

The Arctic Rivers Project

Combining
Monitoring,
Modeling, and
Indigenous
Knowledge

Speaker:

Keith Musselman – University of Colorado Boulder



University of Colorado
Boulder



Problem Identification: The process

Step 1) Partner Identification:

Yukon River Inter-Tribal Watershed Council (YRITWC), non-profit representing 74 Tribes & First Nations w/ mission to preserve the Yukon River Watershed.

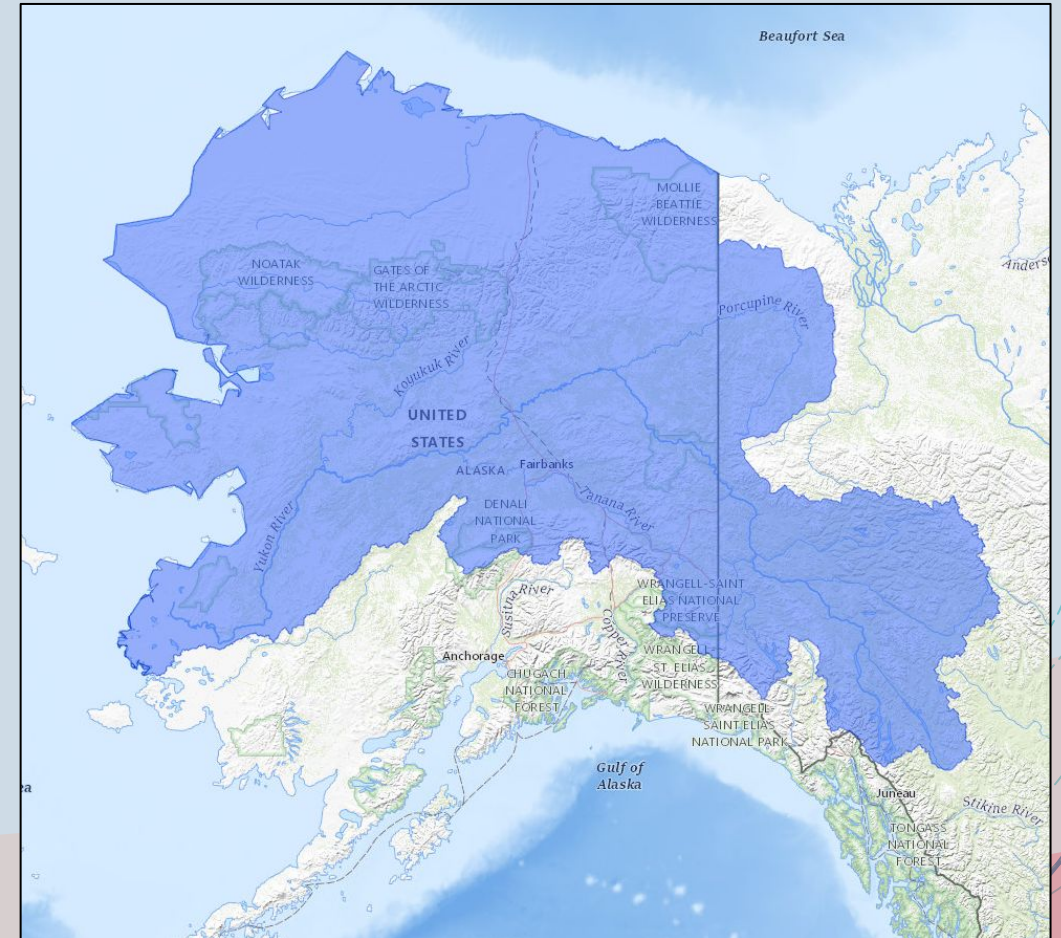
Step 2) Co-Develop Research Questions:

Guided by their executive board of directors and by Tribal and First Nations representatives, we jointly developed initial research questions early in the proposal process.



Problem Identification: The question

How will fish habit and river ice transportation be impacted by permafrost thaw, changes in groundwater, changes in streamflow, and changes in river temperatures?



