ARCTIC SDI
Arctic Spatial Data Infrastructure

Arctic Spatial Data Infrastructure

Enabling Access to Arctic Location-Based Information

Arctic SDI Side Event Co-Chairs:
Arvo Kokkonen
Arctic SDI Board Chair & Director General, National Land Survey of Finland
Kevin T. Gallagher
Arctic SDI Board Member & Associate Director, U.S. Geological Survey

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8th Session of the UN-GGIM

Arvo Kokkonen

Arctic SDI Board Chair
Director General,
National Land Survey of Finland

ARCTIC SDI Arctic Spatial Data Infrastructure

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Agenda

- Introduction to Arctic SDI
- Why an Arctic SDI
- Arctic SDI Strategic Activities
- Stakeholder and Partner Engagement: Delivering the Value of an SDI
- Arctic SDI governance structure, infrastructure, services, tools
- Arctic SDI Geoportal Demo

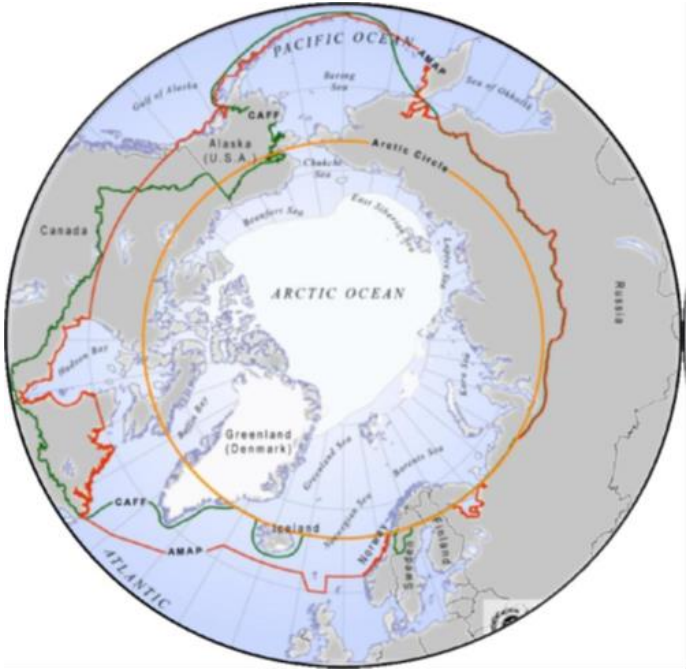
Arctic SDI Strategic Vision

Vision: The Arctic Spatial Data Infrastructure will **facilitate access to geospatial information** in support of social, economic, environmental, monitoring, decision-making and other needs in the Arctic.

Mission: The Arctic Spatial Data Infrastructure mission is to **promote cooperation** and **development of a Spatial Data Infrastructure that enables discovery, visualization, access, integration and sharing** of Arctic geospatial data, while pursuing **best data management practices**

Users, Stakeholders and Data Providers

- Arctic Council Working Groups (CAFF, AMAP, EPPR, PAME)
- Academic institutions in the Arctic
- Government and public sector
- Business, media, citizens, NGOs,…



Arctic SDI is based on voluntary commitments by **the National Mapping Agencies from 8 countries** that border the Arctic Circle

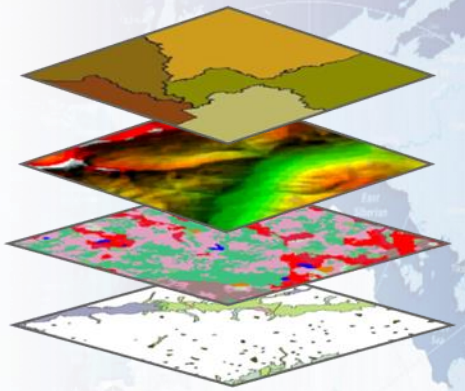
Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden, USA

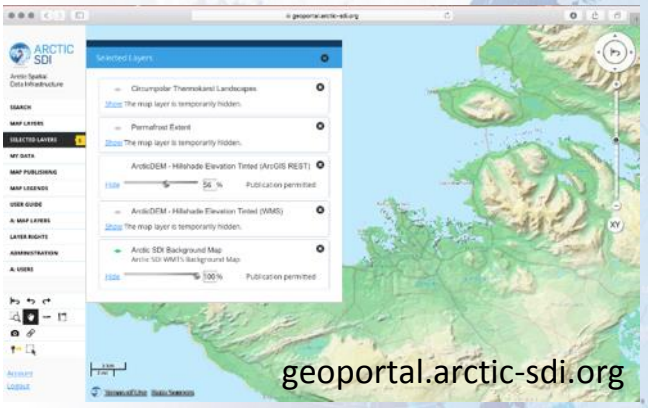
There is a signed Memorandum of Understanding towards cooperative development of an Arctic SDI.

