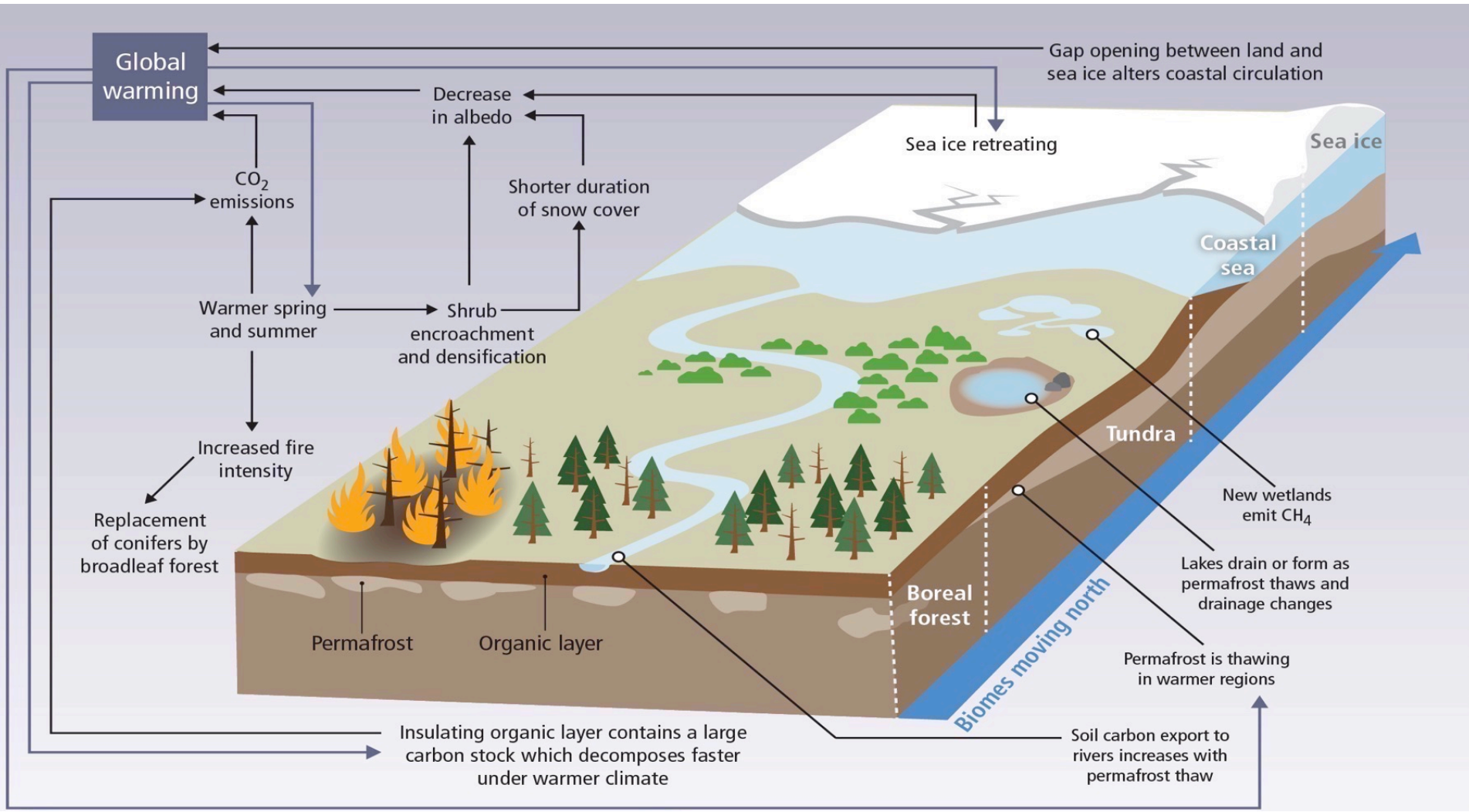


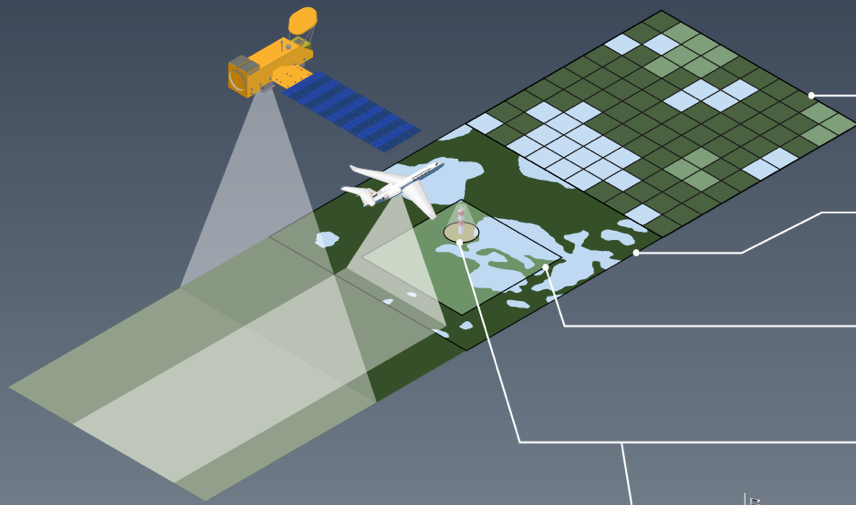


*The Boreal-Arctic Research
Continuum -
Perspectives from an Old
Timer*

Eric S. Kasischke

Point 1: Understanding changes that are occurring to this system requires long-term, coordinated, trans-disciplinary monitoring and research





RESOLUTION

DISTANCE

1m - 10,000 m

0.4m - 40km

10cm - 10m

25m - 1000 km

10cm - 10 m

0.1 cm - 10 cm

101 1010100
0100101001
11011001010
