Beavers Impacting Tundra Ecosystems



Michael Carey[1], Jonathan O'Donnell[2], Brett Poulin[3], Josh Koch[1], and Ken Tape[4]

1 U.S. Geological Survey
2 National Park Service
3 University of California Davis
4 University of Alaska Fairbanks


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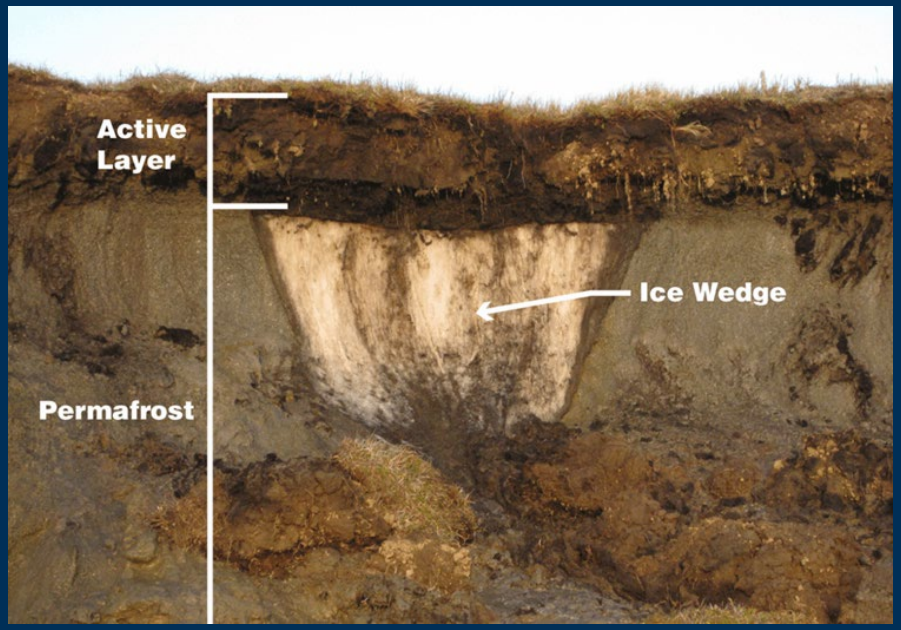