Arctic Rivers Project Team



University of Colorado
Boulder

University of Colorado

Keith Musselman
Cassandra Brooks
Peyton Thomas
Mike Gooseff
Noah Molotch
Dylan Blaskey
Jackie Florman



Kyla Christopher-Moody
Ally Fitts

U.S. Geological Survey +

Nicole Herman-Mercer
Josh Koch
Ryan Toohey
Mike Carey



University of
Waterloo



UNIVERSITY OF
SASKATCHEWAN

Yukon River Inter-Tribal Watershed Council

Edda Mutter
Theresa Clark

Indigenous Advisory Council (10 members; next slide)

National Center for Atmospheric Research

Andy Newman
Joe Hamman
Tony Craig
Yifan Cheng

Institute for Tribal Environmental Professionals

Karen Cozzetto
Ann Marie Chischilly
Nikki Cooley

University of Saskatchewan

Karl-Erich Lindenschmidt

University of Waterloo

Heidi Swanson
Natasha Ayoub

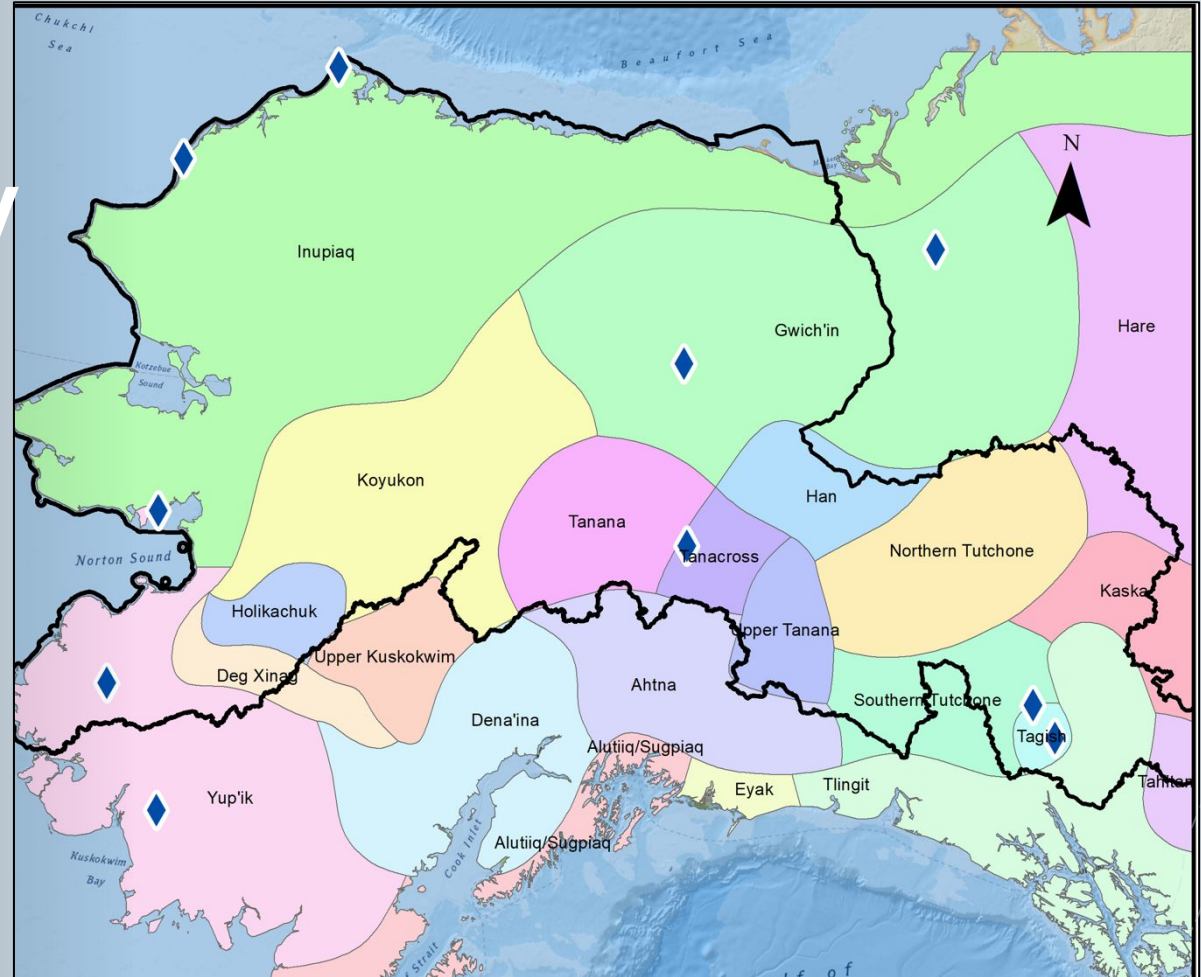


Indigenous Advisory Council

10 Members:

Alestine Andre
Charles Prince
Emily Murray
Evie Combs
Jenessa Tlen

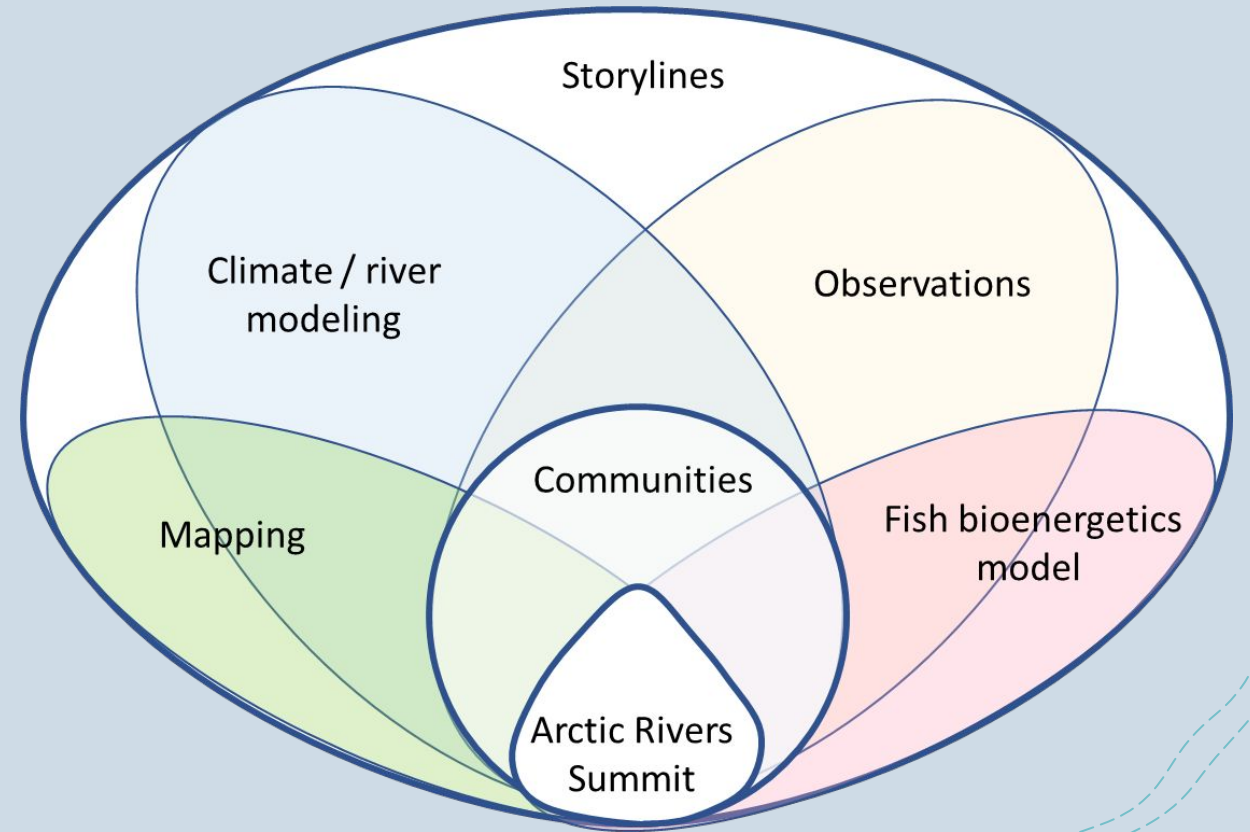
Liz Moses
Mike Williams
Patricia Salmon
Serena Fitka
Dr. Victoria Buschman



