

Ecosystems Approach to Management of Arctic
Ecosystems
Fairbanks, Alaska, USA
August 23 - 25, 2016

Harnessing the Global Observing and Data System to Support Ecosystem-based Fisheries Management in the Arctic: Current Status and Future Directions

Peter L. Pulsifer

Research Scientist, NSIDC, University of Colorado

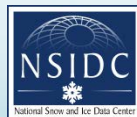
Chair, IASC-SAON Arctic Data Committee

Co-Chair, IARPC Arctic Data Coordination Team

Lisa Loseto, Phil Mundy, Jan Rene Larsen



GEO GROUP ON
EARTH OBSERVATIONS



National Snow and Ice Data Center
Supporting Cryospheric Research Since 1976



ARCTIC DATA COMMITTEE



Overview

1. Ecosystem Approach
2. Ecosystem-Based Fishery Management (EBFM)
3. Global observing and data system
4. Overview of data opportunities and challenges
5. Observing and data as an ecosystem
6. The way forward

Ecosystem Approach

EA Key Points

From Session 1 (Hoel; Skjoldal; Mundy)

- Systems approach – dynamic, processes, functions, interactions, **interconnections**, sensitive to initial conditions
- Policy frameworks are integral
- Location and **scale** are important
- Based **on best available scientific and Indigenous knowledge**
- – includes observations and data underlying information
- Need integrated ecosystem assessments -> requires observations & data
- Requires monitoring -> sound data management and availability over time

Ecosystem-Based Fisheries Management (EBFM)

EBFM Overview

- Recognize impacts on target species as well as environment and ecosystems
- Protect living resources
- Sustain fisheries
- Because of subsistence and economic function of fisheries, this is a socio-ecological issue
- **What roles do observations, data and information play in supporting and implementing EBFM?**

Many Relevant Initiatives

PAME
Protection of the Arctic Marine Environment

Home PAME Document Library Projects A WORKING GROUP OF THE ARCTIC COUNCIL

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CAFF
About Monitoring Assessments Strategies Policy Expert Groups Data Publications

PAME WORK PLAN
The purpose of the PAME Work Plan is to guide the year working period.

The Circumpolar Biodiversity Programme (CBMP)

DECLARATION CONCERNING THE PREVENTION OF UNREGULATED HIGH SEAS FISHING IN THE CENTRAL ARCTIC OCEAN

Meeting in Oslo on 16 July 2015, Canada, the Kingdom of Denmark, the Kingdom of Norway, the Russian Federation and the United States of America continued discussions toward the implementation of interim measures to prevent unregulated fishing in the high seas portion of the central Arctic Ocean. They adopted the following Declaration:

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ICES ADVISES ON POSSIBLE EFFECTS OF SALMONID AQUACULTURE

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LATEST NEWS



Marine Policy

Available online 4 May 2016

In Press, Corrected Proof — Note to users



Development of an integrated fisheries co-management framework for new and emerging commercial fisheries in the Canadian Beaufort Sea

Burton Ayles^{a, 1}, Louie Porta^b, Red McV Clarke^c

^a Fisheries Joint Management Committee, Box 2120, Inuvik, NT, Canada X0E 0T0

^b Oceans North Canada, Ottawa, ON, Canada

^c Environmental Consultant 211 Victoria Cr, Winnipeg, MB, Canada R2M 1*6

Received 17 April 2016, Accepted 18 April 2016, Available online 4 May 2016

Show less

<http://dx.doi.org/10.1016/j.marpol.2016.04.032>

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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

General Info Species Programs Publications Data & Tools Images Education & Outreach Search

Third Meeting of Scientific Experts on Fish Stocks in the Central Arctic Ocean

ANNOUNCEMENT: We will convene the Fourth Meeting of Scientific Experts on Fish Stocks in the Central Arctic Ocean September 26-28, 2016, in Tromsø, Norway. Attendance is by invitation of the participating governments. Scientists may be able to contribute to or participate in the [Arctic Session of the ICES](#) in [Riga, Latvia](#), during the week preceding the meeting in Tromsø.

IL STATES (the Kingdom of Norway, the Russian Federation, the United States of the Kingdom of Denmark) convened the third scientific meeting on Arctic fish stocks in April 14 – 16, 2015, to identify ongoing Arctic research and monitoring activities, and to develop the scientific information necessary to support the development of an [action plan for fishing in the Arctic](#) in areas outside the territorial waters of the five Arctic coastal states. The 2014 meeting in Nuuk reaffirmed that, although commercial fishing in the central Arctic Ocean appears unlikely to occur in the near future, the state of currently available information needs to be improved in order to reduce the substantial uncertainties associated

scientific and policy personnel from governmental and non-governmental institutions. The representatives from the Arctic coastal states were joined by those from other nations conducting Arctic research (China, Japan, Korea). Participation included members from international Arctic research organizations (International Arctic Science Center, Arctic Observing Network, International Council for the Exploration of the Sea (ICES)), the North Pacific Marine Science Organization (PICES), the Ecosystem Approach Expert Group of the Protection of the Arctic Marine Environment Working Group of US domestic Arctic research organizations (the US Arctic Research Commission and the North Pacific Research

North Pacific Marine Science Organization

Home About Members News Projects Publications Meetings

Welcome to PICES

The North Pacific Marine Science Organization (PICES), an intergovernmental scientific organization, was established in 1992 to promote and coordinate marine research in the northern North Pacific and adjacent seas. Its present members are Canada, Japan, People's Republic of China, Republic of Korea, the Russian Federation, and the United States of America.

PICES Structure/Membership Changes:
New Programs/Projects

PICES-2015
on-line session/workshop topic proposals is now open

ANNOUNCEMENT
The PICES website is undergoing some changes. Most of this is "behind the scenes", but there are changes to the "look and feel" and some changes to the functionality (including "mobile-friendly" access for new pages). If you find errors or are experiencing other problems, please let us know right away at [secretariat@pices.int](#). We apologize for any confusion as we work through these changes.

CACCON
ABOUT CACCON ENGAGEMENT

CACCON, the Circum-Arctic Coastal Communities Knowledge Network is a pan-Arctic network of communities and knowledge hubs sharing knowledge and processes that lead to transformative pathways to realize ideal futures.

