewardship of ecosystems.

evidence base, ecosystem management, participation, weaving knowledge systems, coproduction of knowledge

Overview Articles

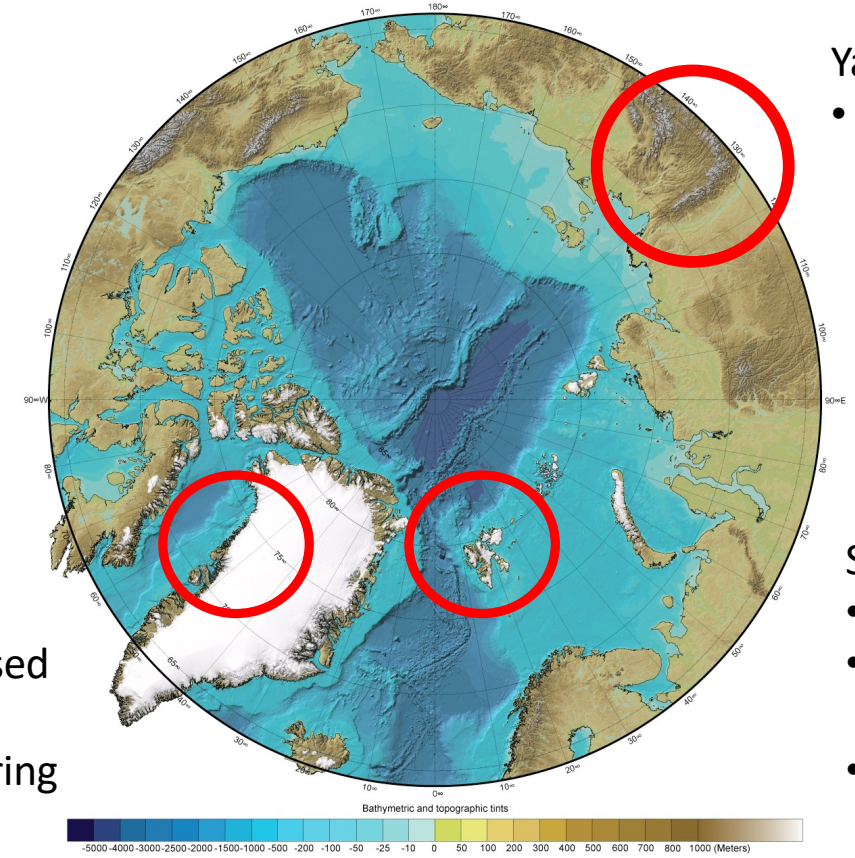
Connecting Top-Down and Bottom-Up Approaches in Environmental Observing

HAJO EICKEN, FINN DANIELSEN, JOSEPHINE-MARY SAM, MARYANN FIDEL, NOOR JOHNSON, MICHAEL K. POULSEN, OLIVIA A. LEE, KATIE V. SPELLMAN, LISBETH IVERSEN, PETER PULSIFER, AND MARTIN ENGHOFF

Effective responses to rapid environmental change rely on observations to inform planning and decision-making. Reviewing literature from 124 programs across the globe and analyzing survey data for 30 Arctic community-based monitoring programs, we compare top-down, large-scale program driven approaches with bottom-up approaches initiated and steered at the community level. Connecting these two approaches and linking to Indigenous and local knowledge yields benefits including improved information products and enhanced observing program efficiency and sustainability. We identify core principles central to such improved links: matching observing program aims, scales, and ability to act on information; matching observing program and community priorities; fostering compatibility in observing methodology and data management; respect of Indigenous intellectual property rights and the implementation of free, prior, and informed consent; creating sufficient organizational support structures; and ensuring sustained community members' commitment. Interventions to overcome challenges in adhering to these principles are discussed.

Keywords: community-based monitoring, observing systems, citizen science, comanagement, coproduction of knowledge

Task 4.3 Pilot community-based observing networks of relevant parameters to support local and national decision-making processes.