Monitoring

Modeling

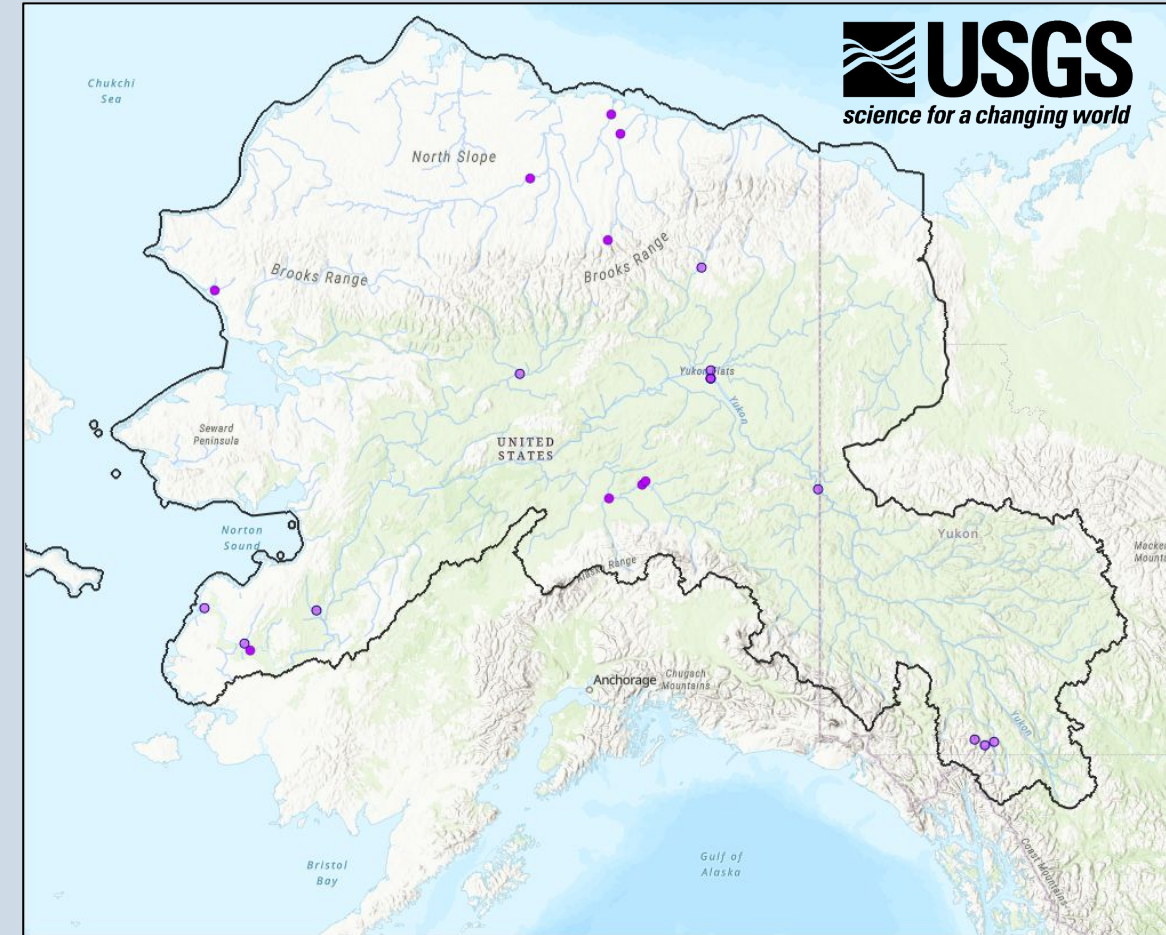
