

Polar Knowledge Canada



Collaborating for the Future Canada's Polar Agency

An Integrated Research and Monitoring Plan

May 10th, 2016

Yellowknife, Northwest Territories



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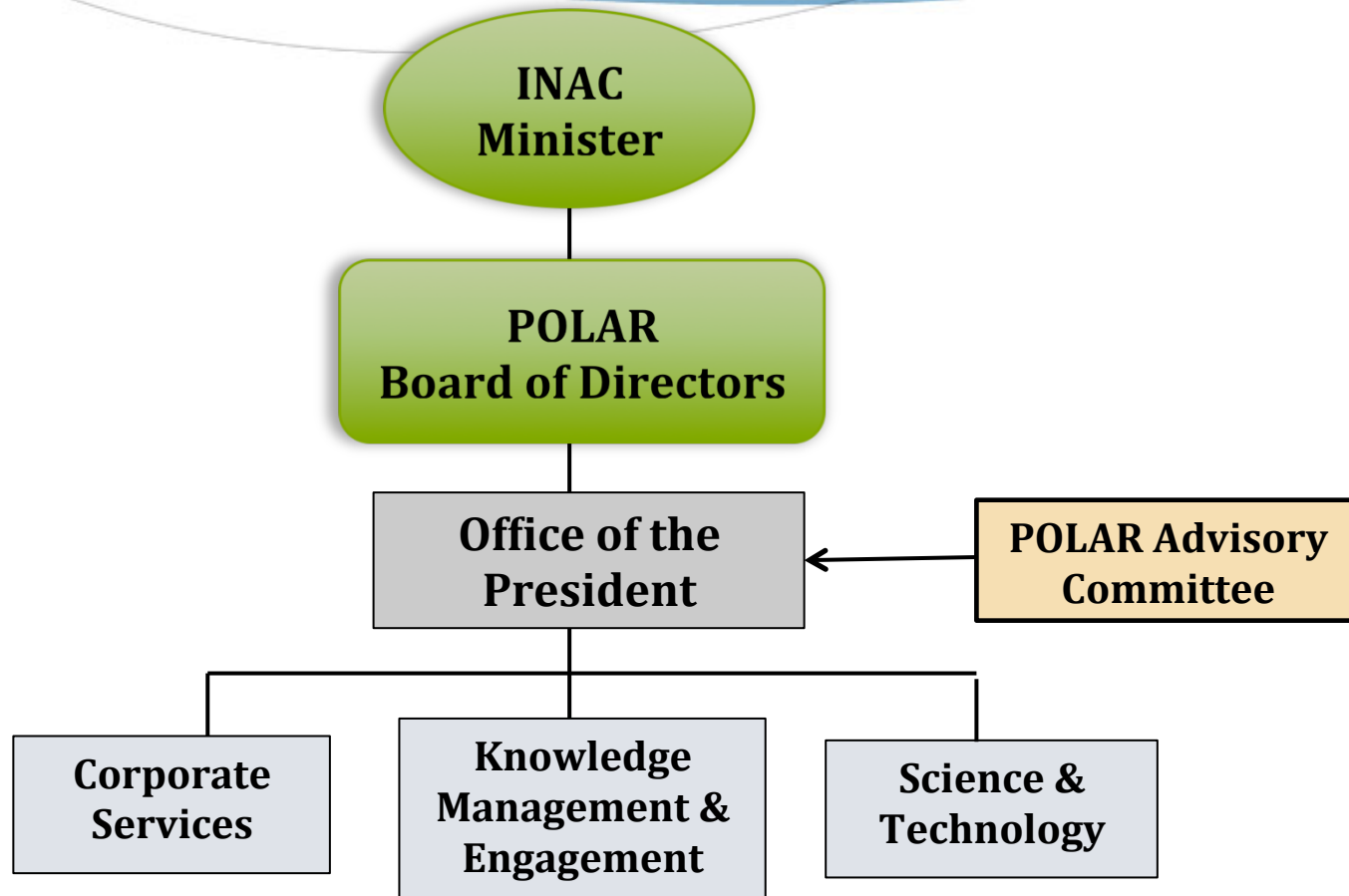
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What is Polar Knowledge Canada?

