

Establishing the CHARS ERA as an Arctic Flagship Research and Monitoring Site

2nd Arctic Biodiversity Congress, Rovaniemi, Finland, October 2018



Polar Knowledge
Canada

Savoir polaire
Canada

Canada

OVERVIEW

- ✓ CHARS Background
- ✓ CHARS Monitoring Plan
- ✓ links to CBMP and CBMP thematic assessments
- ✓ Challenges

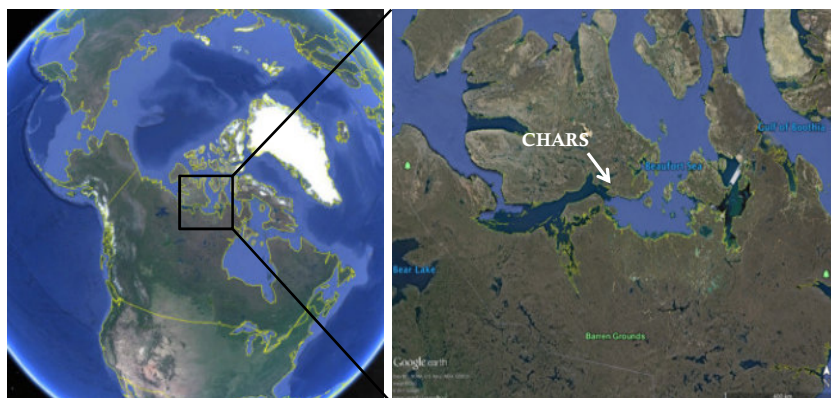
POLAR's Mandate

- Advance knowledge of the Canadian Arctic: Improve economic opportunities, environmental stewardship and quality of life of Northerners and all Canadians
