



Panel 4 Remarks: Strengthening Human Capacity

Ed Brook

Director, NSF COLDEX

College of Earth, Ocean and Atmospheric Sciences

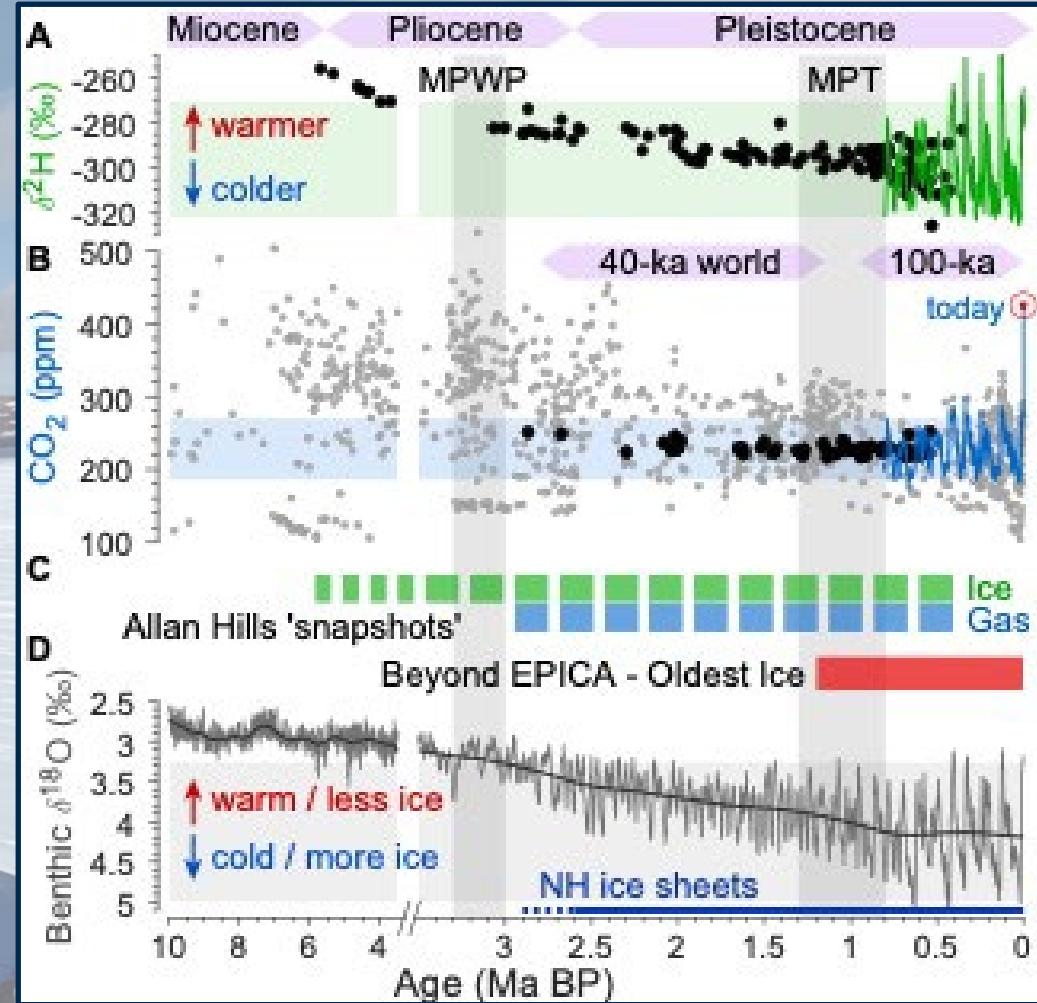
Oregon State University



Oregon State University
College of Earth, Ocean,
and Atmospheric Sciences

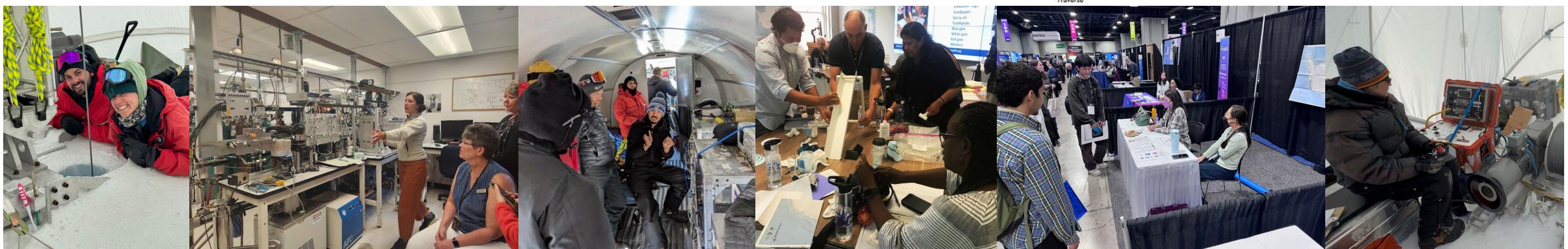
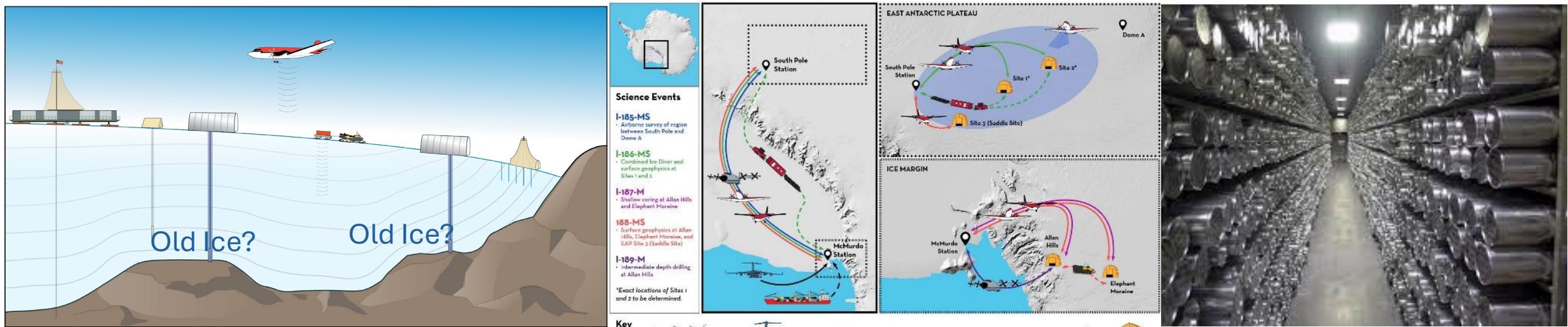


- *COLDEX is unlocking* Earth's history by extending the ice core record through the Pliocene and in to the Miocene.
- *COLDEX is using* the STC structure for broader impacts in education, knowledge transfer and broadening participation.
- With >100 people involved –COLDEX is a microcosm of our broader community.
- Sunset in 2031 but sets stage for IPY Old Ice activities



Polar Science Needs Logistics, But It Does Not Work Without People

Scientists, engineers, pilots, cargo specialists, sample archivists, ice core drillers, field guides, camp managers, lab technicians, graduate students, undergraduate students, outreach specialists, station staff, doctors, ship's crew, NSF staff, contract managers ...



The Need to Strengthen Human Capacity

- Long-term expertise is needed for scientific success
- **Specialized skill and knowledge help build the 21st century American workforce**
- Does our current system build reliable long-term human capacity?



What Can We Do?

- Identify core human capacities and plans to retain them
- Create internships, post baccalaureate positions
- Support technical staff in labs and facilities
- Cross training with international partners
- Integrate training and workforce development more explicitly in logistics and specialized service provider contracts – solidify long- term positions and bring in new people
- Support better partnerships between science, logistics and services
- Support academic trainees spending time at non governmental organizations (NSF DCL 21-013)
- Other?