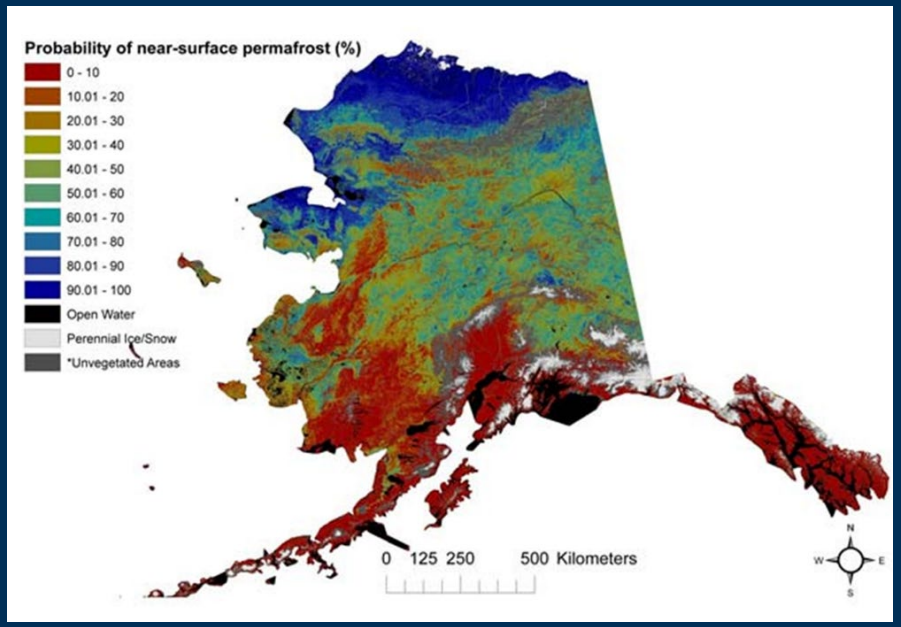

Permafrost is any ground that remains below 0 °C for at least two years straight

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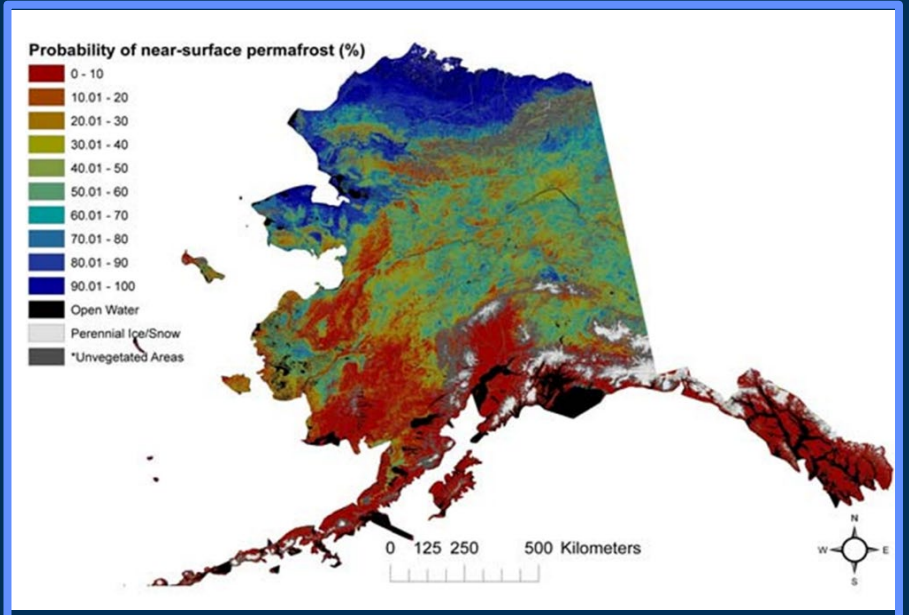
Range expansion

Permafrost



Soil inundation

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Beavers Impacting Tundra Ecosystems

- What is the effect on fish community structure?
- What is the effect on water temperature in impoundments versus mainstem?
- Are there strong bottom-up effects on fish and consumers throughout the food web by higher amounts of N and P?
- Do beaver impoundments increase the bioaccumulation of Hg in fish?
- What is influence of beaver impoundments as disease vectors?

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- What is the effect on fish community structure?

