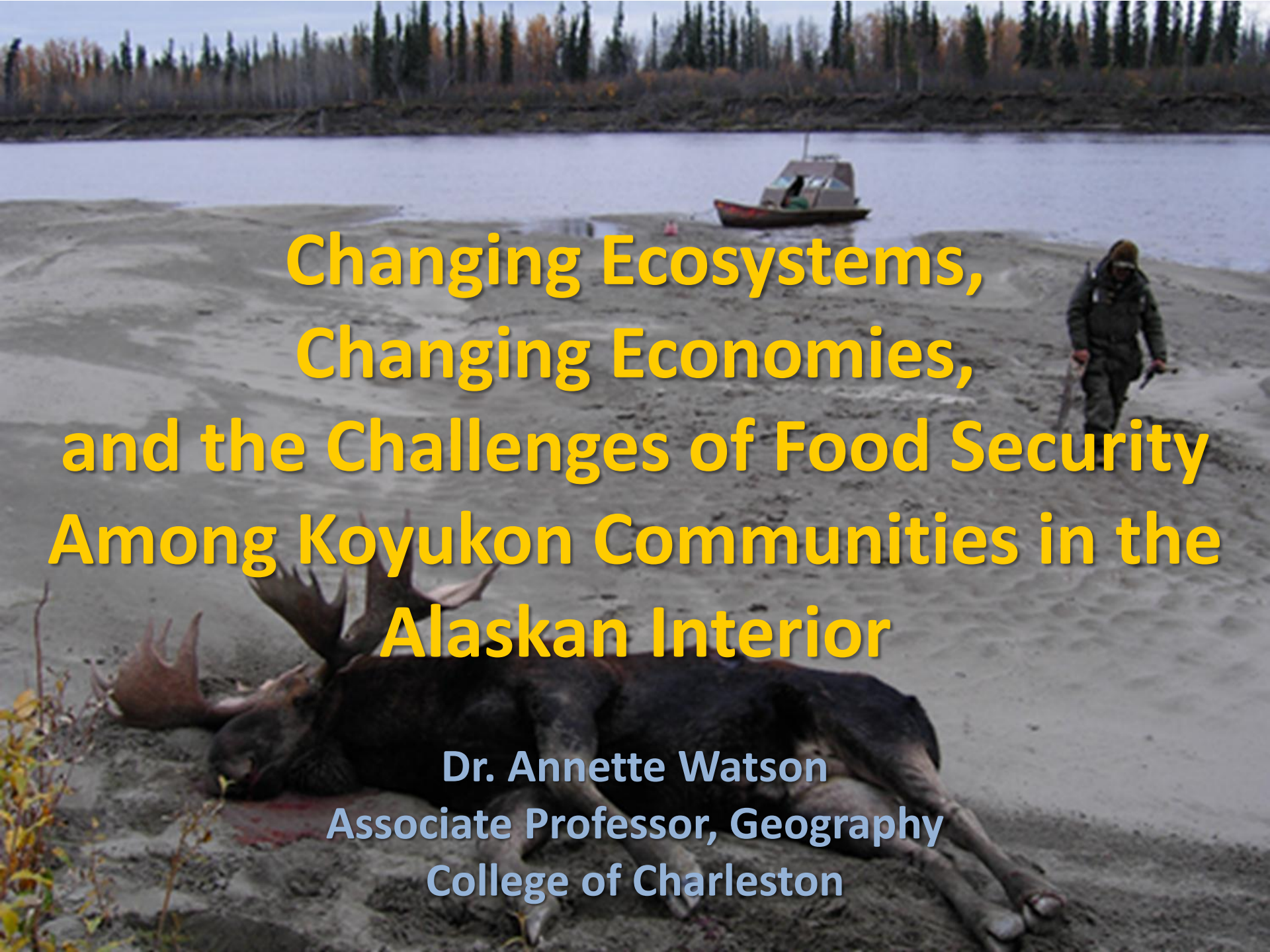


A photograph of a caribou carcass lying on a sandy beach. The caribou has large, dark antlers. In the background, a person in dark clothing is walking on the beach, and a small boat is in the water. The background shows a line of trees with some autumn-colored foliage.