Global Observing and Data System

Emerging Observing and Data System

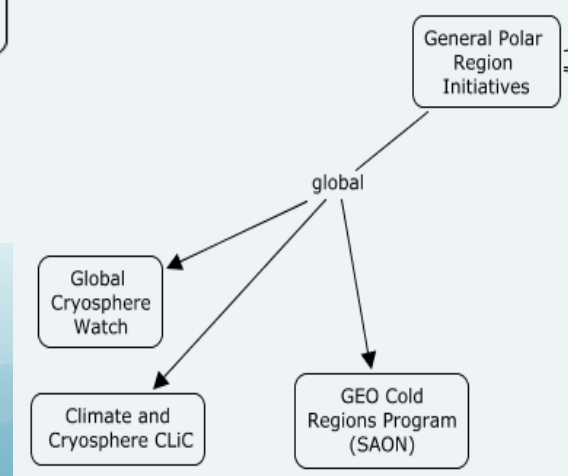
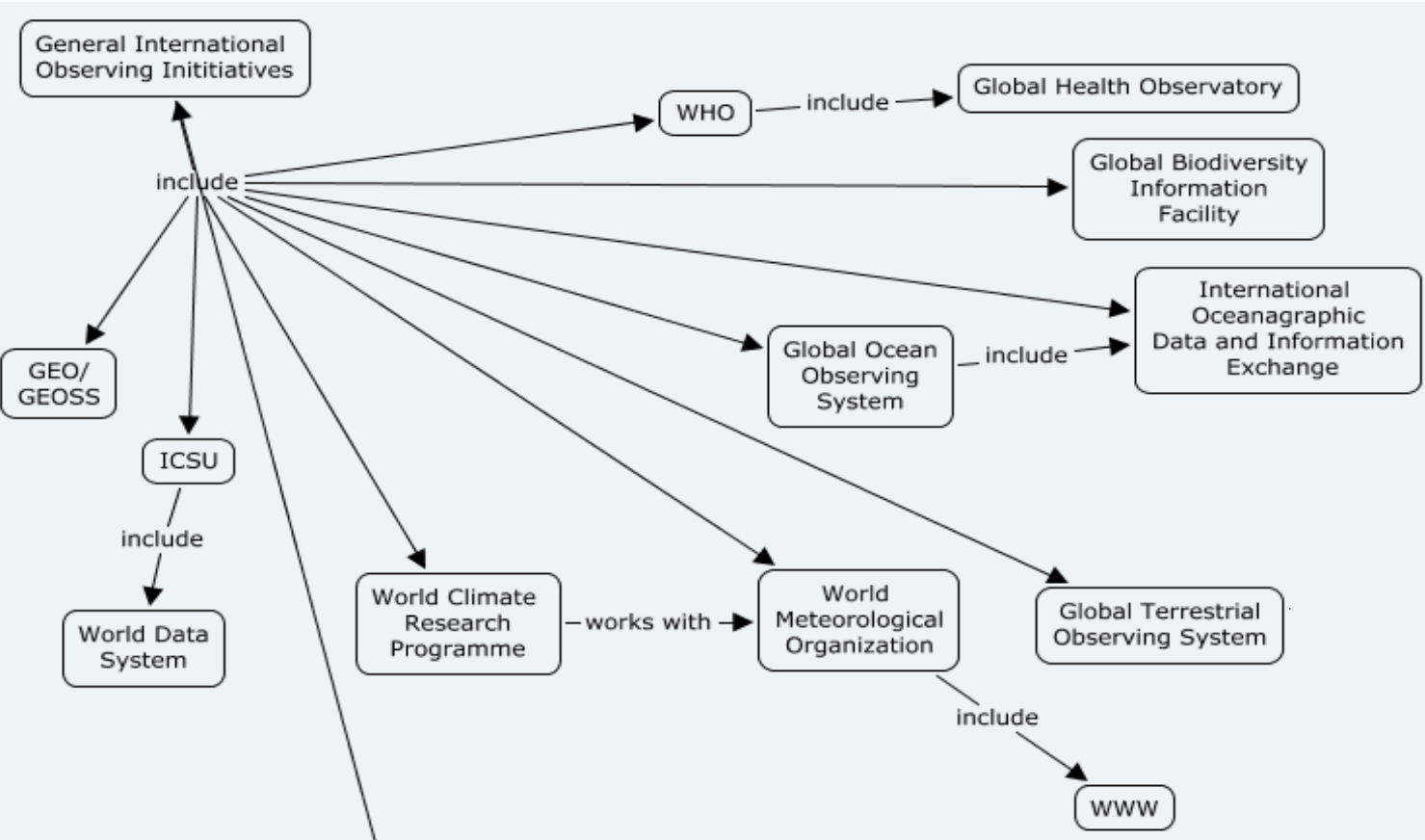
- Observing nodes exist
- Typically discipline-based
- Data management quickly becoming a priority

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- <http://www.arctic.noaa.gov/dbo/>
- <http://www.esrl.noaa.gov/psd/iasoa/home2>
- <http://www.sios-svalbard.org/>
- <http://www.sizonet.org/>
- <http://www.eu-interact.org/>
- <http://www.caff.is/>
- <https://www.leonetnetwork.org/>



Global Initiatives



Broad Polar Initiatives

SAON SUSTAINING ARCTIC OBSERVING NETWORKS

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Home

Photo: Martin Fortier

SAON on the Map

EU-PolarNet

About EU-PolarNet | European Polar Science | Project Themes | News and Events

Connecting Science with Society

EU-PolarNet is the world's largest consortium of expertise and infrastructure for polar research. Seventeen countries and institutions. From 2010-2020, EUSC explores the use of polar enhanced winter targets benefits for society. It previously the consortium engages

International Arctic Science Committee

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IASC ACTIVITIES | ASSW | OUTREACH | CAPACITY BUILDING | DATA & OBSERVATIONS

the International Arctic Science Committee is a non-governmental organization that aims to encourage, facilitate and promote cooperation in all aspects of Arctic research in all countries engaged in Arctic research and in all areas of the Arctic region.

UPCOMING IASC EVENTS

IASC NEWS

Announcement and invitation for a NATC Meeting prior to ICAP 2016

ARCTIC DATA COMMITTEE

IASC SAON

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ADC News & Events

International Conference on Permafrost, ICOP 2016, 20-24 June, Potsdam, Germany, 7 May 2016

polaris

User Needs and High-Level Requirements for the Next Generation of Observing Systems for the Polar Regions

Summary Report

Prepared for: European Space Agency

Prepared by: Polar View Earth Observation Limited

SCAR The Scientific Committee on Antarctic Research

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Standing Committee on Antarctic Data Management

SOOS SOUTHERN OCEAN OBSERVING SYSTEM

ABOUT US | NETWORK | PRIORITIES | ACTIVITIES | RESOURCES | DATA

NEWS

DOOS Survey

The Deep Ocean Observing Strategy (DOOS) invites SOOS members to participate in a deep-ocean observation inventory survey.

SONA Workshop

The Southern Ocean Network of Acoustic (SONA) held an Acoustic Processing and Methods workshop in Vigo (24-25 April 2016), in order to address milestones towards the goal of having useful, open access data.

Mooring Data Help

Data from moorings deployed in the Southern Ocean.

DATA

A key objective of SOOS is the development of a data system that provides seamless access to essential data products for the Southern Ocean.

GET INVOLVED

Regional Working Groups

Indian Subcontinent Info

West Antarctic Peninsula Info

Capability Working Groups

Counting Animal Populations from Space (ICAP) Info

Southern Ocean Flares (SOFLARE) Info

ecosystem Coastal Ocean Variables (ECOVAR) Info

Cleaning and Understanding the Ocean below Antarctic Sea Ice and Ice Shelves (ICASE) Info

National Initiatives



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Accelerating the pace of Arctic research

Collaboration fosters creativity. Through IARPC (Interagency Arctic Research Policy Committee) Collaborations, scientists from Federal, State, academic, NGO, and industry organizations find talent, share their work, and team up to solve hard problems.