10011001010
10010010101

MODEL

ORBITAL

~700 km

AIRBORNE

High Altitude: ~10,000 m - 20 km
Mid Altitude: ~2,000 m - 5 km
Low Altitude: ~300 m

TOWER

<50 m

PLOT

<5 m

LEAF LEVEL

<<1 m

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.

SCALING DIAGRAM



Levels of Human Activities within the Boreal-Arctic Research Continuum (BARC)

- Individual Researchers

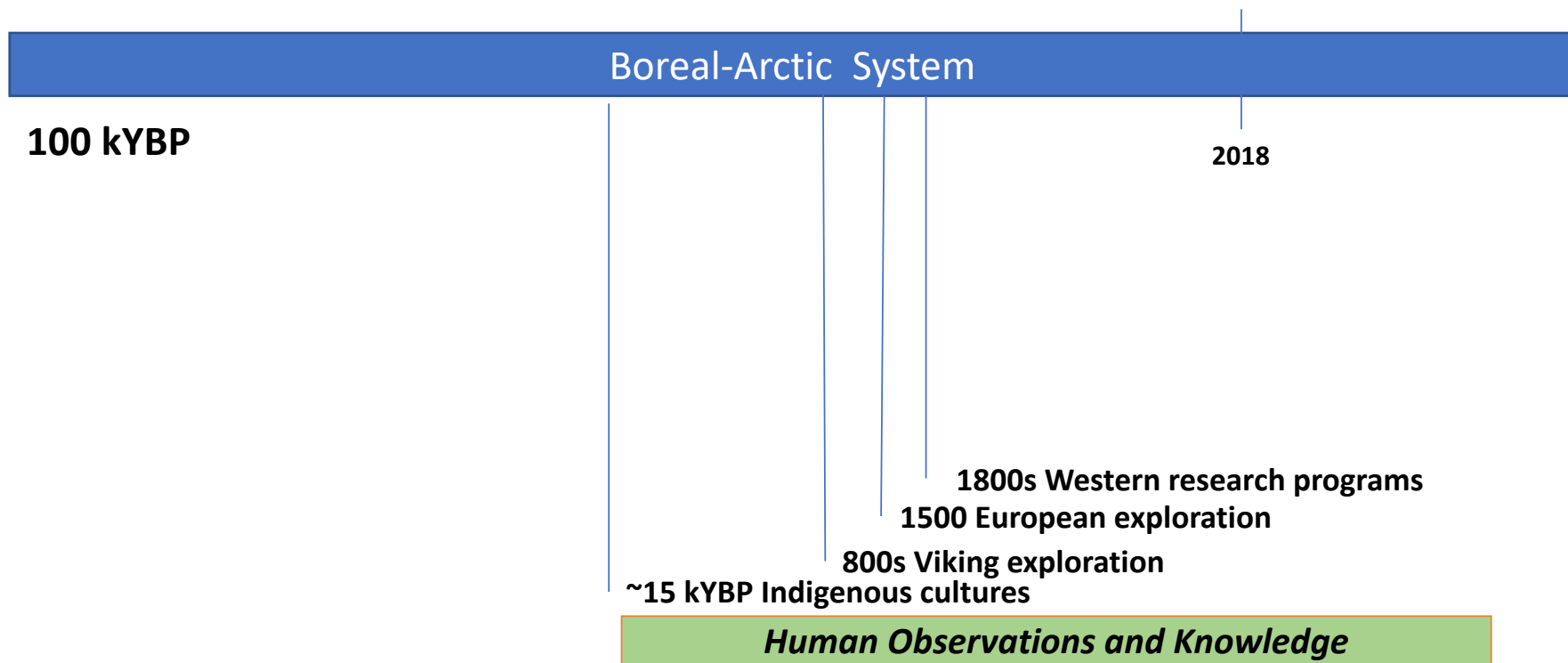
- Organized Groups of Researchers (e.g., ABoVE)