- Promote the development and dissemination of knowledge of the other circumpolar regions, including the Antarctic
- Strengthen Canada's leadership on Arctic issues
- Establish a hub for scientific research in the Canadian Arctic



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Where is CHARs?






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Ecosystem Monitoring in the CHARS Experimental and Reference Area

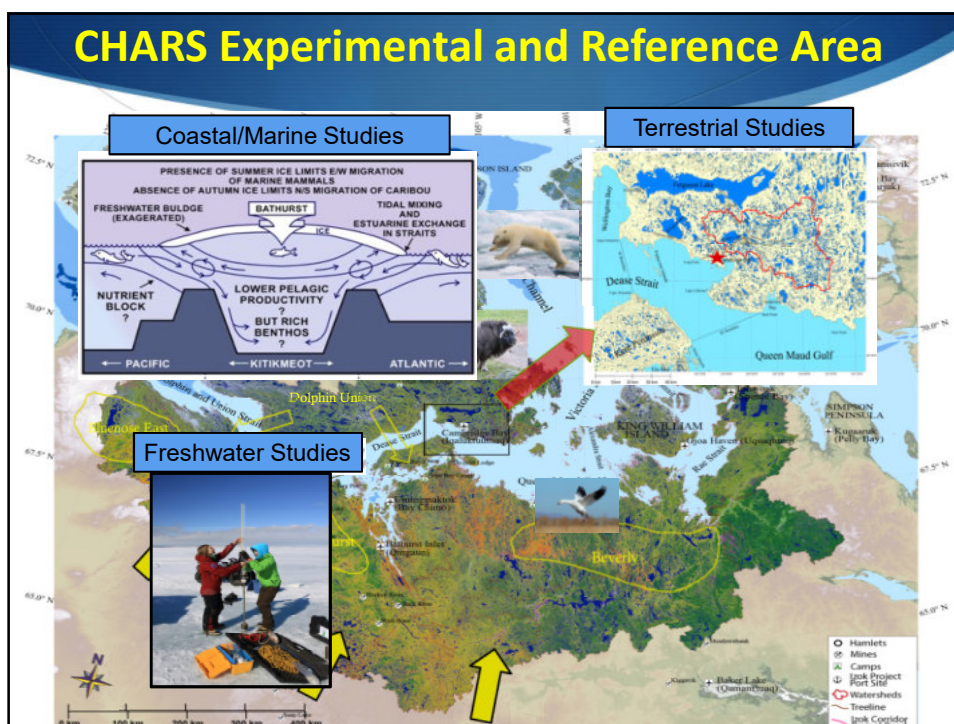
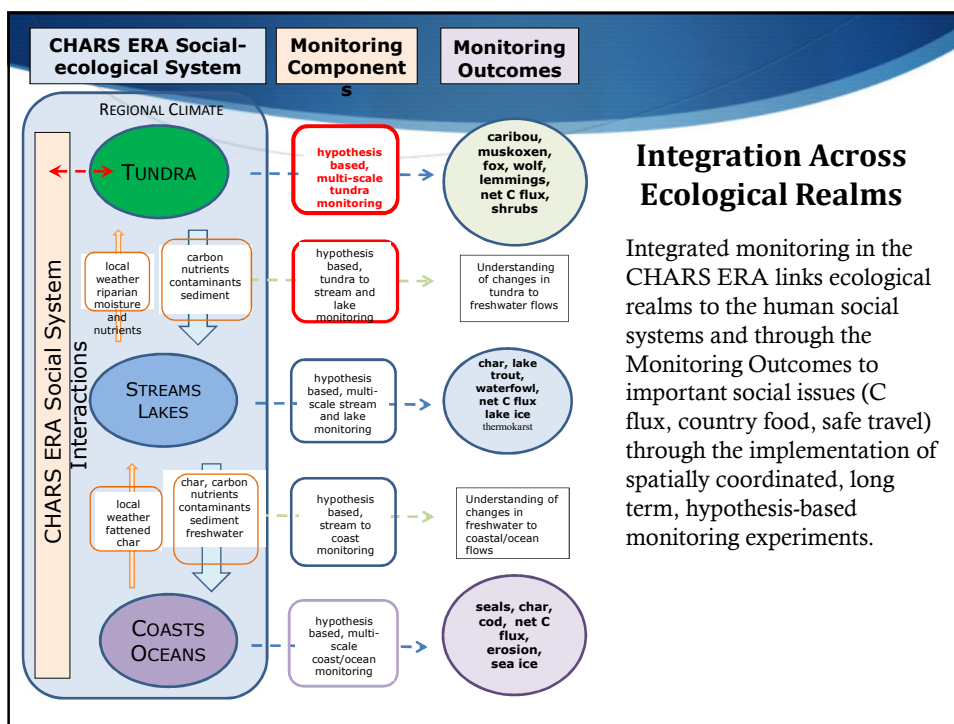