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Data ADCT

Arctic Observing Systems

Latest news

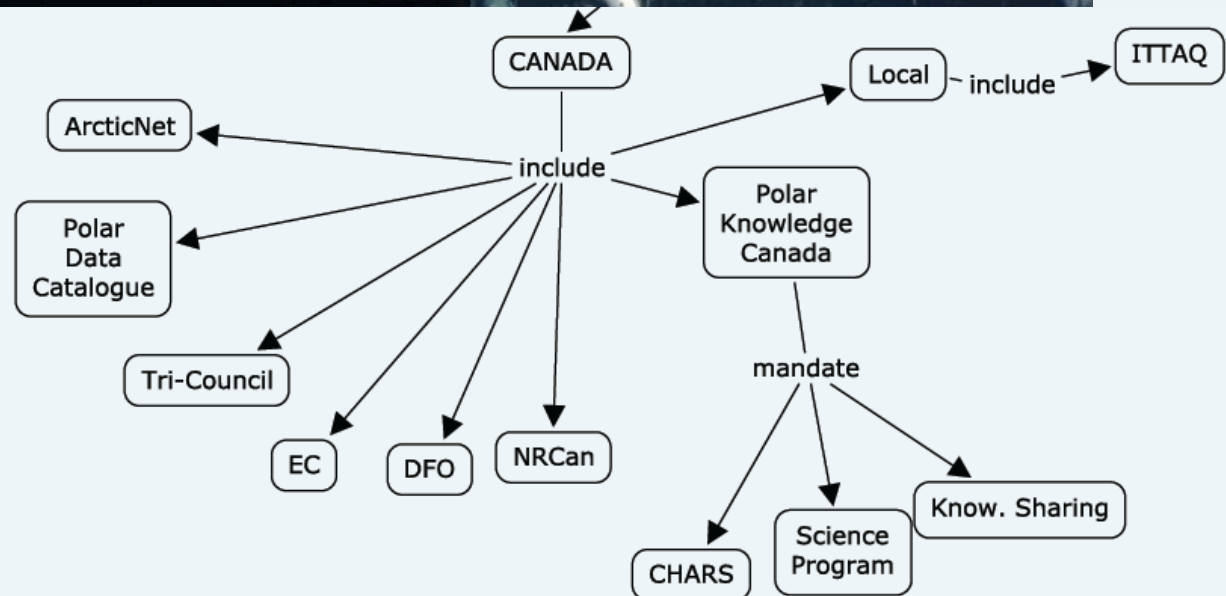
Panel Discussion and Reception at White House Arctic Science Ministerial

August 19, 2016

The public is invited for a recap and discussion of the event taking place on September 28. [Continue »](#)

Final Week to Comment on Draft Arctic Research Plan 2021

August 16, 2016



(G)Local Initiatives

Atlas of Community-Based Monitoring
& Indigenous Knowledge in a Changing Arctic

Focus About Tiles (beta) Welcome Login

Circumpolar Arctic search the atlas Help

Welcome to the Atlas of Community-Based Monitoring in a Changing Arctic. Arctic communities are actively involved with observing social and environmental change: this atlas was

Base Layer

- Alaska Basemap
- Canada Basemap
- Atlantic Basemap
- Europe Basemap
- Russia Basemap

Overlays

- State/Province/Territory
- Boundaries
- Projects
- CBM Partner Communities
- AOS
- European Commission/Nordeco

Loading...

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

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

<http://www.arcticcbm.org>

Domain Specific

ABDS Beta
The Arctic Biodiversity Data Service
About

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Arctic Ocean Fisheries

Domain Description: Ecologically Or Biologically Significant Marine Areas

Physical

- Identification of Ecologically and Biologically Significant Areas (EBSA) in the Canadian Arctic
- Joint OSPAR/NEAFC/CBD Scientific Workshop on the Identification of Ecologically or Biologically Significant Areas (EBSAs) in the North-East Atlantic
- IUCN/NRDC Workshop to Identify EBSAs in the Arctic Marine Environment
- WWF Important Marine Areas in the Arctic Compilation
- Drifter Climatology of Near-Surface Currents
- Surface Current Velocity
- Arctic Regional Climatology ..
- Sea Ice Concentration and Occurrence ..
- Seafloor Geomorphology
- Global Seascapes
- Total Sediment Thickness of the Worlds Oceans & Marginal Seas
- Total Sediment Thickness of the Worlds Oceans & Marginal Seas
- International Bathymetric Chart of the Arctic Ocean (IBCAO)
- Vents and Seeps
- Seamounts
- CSIRO Atlas of Regional Seas (CARS) Physical Ocean Climatologies
- Ocean Surface Temperature
- Chlorophyll A Climatology
- Sea Surface Height

Home About Workshop Products Cruise Data Publications Contacts

Arctic Ocean

East Siberian Sea Beaufort Sea Chukchi Sea Bering Sea

Siberia Alaska Canada

Mean Sea Ice Edge (1979-2017)

- 2010-2017
- 2000-2009
- 1990-1999
- 1980-1989

DBO sites (red boxes) are

- regional "hotspot" transect lines and stations located along a latitudinal gradient
- considered to exhibit high productivity, biodiversity, and overall rates of change

DBO sites will

- serve as a change detection array for the identification and consistent monitoring of biophysical responses
- be occupied by national and international entities with shared data plan

Arctic Data Integration Portal Search for data

Catalog Portal 1 layers

Back to Search Results

Essential Fish Habitat - Alaska

Metadata URL: [http://alaskafisheries.noaa.gov/habitat/...](http://alaskafisheries.noaa.gov/habitat/)

The Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established a new requirement to describe and identify "Essential Fish Habitat" (EFH) in each fishery management plan. "Essential Fish Habitat" means those waters and substrates necessary to fish for spawning, breeding, feeding or growth to maturity. Waters include aquatic areas and their associated physical, chemical and biological properties. Substrate includes sediment underlying the waters. "Necessary" means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem. Spawning, breeding, feeding, or growth to maturity covers all habitat types utilized by a species throughout its life cycle.

EFH - Alaska Plaice

EFH - Arctic Cod

EFH - Arrowtooth Flounder

EFH - Atka Mackerel

EFH - Blue King Crab

EFH - Chinook Salmon

EFH - Chum Salmon

EFH - Coho Salmon

EFH - Dover Sole

EFH - Dusky Rockfish

EFH - Flathead Sole

EFH - Golden King Crab

EFH - Greenland Turbot

EFH - Grooved Tanner Crab

EFH - Northern Rockfish

EFH - Opilio Snow Crab

EFH - Pacific Cod

EFH - Pacific Ocean Perch

EFH - Pink Salmon

EFH - Red King Crab

Overview of Data-Related Opportunities and Challenges

Minutes of the workshop of the
Arctic Data Coordination Network
IPY 2012, Palais des Congrès, Montréal, Québec, Canada
27 April 2012, 13:30-17:00

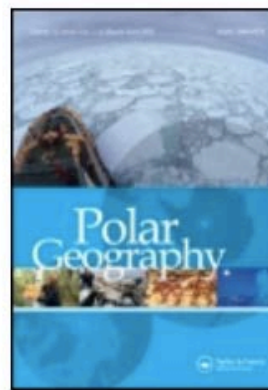
Sustaining Arctic Observing Network (SAON)

SAON Data Management Workshop Report

Developing a Strategic Approach

Prepared By:
Gillian B. Lichota, NOAA Arctic Research Program
Simon Wilson, AMAP

Mark Parsons (USA) and data management to develop



Polar Geography

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/tpog20>

Introduction: local and traditional knowledge and data management in the Arctic

Peter L. Pulsifer^a, Henry P. Huntington^b & Gretta T. Pecl^c

^a Exchange for Local Observations and Knowledge of the Arctic (ELOKA), National Snow and Ice Data Center, University of Colorado, 449 UCB, Boulder, CO 80309, USA



International Forum on Polar Data Activities in Global Data Systems Communiqué

River, AK

quaculture,
Hobart,

Data Science Journal,

TOWARDS AN INTERNATIONAL POLAR DATA COORDINATION NETWORK

P L Pulsifer^{1*}, L Yarmey¹, Ø Godoy², J Fridell³, M Parsons⁴, W F W Manley⁵, A Gaylord⁶, A Hayes⁹, S Nickels¹⁰, C Tweedie¹¹, J R Lu



Statement of Principles and Practices for Arctic Data Management April 16, 2013

All IASC-endorsed scientific results shall be verifiable and reproducible through ethically open access to all data necessary to produce those results. Data shall be preserved, accessible, and used in accordance with scientific norms of fair attribution and use.