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

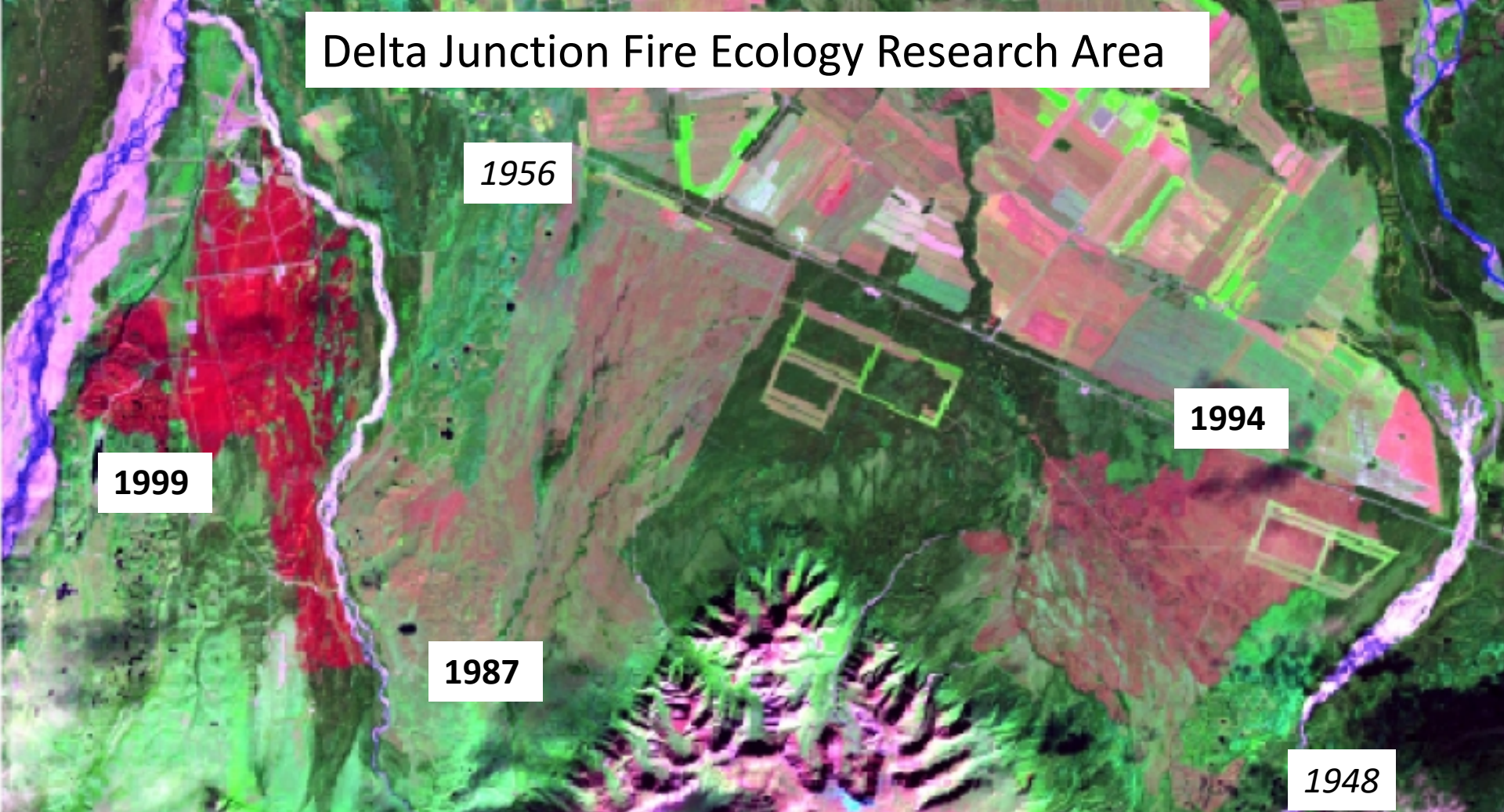
- National and International Science Synthesis Activities