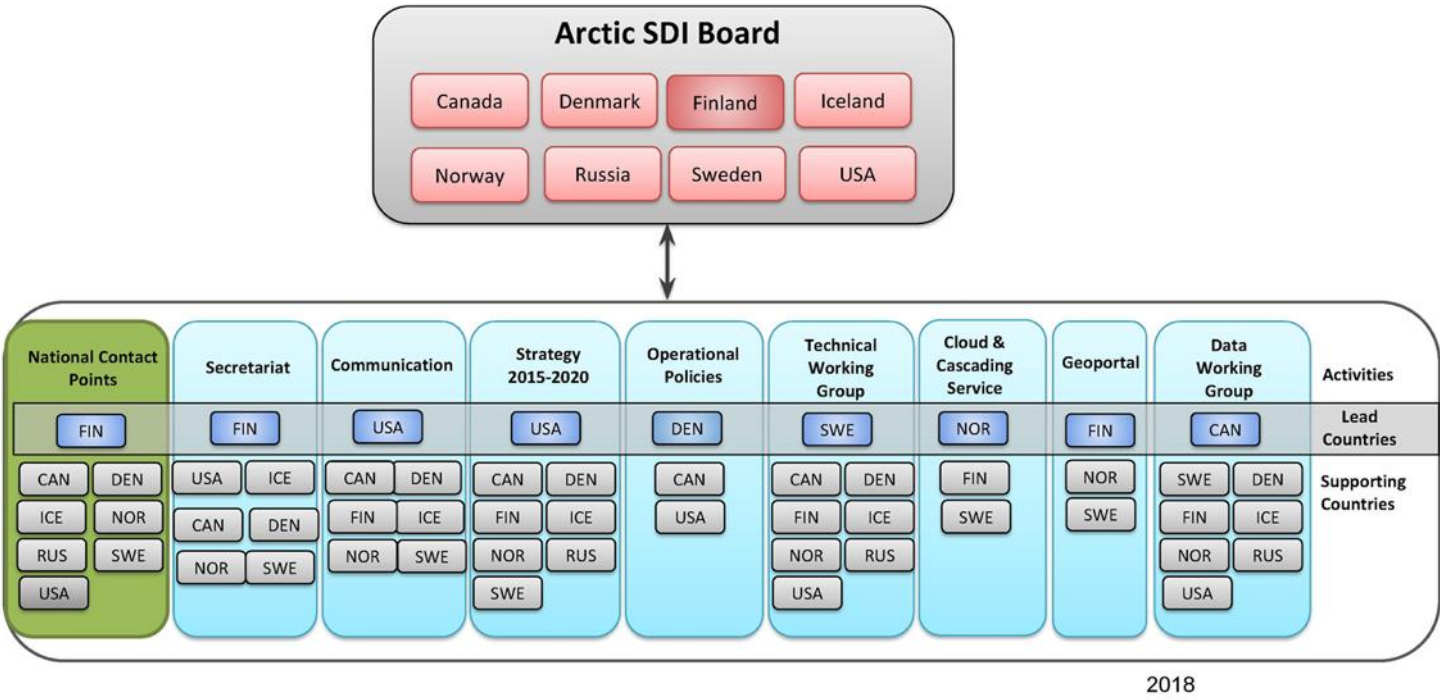
Arctic SDI Services

The Arctic SDI is an infrastructure that provides a web portal with easy access to:

- A geoportal for geospatial data viewing and discovery
- A searchable metadata catalogue
- Authoritative reference data as a
  - Web Map Service (WMS) 1:250.000
  - Searchable Circumpolar Gazetteer
- Thematic data and partnerships – Distributed Sources
  (DEM, marine data, ice cover, ship routes, flora & fauna, etc.)



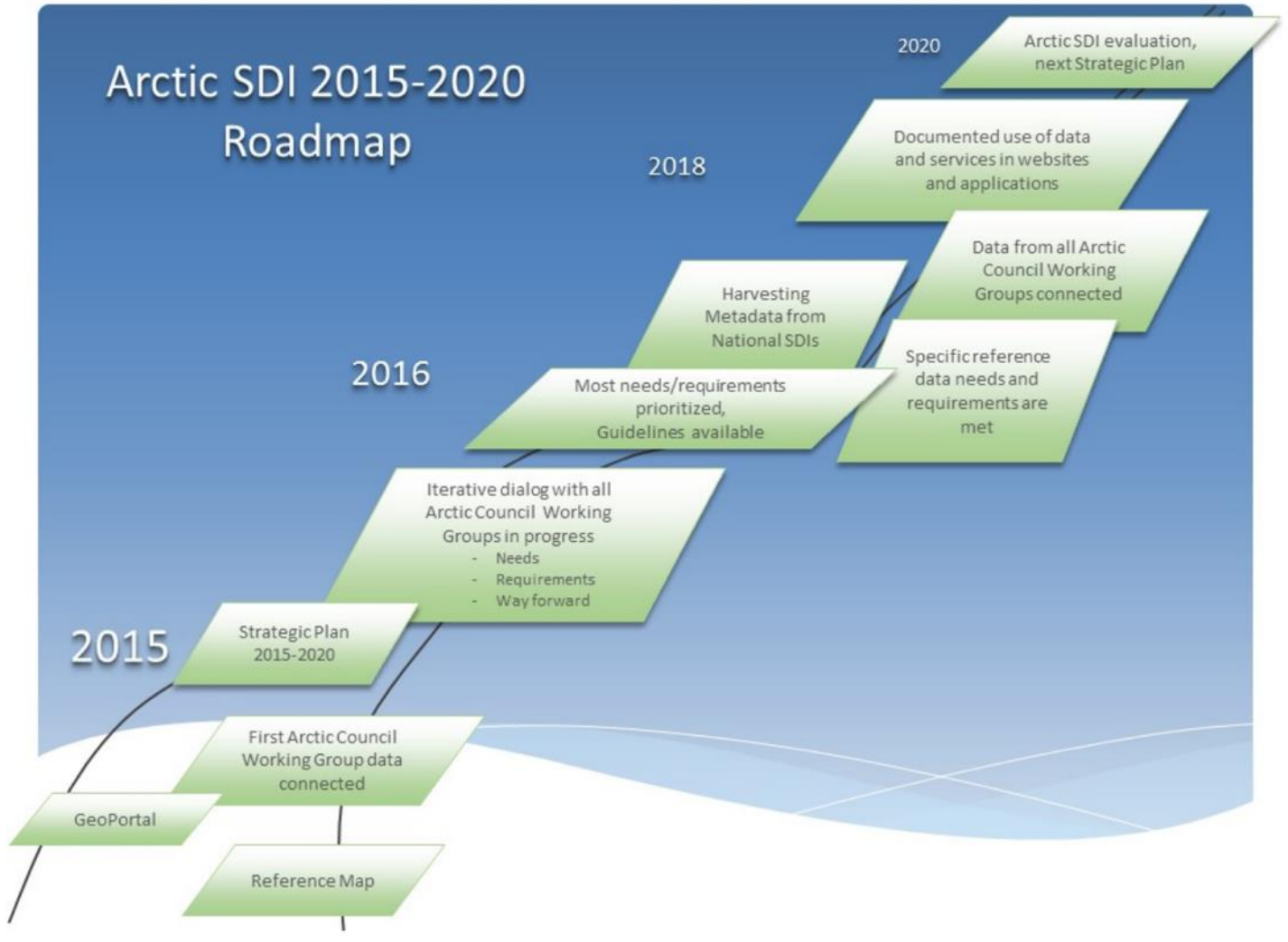



Arctic SDI Board
Canada
Denmark
Finland
Iceland
Norway
Russia
Sweden
USA
National Contact Points
Secretariat
Communication
Strategy 2015-2020
Operational Policies
Technical Working Group
Cloud & Cascading Service
Geoportal
Data Working Group
Activities
Lead Countries
Supporting Countries
FIN
FIN
USA
USA
DEN
SWE
NOR
FIN
CAN
CAN DEN ICE NOR RUS SWE USA
USA ICE CAN DEN NOR SWE
CAN DEN FIN ICE NOR SWE
CAN DEN FIN ICE NOR RUS SWE
CAN USA
CAN DEN FIN ICE NOR RUS USA
FIN SWE
NOR SWE
SWE DEN FIN ICE NOR RUS USA
2018

Strategic Objectives from Arctic SDI Strategic Plan 2015 -2020

1. Address Needs of Arctic Council and Other Users
2. Provide Reference Datasets
3. Facilitate Access to Thematic Datasets
4. Data and Technical Interoperability
5. Spatial Operational Policies
6. Communications

Arctic SDI & ARMSDIWG Joint Workshop


Arctic SDI 2015-2020 Roadmap
2015
2016
2018
2020
Strategic Plan 2015-2020
Iterative dialog with all Arctic Council Working Groups in progress
- Needs
- Requirements
- Way forward
Most needs/requirements prioritized, Guidelines available
Harvesting Metadata from National SDIs
Specific reference data needs and requirements are met
Data from all Arctic Council Working Groups connected
Documented use of data and services in websites and applications
Arctic SDI evaluation, next Strategic Plan
First Arctic Council Working Group data connected
GeoPortal
Reference Map

Strategic Documents

Who and What is the Arctic SDI?