To this end, IASC Council approves the following actions:

1. Endorsement of the Statement of Principles and Practices for Arctic Data Management;
2. Establishment of an IASC Data Standing Committee;
3. To undertake measures towards adoption of national data policies consistent with

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The Importance of the Polar Regions for Humankind

The Polar Regions are experiencing dramatic change. Understanding their complex dimensions (environmental, climatic, social, economic, and geophysical) is critical to grasping the global system and defining our future. Data are an invaluable resource. The coordinated capture, analysis, storage, stewardship, and sharing of scientific data along with Indigenous knowledge helps society better understand the regional and global impacts of Polar changes. But these data management activities present considerable technical, social, policy and economic challenges.

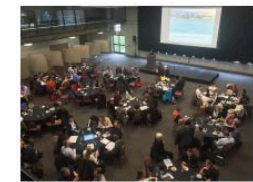


Photo Credit: Marien Taocana

In October of 2015, more than 110 people gathered at the Second Polar Data Forum at the University of Waterloo, Canada (PDF II) to address these challenges. Data managers, scientists, funding program managers, Indigenous people and their representatives, students and others from more than ten nations shared their knowledge and ideas on how

to make polar data more useful and valuable in solving global problems.

The Second Polar Data Forum

In 2013, at the First Polar Data Forum in Tokyo (PDF I), the community identified issues and made observations and recommendations on polar data management. PDF I focused on improving how people and systems can share data in a meaningful way. The goal was to move towards open and connected systems based on a culture of trust and acknowledgement of data production and use.

PDF II highlighted the significant progress in polar data management that has been made since PDF I and also identified priorities as we move forward. The community reaffirmed the themes of PDF I, identified key new themes that have evolved, and planned a set of action-oriented recommendations and activities.

Key Themes Emerging from PDF II

Including Arctic Indigenous Perspectives: In this time of change, Indigenous knowledge and the underlying observations of Arctic peoples are more important than ever. Increasingly, this knowledge is being documented and represented as digital data, but the nuances of these data are not well understood by the broader data management and science community. The perspectives of Indigenous people must be heard directly. This will enhance understanding of how their knowledge and observations can be used appropriately.

Community building: Improved polar data sharing that is part of a broader global system will require community building, collaboration, and coordination of efforts. To do this we need



Summary of Key Opportunities

- Improved sharing resulting in better science and decision making
- More complete view of the environment over space and time
- New kinds of integrative science and research
- Economic opportunities
- ...

Summary of Key Challenges

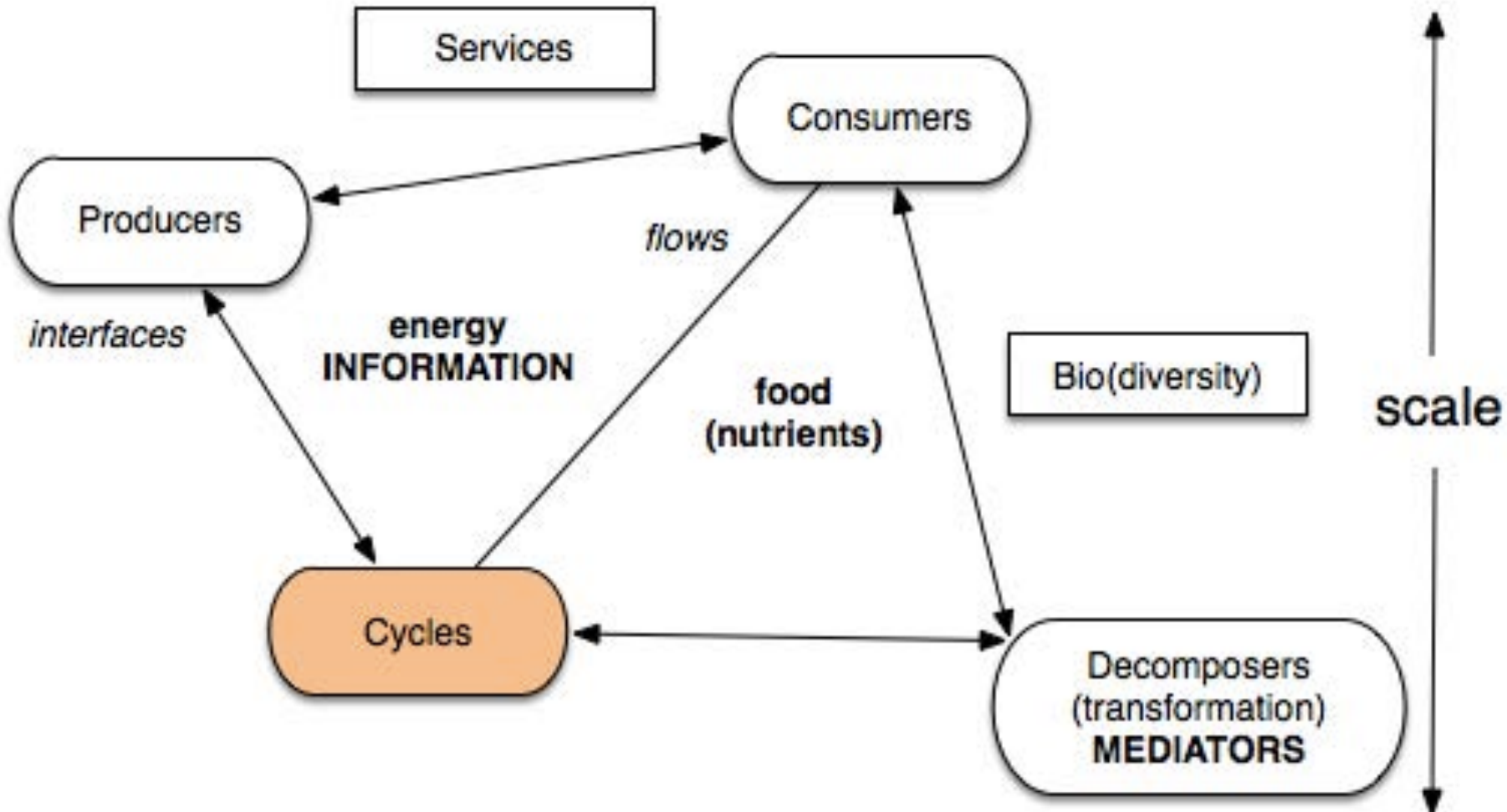
- Data rescue
- Data stewardship: discovery, access, preservation
- Attribution and reward
- Avoiding “silos” (science, operation, CBO)
- Interoperability

Where Are We Now?

- Parts of the system are in place
- We are making real progress in establishing important new parts of the system (data, centers, access points etc.)
- Key challenges are known
- **Integrated** observing and supporting data system has not yet emerged
- Part of the issue is that we are not understanding and managing as a “system”

Observing and Data as an Ecosystem

The Data Ecosystem



International

Regional

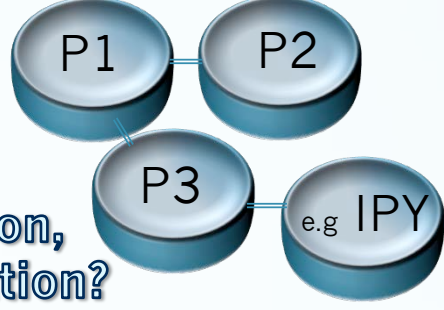
National

Regional

Local

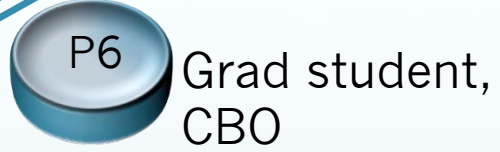
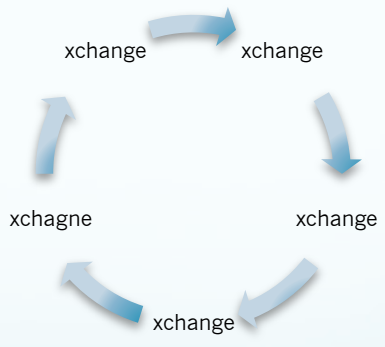
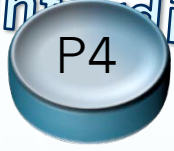
Disciplinary

Small (team)



Communication, linking, integration?