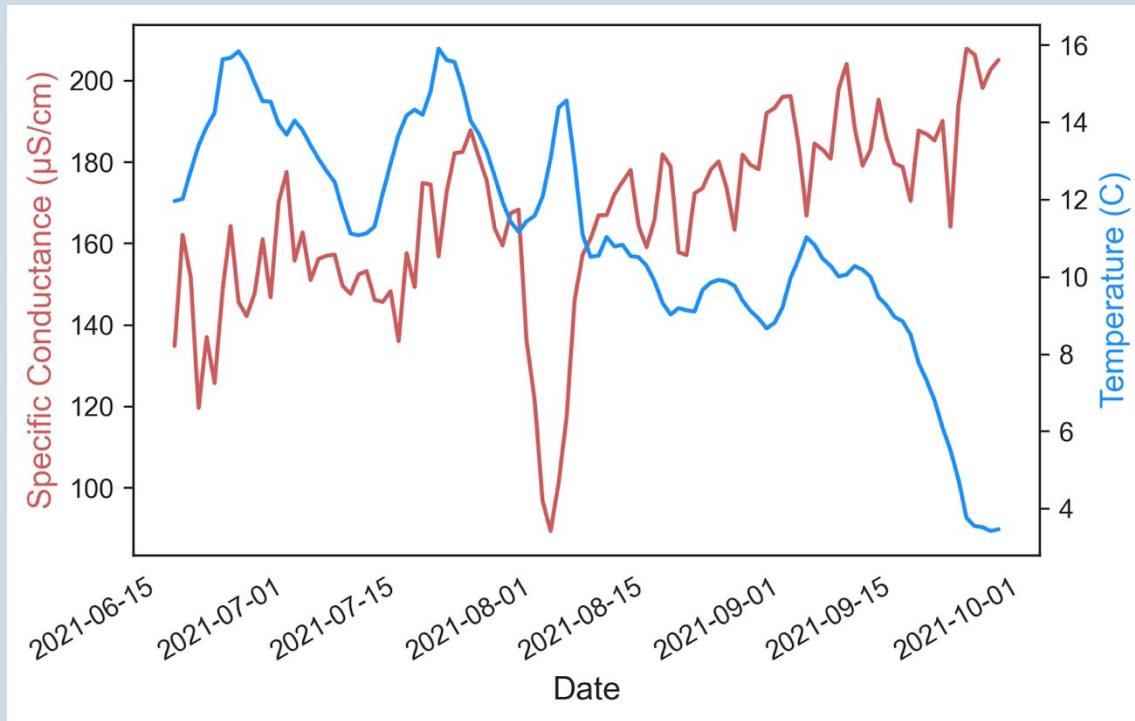
Knowledge
Co-Production