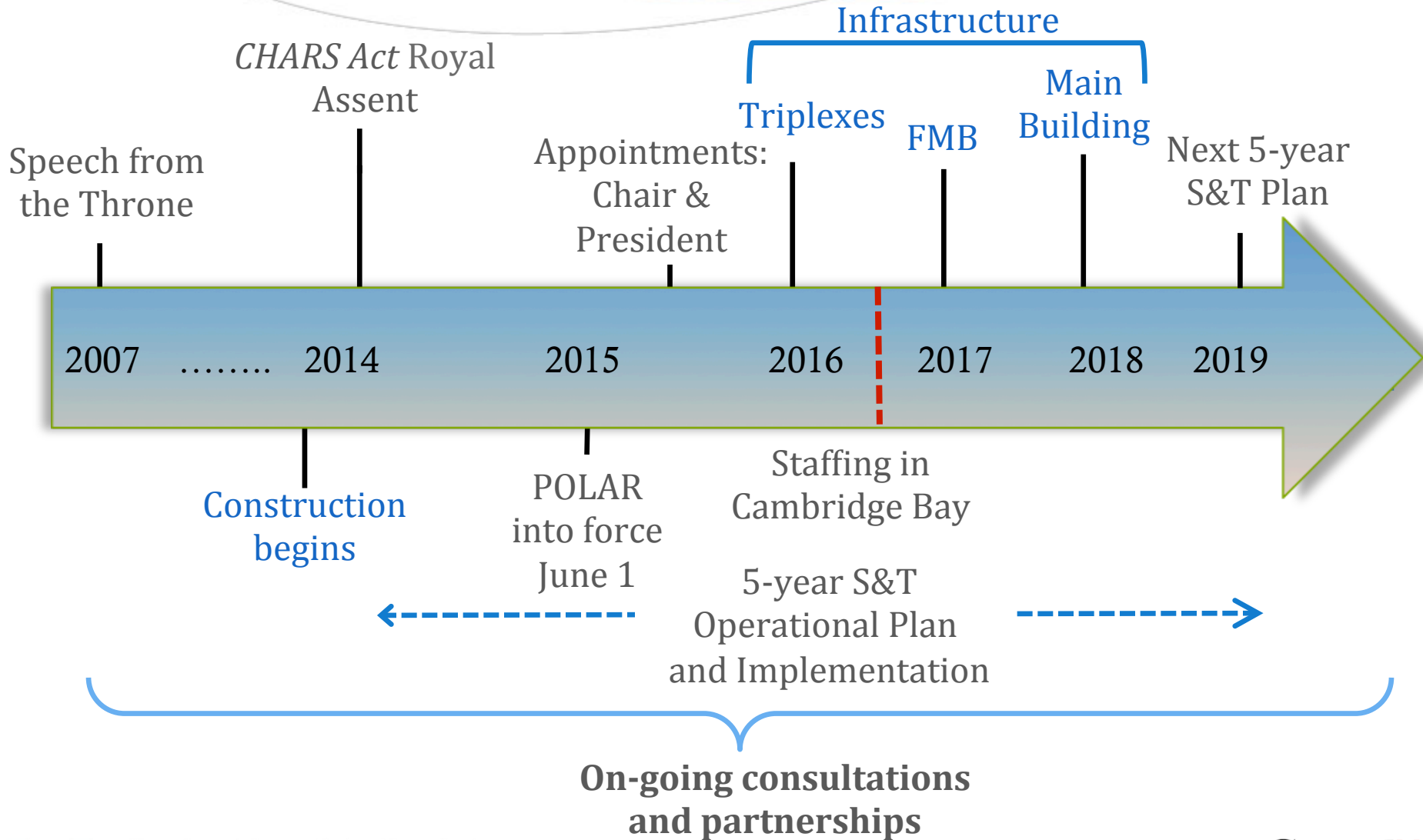
- A **innovative** Government of Canada agency, that will be **based in the north**, reporting to the Minister of Indigenous and Northern Affairs
- Established on June 1st, 2015, by **merging** the Canadian Polar Commission and the Canadian High Arctic Research Station's pan-northern science and technology program
- POLAR's horizontal function is based on the **Canadian High Arctic Research Station Act (2014)** to:
 - “Advance knowledge of the Canadian Arctic in order to improve economic opportunities, environmental stewardship and the quality of life of its residents and all other Canadians”
 - Promote the development and dissemination of knowledge of the circumpolar regions, including the Antarctic
 - Strengthen Canada's leadership on Arctic issues
 - Establish a hub for scientific research in the Canadian Arctic”



POLAR – Governance Structure



We are making progress..



Benefits for Northerners

- Employment opportunities in northern communities
- Career development programs to encourage northern leaders and ensure Northerners are an integral part of the organization
- Access to current knowledge to support decision making and increased capacity to engage in decision making
- Capacity building and training activities
- Respectful co-design of research that includes indigenous knowledge



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Pan-Northern S&T Program

Priority Areas for 2014-2019:

➤ **Alternative and renewable energy for the North**

- Reduce the dependency on high-cost imported energy, explore feasibility of local sources and enhance northern application of alternative technologies.

➤ **Baseline information to prepare for northern sustainability**

- Improve decision support for sustainable communities and responsible development in Canada's North.

➤ **Predicting the impacts of changing ice, permafrost, and snow on shipping, infrastructure and communities**

- Increase knowledge of terrestrial and marine cryosphere to support adaptation and improve climate models.