Terrestrial Ecosystem Monitoring Plan
PILOT PHASE (2017-2019)

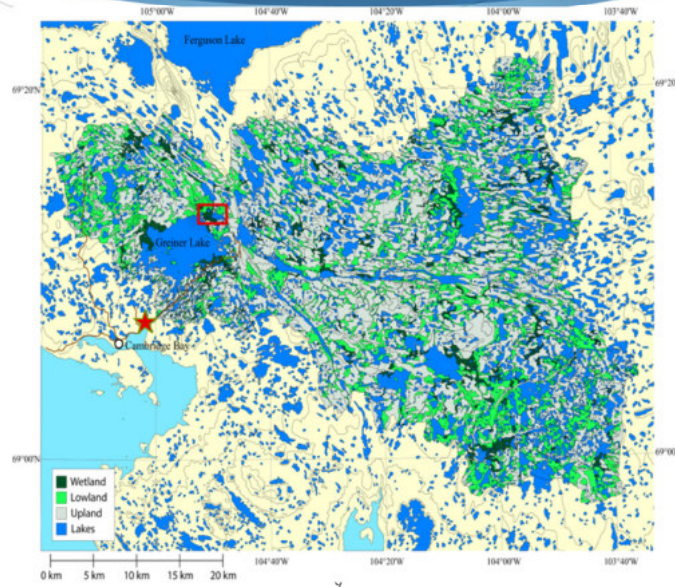
August 2017

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Greiner Lake Watershed



Geology and Landforms

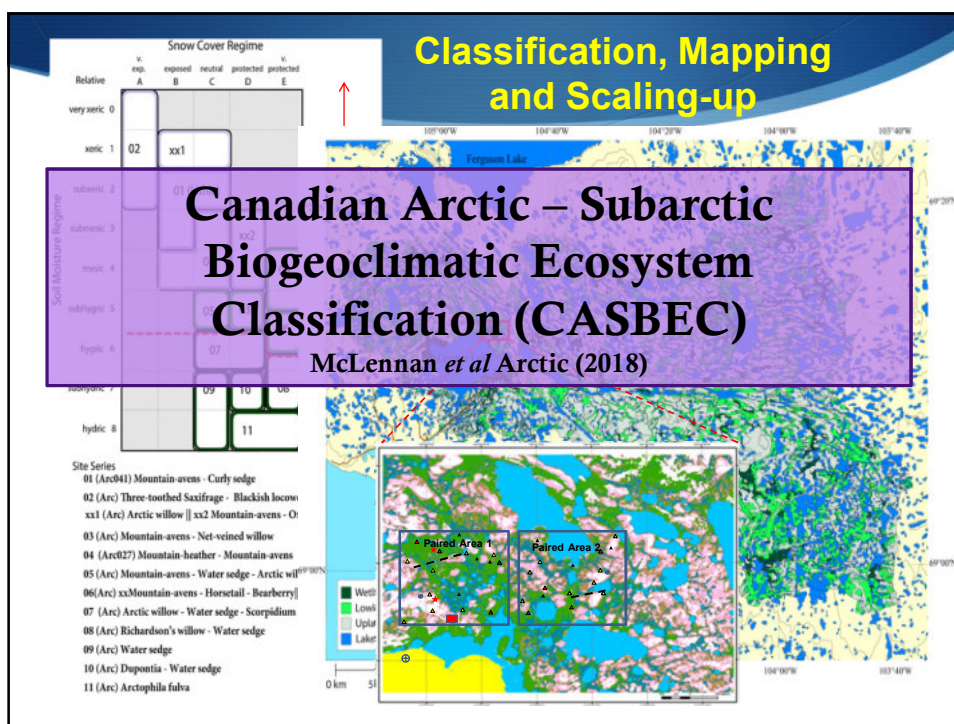
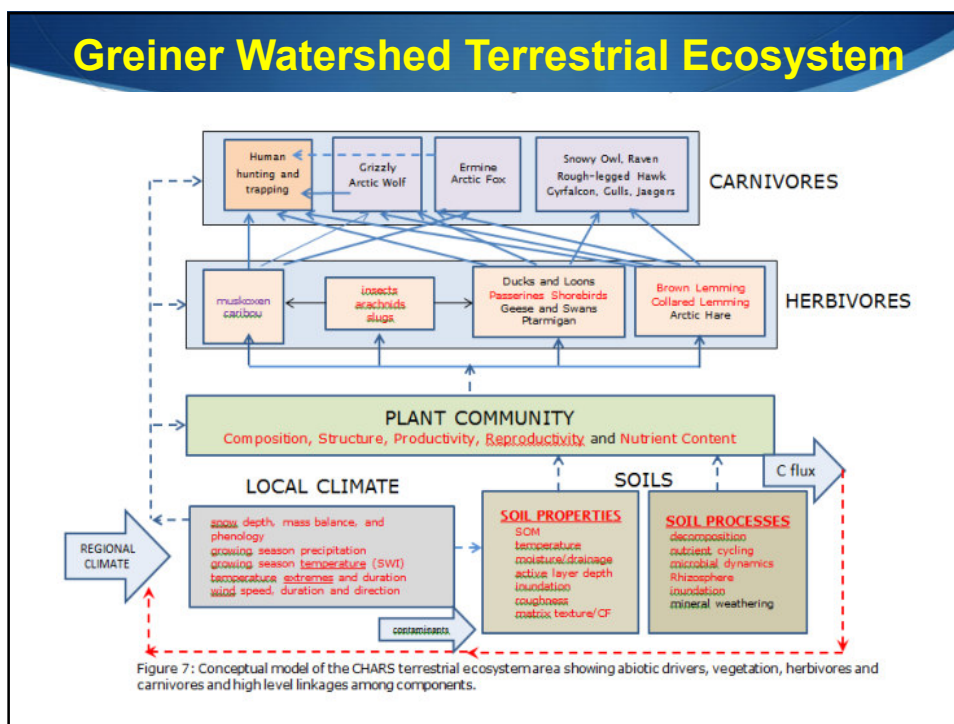
- Carbonate bedrock overlain by 1–3 m of till of mixed lithology
- Post-glacial marine transgression – areas of fine textured marine deposits
- Soils mostly Turbic and Organic Cryosols (CSSC1998); active layers 30 cm to > 2m