- **2015-2017 Biennial Report**: Highlights from the US Chairmanship
- **Arctic SDI Fact Sheet 2016**

Governing Documents

- **Signed Memorandum of Understanding** – English, French, and Russian version
- **Arctic SDI Governance** v2.0

Arctic SDI Strategic Plan Documents

- **Strategic Plan 2015-2020**
- Implementation Plan
- Roadmap

Arctic Spatial Data Pilot

- Open Geospatial Consortium Spatial Data Pilot with data intensive scenario based videos and a Final Engineering Report

Pan-Arctic Digital Elevation Model

- **ArcticDEM** – Arctic SDI Board Position Statement
  - Polar Geospatial Center ArcticDEM Documentation

Arctic SDI Documentation

- **SDI Manual for the Arctic with Glossary of Terms**
  - Guidance and information management good practices on commonly accepted SDI operational policies and standards.
  - Audiences: strategic decision makers, data providers, distributors and end users of Arctic data
- **Arctic SDI Glossary of Terms**
  - A living glossary providing terms, acronyms, definitions and sources
- **Arctic SDI Evaluation**
  - Arctic SDI Evaluation Report
  - Arctic SDI Evaluation Framework
  - Arctic SDI Evaluation and Benchmarking presentation

Arctic SDI Historical Framework

- Arctic-SDI-Framework-Document_V2 0

Transforming our World: The UN 2030 Agenda for Sustainable Development

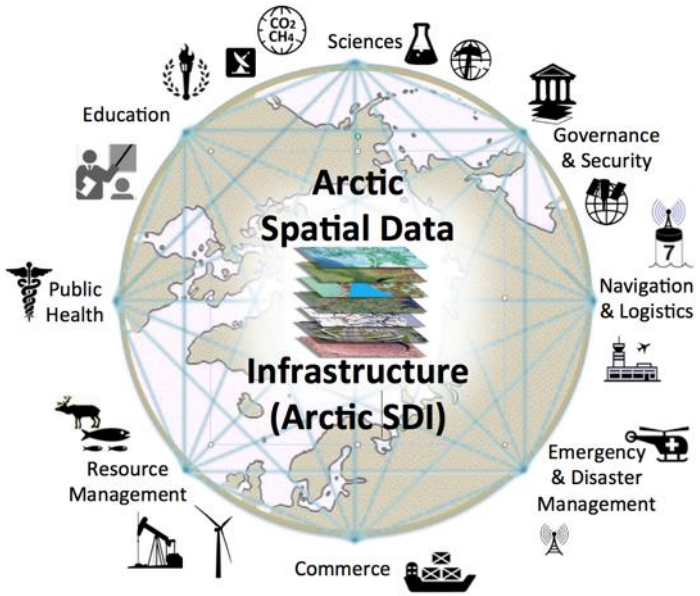
- Agenda 2030 Declaration highlights the need for "quality, accessible, timely and reliable disaggregated data"
- Arctic SDI and its Geoportal supports the Declaration through
  - Outreach with regional stakeholders to increase understanding and strengthen the "system of systems" approach to spatial data infrastructures,
  - Providing standards-based tools to find data, visualize data (determine fit for use and fit for purpose) and share data (e.g. embedded maps)

Kevin T. Gallagher

Arctic SDI Board
Associate Director,
U.S. Geological Survey

A Collaborative Model for Arctic SDI

Facilitate the "System of Systems" Approach to Data Sharing



- Working with stakeholder organizations to make their key data available, with a focus on the Arctic Council
- Understanding the needs and requirements of stakeholders
- Information Management best practices (lifecycle of geospatial data)
- Open standards and interoperability
- Helping data contributors and users understand how to participate and why it's important

Graphic Source: OGC

ARCTIC SDI Arctic Spatial Data Infrastructure

ARCTIC COUNCIL

arctic-sdi.org

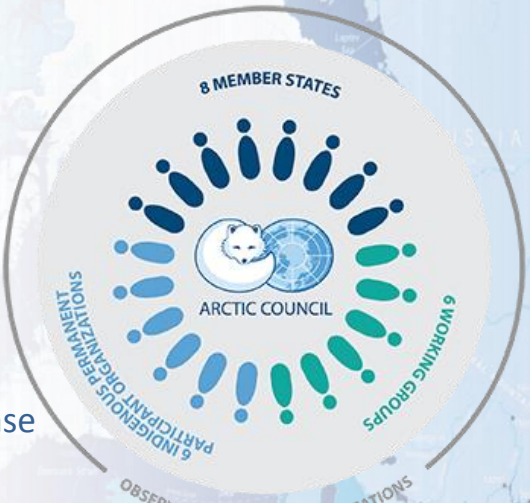
Arctic Council

An Intergovernmental forum **promoting cooperation, coordination and interaction among the Arctic States, Arctic indigenous communities and other Arctic inhabitants** on common Arctic issues…

- Endorsed Arctic SDI in 2009

Collaboration to develop common data sharing methodologies and best practices

- Arctic **Contaminants** Action Program
- Arctic **Monitoring and Assessment** Programme
- Conservation of Arctic **Flora and Fauna**
- **Emergency** Prevention, Preparedness and Response
- Protection of the Arctic **Marine Environment**
- **Sustainable Development** Working Group



AC AP ARCTIC CONTAMINANTS ACTION PROGRAM

AMAP Arctic Monitoring and Assessment Programme

CAFF Conservation of Arctic Flora and Fauna

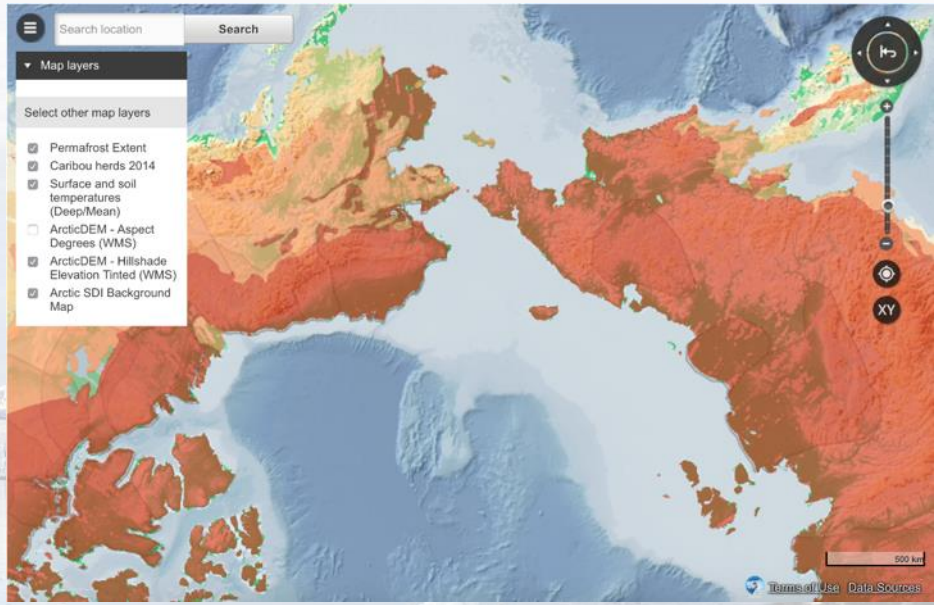
EP PR EMERGENCY PREVENTION, PREPAREDNESS AND RESPONSE

PAME Protection of the Arctic Marine Environm

Sustainable Development

Partnering with Arctic Council

- **Enhance Data Management Best Practices** across Working Groups
- Regular dialog with Arctic Council
  - **Biannual Reporting through CAFF**
- **Incorporation of SDI standards into published data products**