➤ **Catalysing improved design, construction and maintenance of northern built infrastructure**

- Application of innovative designs, materials and techniques to increase energy efficiency, quality, and reduce life-cycle costs.



Pan-Northern S&T Program

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POLAR Challenges and Opportunities

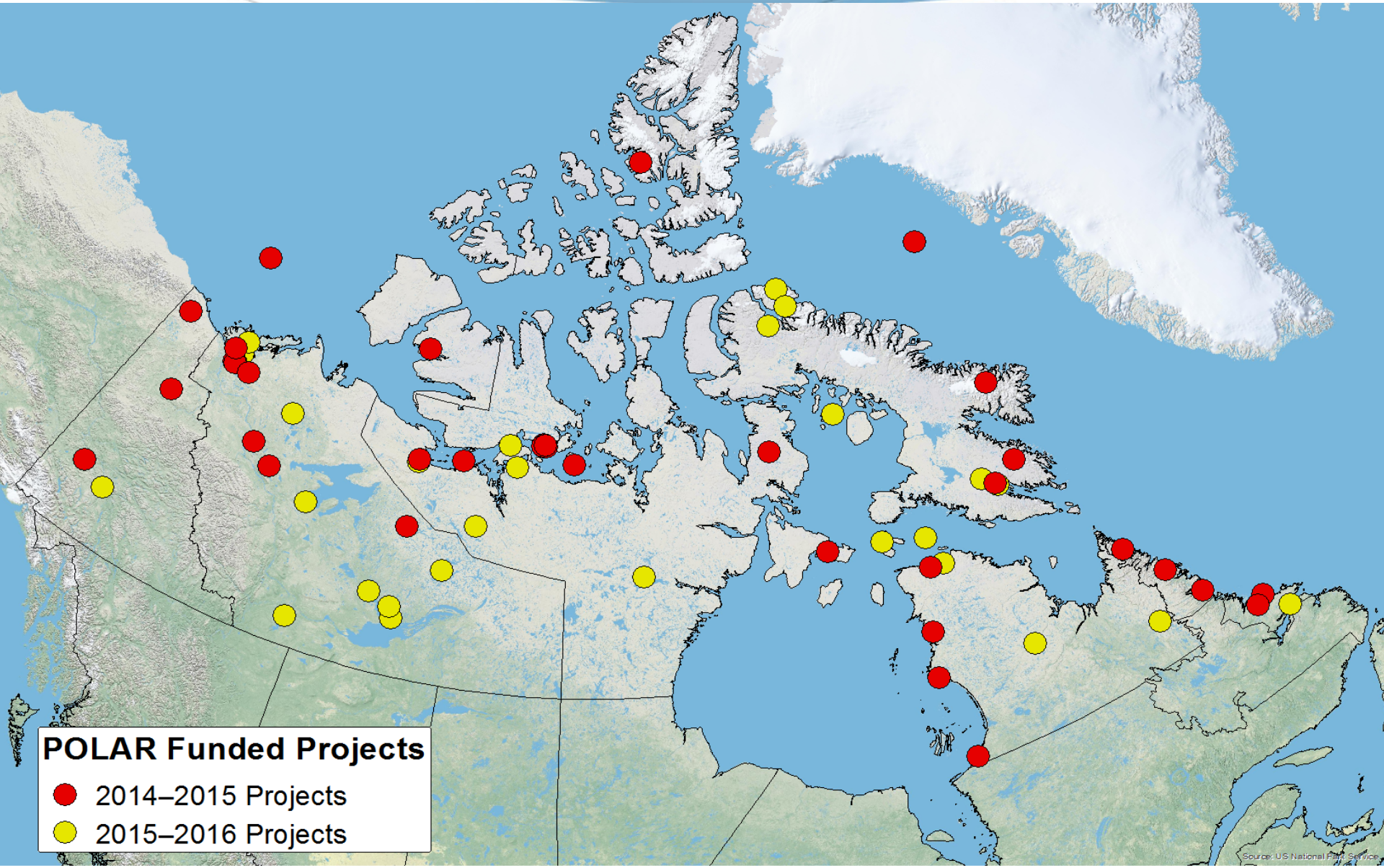
◆ **Challenges:**

- ◆ Broad and diverse mandate (4 Science & Technology Priorities), etc.
- ◆ Large geographic mandate: all of Canada north of the southern limit discontinuous permafrost line (~55% of Canada!)
- ◆ Many clients & stakeholders with varying interests, mandates and needs
- ◆ Expensive and logistically challenging and limited data

◆ **Opportunities:**

- ◆ Strong domestic capacity for research and monitoring
- ◆ Strong international interest in Arctic science (e.g. NASA, EU, Asia) & ability to access large data (e.g. airborne, satellite) to scale up ground observations
- ◆ An integrated and coordinated approach increases our ability to detect and understand change and answer a diversity of questions
- ◆ ...Polar can serve as a targeted catalyst and coordinator for user driven research and monitoring