Yakutia:

- Herder-based monitoring of wildlife resources

Greenland

- Citizen seismology
- Expedition cruise-based observing
- Fisher-based monitoring of natural resources (PISUNA)

Svalbard

- Citizen seismology
- Expedition cruise-based observing
- Networking for knowledge co-creation

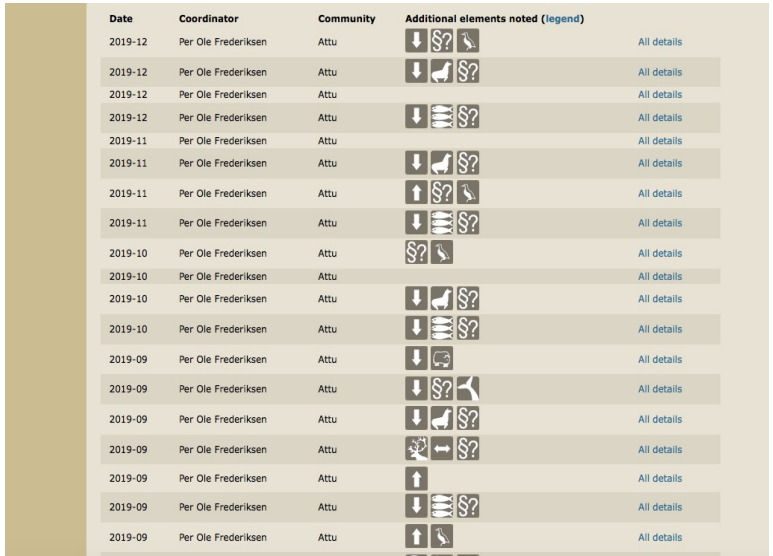
Task 4.3 cont.

- In Greenland's Disko Bay, we tested focus group discussions with 30 fishermen and hunters in the PISUNA program (*Piniakkanik Sumiiffinni Nalunaarsuineq).*
- The fishermen and hunters made observations during 4,300 field trips.
- They discussed their observations among themselves and with local government staff, and they used the findings to send 197 management proposals to the authorities.

- With Ilisimatusarfik and KNAPK, we published a Policy Brief urging the government to incorporate the use of such Local Knowledge into the new Fisheries Law

Access to resources is central to the livelihoods

Engagement in resource management is critical



Date	Coordinator	Community	Additional elements noted (legend)	
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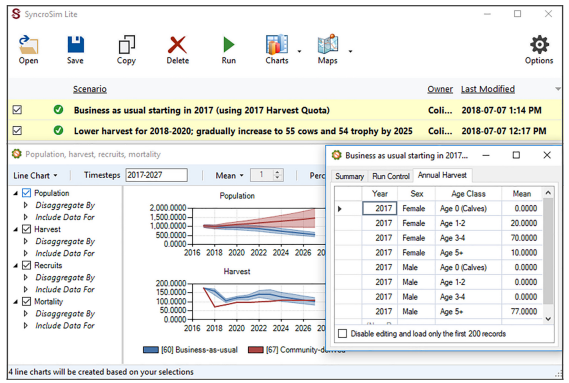
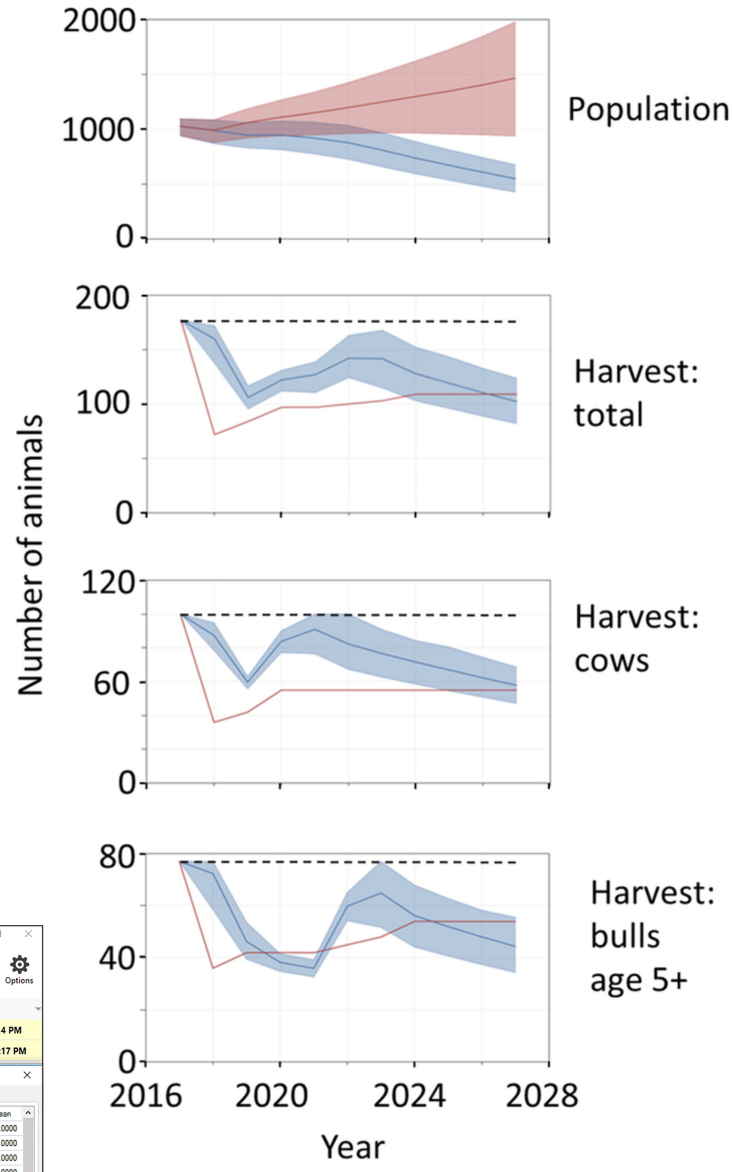
2019-09	Per Ole Frederiksen	Attu		All details