- Using **Arctic SDI Geoportal** to **enable customized embedded maps**

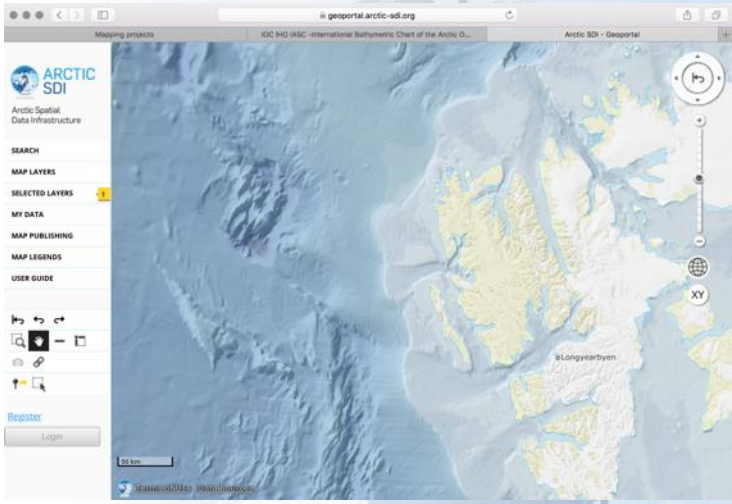
Joint Session with CAFF at the 2018 Biodiversity Congress

Partnering with IHO/ARHC*

Arctic Regional Marine SDI Working Group

- Two Joint Meetings and a Workshop

  Develop a Joint Statement of Intent and Work to:
  - Avoid duplication of effort
  - Efficiently use and expand on established communication channels and relationships with stakeholders



- **Divide tasks with respect to established stakeholder "domains"**
- Build on existing infrastructure, such as

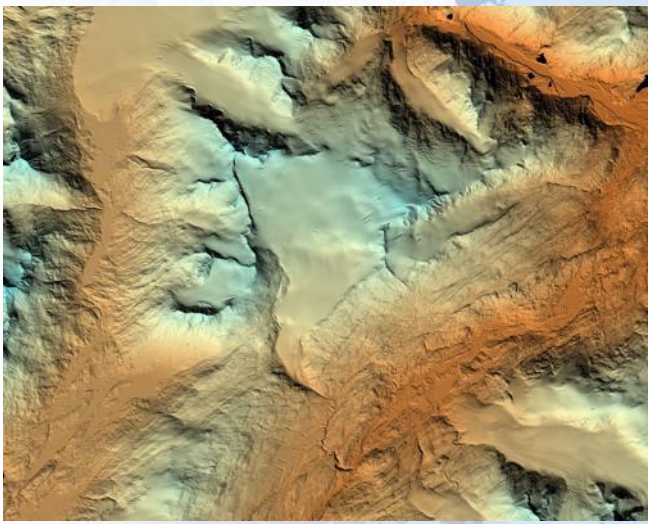
  Geoportal and its services, communication tools such as the Website, centralized document storage environment, and Guidelines whenever possible.

*Arctic Regional Hydrographic Commission

National Science Foundation and Polar Geospatial Center

Partnering on a Pan-Arctic DEM

- An initiative of the Arctic Council US Chairmanship to **produce a 2m resolution DEM** of the entire Arctic
- **Elevation Experts and NMA Representatives collaborated** to enrich the process towards delivery of a Pan-Arctic DEM
- **More than 95% of the world's Arctic regions are already covered** by the project
  - Next release September 2018
- **Available in a number of visualizations at the Arctic SDI Geoportal**



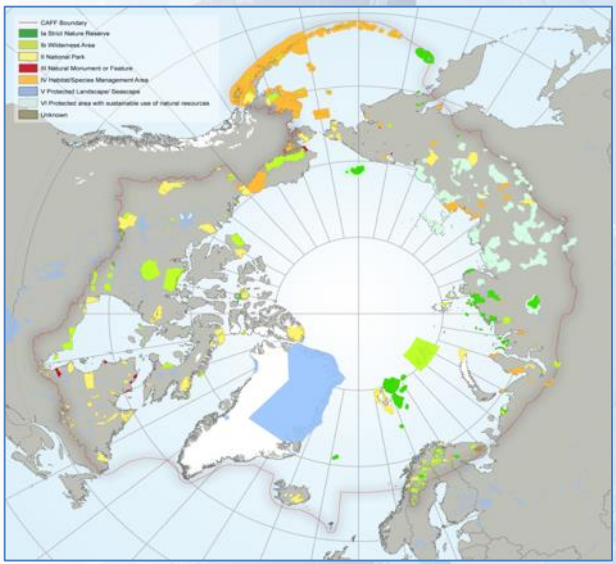
Governance Structure: *Information Management Best Practices*

SDI Manual for the Arctic: Provide Stakeholders with Guidelines & Best Practices

- Data Management and Sharing
- SDI Development & Growth
- Standardization

Arctic SDI Monitoring

- **Key Performance Indicators**
- **Arctic SDI Evaluation** (every two years)



We are all stakeholders!

Increased efficiency and improved discovery, access, and use

Arctic Spatial Data Pilot

- 18 month Study defined land and sea scenarios to demonstrate the value of standards and webservices to break down *information management silos* with technical piloting activities:
  - Improve access to reliable data for monitoring, management, emergency preparedness and decision making in the Arctic,
  - Produced 9 videos showcasing how standards and common approaches to data management are deployed.
- Addressed technology issues to meet the realities of Arctic frontier economies, such as in zero/low bandwidth Internet.

OGC® Making location count.