0

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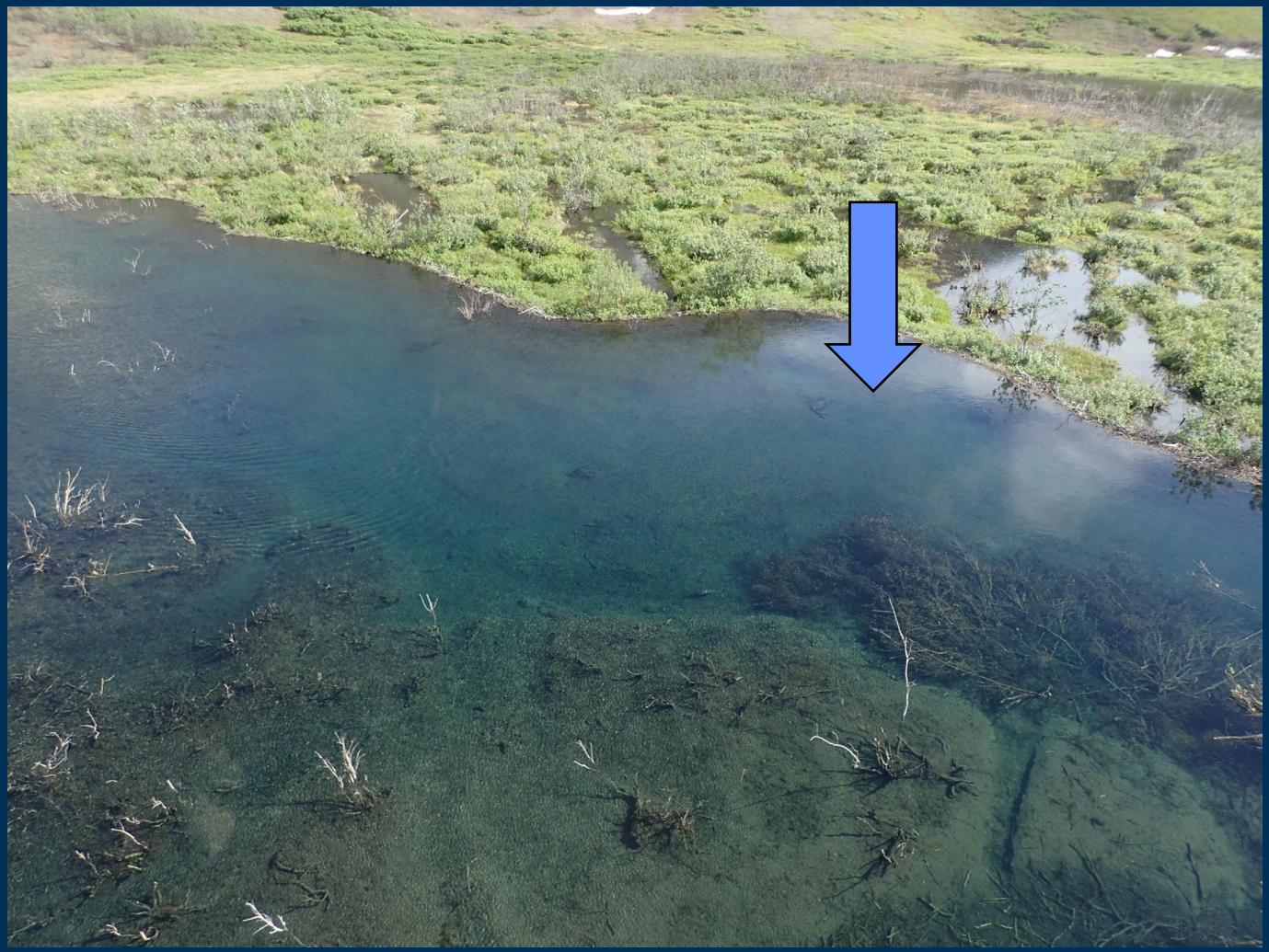
- **What is the effect on water temperature in impoundments versus mainstem?**



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- **Are there strong bottom-up effects on fish and consumers throughout the food web by higher amounts of C, N, and P?**

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U.S. Geological
Earth System
E127, Boulder,
N 6N5, Canada