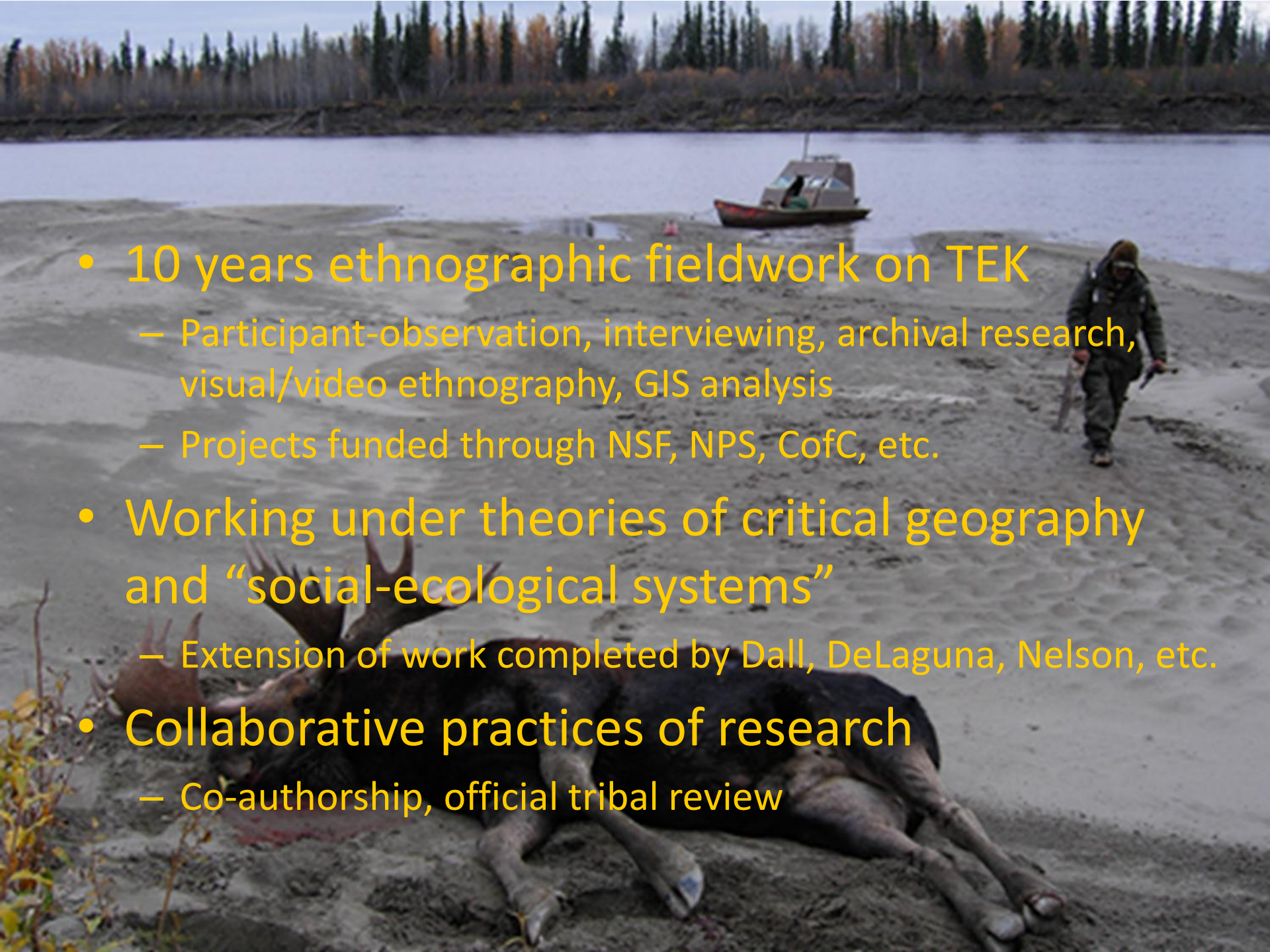
Changing Ecosystems, Changing Economies, and the Challenges of Food Security Among Koyukon Communities in the Alaskan Interior