USGS science for a changing world

Natural Resources Canada

ARCTIC SDI Arctic Spatial Data Infrastructure

Visit https://www.opengeospatial.org/pub/ArcticSDP/

Arctic Spatial Data Pilot – Summary Video

Key results of the Arctic Spatial Data Pilot. Showcase how standards and common approaches to data management are deployed

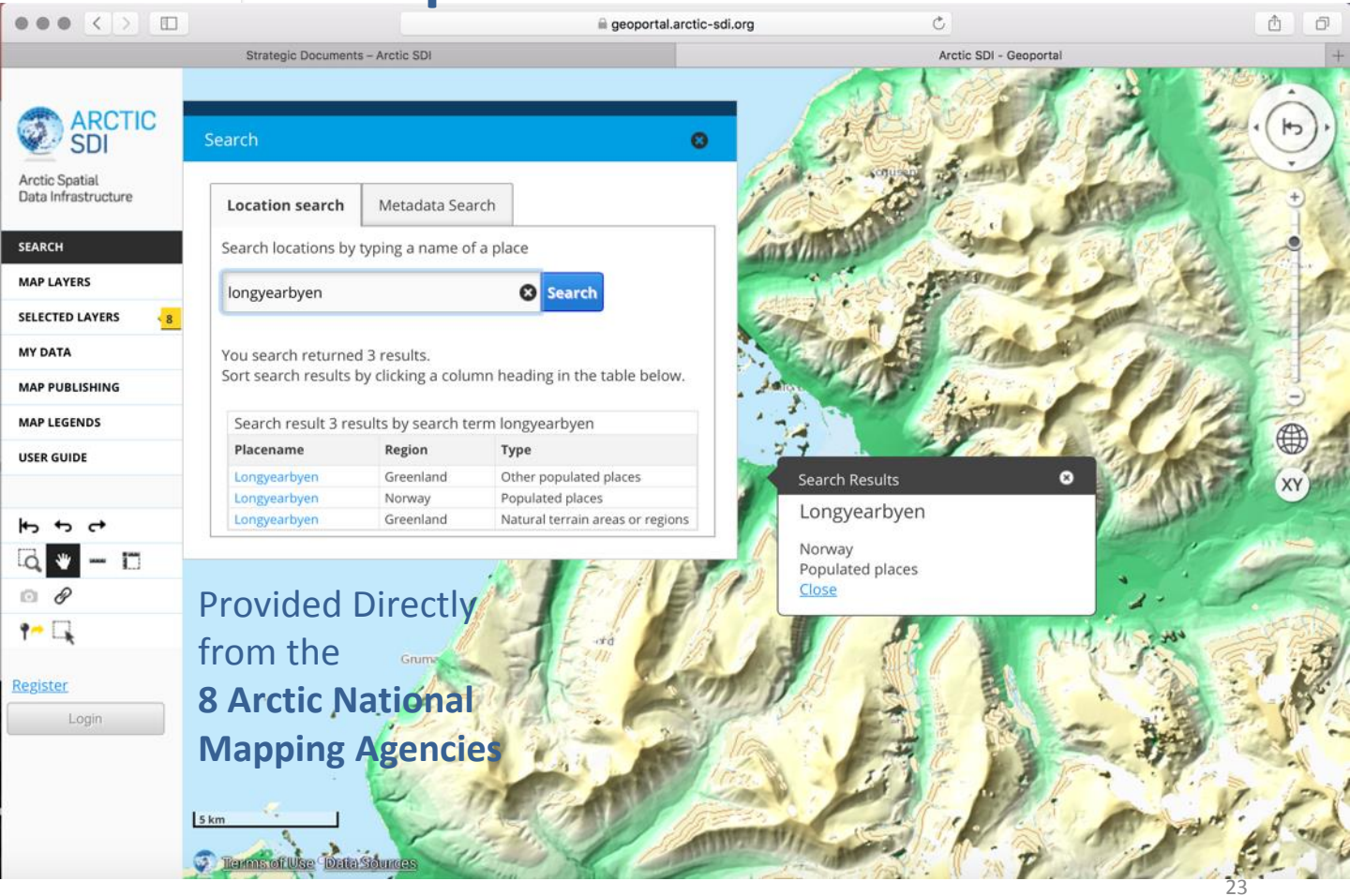
- Integrates **highlights from the various scenarios**, adds statements from **key stakeholders interviewed** by OGC
- Quick overview of the **power and value of data and processing capacities served via standardized Web services**

Visit https://youtu.be/GdExjD9dfGQ

Authoritative Topographic Basemap

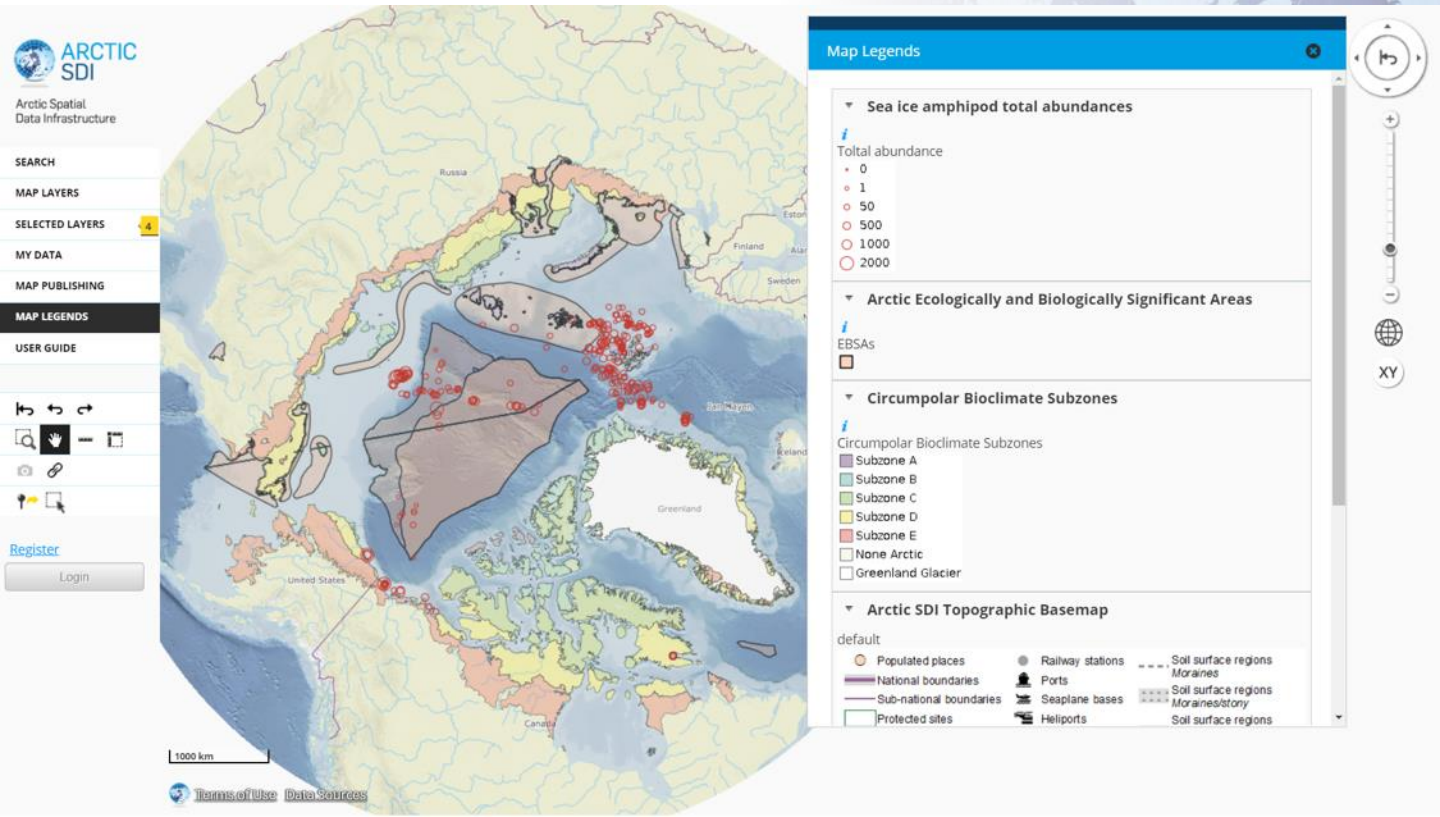
- **Common Cartographic Specification**
- **A Trusted Source of Detailed Information**