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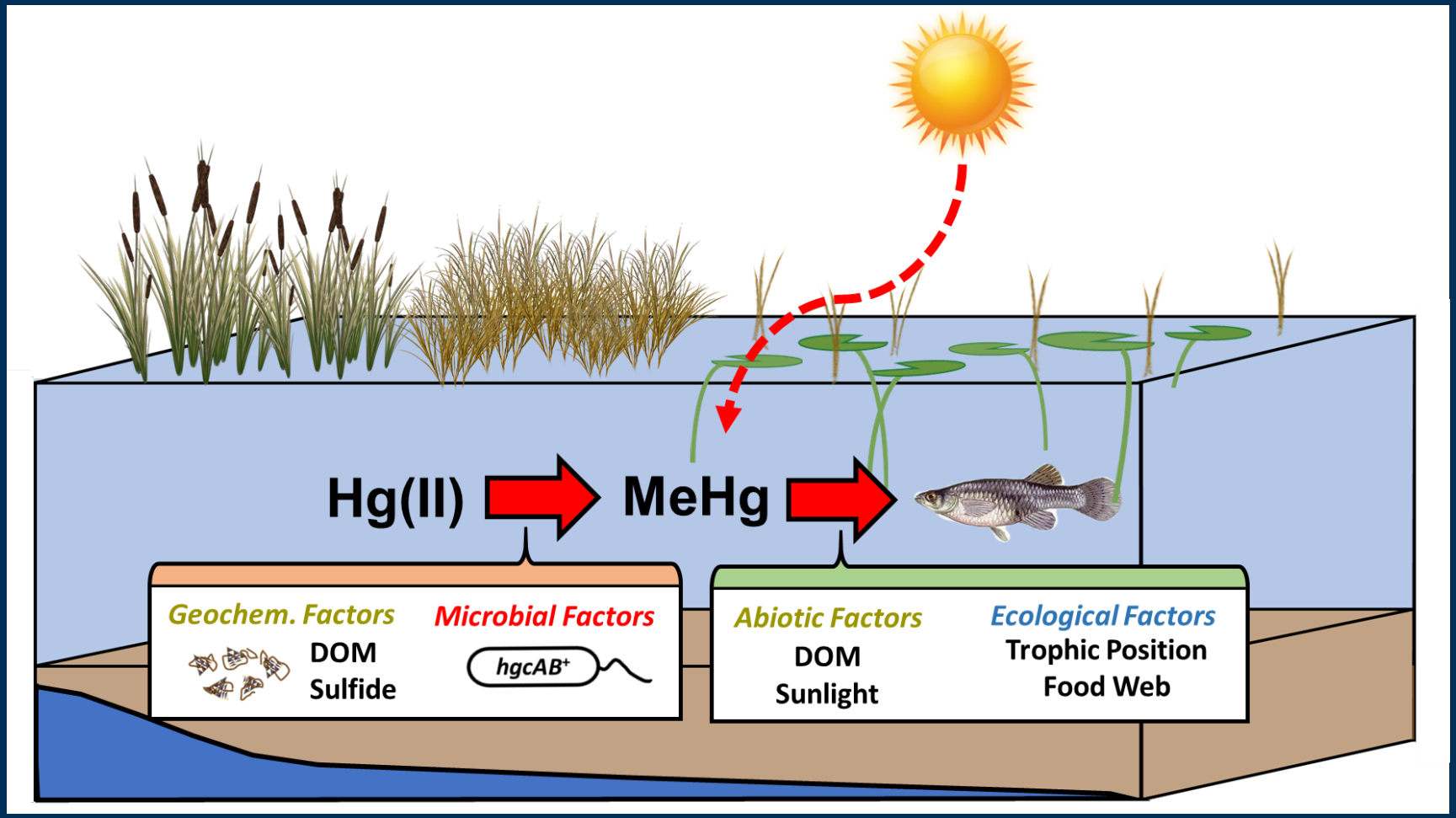
- **Do beaver impoundments increase the bioaccumulation of Hg in fish?**



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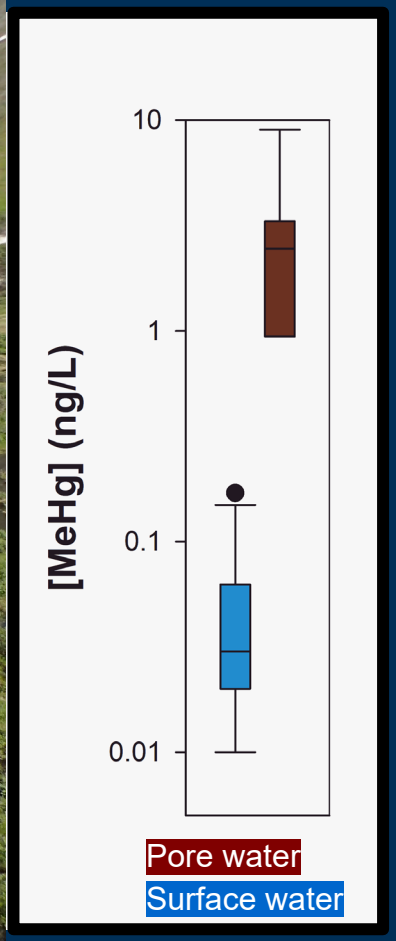