Monitoring:

- River water temperature & salinity

We are developing community-specific reports and sharing specific conductance (salinity) and river temperature data with all communities that helped to collect the data.



Monitoring:

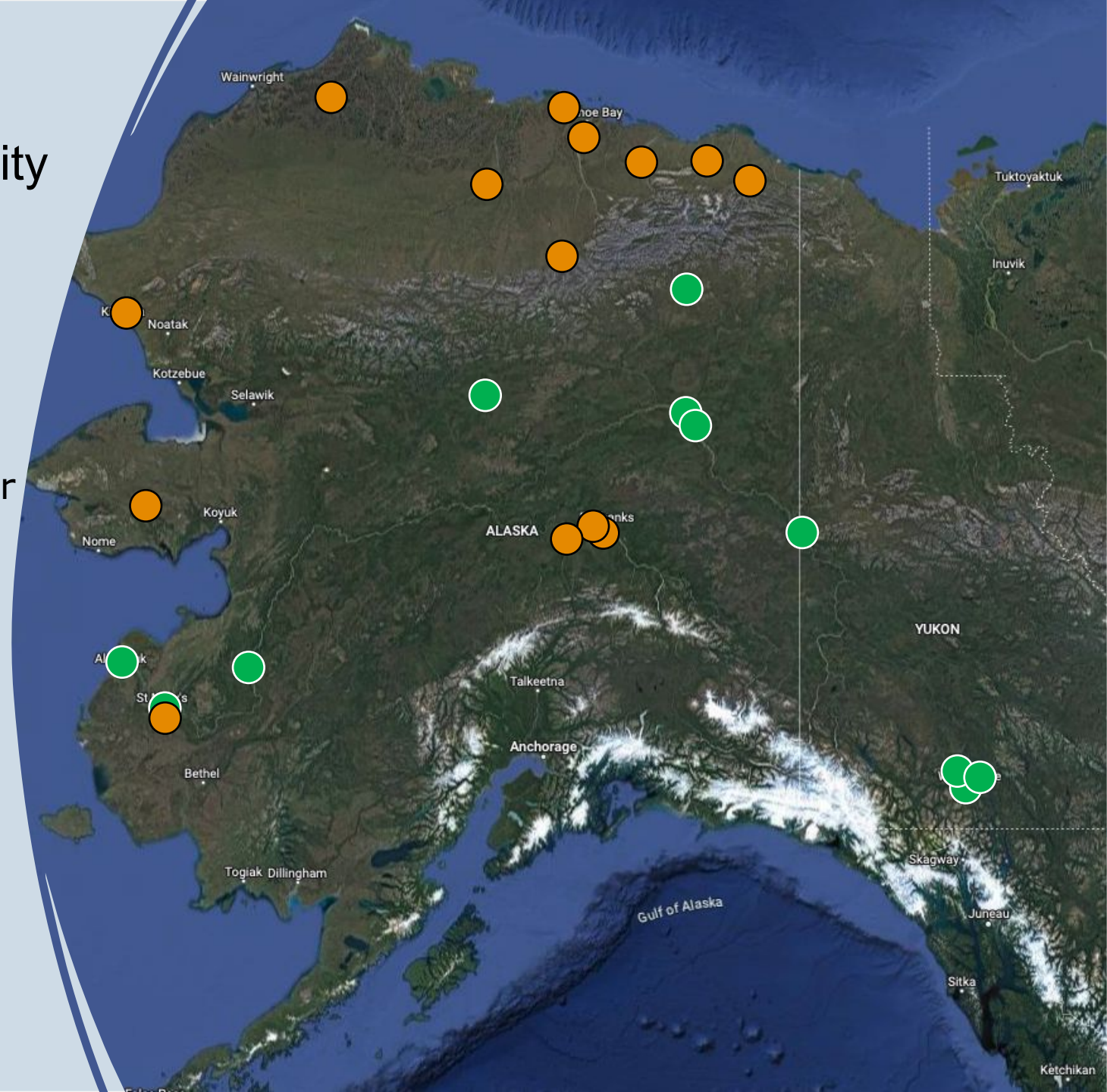
- River water temperature & salinity

Communities via YRITWC

Alakanuk	Fort Yukon
Saint Marys / Andreaski	Eagle Village
Anvik River near Anvik	Bennett Lake
Porcupine River	Tagish River
T'ee Drin Jik River, Arctic Village	Wheaton River
Koyukuk River, Allakaket	