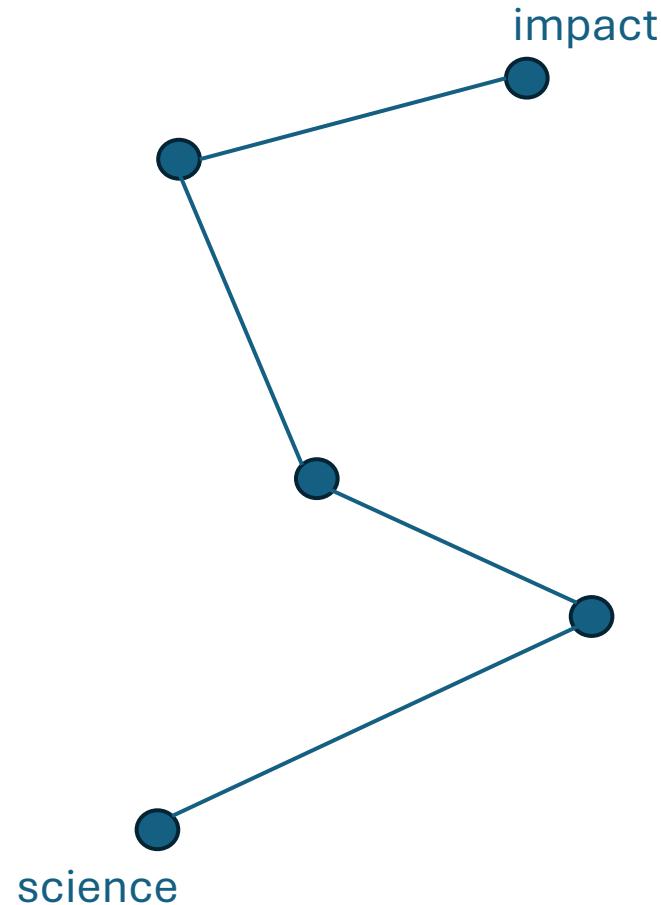
Immediate action needed to protect US federal science agencies, budgets, and existing personnel.

Save NSF

AGU

STAND UP
FOR SCIENCE

Use existing resources.

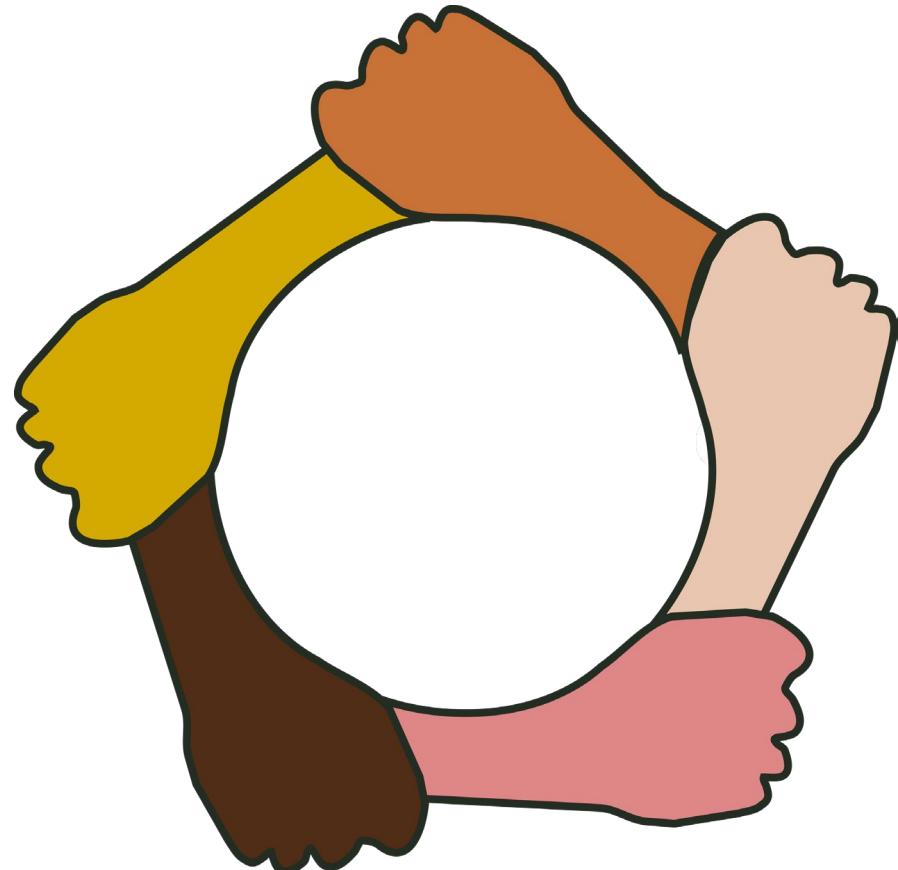


Connect the dots.



Try new contacts.
Bring full, vulnerable honesty.

Develop, maintain, and strengthen personal & professional relationships with people & organizations on the ground.