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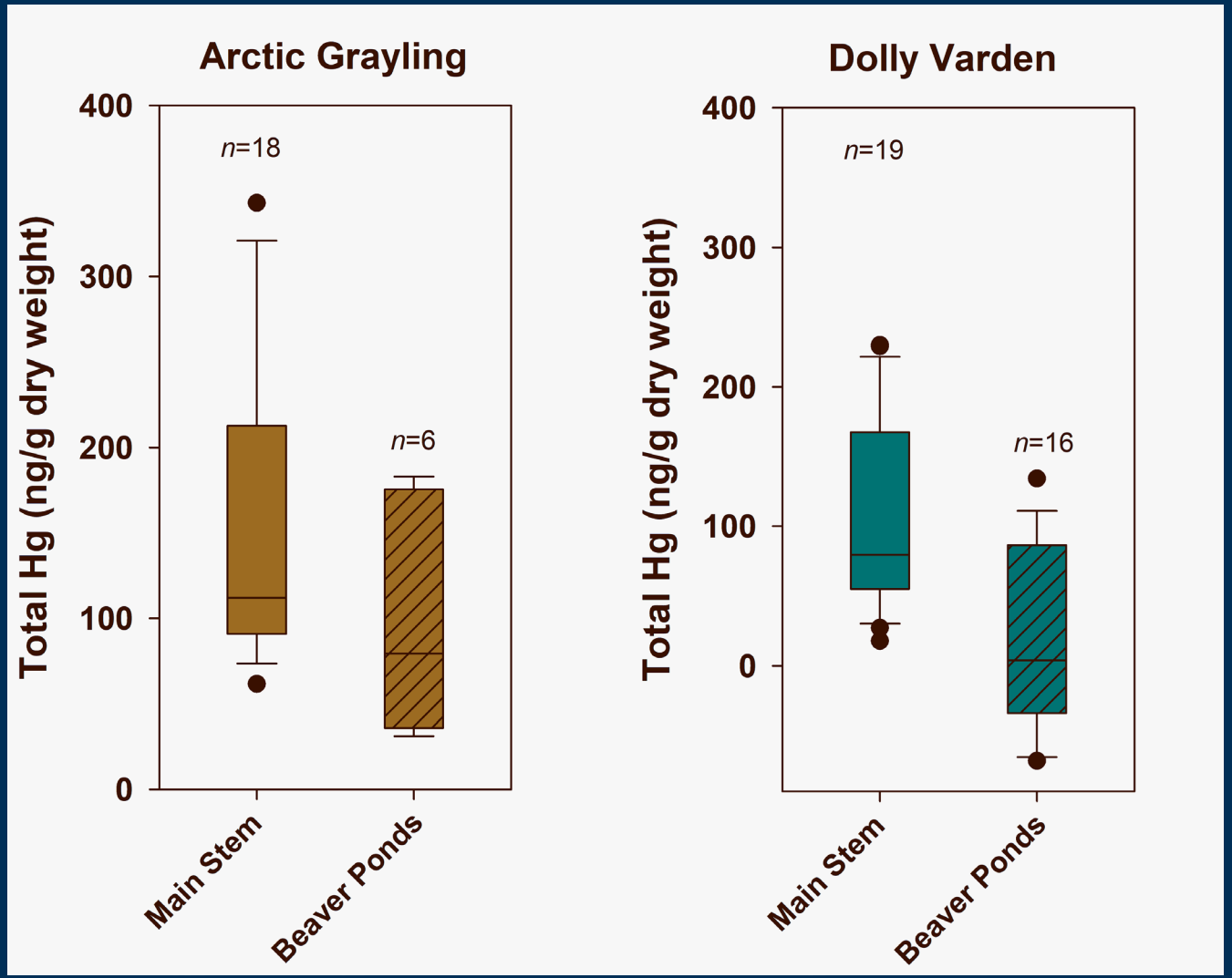