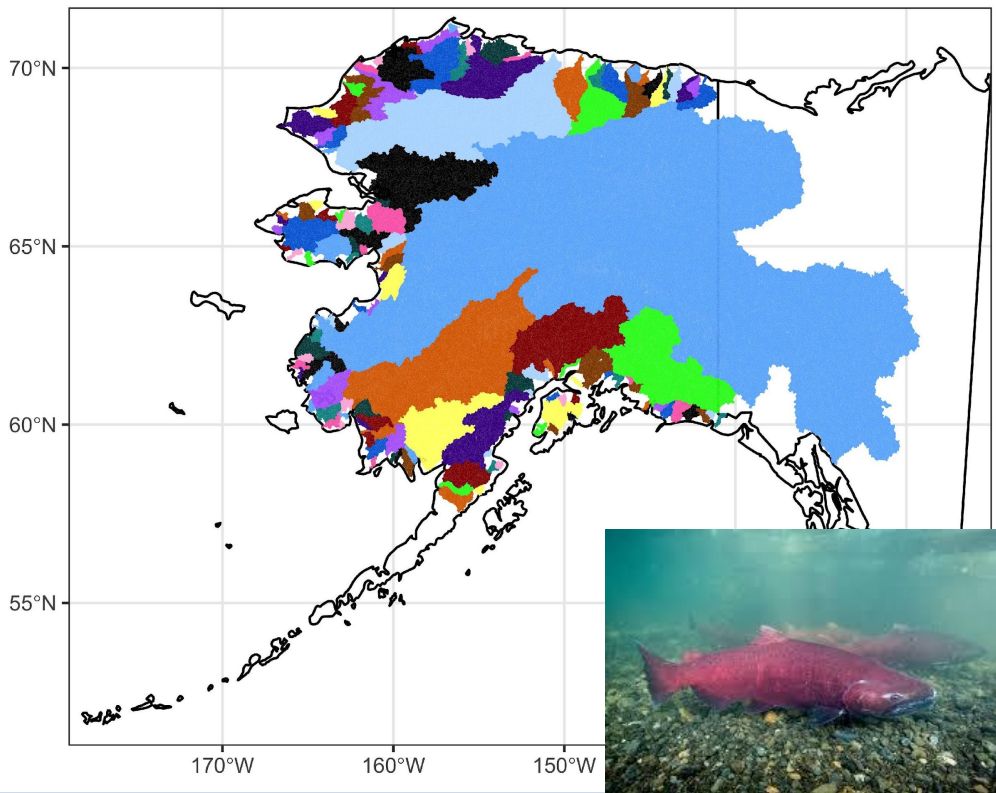
River gages via USGS

Aichillik	Meade
Atigun	Niukluk
Canning	Sag
Chena	Tanana @ Fbx
Coleville	Tanana @Nenana
Hulahula	Wulik
Kobuk	Yukon @ Pilot Station
Kuparuk	



Modeling:

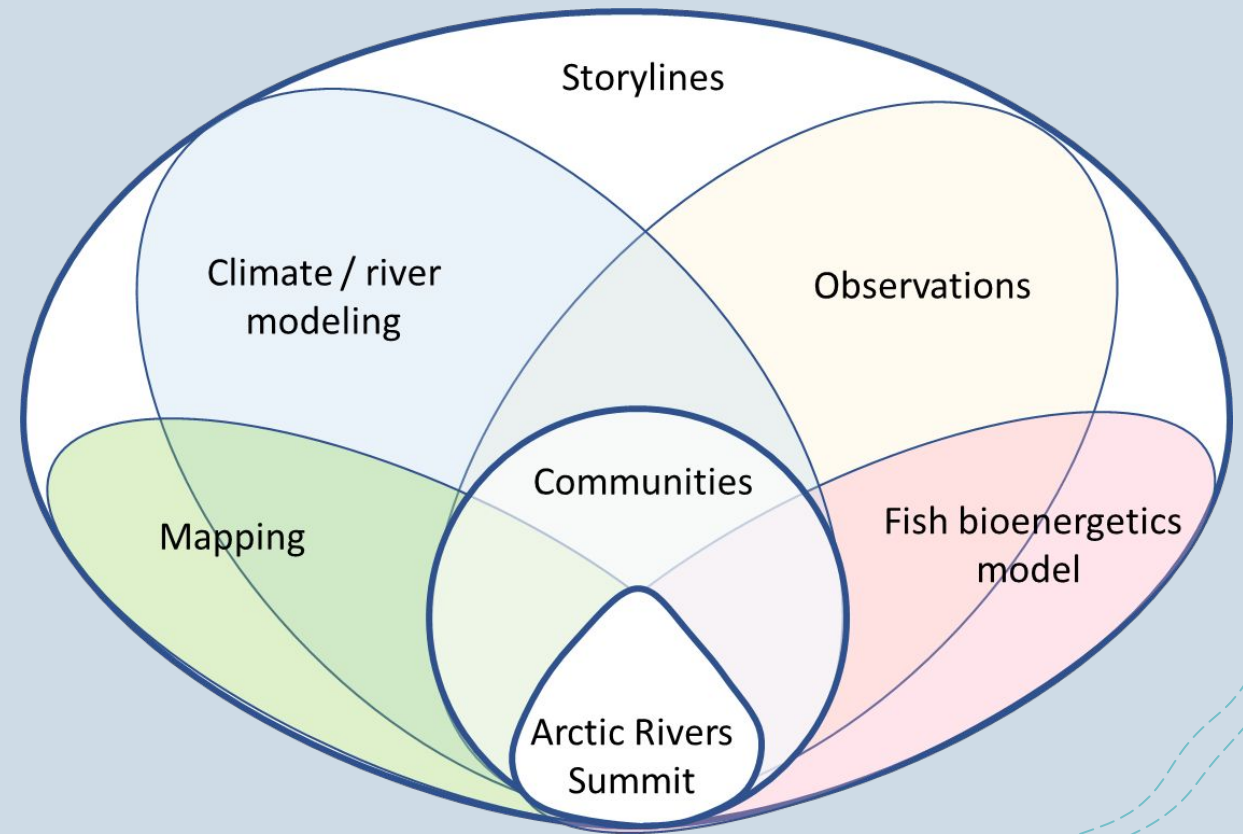
- Regional climate
- River ice
- Fish



- Climate Model: Regional Arctic System Model (RASM)
- Land surface model: Community Terrestrial Systems Model (CTSM)
- Streamflow model: MIZUROUTE
- River temperature & ice model: River Basin Model (RBM)
- Fish bioenergetics model

Knowledge Co-Production:

- Indigenous Advisory Council
- Community data collection
- Indigenous knowledge
- Arctic Rivers Summit





Arctic Rivers Summit

December 6-8, 2022
Alaska Native Heritage Center
Anchorage, AK

- + Exchange knowledge about current and potential future conditions for Alaskan and Yukon rivers, fish, and people and ways we can adapt.
- + Inform modeling of climate, river flows, river ice, and fish to make data generated as useful as possible for communities.
- + Develop an action plan centered around: (1) State of Salmon, (2) State of Rivers, (3) Partnering Indigenous Knowledge with Western Science to Inform Management, (4) Youth and Elders: Building a Bridge of Traditional Knowledge.

Acknowledgements



Edda Mutter
Yukon River Inter-tribal
Watershed Council



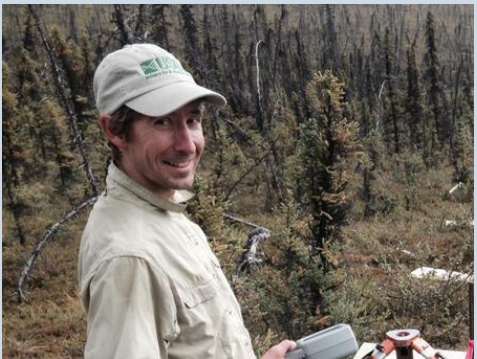
Andrew Newman
National Center for
Atmospheric Research



Peyton Thomas
University of Colorado
Boulder



Yifan Cheng
National Center for
Atmospheric Research



Josh Koch
US Geological Survey



Dylan Blaskey
University of Colorado
Boulder

Acknowledgements

- Funding provided by the National Science Foundation's Navigating the New Arctic Program
- Our Indigenous Advisory Council Members
- The Yukon River Inter-Tribal Watershed Council
- The Institute for Tribal Environmental Professionals

Keith Musselman
keith.musselman@colorado.edu

Twitter: @RiversArctic

Instagram: @arctic.rivers