Interdiscipl.



Multiple dimensions of the Arctic Data Ecosystem

Large

Elements of EA

(From Day 1, Talk 2, Skjodal)

- **Define ecosystem**
- **Describe ecosystem**
- Set ecological objectives
- Assess the ecosystem
- Value the ecosystem
- Manage human activities

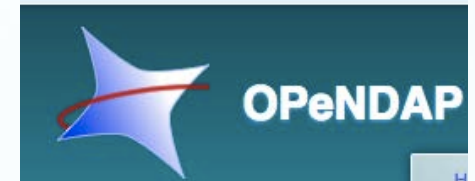
BEST AVAILABLE SCIENTIFIC INFORMATION

The Way Forward

Practical Foundations

Standards & Services

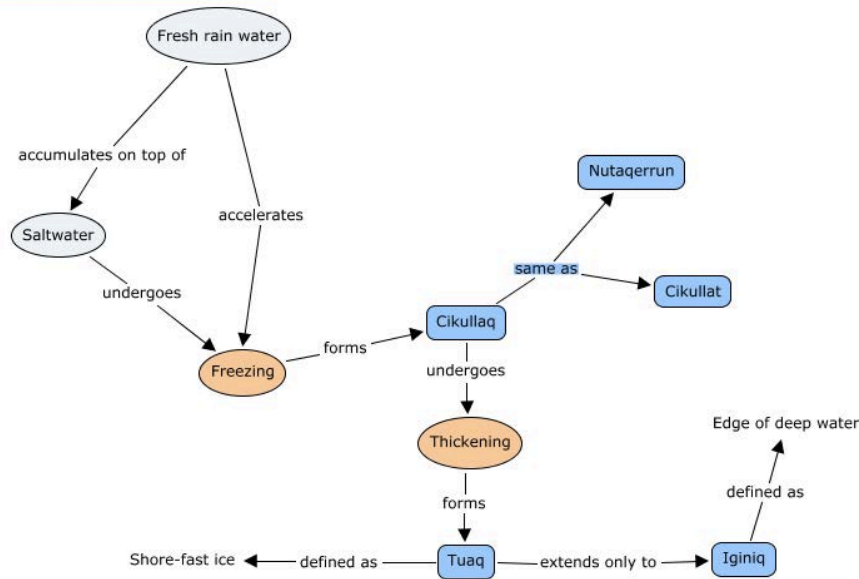
- Many data sharing standards - *interfaces*
- Adoption occurring *within* disciplines/domains, but not necessarily *between*
- ‘Data as a Service’ emerging as a way to create interfaces



many more ...

Terminology Models

Concept Map based on interpretation of
"Ellavut: Our Yup'ik World and Weather"
Anne Fienup-Riordan & Alice Rearden, 2012



SEMANTIC INTEROPERABILITY = “LINGUISTIC (UN)CERTAINTY”

Activities under partnership with Alaskan Indigenous Knowledge holders,
ELOKA & Semantic Sea Ice Interoperability Initiative (SSIII)

Interoperability Activities

info@opengeospatial.org



About ▾ Standards ▾ Innovation ▾ News & Events ▾ Membership ▾ Resources ▾

ArcticSpatialDataPilot

Update June 3rd, 2016:

ArcticSDP Clarifications Webinar Friday, 3 June 2016, 0900 EDT recordings available

RFQ

The Open Geospatial Consortium (OGC) and sponsors, U.S. Geological Survey and Arctic Spatial Data Infrastructure Participants, announce a Request for Proposal (RFQ) for the Arctic Spatial Data Pilot Phase-2 (Arctic SDP) initiative. The Arctic SDP Participation is to solicit proposals in response to a set of request for proposals (RFQ) has been released May 25, 2016. It is available online: [ArcticSDP Participation](#)

It is strongly recommended that interested readers also review the RFQ. If you have any questions, please send an email to techdesk@opengeospatial.org or chat window took place on 3 June 2016, at 09:00 AM EDT. The chat window took place on 3 June 2016, at 09:00 AM EDT. The chat window took place on 3 June 2016, at 09:00 AM EDT.

Phase-1 Concept Development Report

The final report from phase 1, including the results from the first

Picture by NASA / Kathryn Hansen

Home > Meetings > ADC Meetings > Polar Connections Interoperability Workshop

Polar Connections Interoperability Workshop

Details

Published: 23 August 2016

8 - 10 November 2016

Frascati, Italy

Venue details coming soon.

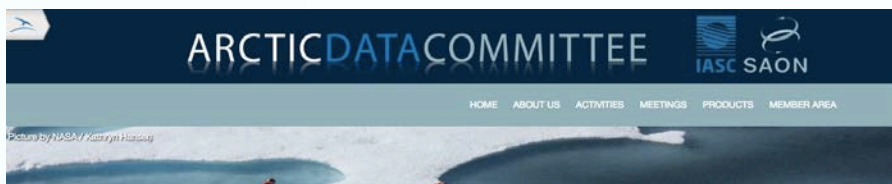
Workshop Description

The importance of data and its proper management are increasingly being recognized by governments, the science community, and society. The polar science community has unprecedented opportunities for science based on open, networked, digital, and ubiquitous communication technologies. This presents an urgent need for the community, Arctic residents,

Defining, Describing and Understanding the Data Ecosystem

Mapping the Arctic Data Ecosystem

<http://arcticdc.org>



Database + Mapping + Visualization

Arctic Data Ecosystem Map (DRAFT)

The objective of this activity is to establishing a map of the arctic data management "ecosystem" or "universe". This will be both a concept map indicating projects, services and relationships as well as a geographic map indicating location. The effort was started during the first meeting of the ADC in Potsdam, Germany, November 2014 and is an ongoing activity. The roadmap for this project includes establishing a linked open data end point that will allow people to query the database (i.e. using SPARQL).