Task 4.3 cont.

Example: In *Conservation Science and Practice*, we presented a muskoxen demographic model that enables community observers – independently from scientists – to undertake multiannual harvest planning of muskoxen stocks in Greenland, ensuring both a supply of meat for subsistence and of old bulls for trophy hunting





Task 4.3 cont.

- We initiated a dialogue on coordinated expedition cruise operator-based observing with the expedition cruise industry, scientists, and the authorities. Cruise guests already make observations of the environment in remote regions but the attributes observed and the volume of records are limited and few of the observations are used by decision-makers.

- We tested the use of four Citizen Science programs among cruise operators in Disko Bay and Svalbard.

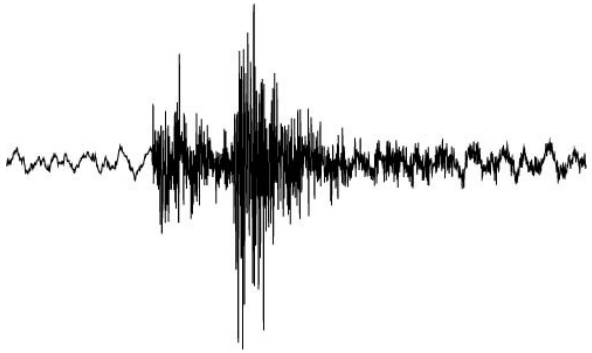
- A total of 165 people contributed observations during one cruise season, mostly bird checklists, to eBird and marine mammal encounters through photos to Happywhale.

Task 4.3 (cont.)

- We tested Citizen Seismology for the first time in the Arctic.

- In the Greenlandic settlements of Akunnaaq and Attu, fishermen Gerth Nielsen and Per Ole Frederiksen put geophones on the bedrock under their houses. The geophones enabled the location of 23 seismic events and improved the location of 209 events, significantly enhancing our understanding of both ice-generated and tectonic events in the area.

- We learned that citizen seismology is useful where buildings are constructed on bedrock and trusted relationships exist between government agencies, scientists and residents. It may help build community awareness of natural hazards



Task 4.3 (cont.)

- In Russia's Sakha Republic, we assisted community organizations to establish CBM. Eight groups of reindeer herders are monitoring the environment and the mining on their traditional territories. The CBM enabled dialogue between the extractive industries and the owners and users of the traditional lands.

- Example: A community in Zhigansk District obtained the rights to a traditional fishing ground in part because of its active participation in the CBM.