Pan-Northern S&T Program – Funded Projects



A Call for Integrated and Coordinated Research and Monitoring

Project driven by recommendations common to many Arctic science reports:

“ It is critical to **anticipate changes in the Arctic rather than respond to them**, but to do this requires **sustained observations and improved understanding of local, regional, and global processes**. These research challenges must be addressed in a coordinated and timely manner to ensure sustainable development and resilient Arctic communities and ecosystems.” (IASC Toyama Statement 2015)

“The Arctic requires a **collaborative, co-designed and integrated Arctic observing system of systems, relying on concerted ground observations, remote sensing, modeling and traditional and local knowledge.**”

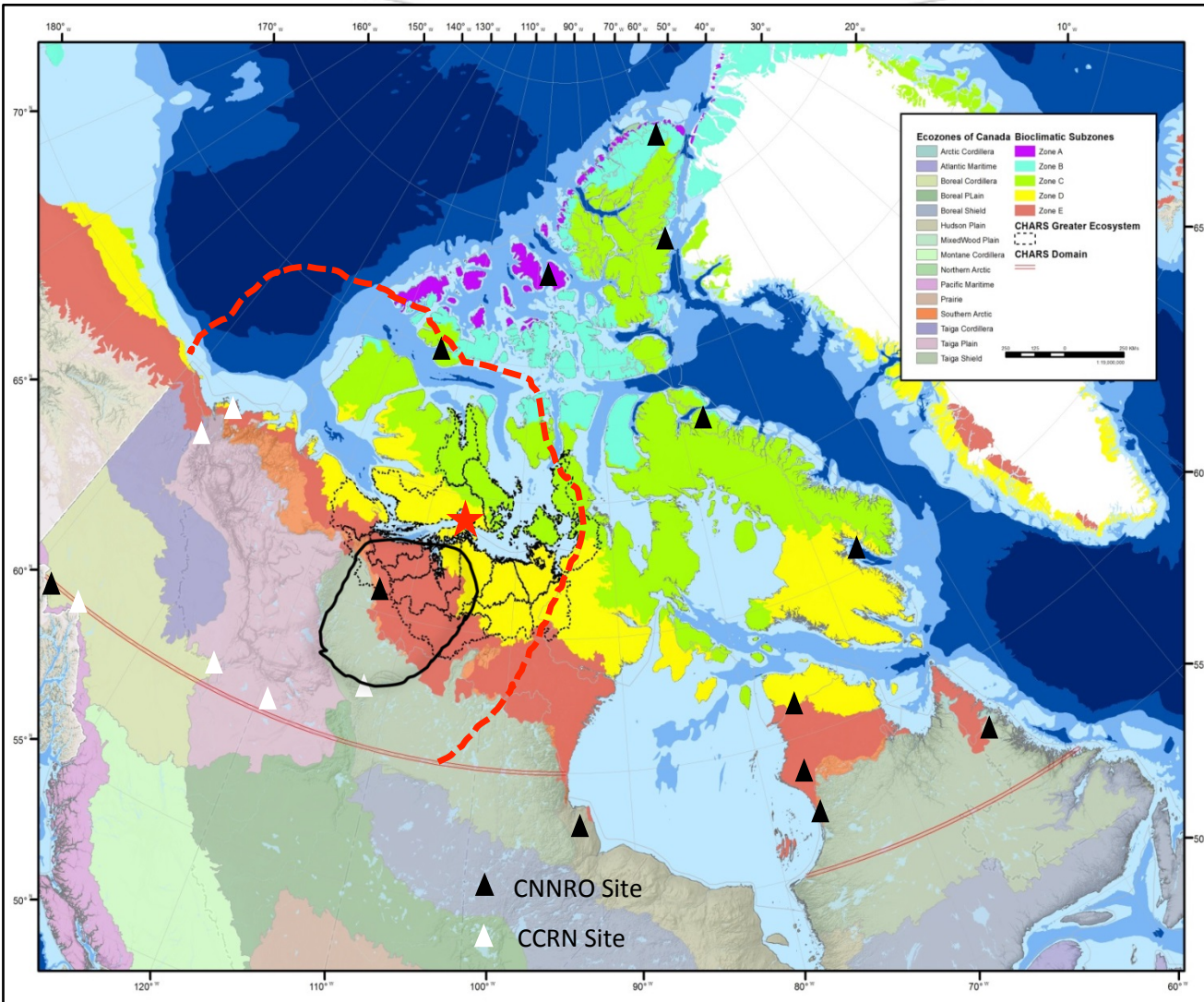
ICARP III Final Report – Integrating Arctic research – a Roadmap for the Future