Circumpolar Gazetteer



Provided Directly from the **8 Arctic National Mapping Agencies**

Arctic SDI Geoportal



Heli Ursin

Arctic SDI National Contact Point
National Land Survey of Finland

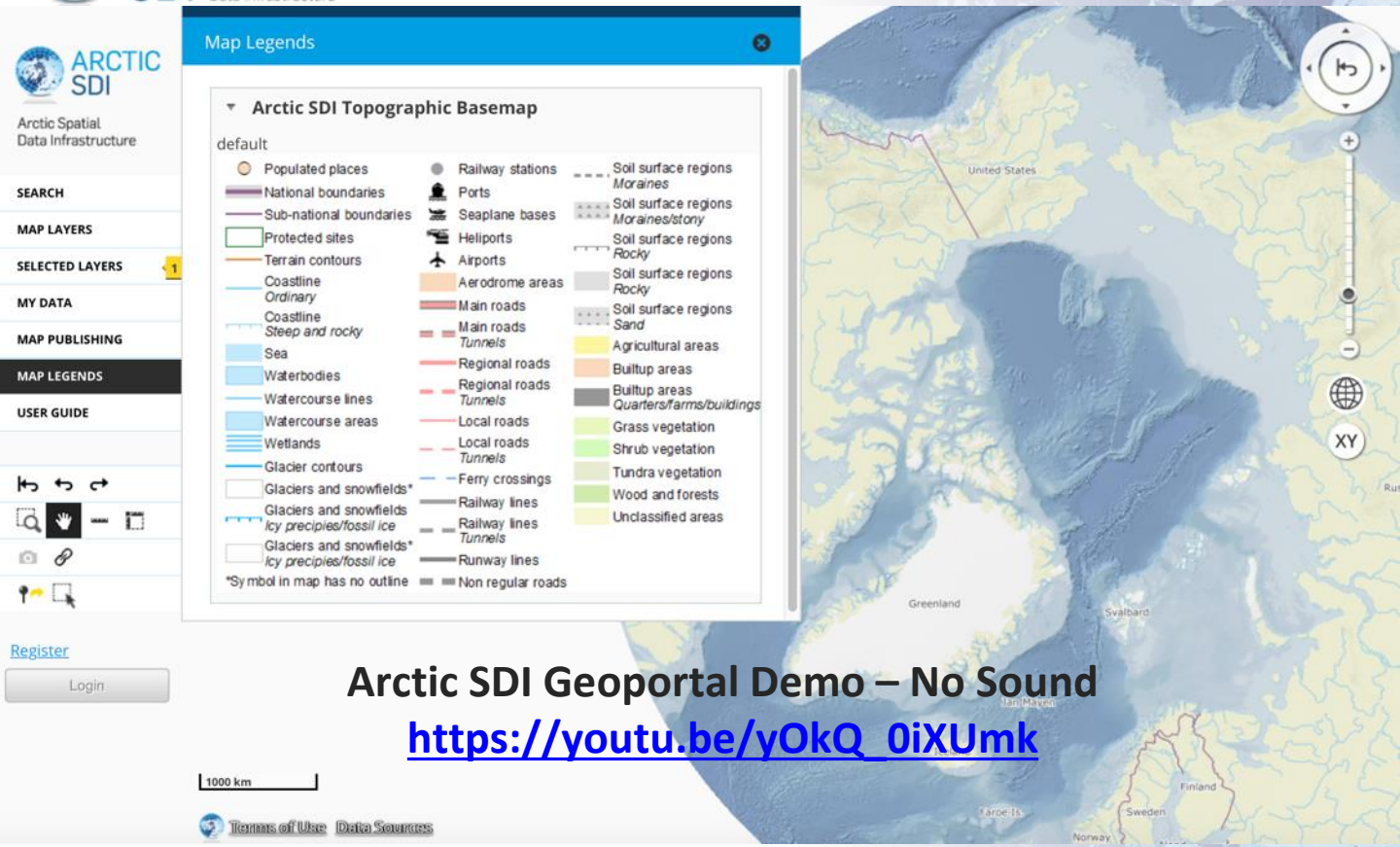
Oskari - Geoportal and Embedded maps

Can be used for:

- Setting up Geoportals or Web GIS systems
- Creating Embedded map clients onto other websites very efficiently
- Setting up advanced web-based tools, such as decision-making support services and data analysis tools

Multilingual – English, Swedish & Finnish full coverage, 15 other languages with partial coverage

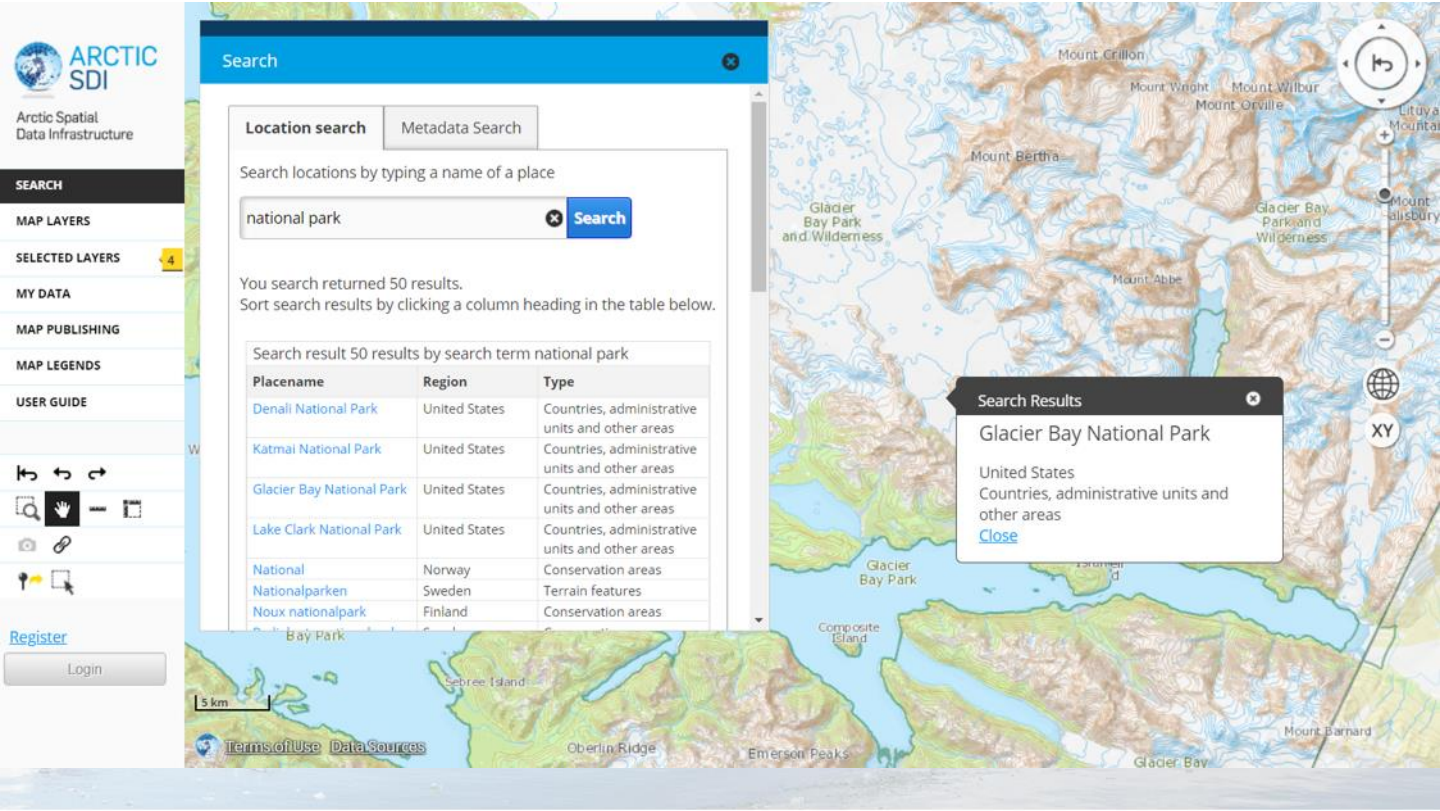
Open Source - see oskari.org and Oskari GitHub for more info