The interactive map below is under active development in collaboration with communities of practice can other partners. This version is a preliminary, incomplete draft. If you would like to contribute to the effort, please contact [peter.pulsifer\[at\]colorado\[dot\]edu](mailto:peter.pulsifer[at]colorado[dot]edu)

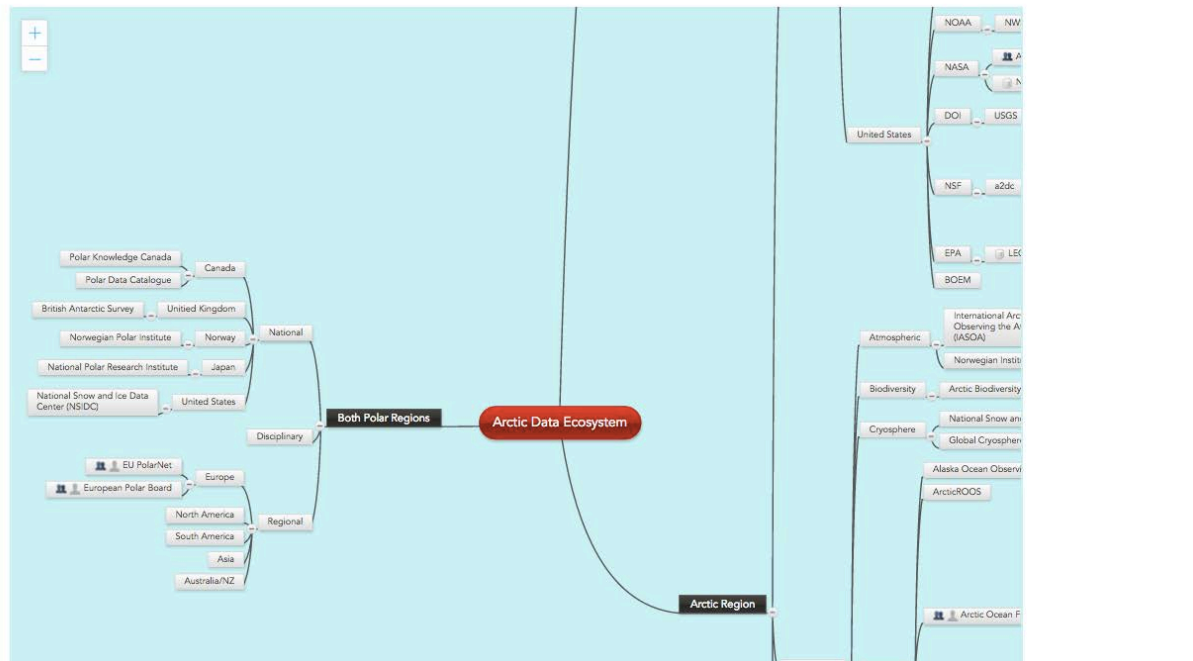
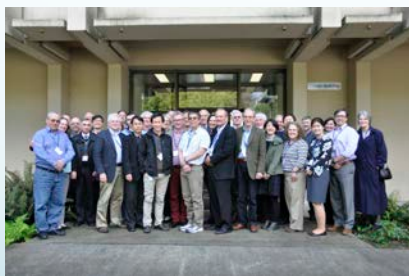
Task lead: Peter Pulsifer, NSIDC/ELOKA, University of Colorado, USA

ADC News & Events

- International Conference on Permafrost, ICOP 2016, 20-24 June, Potsdam, Germany, 1 May 2016
- SciDataCon 2016, 11-13 September, Denver, USA, 1 May 2016
- ASSW / AOS 2016, 11-18 March, Fairbanks, USA, 14 Mar 2016
- Arctic Science Summit Week: IARPC Data Collaboration Team Open Town Hall Meeting, 14 March

Arctic Data

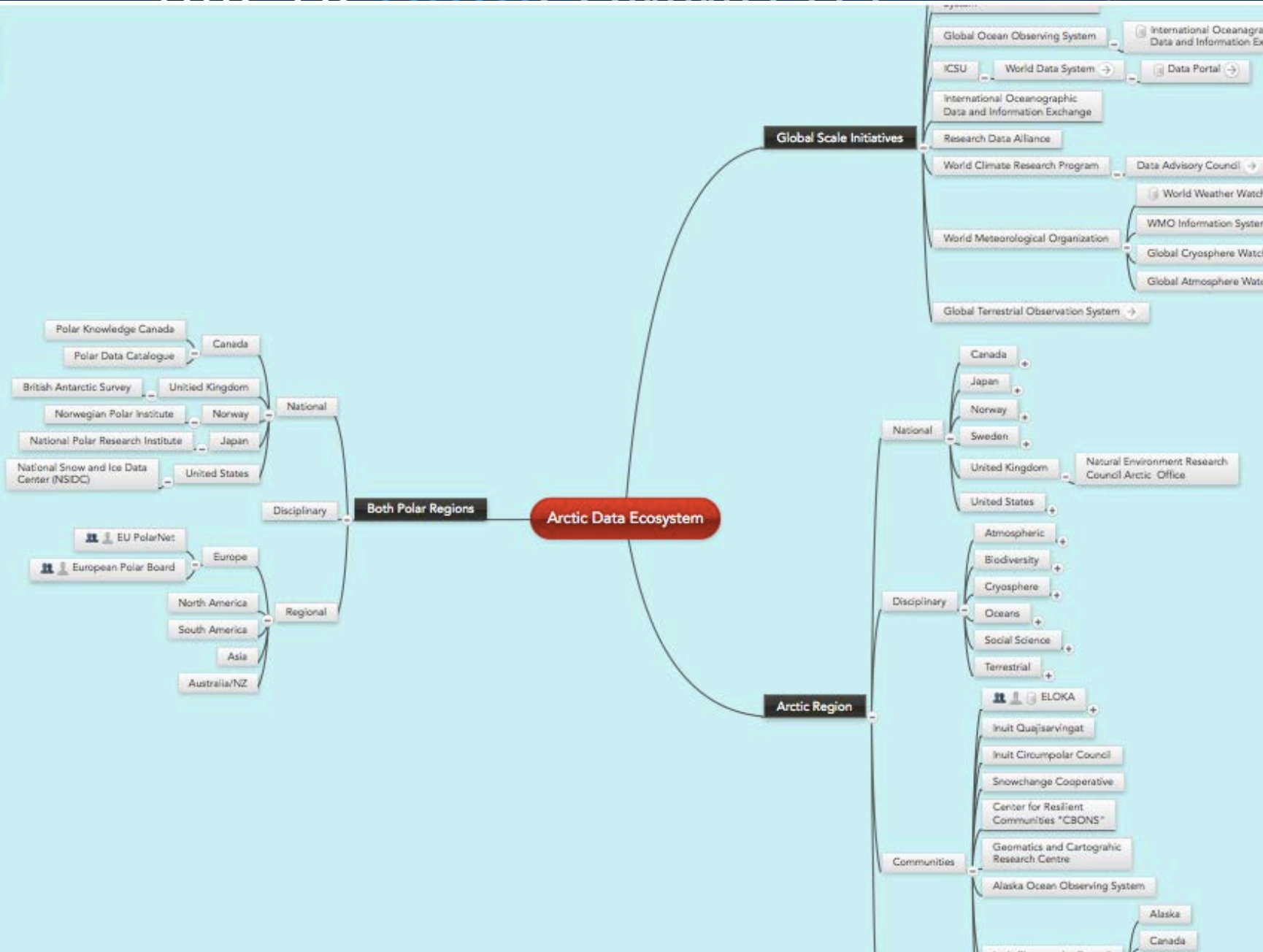
Interoperability



ARCTIC DATA COMMITTEE



Picture by N



Why? Planning, strategy and interoperability

- Support analysis for supporting sciences, identifying gaps etc.
- Policy development
- Academic discourse
- Interoperability: *Property of a product or system, whose interfaces are completely understood, to work with other products or systems, present or future, without any restricted access or implementation.*
- *Task of building coherent services for users when the individual components are technically different and managed by different organizations (Wikipedia)*
- “Map” will be used to promote interoperability in a strategic and efficient way