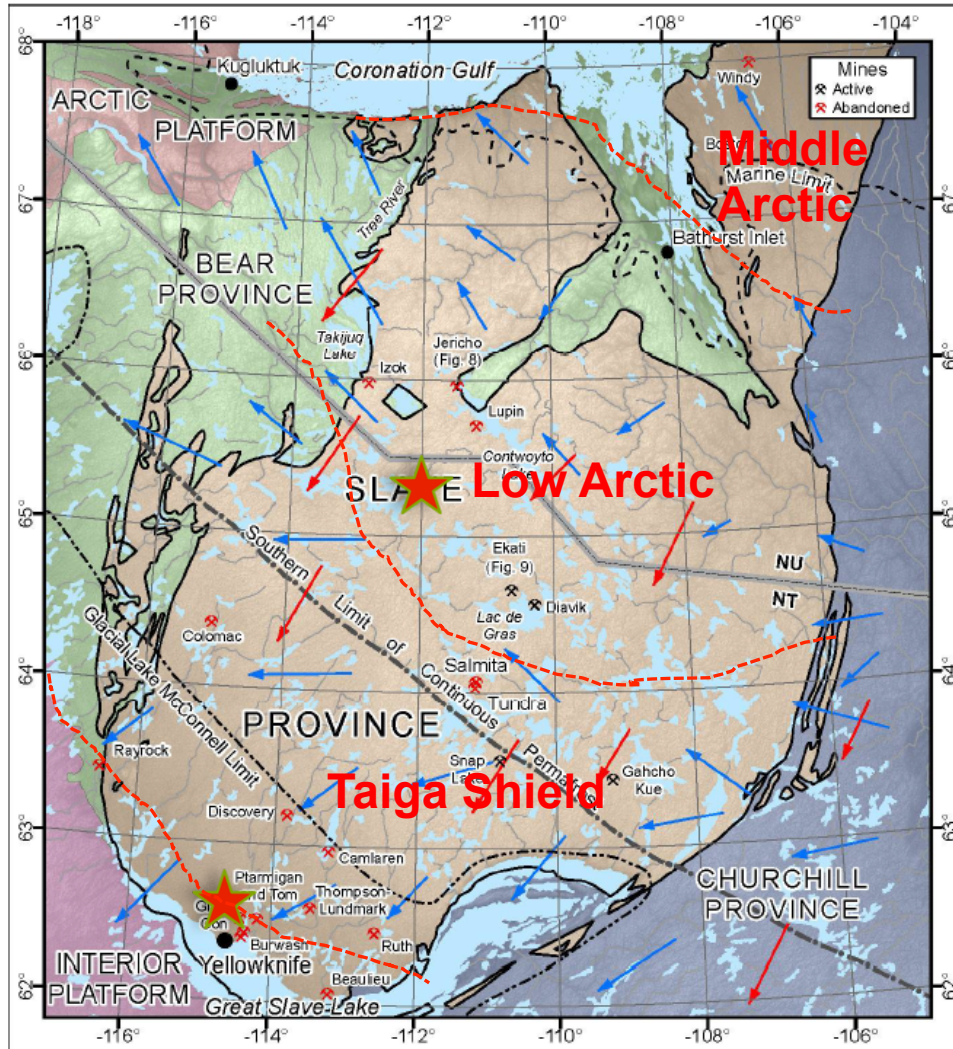
Working Together in a Rapidly-Changing Arctic

Approach

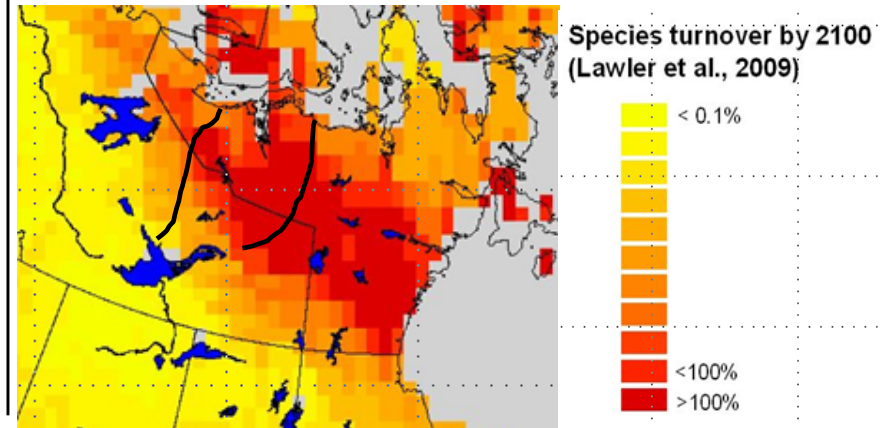
- establish coordinated regional research and monitoring plans that optimize existing investments in academic, government and industry initiatives and provide useful and timely information
- build on and support CBM/TK
- seek long term support for regional science nodes – CNNRO, colleges
- link to NASA ABoVE
- proof of concept project for western Arctic – Slave Geological Province