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



Delta Junction Fire Ecology Research Area



Point 3 – Understanding changes to Arctic-boreal ecosystems requires a commitment to long-term, inter-disciplinary research

Ted Schuur, ^{postdoctoral research fellow} ~~postdoctoral research fellow~~
 Dep't of Earth System Science
 220 Rowland Hall
 University of California
 Irvine, CA 92697
 tschuur@uci.edu

Summer Fairbanks: 907-474-6038
 Winter 949-824-5540

Delta Inet, every 1-2 weeks for 2-3 day periods.
 otherwise in Fairbanks

ERIC KASISCHKE
 Department of Geography
 University of Maryland
 2181 Le Frere Hall
 College Park, MD 20742

office: 301-405-2179
 kkk169@gmail.com

Scientist Contacts for the Summer of 2000, 1999 Donnelly Flats Fire

Michelle Mack
 Institute of Arctic Biology
 University of Alaska Fbks
 Fbks, AK 99705-7000
 Summer phone (907) 474-6038

July 8-20

June 5-8
 Jul.

Jennifer Harden, Soil Scientist
 US Geological Survey
 MS962
 345 Middlefield Rd
 Menlo Park CA 94025
 650-329-4949 wk July 31 - Aug 1
 650-728-7412 home Aug 18-20
 650-576-0341 cell
 jharden@usgs.gov

KATHY O'NEILL
 Duke Univ. / USGS
 Nicholas School of Env
 LSRC A-141
 Durham NC 27708-0322
 919-613-8008 (w) May 31 - June
 919-493-1423 (h)
 kpo@duke.edu

Jim Randerson, Assistant Prof.
 Caltech
 Dept. Geological and Planetary Science
 Mail Stop 100-23
 Pasadena, CA 91125
 626 395 2683 (w) July 29 - July
 626 395-9336 (h) August 14-25
 jimr@gps.caltech.edu

Jason Neff, Scientist
 Natural Resource Ecology Lab
 Colorado State University
 Fort Collins, CO 80523
 970-491-1565 (w) - mid-
 970-472-9168 (h) September
 970-217-1028 (cell)
 jason.N@NREL.colostate.edu



Research at the Delta Junction fire sites by multiple groups has resulted in > 60 journal publications