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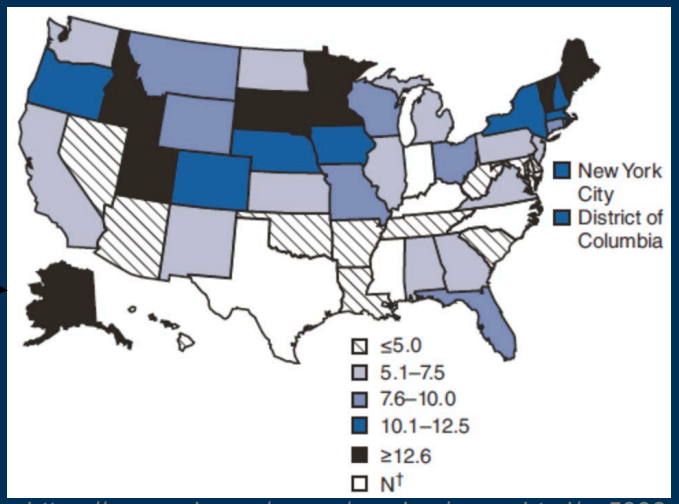
- **What is influence of beaver impoundments as disease vectors?**

Annual rates of giardiasis in Alaska residents are routinely higher than in the rest of the United States

Infection with *Giardia* or *Cryptosporidium* parasites may be associated with fecal contamination of drinking or recreational water



https://www.cdc.gov/mmwr/preview/mmwrhtml/ss5906a2.htm

Christina Ahlstrom, Andrew Ramey, Damian Menning, and Michael Carey

Research questions

1. Is *Giardia* or *Cryptosporidium* present in Arctic Alaska watersheds?
2. Is the presence of *Giardia* or *Cryptosporidium* associated with specific wildlife or human hosts?
3. Is the presence of *Giardia* or *Cryptosporidium* associated with beaver impacted watersheds and/or locations within the beaver dam complex?

Acknowledgements

Fish Program of the USGS Ecosystem Mission Area

Changing Arctic Ecosystem Initiative

National Park Service Arctic Inventory and Monitoring Network

USGS-NPS National Water Quality Partnership

USGS

The Rusting of Arctic Rivers:
Effects of Iron Mobilization from Permafrost Soils on Stream Water

Jonathan A. O'Donnell[1], Michael P. Carey[2], Joshua C. Koch[2],, Carson Baughman[2], Ken Hill[2], and Brett Poulin[3]

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[2]U.S. Geological Survey, Alaska Science Center
[3]University of California, Davis