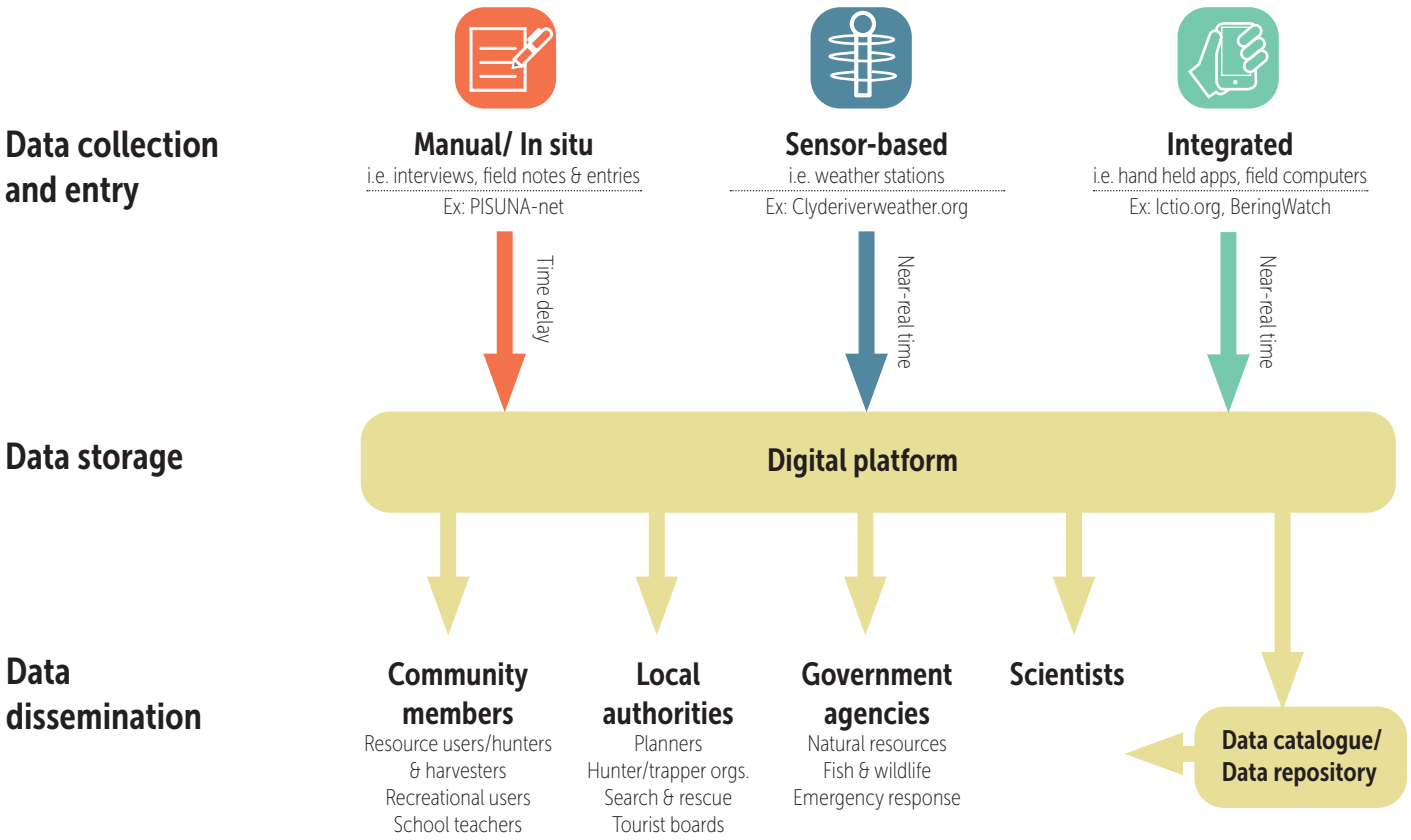
- Example: Evenk community groups documented that Siberian and Arctic cisco are increasingly found at greater water depths. The fish are therefore difficult to catch with the permitted net types. This finding was used by the Republic Indigenous Peoples organisation to influence a change in permitted net types.

- We demonstrated, that for Indigenous Peoples, community-based monitoring (CBM) can be not only a tool for ensuring sustainable resource use, it can also provide a means for protecting their rights to land and resources.

Photo by M. Enghoff

Siberian/ Arctic cisco (*Coregonus sardinella / autumnalis)*

Task 4.4 Make community-based observations accessible for iAOS.



- We have connected community datasets to international databases.
- We entered meta-data on PISUNA-net and 14 other Arctic CBM and Citizen Science data collections into the INTAROS data catalogue.
- We learned that most data catalogues and international data repositories are not suitable for hosting CBM data collections

(From Johnson et al. 2021 https://academic.oup.com/bioscience/article/71/5/452/6236037?login=true)

Task 7.7

- Co-organized 40 workshops to exchange experiences among community observers on community-based monitoring and citizen science in the Arctic.
- The events have been attended by >600 people, including representatives from five Indigenous Peoples (Inuit, Sami, Evenk, Gwi´chin and Komi Izhma).