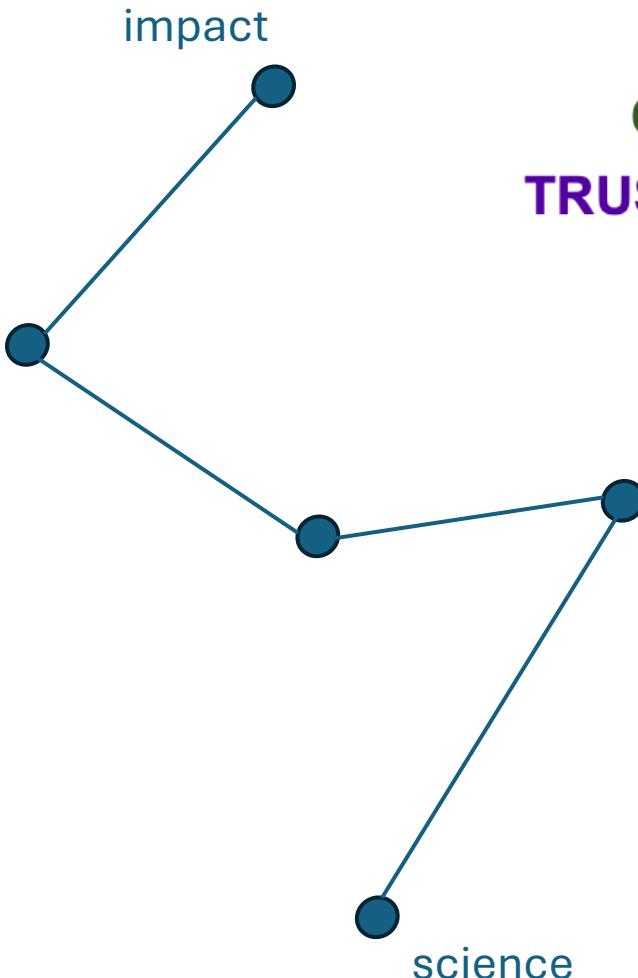


Science diplomacy:

- Generate knowledge
- Deflate myths
- **Maintain communications**

- Oran Young, ASSW 2025

Make resources easy to use and find key folks to disseminate and connect.



FAIR: Findable, Accessible, Interoperable, Reusable

CARE: Collective benefit, Authority to control, Responsibility, Ethics

TRUST: Transparency, Responsibility, User focus, Sustainability, Technology

science policy brief

The Arctic and the U.S. Lower 48

U.S. Navy SEALs and Norwegian naval commandos test ice thickness near the North Pole to establish a landing zone for a Chinook helicopter during an exercise to better understand the Arctic's changing environment.

The Arctic is changing rapidly, with immediate effects for sovereignty and security, natural hazards, food security, and human health.

CIRES University of Colorado Boulder NSIDC

OFFICE FOR COASTAL MANAGEMENT DIGITAL COAST

Home / Tools / Catalog / Sea Level Rise Viewer

Sea Level Rise Viewer

NOAA Office for Coastal Management

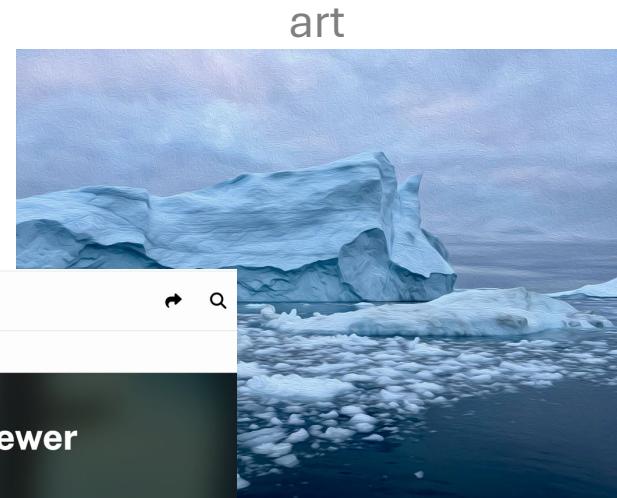
Launch Download Data Access Map Services

GEOGRAPHY: Coastal contiguous U.S. (excludes Great Lakes, AK, HI, and territories)