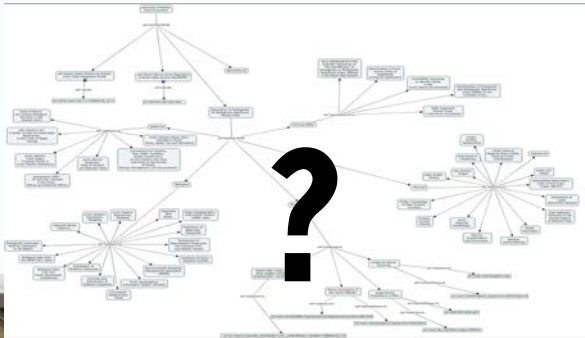
Recent Developments

- Working with ADC, Scientific Experts on Fish Stocks in the CAO, SCADM, ELOKA & partners, EU-PolarNet
- Establishment of new partners and resources
- *Pan-Arctic Options Project*: Research capacity in the area of oceans expertise and systems thinking – in partnership with *International Institute for Applied Systems Analysis*
- University of Tromsø/Fram Center, Norway – Barents Sea fisheries
- Establishing relationships with IARPC (U.S.), GEOCRI
- Exploring Global Linkages through RDA – meeting during IDW, September 2016



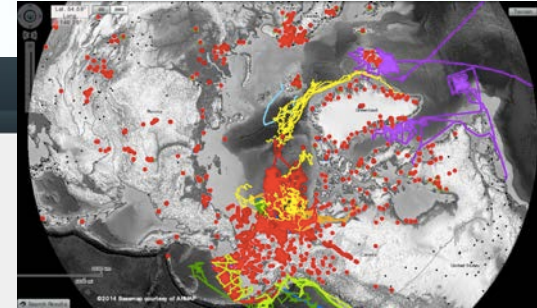
Followed by Expanding Partnerships with Communities of Practice

Arctic Fisheries Science



Integrative Projects

Arctic Observing



<http://www.arcticobservingviewer.org/>

Regional Initiatives

Atlas of Community-Based Monitoring & Traditional Knowledge in a Changing Arctic

TK & CBM

<http://arcticcdc.org>

pulsifer@nsidc.org



©photo Shari Gearheard

Thank You

Acknowledgements

- ELOKA acknowledges the valuable contributions of all partners and particular the Indigenous knowledge holders and community members who have generously donated their time and knowledge
- This material is based in part upon work supported by the National Science Foundation under Grant Numbers ARC 0856634 and ARC 1231638
 - Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.
- The Arctic Social Sciences Postdoctoral Fellowship is funded in part by the Council on Library and Information Resources

Interconnections

We recognize that until recently ice has generally covered the high seas portion of the central Arctic Ocean on a year-round basis, which has made fishing in those waters impossible to conduct. We acknowledge that, due to climate change resulting in changes in ice distribution and related environmental phenomena, the marine ecosystems of the Arctic Ocean are evolving and that the effects of these changes are poorly understood. We note that the Arctic Ocean ecosystems until now have been relatively unexposed to human activities.

DECLARATION CONCERNING THE PREVENTION OF UNREGULATED HIGH SEAS FISHING IN THE CENTRAL ARCTIC OCEAN

The screenshot shows the NSIDC website search interface. The search term 'sea ice' has yielded 263 results. The results are sorted by relevance. Three results are visible:

- Sea Ice Index**: Temporal Coverage 1978-10-26 to continuous. Parameters: Ice Extent, Ice Growth/Melt, Sea Ice Concentration. Data Format: ASCII Text, ESRI Shapefile, PNG. Summary: The Sea Ice Index provides a quick look at Arctic- and Antarctic-wide changes in sea ice. It is a source for consistent, up-to-date sea ice extent and concentration images, in PNG...More Detail
- Sea Ice Trends and Climatologies from SMMR and SSM/I-SSMIS**: Temporal Coverage 1978-10-26 to 2013-12-31. Parameters: Ice Extent, Sea Ice Concentration. Data Format: ASCII Text, Binary, JPEG, PNG. Summary: Notice Regarding Data Corrections 04 September 2013 These data sets were recently revised. Please refer to the Documentation link provided above for details regarding data...More Detail
- Multisensor Analyzed Sea Ice Extent - Northern Hemisphere (MASIE-NH)**: Temporal Coverage 2006-10-01 to continuous. Parameters: Ice Edges, Ice Extent, Ice Growth/Melt. Data Format: ASCII Text, ESRI Shapefile, GeoTIFF, Keyhole Markup Language (.kml), Microsoft Excel, NetCDF, PNG. Summary: The Multisensor Analyzed Sea Ice Extent - Northern Hemisphere (MASIE-NH) products provide measurements of daily sea ice extent and sea ice edge boundary for the Northern...More Detail

Denmark, the Kingdom of Norway,

SIPN SEA ICE PREDICTION NETWORK

Home About Sea Ice Outlook Meetings Data Join Presentations and Publications Resources News

News

2016 Sea Ice Outlook August Report Available

19 August 2016

The August report for the 2016 Sea Ice Outlook (SIO) is now available! The goal of the SIO is to improve Arctic sea ice prediction on seasonal time-scales. Organizers thank all who contributed to the 40 Outlooks received for this report. This month the median pan-Arctic extent Outlook for September 2016 sea ice extent is 4.4 million square kilometers. Contributions are based on a range of methods from advanced numerical models to qualitative perspectives from citizen scientists. This report includes discussions about dynamical model contributions and their variance, current conditions, recent atmospheric conditions, probability forecasts for late summer meteorological conditions, and comments on sea ice conditions in the Alaska sector as well as the Outlooks that focused on that region; key statements from each individual Outlook; and links to view or download individual contributions.

[Read Complete Report](#)

Mailing List

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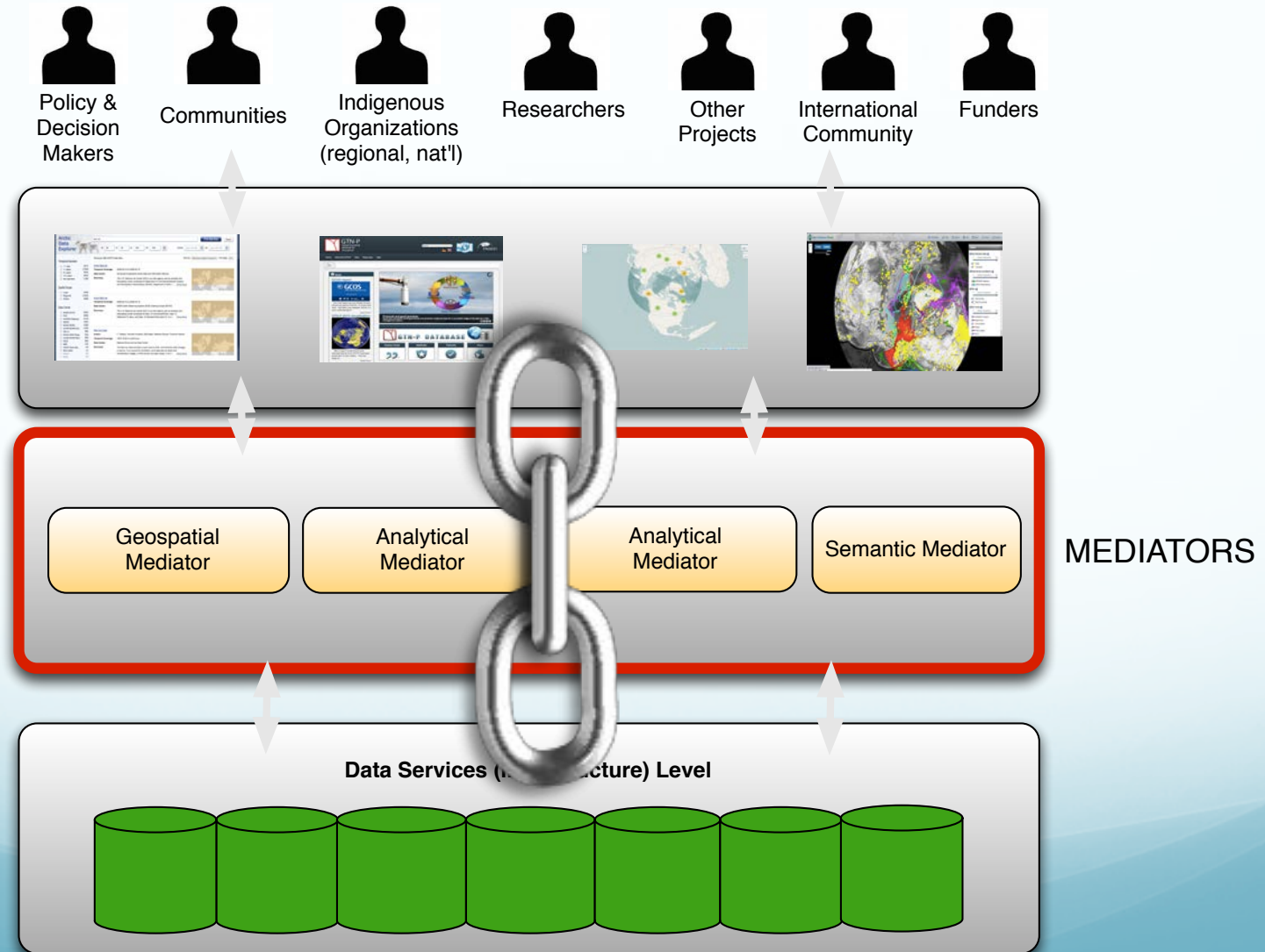
SIPN on LinkedIn