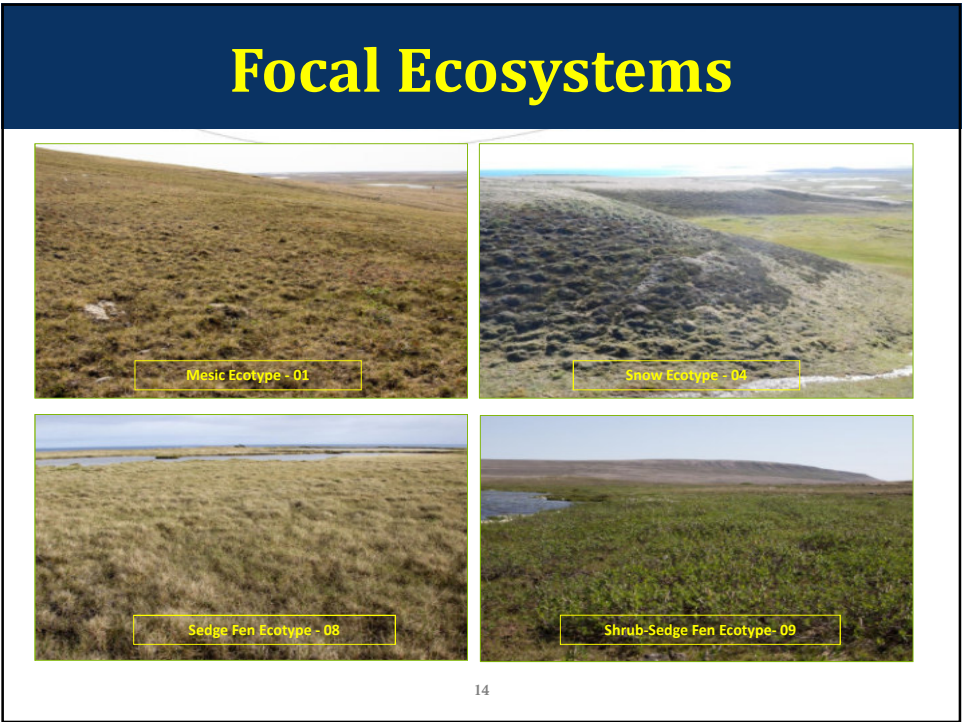
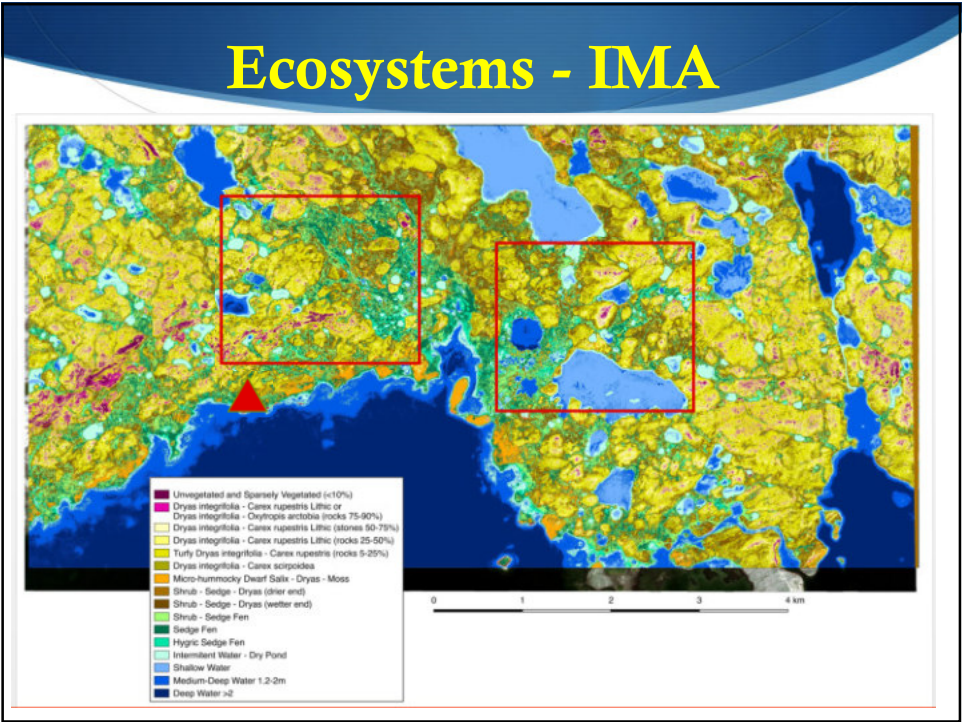
Freshwater Ecosystems