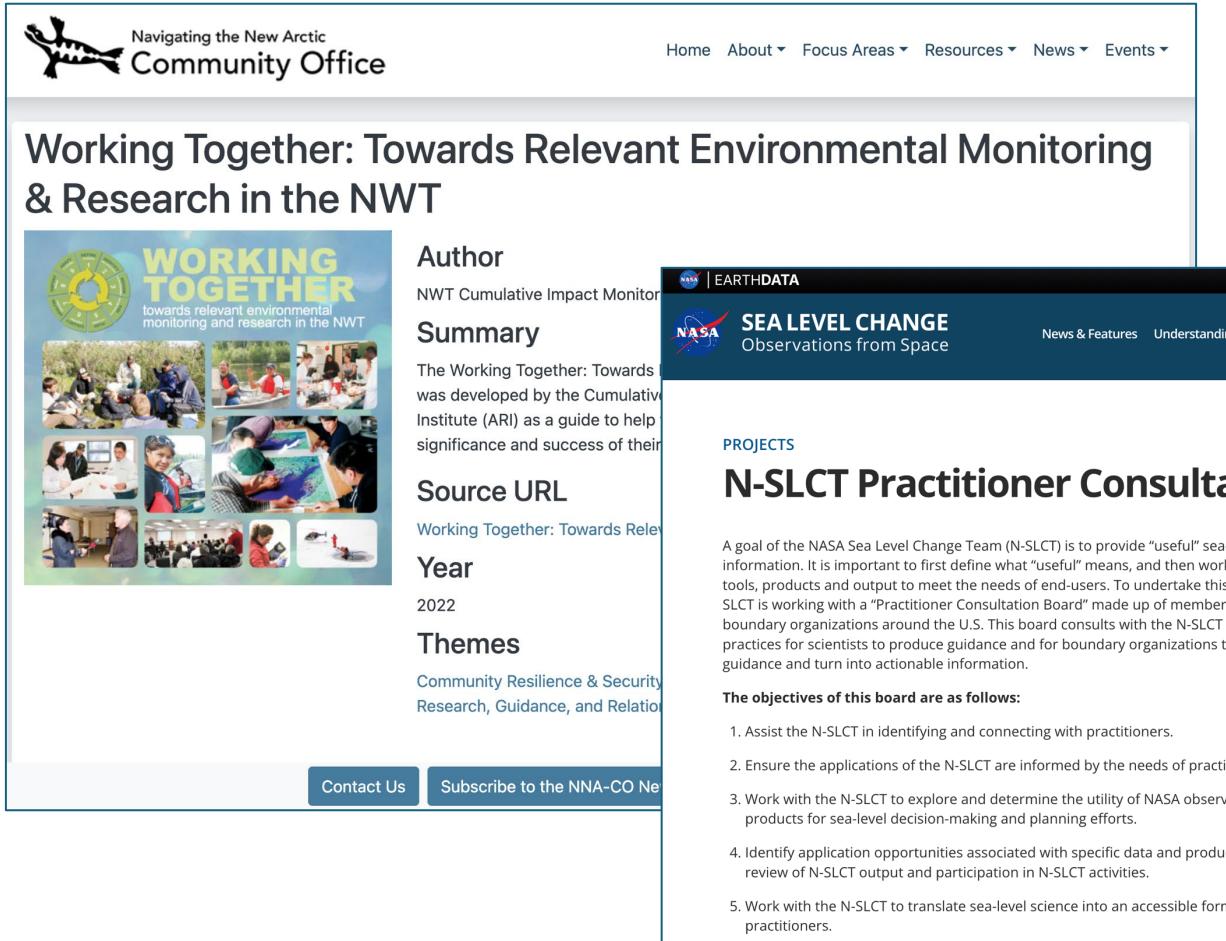
PLATFORM: Web-based

LEVEL OF EFFORT: Low

planning tools



“Community”-requested (\geq co-developed) is more likely to have impact and be sustained.



Working Together: Towards Relevant Environmental Monitoring & Research in the NWT

Author
NWT Cumulative Impact Monitor

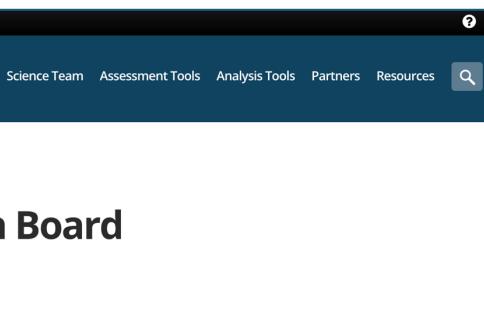
Summary
The Working Together: Towards was developed by the Cumulative Institute (ARI) as a guide to help significance and success of their

Source URL
[Working Together: Towards Rele](#)