Western Arctic - Slave Geological Province



- mineral-rich area – focus of development
- critical social-ecological issues
- modeled ‘hotspot’ of climate and ecological change
- ongoing research and monitoring
- geographic connection to CHARS
- ABoVE project – NASA partners
- excellent candidate area for proof of concept



Landscapes of Canada, Chapter 4 , Slave Geological Province

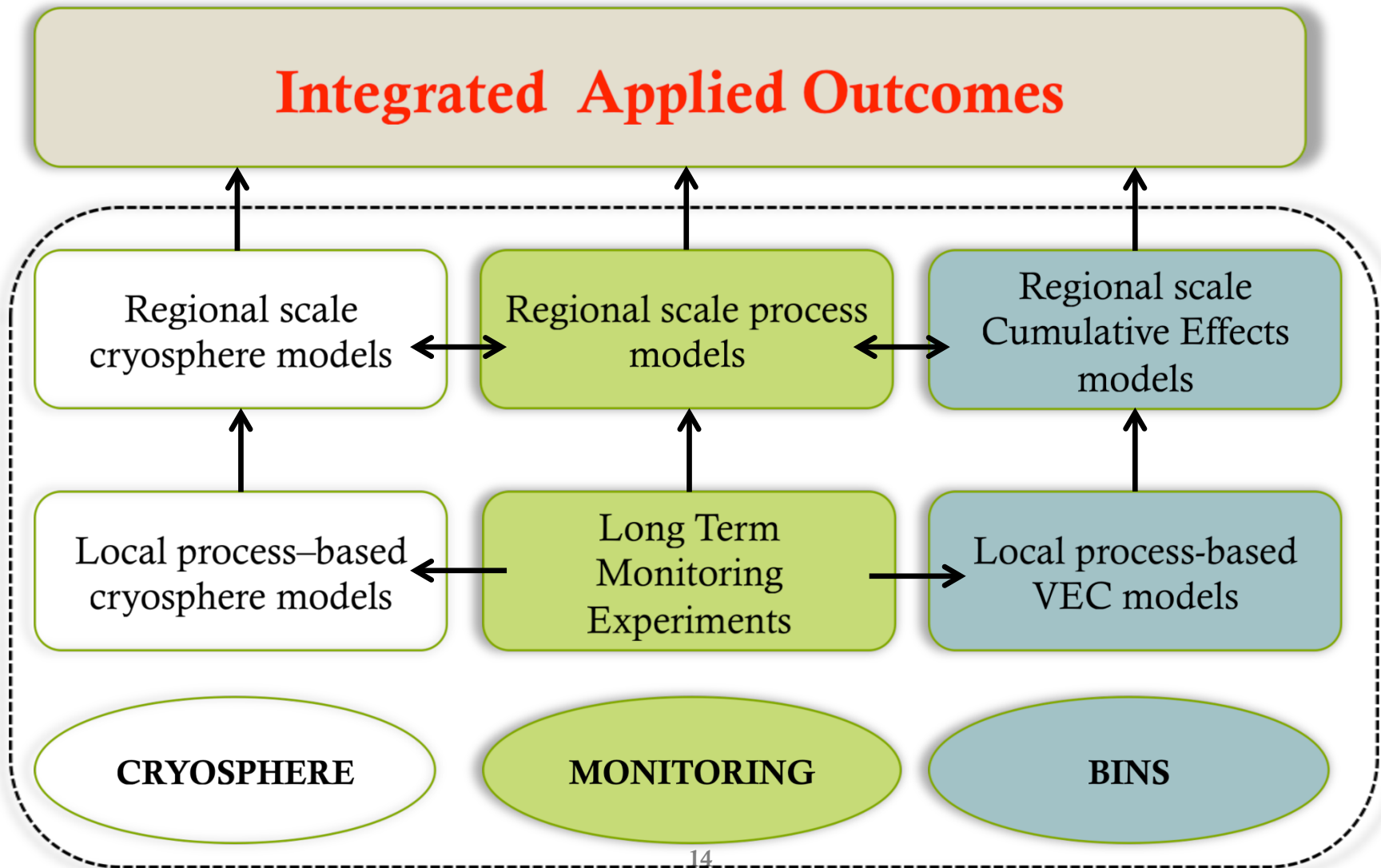
Approach and Rationale

Proof of Concept - pilot a 3 step, multi-scalar, ecological initiative for terrestrial and freshwater ecosystems in the western Canadian Arctic that integrates POLAR BINS, CRYO, and monitoring priorities to:

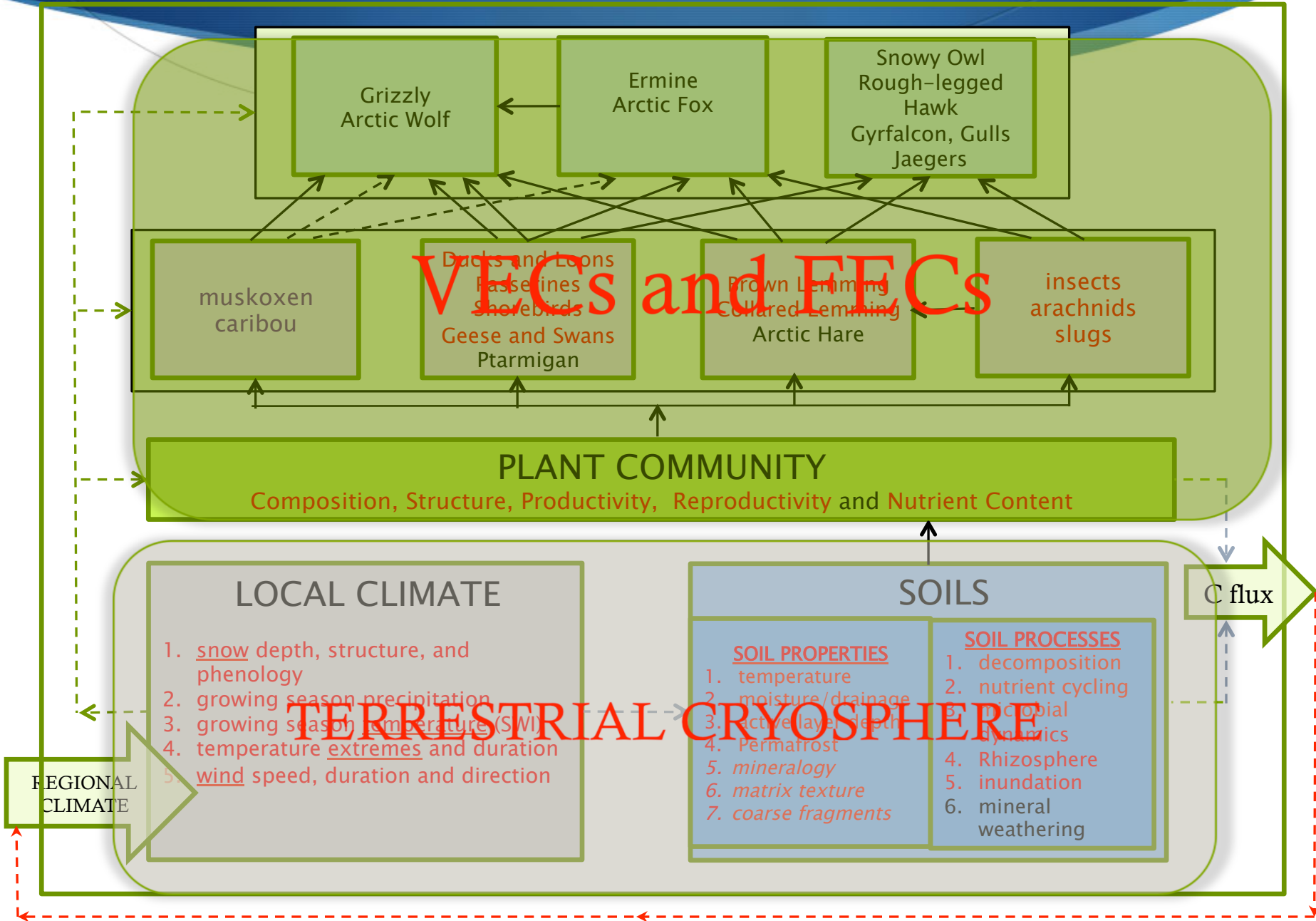
1. establish long term ecological monitoring experiments at 3 sites (Baker Creek, Daring Lake, CHARS ERA)
2. link local scale experiments to ongoing regional research and monitoring (governments, academia, communities, NGOs) to establish a regional synopsis
3. generate remote sensing products and predictive models to address regional knowledge needs for government, communities, and industry



