The Boreal-Arctic Research Continuum - Perspectives from an Old Timer

Eric S. Kasischke
**Point 1:** Understanding changes that are occurring to this system requires long-term, coordinated, trans-disciplinary monitoring and research.
VULNERABILITY AND RESILIENCE FRAMEWORK

CAUSES OF CHANGE

Many factors from the local, to regional, to global scales drive changes to ecosystems. Examples include: increasing temperature and CO₂; altered timing, amount, and types of precipitation; and social factors such as global demand for fossil fuels, economic stability, and land development.

To varying degrees, these drivers interact to influence the structure and function of ecosystems.

CHANGES TO ECOSYSTEMS

Ecosystem structure and function are impacted by drivers that are both external (e.g., global climate change) and internal (e.g., natural increase or decrease in population). Potential impacts include: changes in species range and biodiversity; greater intensity and frequency of fires; changes in the distribution of insects; increased soil respiration and production of CO₂ and methane; lake formation due to permafrost thaw.

SOCIAL SYSTEMS

People respond to these changes in many ways. Individuals and households may change their behavior, for example relying more heavily on store-bought food than subsistence hunting. Communities may invest in new infrastructure or move to a new location. Governments may change wildfire suppression strategies or enact policies for reducing greenhouse gas emissions.

All of these responses may influence the drivers of change in both intended and unintended ways.

ECOSYSTEM SERVICES

Ecosystem services are the benefits and value that people derive from the environment that sustains us. Examples include: food and freshwater production; solid soil foundations for building and transportation infrastructure; indigenous wildlife harvest for subsistence.

When ecosystem structure and function changes, there are consequences to the types, timing, and amount of ecosystem services available.
Levels of Human Activities within the Boreal-Arctic Research Continuum (BARC)

- Individual Researchers

- Organized Groups of Researchers (e.g., ABoVE)

- Research/Monitoring Programs (national, regional, local)

- National and International Science Synthesis Activities
Elements of the Boreal-Arctic Research Consortium – Individual Observers

Point 2 – *Observations made by and knowledge accumulated by individuals provide the foundation for the research needed to understand the processes driving changes to the boreal-arctic continuum*.

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**Boreal-Arctic System**

- 100 kYBP
- ~15 kYBP Indigenous cultures
- 800s Viking exploration
- 1500 European exploration
- 1800s Western research programs
- 2018

*Human Observations and Knowledge*
Point 3 – Understanding changes to Arctic-boreal ecosystems requires a commitment to long-term, inter-disciplinary research
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Research at the Delta Junction fire sites by multiple groups has resulted in > 60 journal publications.
Point 4

• The Delta Junction research area is but one of numerous sites in the ABoVE Domain where groups of researchers are carrying out a variety of long-term monitoring and research activities

• How will the research initiated through ABoVE contribute to long-term observations?

• What steps we can take to continue research beyond the ABoVE time frame?
Elements of the Boreal-Arctic Research Consortium – National Programs

Point 5 – The agencies that fund individual research projects that contribute to the BARC require continuing support from the research community.

Boreal-Arctic System

100 kYBP

1987–?? LTERs, AON, NEON, SEARCH

Local, Regional, National Monitoring and Research Activities

1800s Western research programs

1500 European exploration

800s Viking exploration

~15 kYBP Indigenous cultures

Human Observations and Knowledge

Numerous research and monitoring projects supported by NSERC, NRCAN, CCEC, PKN, CSA, etc.

1992-2000 BOREAS

2012-2021 NGEE Arctic

1992-2000 BOREAS

2015-2024 ABoVE

2018
Elements of the Boreal-Arctic Research Consortium

Point 6 - How will the results from ABoVE research contribute to national and international programs focused on High Northern Latitude regions?
Thanks to everyone for sharing my personal journey through the BARC!!