Year
2022

Themes
Community Resilience & Security
Research, Guidance, and Relatio

[Contact Us](#) [Subscribe to the NNA-CO Ne](#)



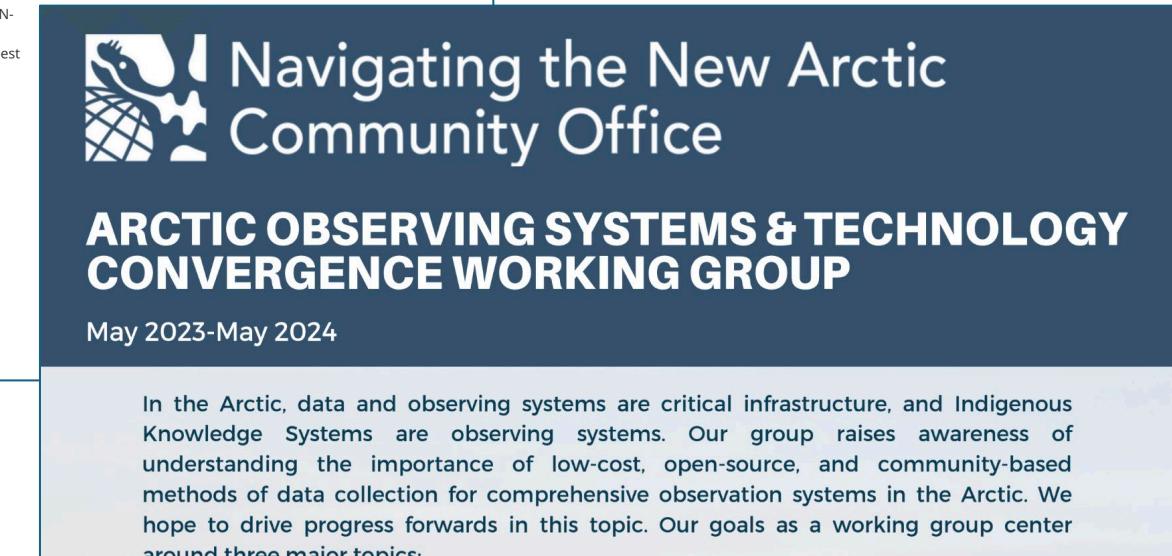
PROJECTS

N-SLCT Practitioner Consultation Board

A goal of the NASA Sea Level Change Team (N-SLCT) is to provide “useful” sea-level information. It is important to first define what “useful” means, and then work to tailor tools, products and output to meet the needs of end-users. To undertake this effort, the N-SLCT is working with a “Practitioner Consultation Board” made up of members from boundary organizations around the U.S. This board consults with the N-SLCT to discuss best practices for scientists to produce guidance and for boundary organizations to take this guidance and turn into actionable information.

The objectives of this board are as follows:

1. Assist the N-SLCT in identifying and connecting with practitioners.
2. Ensure the applications of the N-SLCT are informed by the needs of practitioners.
3. Work with the N-SLCT to explore and determine the utility of NASA observations and products for sea-level decision-making and planning efforts.
4. Identify application opportunities associated with specific data and products through review of N-SLCT output and participation in N-SLCT activities.
5. Work with the N-SLCT to translate sea-level science into an accessible form for use by practitioners.



Navigating the New Arctic Community Office

ARCTIC OBSERVING SYSTEMS & TECHNOLOGY CONVERGENCE WORKING GROUP

May 2023-May 2024

In the Arctic, data and observing systems are critical infrastructure, and Indigenous Knowledge Systems are observing systems. Our group raises awareness of understanding the importance of low-cost, open-source, and community-based methods of data collection for comprehensive observation systems in the Arctic. We hope to drive progress forwards in this topic. Our goals as a working group center around three major topics:

Prioritize supporting people. Fund the whole team.

Near-term: Support people first.
Culture change to share needs &
combine resources.
(Realistic need to survive over thrive)



Move away from the volunteer model.



Create more usable administrative systems.



Key Messages for Strengthening Human Capacity

- Immediate action needed to protect US federal science agencies, budgets, and existing personnel. This is the time to engage!

- Develop, maintain, and strengthen personal and professional relationships with people and organizations on the ground.
- Make resources easy to use and find key folks to disseminate and connect.
- “Community”-requested (\geq co-developed) is more likely to have impact and be sustained.
- Prioritize supporting people; fund the whole team.