Arctic SDI Geoportal Demo – No Sound

https://youtu.be/yOkQ_0iXUmk

Location Search



Metadata Search

ARCTIC SDI
Arctic Spatial Data Infrastructure

SEARCH
MAP LAYERS
SELECTED LAYERS 4
MY DATA
MAP PUBLISHING
MAP LEGENDS
USER GUIDE

Register
Login

Search

Location search | Metadata Search

Search Results

Name

- Land Water Mask (publication:2014-12-16, update frequency: unknown)
- Drinking Water Advisories in First Nations Communities
- Trends in water temperature and salinity (a) and density of phytoplankton
- Local water quantity in Canadian rivers – Water quantity at monitoring st… Canada
- North America Surface Water Values
- Water quality in Canadian rivers – Water quality at monitoring sites, Cana…
- USGS Watershed Boundary Dataset (WBD) Overlay Map Service from The…
- USGS Hydrography (NHD) Overlay Map Service from The National Map (P…
- National Long-term Water Quality Monitoring Data
- Releases of harmful substances to water – Releases of mercury to water b… Change Canada
- Releases of harmful substances to water – Releases of lead to water by fa… Canada
- Land and Water Area by Province/Territory and Ecozone
- Land and Water Area by Province/Territory and Ecoregion

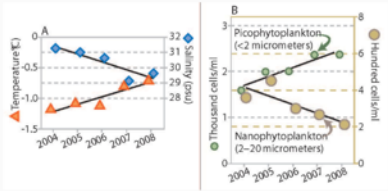
1000 km

Terms of Use | Data Sources

Metadata

Trends in water temperature and salinity (a) and density of phytoplankton.

Basic information | ISO 19115 metadata | Inspire metadata | Data quality | Actions



TRENDS IN WATER TEMPERATURE AND SALINITY (A) AND DENSITY OF PHYTOPLANKTON.

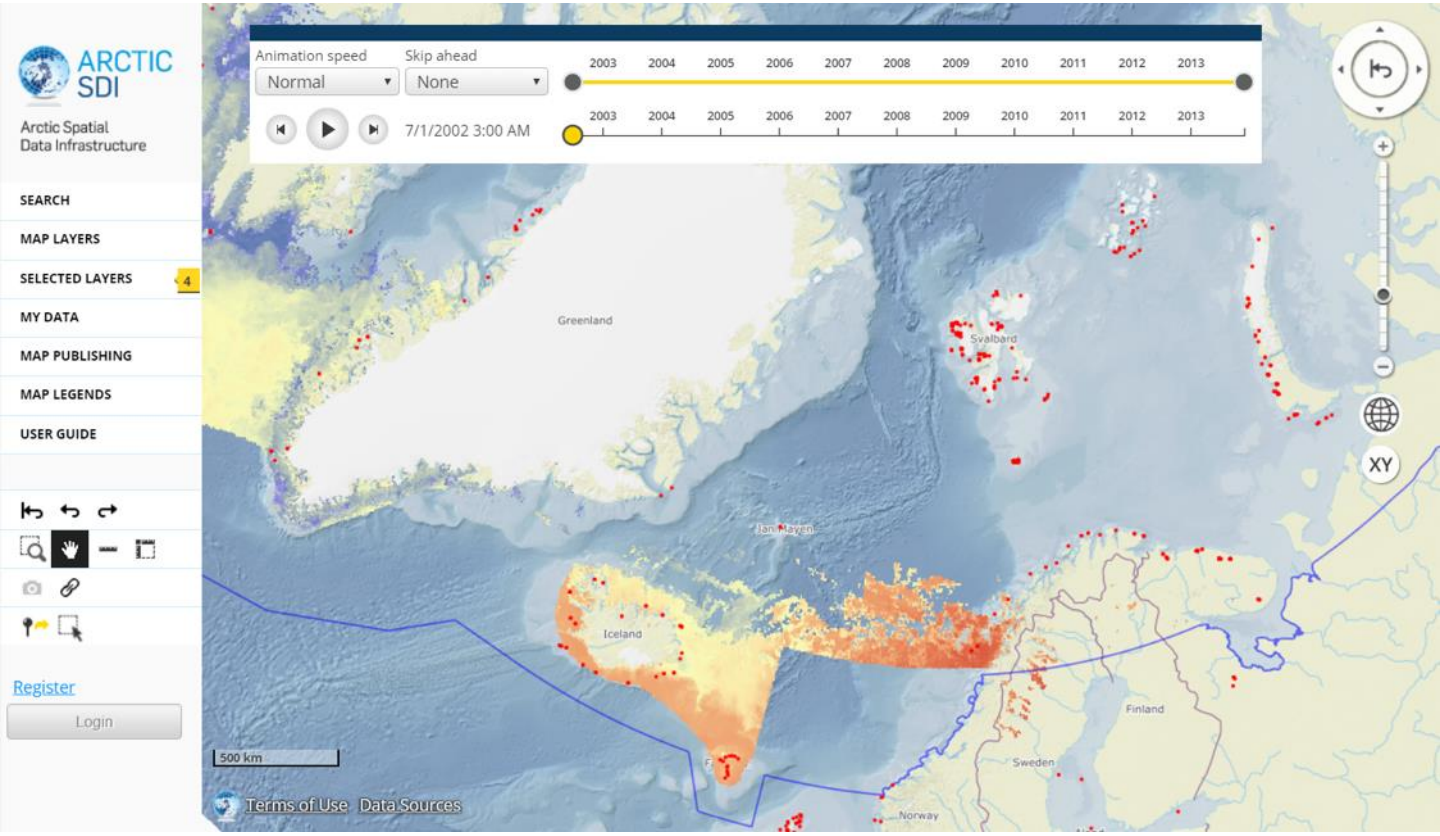
ABSTRACT TEXT (DATA)

Trends in water temperature and salinity (A) and density of phytoplankton of two size ranges (B), Canada Basin, 2004 to 2008.