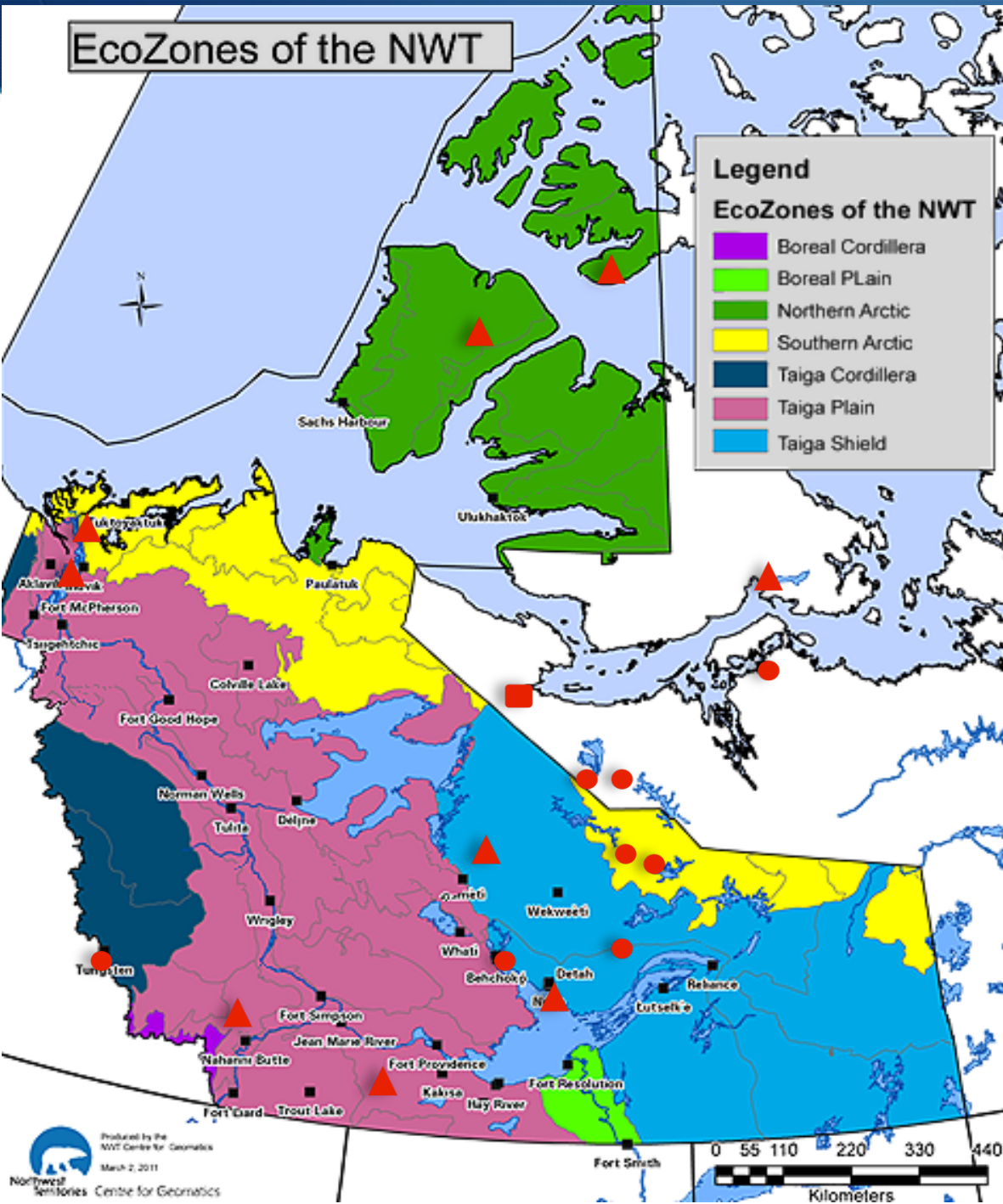
An Integrated Ecological Approach



LONG TERM ECOSYSTEM EXPERIMENTS



EcoZones of the NWT



A Regional Network

- co-ordinated network serves territorial monitoring goals, regional RS modeling, and cumulative effects synthesis
- challenge to co-ordinate ongoing community, academic, government and industry monitoring and research initiatives
- success will depend on mutual benefits to network partners

Integrated Research and Monitoring Program: Example Outputs - CRYOSPHERE

Local Scale (Baker Creek, Daring Lake, CHARs ERA)

- baseline studies of the roles of snow, lake ice and permafrost in terrestrial and freshwater ecosystems
- establishment of local scale long term monitoring of snow, lake ice and permafrost
- model framework for predicting cryosphere change and related ecosystem effects

Regional Scale (SGP, ABoVE-POLAR overlap)

- cryosphere (ground temperature, snow, lake ice and permafrost) monitoring network
- permafrost/active layer, snow, lake ice models

Integrated Research and Monitoring Program: Example Outputs - BINS

Local Scale (Baker Creek, Daring Lake, CHARs ERA)

- baseline studies of selected VECs and FECs in terrestrial and freshwater ecosystems
- establishment of local scale long term monitoring of VECs and FECs
- model framework for predicting VEC/FEC change and related ecosystem effects

Regional Scale (SGP, ABoVE-POLAR overlap)

- establishment of VEC/FEC monitoring network
- VEC/FEC predictive models
- frame for cumulative effects

This workshop: Seeking Input & Coordinating Partnerships

Take advantage of the experience and expertise of workshop attendees to receive input and look for collaboration opportunities:

- ‘Actionable’ priority collaborations & partnerships identified that:
 - take advantage of POLAR and NASA’s research and monitoring plans
 - Address priority needs and knowledge gaps
 - Build upon existing capacity in the region

Contact Us

Website: <http://www.canada.ca/en/polar-knowledge/> (English)
<http://www.canada.ca/fr/savoir-polaire/index.html> (Français)



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QUESTIONS?

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Photo: Johann Wagner