Much is being ripped up in US research right now. How do we build back better (and create a more impactful IPY5)?

Indigenous Sentinels Network (ISN):

Fostering Environmental Stewardship and
Supporting Community-Driven Research



Exploring Key Research and Monitoring Topics for U.S. Engagement
in the Fifth International Polar Year--A Workshop
Session 4: Human Capacity and Collaboration

www.sentinelnetwork.com



Hannah-Marie Ladd
May 2025

“Data are not a foreign concept in the Indigenous world. Indigenous peoples have always been data creators, data users, and data stewards. Data were and are embedded in Indigenous instructional practices and cultural principles.”

— Dr. Stephanie Russo Carroll



Why Capacity Must Be Reframed

- Polar research relies on **interconnected human systems** — including local and Indigenous communities, technicians, transporters, and more.
- “Capacity” isn’t just technical — it includes **cultural knowledge, local logistics, and relationships with place**.
- Effective IPY5 participation must center **those who live in and steward polar regions every day**, not only visiting scientists.
- Recognizing communities as **critical caretakers and vital locations for improving infrastructure** for research — not just collaborators, but **co-creators and facilitators**.



Background on the Indigenous Sentinels Network:

- ISN was established by the Aleut Community of St. Paul Island's (ACSPI) Tribal Government 20+ years ago
- The Network aims to train and equip communities with the skills, technology, and tools to conduct environmental monitoring and implement community-driven research.
- ISN was established by and for Indigenous peoples
- ISN aims to address the urgent need to increase seasonal breadth and spatial resolution of monitoring efforts to track environmental changes across the Arctic and other ecosystems.



ISN Components

ISN provides access to:

Software: *to design and implement community-driven environmental monitoring programs*

- Online privacy-protected database
- Data collection mobile applications

Programmatic Support and Consulting: *to ensure sustainable solutions*

- Grant Writing and Collaboration
- Partnership Development
- Science Communication and Storytelling Support
- Data Protection and Data Sharing
- Training, Education, and Outreach



What is ISN in context of our conversation?

- A scalable model for how to **center, empower, and embed communities into polar science** with sustained roles and responsibilities.
- Community Sentinels and Guardians often **manage logistics**, coordinate observation protocols, and help **enable research access** year-round.
- ISN-trained monitors are not just observers — they are **field technicians, analysts, educators, and guides**.
- Enables **multi-disciplinary teams** through shared protocols, locally hosted data, and flexible collaboration frameworks.



Monitoring as Stewardship

- Sentinels often operate at the **front lines of environmental change**, gathering early indicators researchers rely on.
- Their work bridges **logistics and lived experience**— they maintain watch, enable access, and understand change in real time.
- The act of monitoring is **analytical, adaptive, and generational** — information is gathered with purpose and passed forward.
- Supports **logistics continuity** (e.g., weather, sea ice, species patterns) that informs both **science and safety**.



Building Infrastructure for Equity

- ISN and similar community-driven monitoring and observing networks functions as **a logistics and knowledge bridge**, ensuring communities can both contribute to and benefit from research.
- Helps build **trusted communication channels** across sectors: science, governance, Indigenous institutions.
- Facilitates **practical field coordination**, such as supporting remote in-situ research, identifying observation windows, or hosting long-term monitoring assets.
- Enables **distributed research capacity** that's place-based and scalable — especially important for polar access constraints.



Opportunities for IPY5

New Emphasis on Collaboration & Essential Contributors:

- Invest in **networks that integrate observation, coordination, and communication** — like ISN
- Engage with Indigenous Nations and local communities not only as partners but as **co-designers of field logistics and monitoring strategy - our elders, hunters, and knowledge holders are the original researchers**
- Support **role-specific training, compensation, and recognition** that reflects the real demands of polar work: technology transfer opportunities, cross-cultural coordination, and data ethics
- Embrace **boundary-spanning roles** — Indigenous Guardians, local guides, technicians, vessel operators, local fisheries, and Sentinels are essential to team function



Hannah-Marie Garcia
ISN Program Director
Aleut Community of St. Paul
Island Tribal Government
hladd@aleut.com
www.sentinelnetwork.com

Decolonization: Indigeneity, Education & Society
Vol 7., No 1, 2018, pp. 60-75

Refracting the State Through Human-Fish Relations: Fishing, Indigenous Legal Orders and Colonialism in North/Western Canada