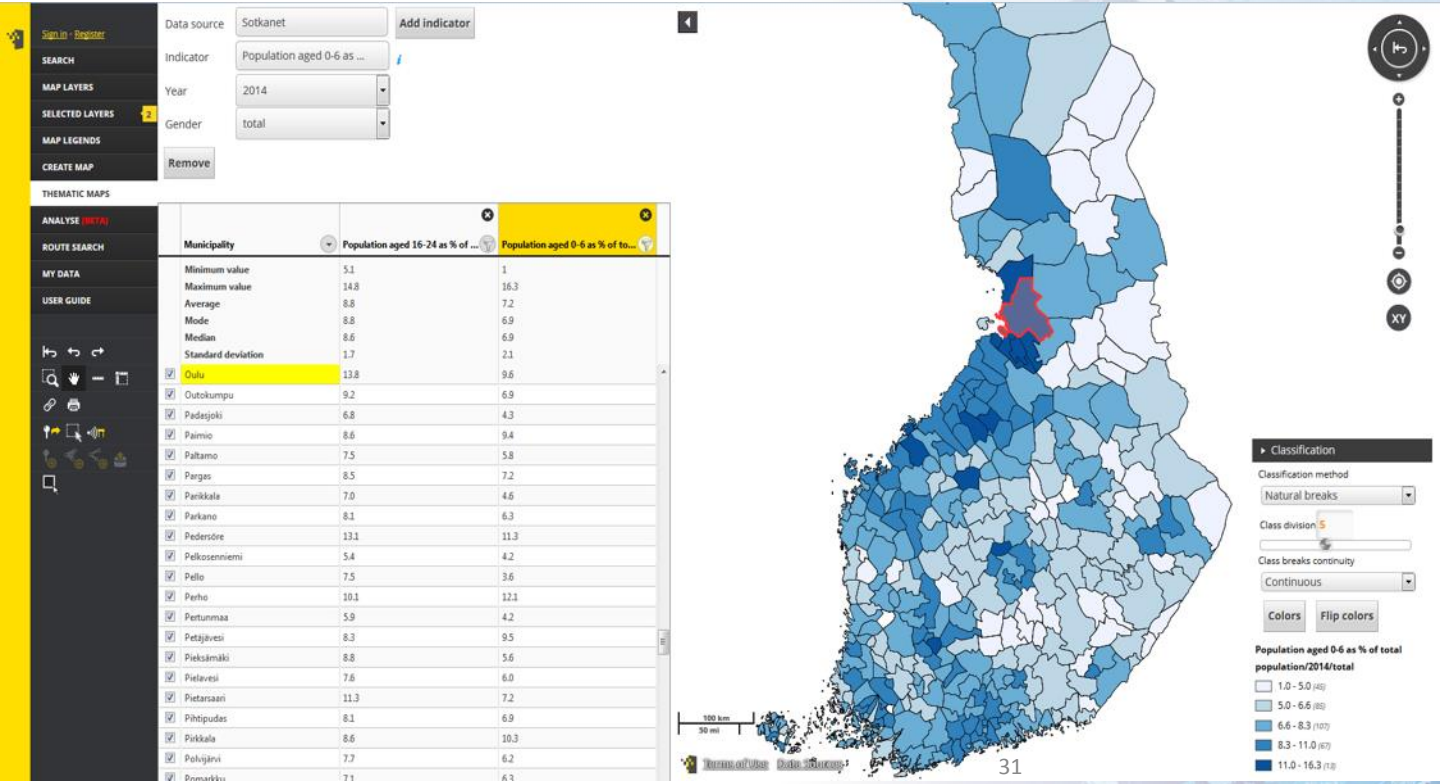
Stratification of the water column increased throughout the Canada Basin over a recent five-year period, accompanied by a change in phytoplankton communities. The upper ocean layer showed trends of increased temperature and decreased salinity (Figure 18A), which combine to make this layer progressively less dense. The layer of water below this did not change in density over this period (not shown). The larger size class of phytoplankton (which would include diatoms) decreased in abundance, while the smaller types of plankton increased (Figure 18B). In addition to the trends shown, nutrient content in the upper ocean water layer decreased. Abundance of microbes (bacteria and similar organisms) that subsist on organic matter increased. Total phytoplankton biomass, however, remained unchanged.

If this trend towards smaller species of phytoplankton and microbes is sustained, it may lead to reduced production of

Time Series (WMS-T)



Future:
Combined Spatial and Statistical Data



Arctic SDI Video on YouTube

Visit:

arctic-sdi.org

geoportal.arctic-sdi.org

Arctic SDI YouTube Channel

Arctic SDI Fact Sheet

GEOSPATIAL DATA – A TOOL FOR BETTER INFORMED DECISIONS AND MORE EFFICIENT ADMINISTRATION IN THE ARCTIC

Improved access to geospatial data can help us better to predict, understand and react to changes in the Arctic. Responses to the impact of climate change and human activities in the Arctic requires accessible and reliable data to facilitate monitoring, management, emergency preparedness and decision making.

Important data sets are produced and distributed by many stakeholders – public and private sector – and most of it can be geographically referenced. A spatial data infrastructure provides tools for data distributors to ensure that their geospatial data is easier for users to access, validate and combine with other data.

The Arctic SDI provides such an infrastructure and its development is facilitated by the National Mapping Agencies of the eight Arctic countries.

The Arctic SDI Geoportal and the initial Arctic SDI Reference Map – the basic building blocks in the Arctic Spatial Data Infrastructure are available

- The Arctic SDI Geoportal providing a web map viewer for use by any interested user to access

Arctic SDI Geoportal in the

https://www.youtube.com/channel/UCn1vg2HcsIdxv1p3DqKHMpQ

Arctic SDI 2015-2017 Biennial Report

The On-line Arctic SDI 2015 – 2017 Biennial Report covers:

- Recognizing Successes and Accomplishments—2015–2017
- Delivering on the Strategic Plan
- SDI Manual for the Arctic
- Outreach and extending collaboration
  - Arctic Council
  - International Hydrographic Organization
    - Arctic Marine Spatial Data Infrastructure
- Delivering Authoritative, Harmonized Data
  - Basemap
  - Circumpolar Gazetteer
- Arctic SDI Geoportal
- OGC Arctic Spatial Data Pilot
- ArcticDEM

Questions or Comments?