Join SIPN on LinkedIn and connect with other sea ice professionals!

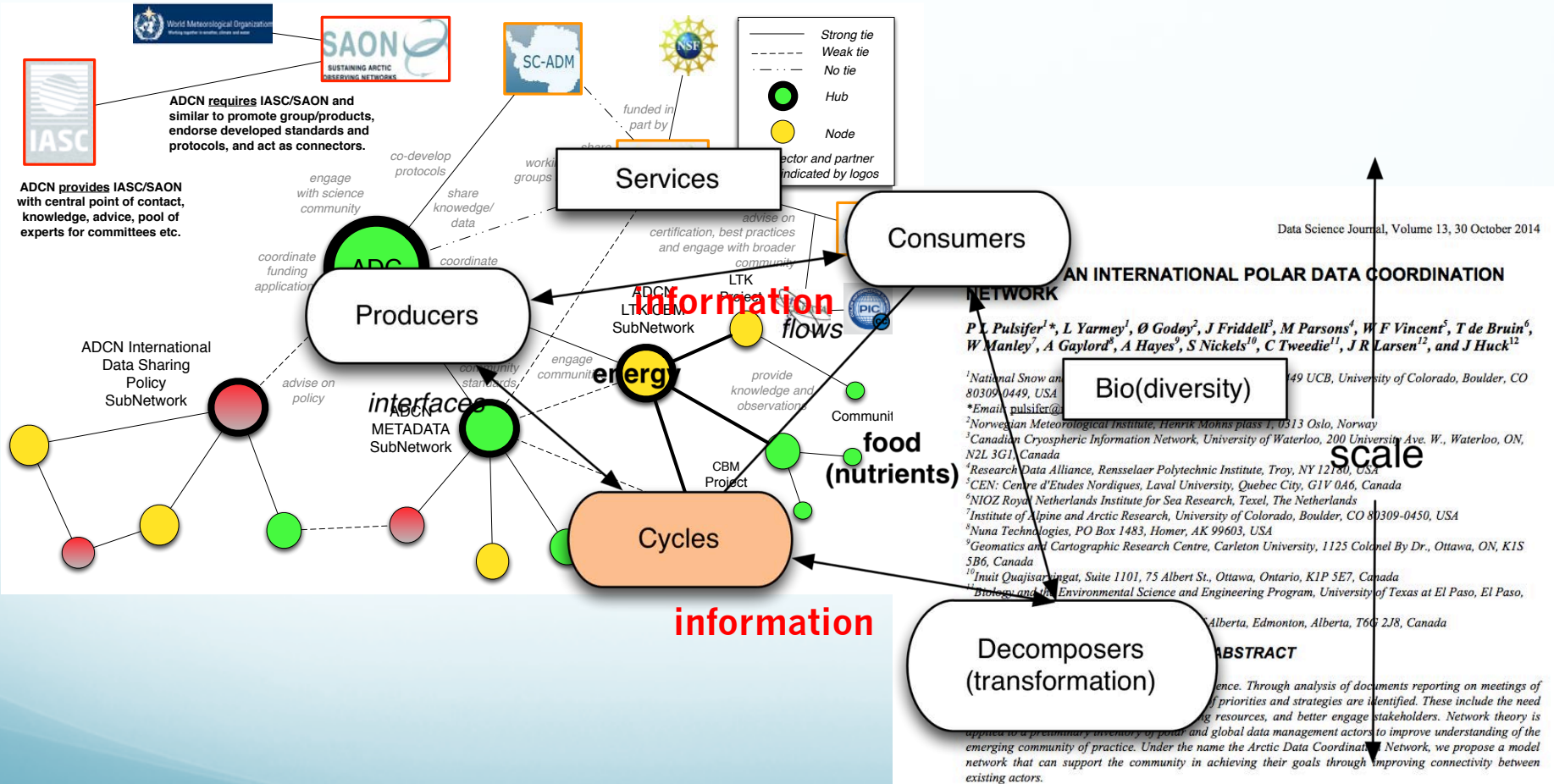
[SIPN on LinkedIn](#)

Sea Ice Data at NSIDC

Mediators are Links



Data Ecosystem



Data Science Journal, Volume 13, 30 October 2014

AN INTERNATIONAL POLAR DATA COORDINATION NETWORK

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ABSTRACT

Through analysis of documents reporting on meetings of the Arctic Data Coordination Network, priorities and strategies are identified. These include the need to better engage stakeholders. Network theory is applied to a preliminary inventory of polar and global data management actors to improve understanding of the emerging community of practice. Under the name the Arctic Data Coordination Network, we propose a model network that can support the community in achieving their goals through improving connectivity between existing actors.

Keywords: Data management, Network, Arctic, Antarctic, International Polar Year, Interoperability, Data sharing

1 INTRODUCTION

Well defined, efficient, and sustainable data management is a prerequisite to moving Arctic observing initiatives from a loose collection of individual projects and missions to a unified observing system advancing a common

Ecosystem = Network

- (i) Only a small number of links per node are needed to create a highly interconnected and robust network (the idea of a 'it's a small world' or 'six degrees of separation').
- (ii) 'Weak ties' involving rare or occasional contact, i.e., individuals who are not necessarily part of the same organization and have a limited personal relationship, are important. Although the establishment of weak ties is not difficult or resource intensive, these ties provide the connectivity necessary to establish a robust network.
- (iii) Robust networks are those able to withstand or overcome adverse conditions such as removal of a major node or hub (e.g., loss of funding for a major programme) and include multiple, highly connected hubs as well as less connected nodes.
- (iv) 'Connectors' are vital. In a social setting, these are the 'people who know people' whereas in an organizational situation, they are organizations that are highly connected but may or may not engage in the practical activities of the community. Connectors may also act as mediators, where they do more than simply connect but also actively engage in the subject matter, perform acts of synthesis, abstraction, transformation, and so on that enable disparate actors to better communicate.