Zoe Todd
Carleton University

Sustainability Science
https://doi.org/10.1007/s11621-020-09822-w

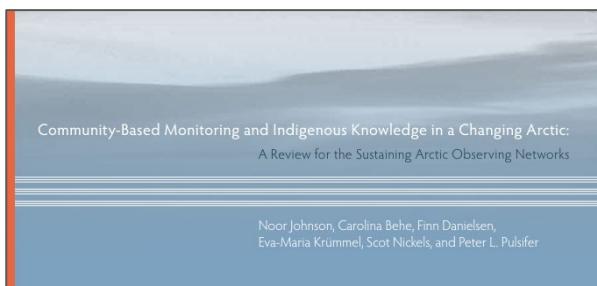
ORIGINAL ARTICLE



Creating a space for place and multidimensional well-being: lessons learned from localizing the SDGs

Eleanor J. Sterling¹ • Pua'ale Pascual¹ • Amanda Sigoun¹ • Nadav Ganz¹ • Lisa Mandell¹ • Erin Betley¹ • John Ains² • Simon Albert³ • Sophie Calliou² • Emily E. Castle² • Samantha H. Cheng¹ • Joachim Claesder^{1,2} • Rachel Dicks³ • Emily S. Darling^{1,2} • Chris Filardi^{1,3} • Stacy D. Jupiter^{1,2} • Alexander Mawyer^{1,2} • Manuel Mejia^{1,2} • Kenne Ojalaan Membra^{1,2} • Winifred Niitsoo^{1,2} • John Parks^{1,2} • Jamie Tanguay^{1,2} • Tamara Ticktin^{1,2} • Ross Vigne^{1,2} • Veneska Ware^{1,2} • Supjin Wongjirasarakul^{1,2,3} • Joe McCarter^{1,2,3}

Received: 16 November 2019 / Accepted: 11 May 2020
© The Author(s) 2020



Best Practices for Upholding Indigenous Data Sovereignty:
Insights and Recommendations for Funding Entities, Government Agencies, Philanthropic Institutions, and Researchers

Developed through an NPRB-funded partnership between the Aleut Community of St. Paul Island Ecosystem Conservation Office and Axiom Data Science



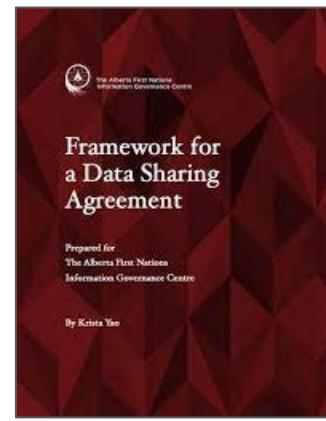
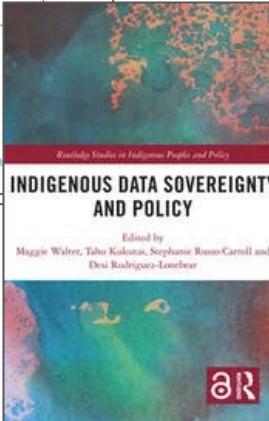
Copyright © 2023 by the author(s). Published here under license by the Resilience Alliance.
Hatch, M. B. A., J. K. Parrish, S. S. Heppell, S. Augustine, L. Campbell, L. M. Divine, J. Donatuto, A. S. Groesbeck, and N. F. Smith.
2023. Boundary spanners: a critical role for enduring collaborations between Indigenous communities and mainstream scientists.
Ecology and Society 28(1):41. <https://doi.org/10.5751/ES-13887-280141>

Insight

Boundary spanners: a critical role for enduring collaborations between Indigenous communities and mainstream scientists

Marco B. A. Hatch¹ , Julia K. Parrish² , Selina S. Heppell³, Skye Augustine⁴ , Larry Campbell⁵, Lauren M. Divine⁶, Jamie Donatuto⁷, Amy S. Groesbeck⁷ and Nicole F. Smith^{8,9}

E&S



FISH and FISHERIES

ORIGINAL ARTICLE |  Open Access 

“Two-Eyed Seeing”: An Indigenous framework to transform fisheries research and management

Andrea J. Reid , Lauren E. Eckert, John-Francis Lane, Nathan Young, Scott G. Hinch, Chris T. Darimont, Steven J. Cooke, Natalie C. Ban, Albert Marshall

First published: 19 October 2020 | <https://doi.org/10.1111/faf.12516> | Citations: 224