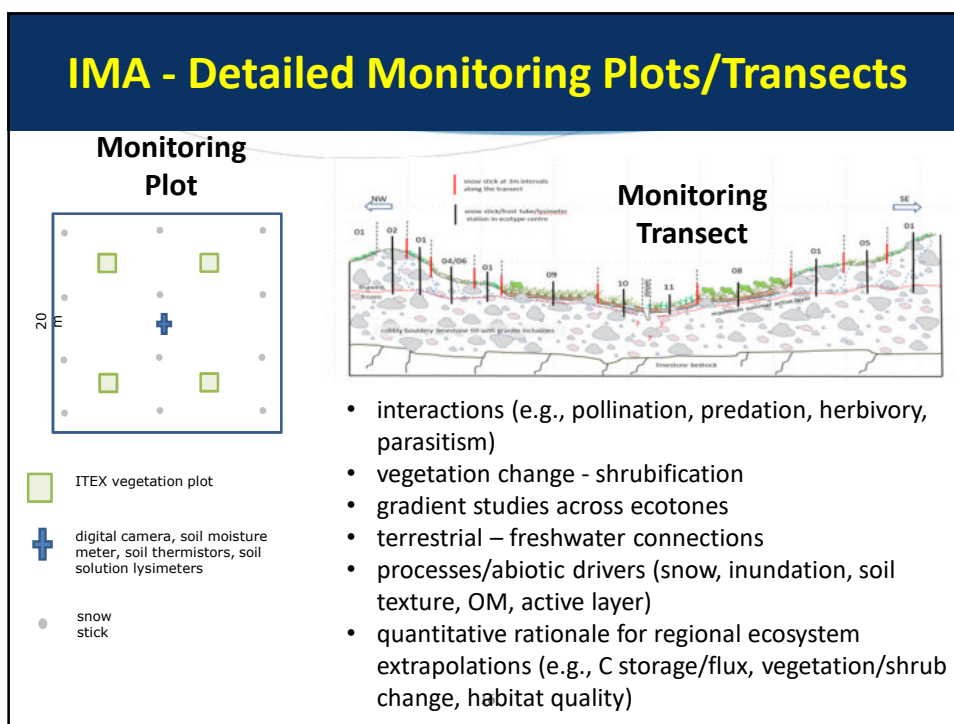
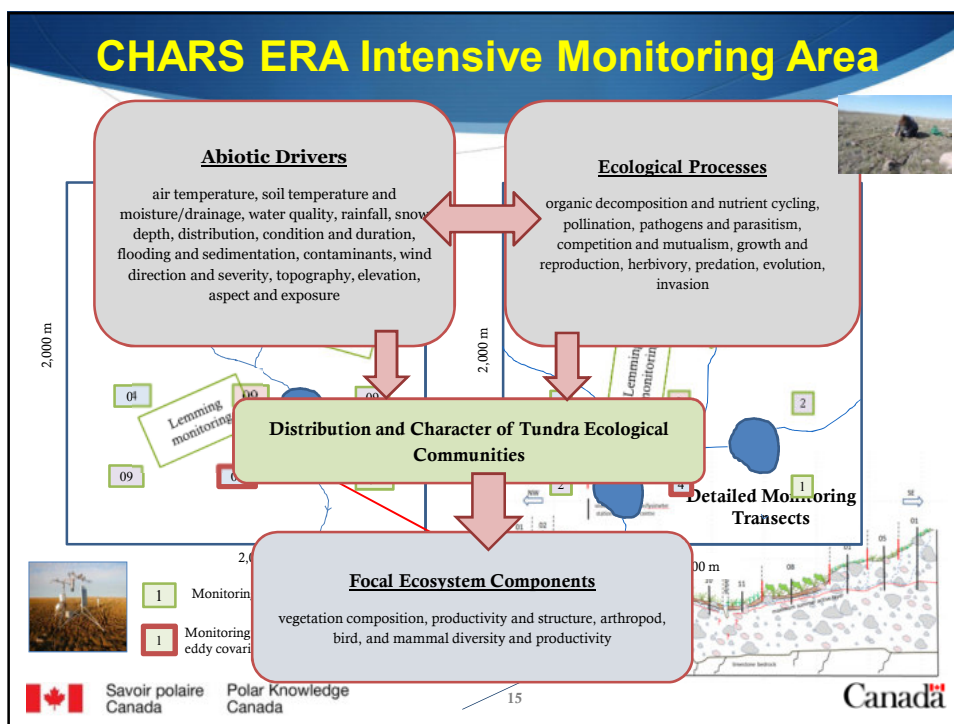
- Hundreds of water bodies that range from large connected basins (to ca 10m) to shallow (<1m) seasonally connected ponds
- Few large rivers – small streams and seasonal drainages
- Highly alkaline systems – pH > 8.0
- Supports very productive char and lake trout populations