Co-initiated new UArctic Thematic Network

Thematic Networks and Institutes

- Arctic and Northern Governance
- Arctic Boreal Hub
- Arctic Economic Science
- Arctic Engineering
- Arctic Extractive Industries
- Arctic Geology
- Arctic Indigenous Skills
- Arctic Law
- Arctic Lingua
- Arctic Migration
- Arctic Plastic Pollution
- Arctic Safety and Security
- Arctic Sustainable Arts and Design (ASAD)
- Arctic Sustainable Resources and Social Responsibility
- Arctic Telecommunications and Networking
- Arctic WASH
- Arthropods of the Tundra / NeAT
- Circumpolar Archives, Folklore and Ethnography (CAFE)
- **Collaborative Resource Management**
- Commercialization of Science and

Home > Thematic Networks > Collaborative Resource Management

Thematic Network on Collaborative Resource Management

Photo by M. Enghoff

The network seeks to develop capacity in collaborative natural resource management and community monitoring in the Arctic.

Overall Goal

Related news

- Three New Thematic Networks established in 2019

See All News

Partner Organizations

- Greenland Institute of Natural Resources
- Hokkaido University
- National Institute of Polar Research
- Nordisk Fond for Miljø og Udvikling
- University of Alaska Fairbanks

Contacts

- Finn Danielsen (Lead)
  Institution: Nordisk Fond for Miljø og Udvikling

See All Partners & Contacts

Related files

- Thematic Network proposal "Collaborative Resource Management"

See All Related

In-service course in Greenland

25 government resource managers (women & men)

From **all** 5 municipalities of Greenland

Co-funding:

Photos and collage: Shuhei Takahashi

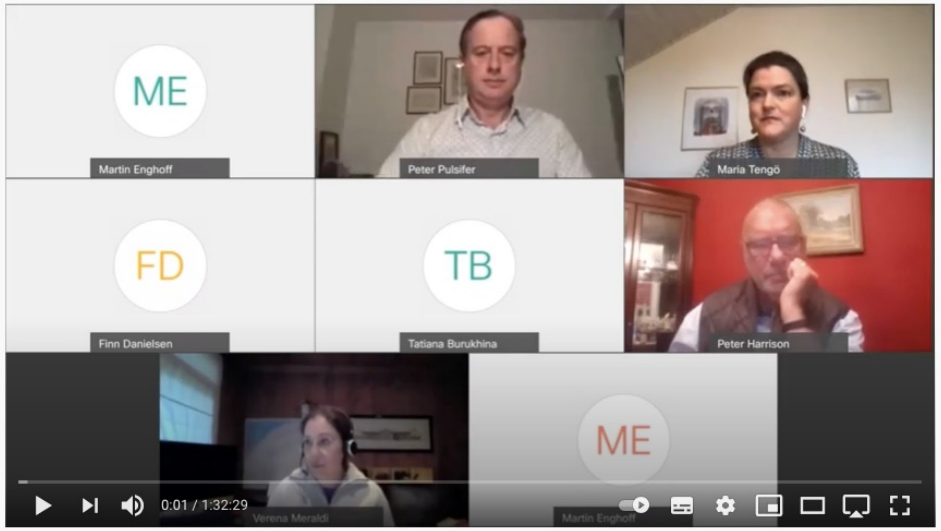
Grand Challenges
in Polar Sciences 2030

Cross-weaving Citizen Observations, Loca
Knowledge and Scientific Research in th Arctic
30
Session C Finn Danielsen, P Pulsifer, Martin Enghoff

Finn Danielsen, NORDECO
Peter Pulsifer, Carleton University
Martin Enghoff, NORDECO
Peter Harrison, Queen's University
PâviâraK Jakobsen, Qeqertalik Municipality and PISUNA
Verena Meraldi, Hurtigruten
Maria Tengö, Stockholm University