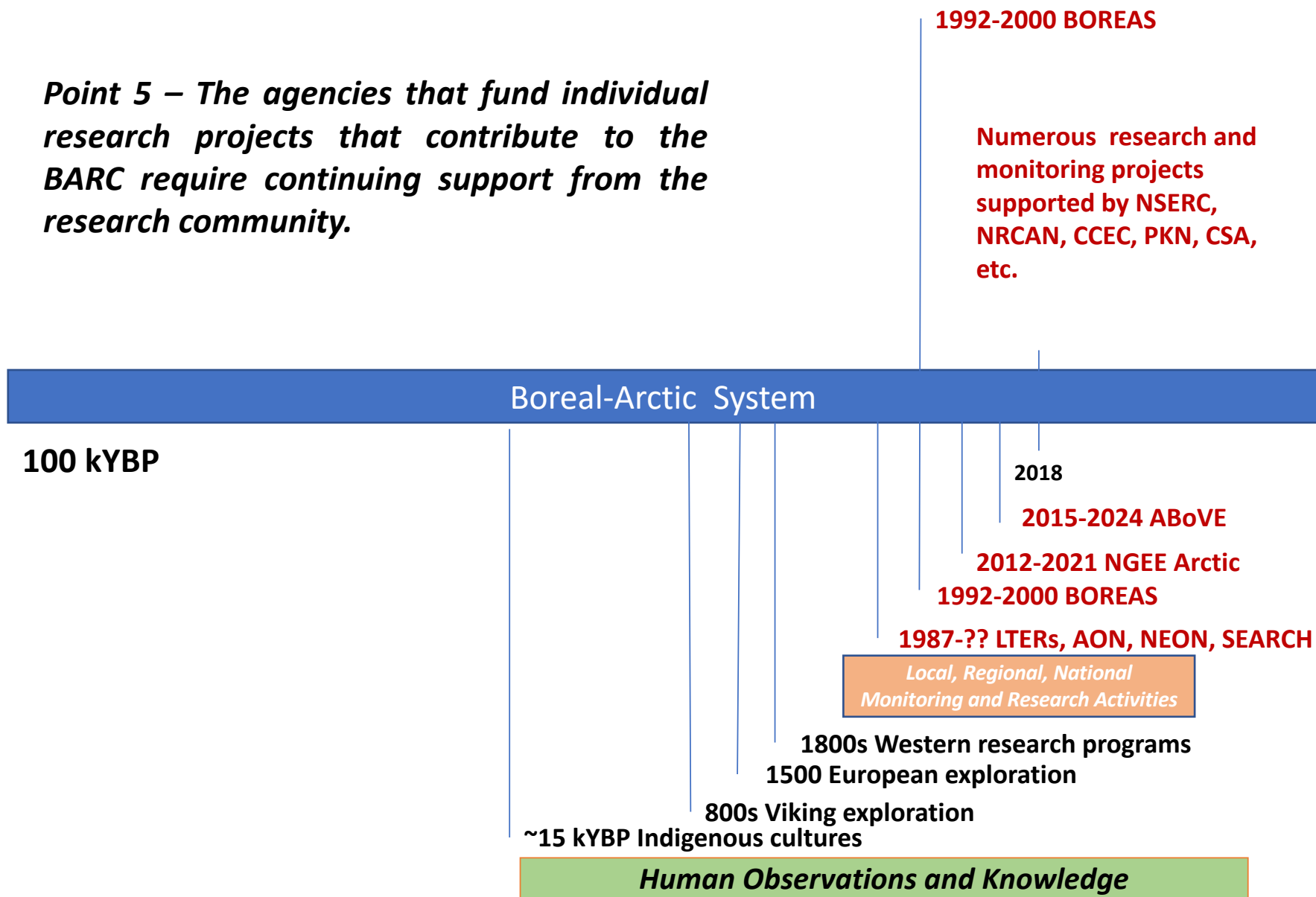


Point 4

- 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.



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?

1984 - ??? IARPC/ARC

1987-2015 IGBP

1989 - ???USGCRP

1991-??? Arctic Council

1991-??? AMAP

2007-9 International Polar Year

2011-??? Polar Space Task Group

2017 NCA

2016, 18 Arctic Science Ministerials

6th IPCC Climate Assessment

Boreal-Arctic System

100 kYBP

2018

2015-2024 ABoVE

2012-2021 NGE Arctic

1992-2000 BOREAS

1987-?? LTER, AON, NEON, SEARCH

Local, Regional, National Monitoring and Research Activities

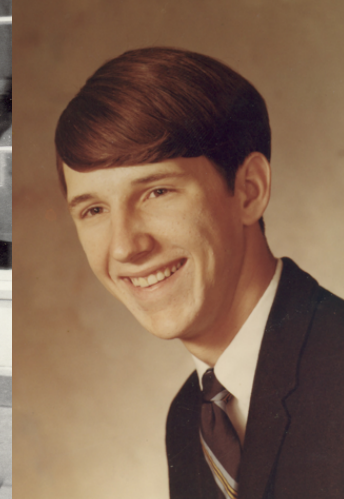
1800s Western research programs

1500 European exploration

800s Viking exploration

~15 kYBP Indigenous cultures

Human Observations and Knowledge



*Thanks to everyone
for sharing my
personal journey
through the BARC!!*