Tundra Ecosystems

- Erect Dwarf Shrub Tundra Biome (Zone D – CAVM)
- Snow a key driver of terrestrial ecosystem processes (spring inundation, winter protection)
- Supports diverse Arctic biota directly in the path of climate change effects



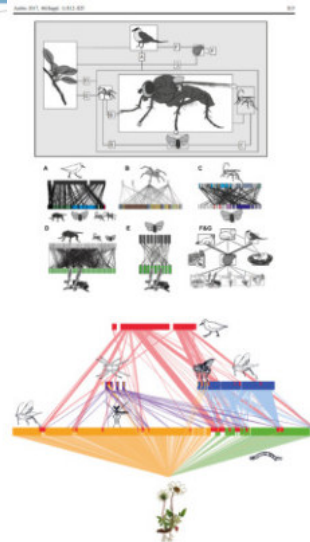




Interactions Study

*Interaction webs in arctic ecosystems:
Determinants of arctic change?*

Niels M. Schmidt, Bess Hardwick,
Olivier Gilg, Toke T. Høye, Paul
Henning Krogh, Hans Meltofte, Anders
Michelsen, Jesper B. Mosbacher, et al.



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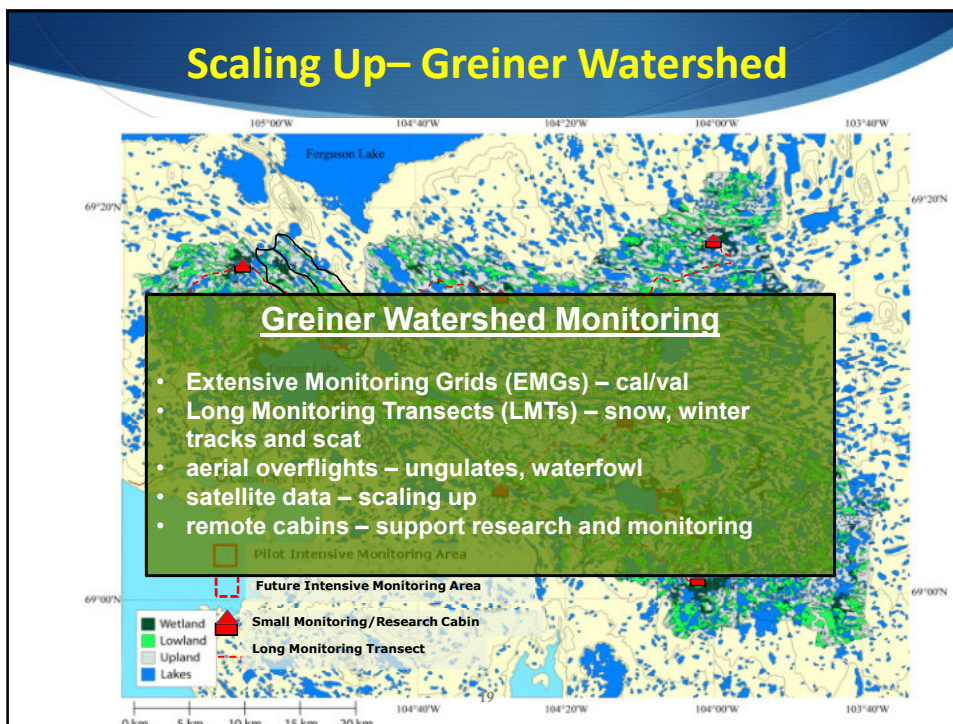
CHARS-Zackenberg Partnership