OPINION: The degradation of a wild and scenic river in Alaska's Brooks Range

By Patrick Sullivan, Jonathan O'Donnell, Roman Dial and Rebecca Hewitt

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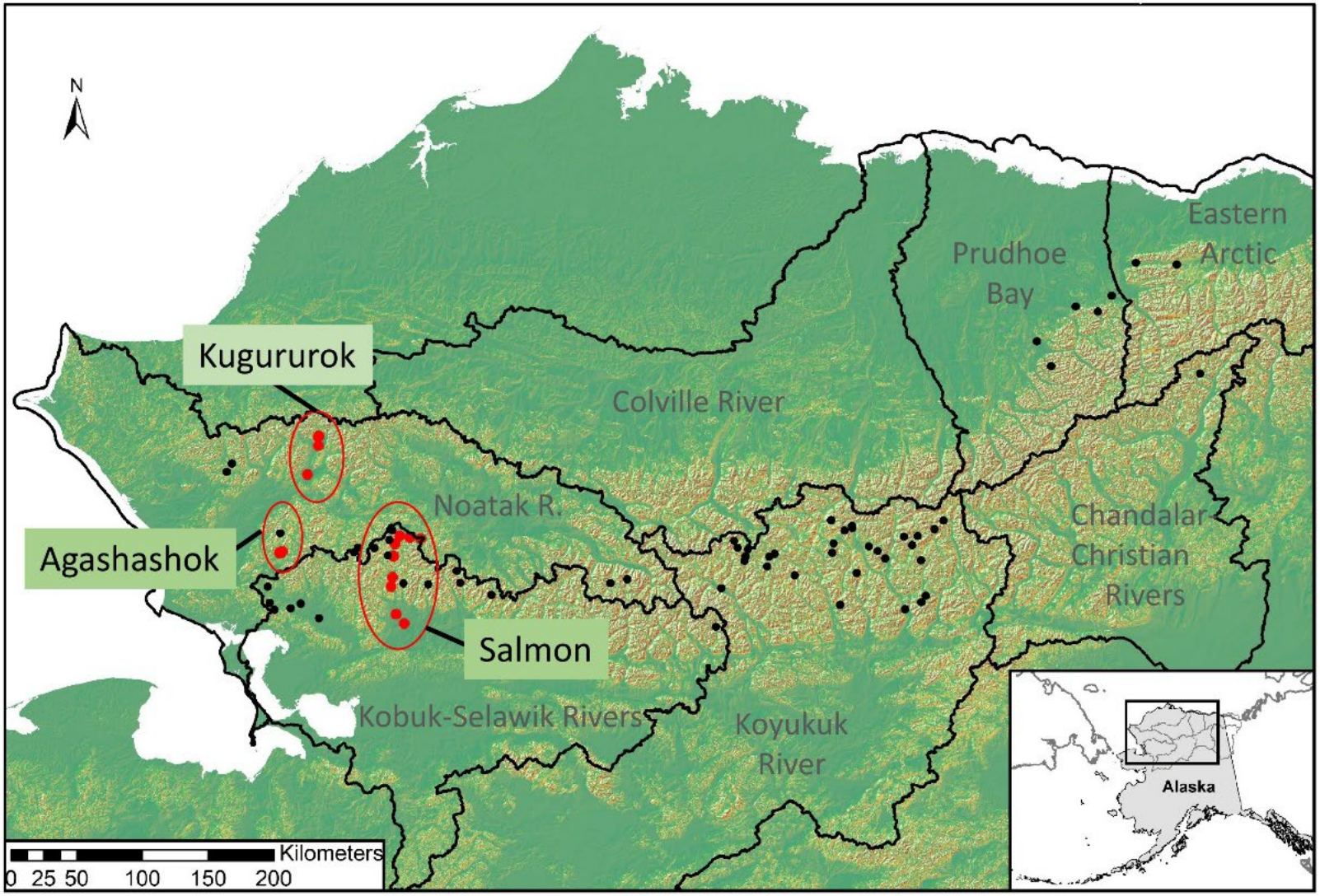
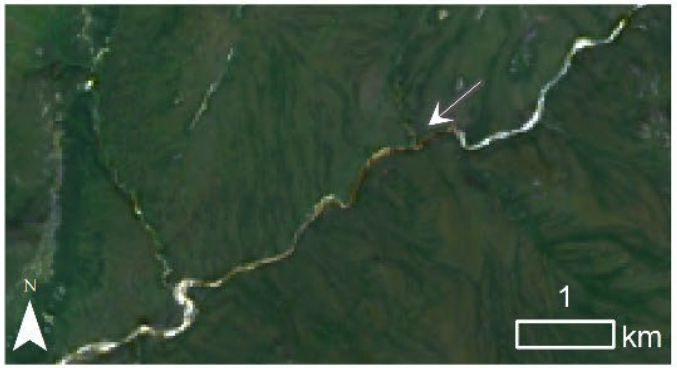
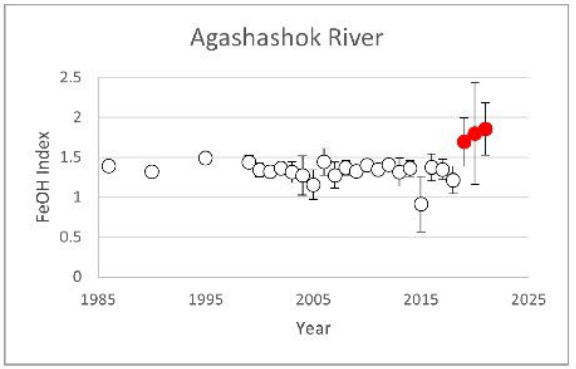
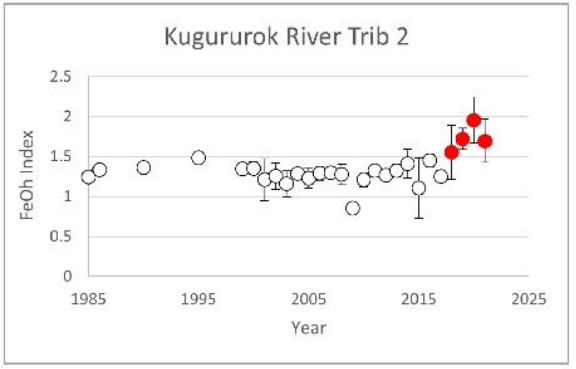
Observations of orange streams