Watch Replay | Technical Session
Social sciences and humanities

Link: https://youtu.be/ljUTNlw4slM



Cross-weaving Citizen Observations, Local Knowledge and Scientific Research

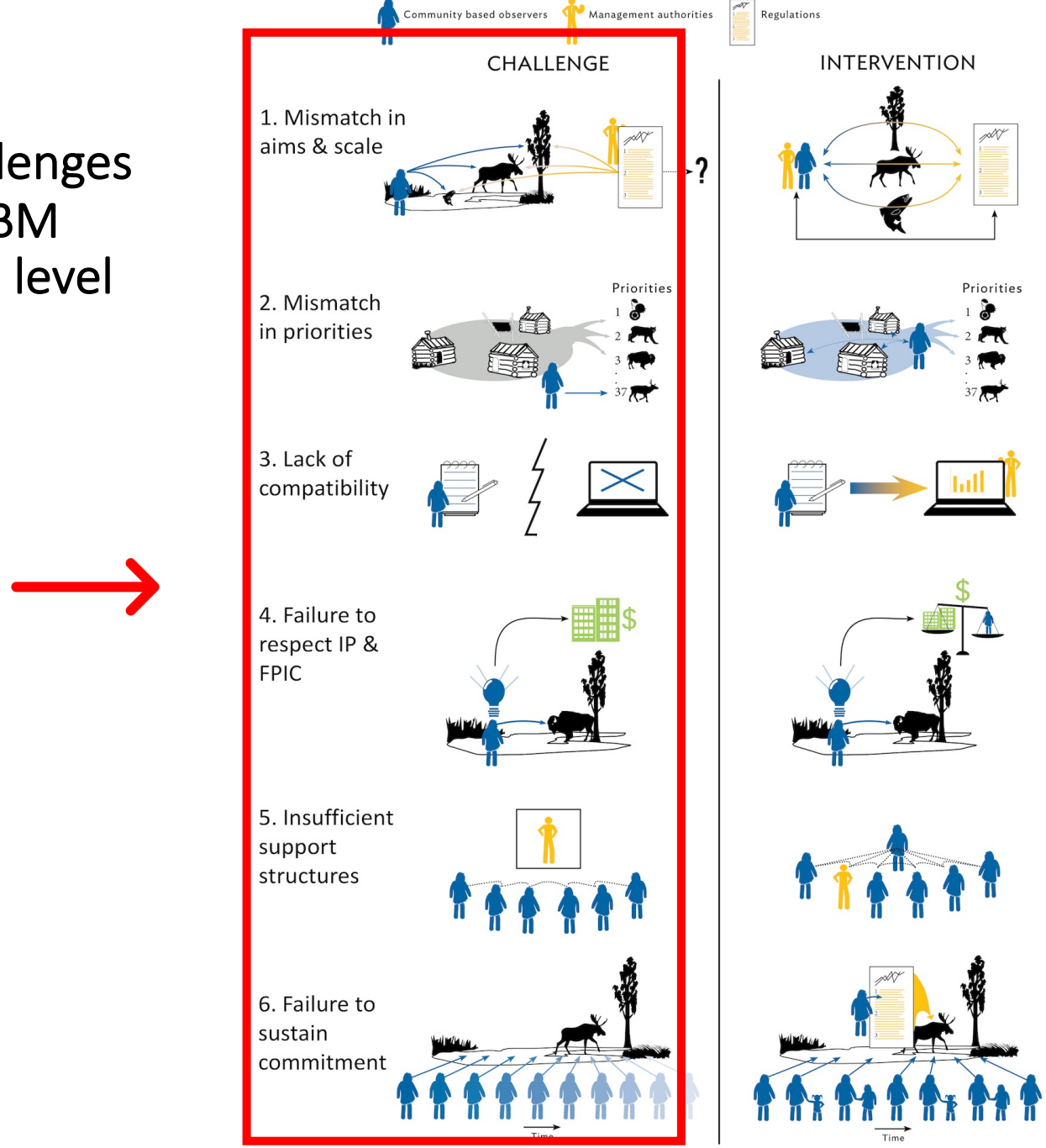
Expected impact

- Demonstrated that mobilizing **all** relevant knowledge, observations and data on the Arctic environment has great potential - and perhaps can be transformational.

- It will bring better understanding that can transform natural and social science research and natural resource management in the Arctic. This has great potential to impact the lives of Arctic peoples.

EO4 Grand Challenge Session: https://youtu.be/ljUTNlw4slM

Key challenges at the CBM program level



(From Eicken et al. 2021 https://academic.oup.com/bioscience/article/71/5/467/6238581?login=true)

Key challenges

1. Insufficient respect among scientists
2. Incomplete understanding of how to obtain and use data from different people* and different knowledge systems in mutually beneficial ways
3. Lack of shared protocols enabling cross-weaving, and insufficient dialogue on how to ensure knowledge synthesis
4. Lack of enabling government policies
5. Asymmetric power relationships (incl. finances)

*With varying beliefs, epistemologies, rationalities and cosmologies

Recommendations

- Establish an understanding of how to obtain and use data from different people and different knowledge systems
- Develop ways to enable knowledge production across scales
- Improve coordination of research efforts, mobilize all research results for operational contexts
- Develop observing-logistics and research infrastructures for cross-weaving knowledge

EO4 Grand Challenge Session: https://youtu.be/ljUTNlw4slM

Thank you

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Photo by F. Danielsen