Communities of Practice

- establish long-term experiments through consultations with subject experts across a range of areas of expertise
- for example, CoPs for terrestrial experiments in the IMA;
 - vegetation (ITEX?)
 - CO₂ / CH₄ flux
 - soil physics – permafrost, temperature, hydrology
 - microbiology, C and organic matter decomposition
- establish Best Practices for each area and implement as a long term integrated experiment
- CHARS to support implementation using grad students/post docs from CoP participants
- similar approach for other areas, e.g., arthropods, shorebirds, small mammals

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Scaling Up– Greiner Watershed

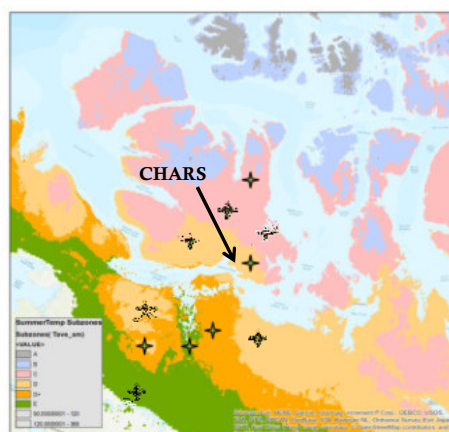


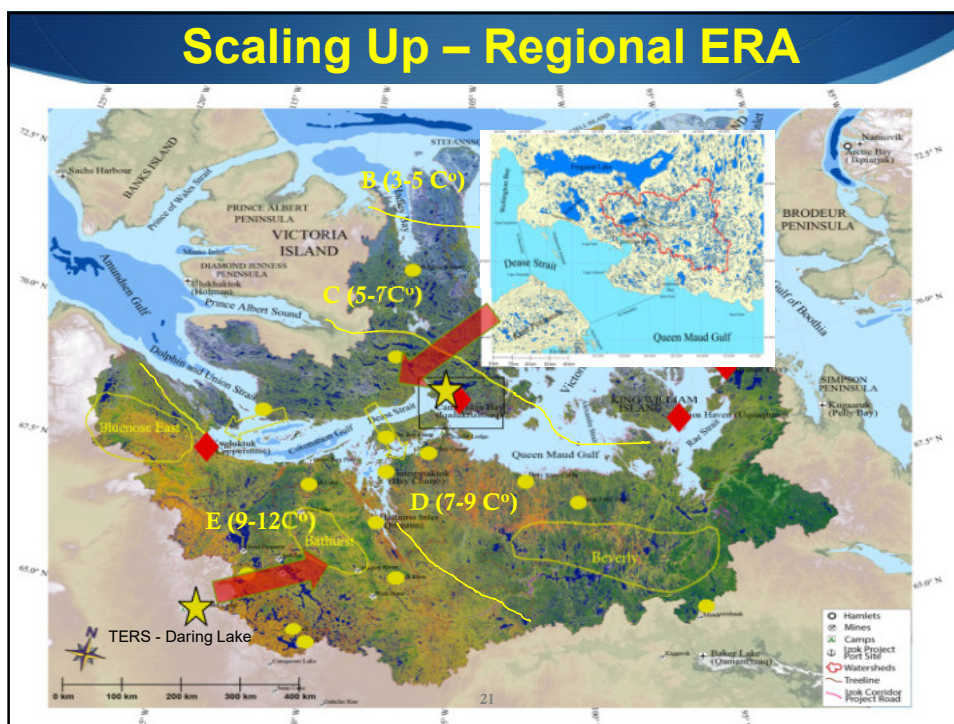
Refining Bioclimatic Subzone Boundaries

CAVM Team 2005 Subzones



Modeled/Gridded Mean July Temps





CBMP Questions

1. What are the **distribution and status of terrestrial focal species**, populations, communities, and landscapes/ecosystems and key processes/functions occurring in the Arctic?
2. **How and where** are these terrestrial focal species, populations, communities, and landscapes/ecosystems and key processes/functions changing?
3. What and how are the primary **environmental and anthropogenic drivers** influencing changes in biodiversity and ecosystem processes?
4. Where are the **areas of high ecological importance** including, for example, resilient and vulnerable areas (related to the FECs) and where are drivers having the greatest impact?



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QUESTIONS?

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Photo: Johann Wagner