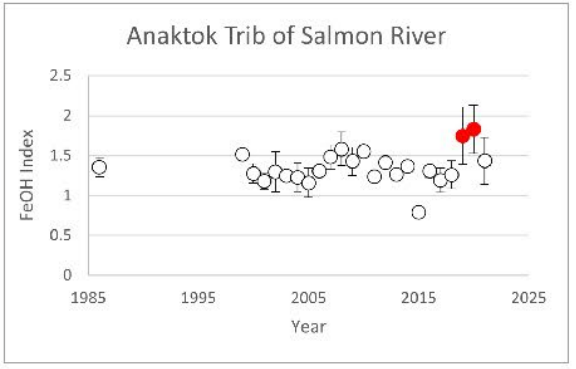


When did rivers start turning orange?







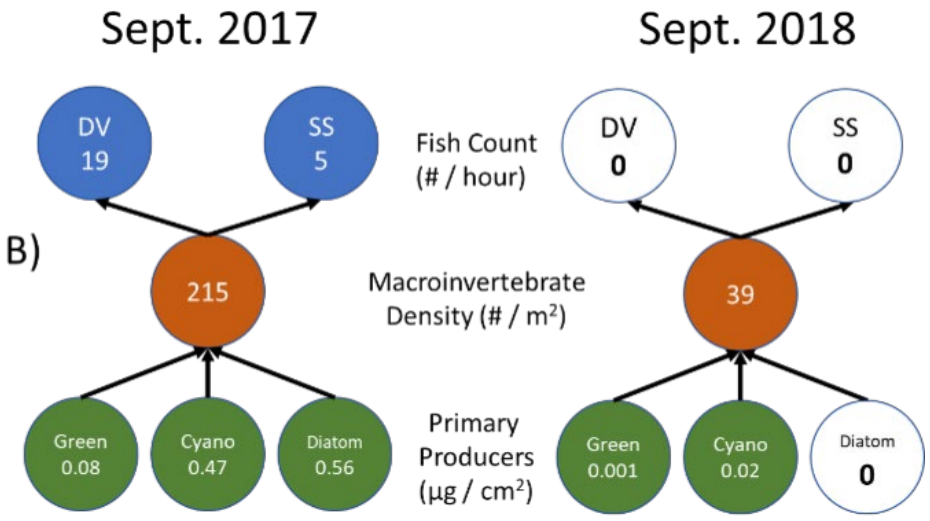


Agashashok River Point Source

2019

2022

Akillik River
Kobuk Valley



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