Dr. Annette Watson
Associate Professor, Geography
College of Charleston

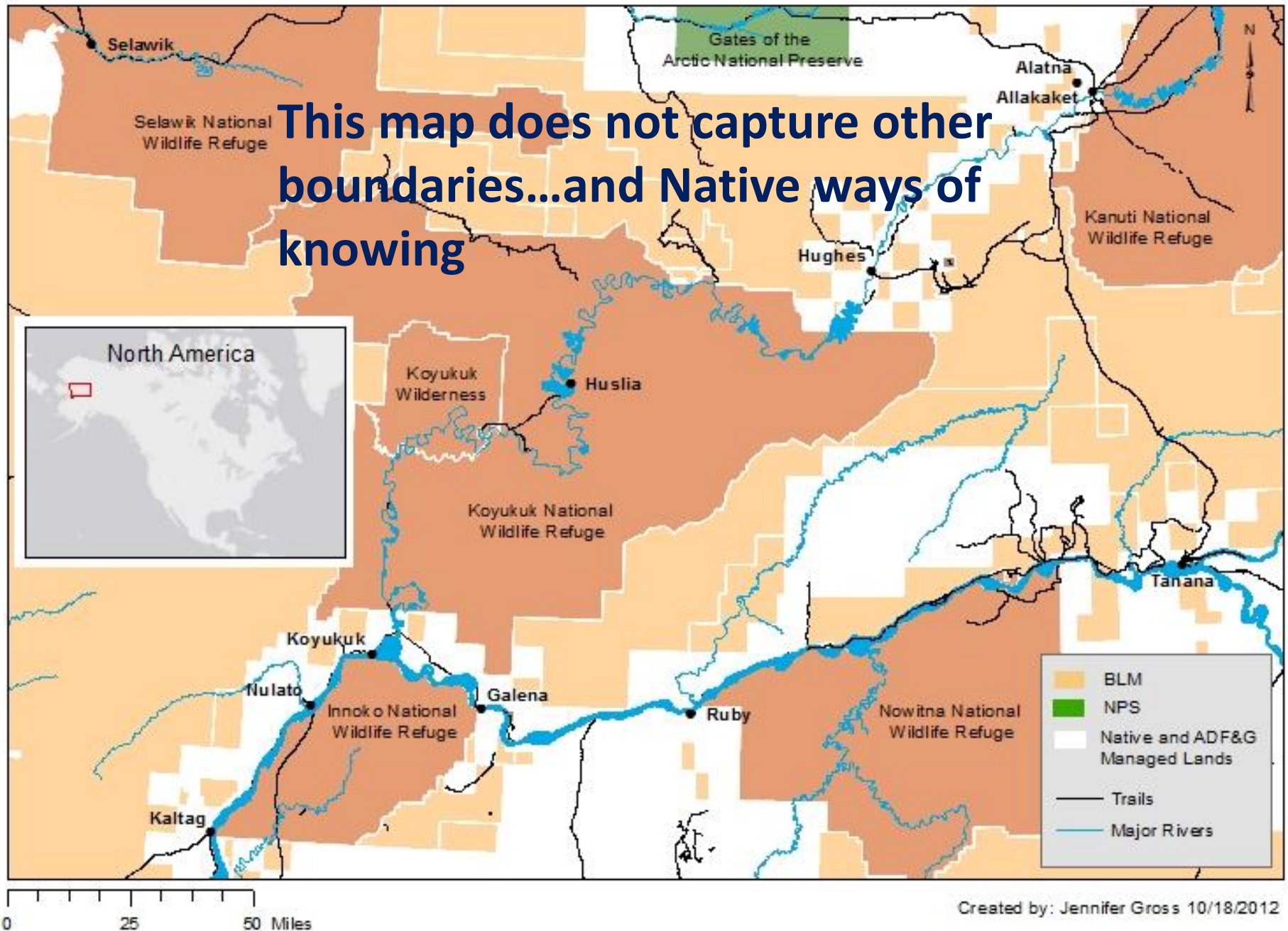
Archaeological record places Koyukon on this landscape for the last 7000 years, pre-dating the boreal forest ecosystem (Chapin et al 2010; Arundale and Jones 1989)



(From Krauss 1982)

- 
- A photograph of a caribou carcass lying on a sandy beach. In the background, a person is walking on the beach, and a small boat is in the water. The scene is set against a backdrop of a forested shoreline.
- 10 years ethnographic fieldwork on TEK
 - Participant-observation, interviewing, archival research, visual/video ethnography, GIS analysis
 - Projects funded through NSF, NPS, CofC, etc.
 - Working under theories of critical geography and “social-ecological systems”
 - Extension of work completed by Dall, DeLaguna, Nelson, etc.
 - Collaborative practices of research
 - Co-authorship, official tribal review

This map does not capture other boundaries...and Native ways of knowing



Oral Tradition speaks of other boundaries...and ethical ways of knowing

TEK is as much an approach to research questions and data, as it is a collection of facts about things.

The “Nulato Massacre”
...and other
“transgressions”
(Watson and Huntington 2014)



Changes (and Continuities) in the Social-Ecological System

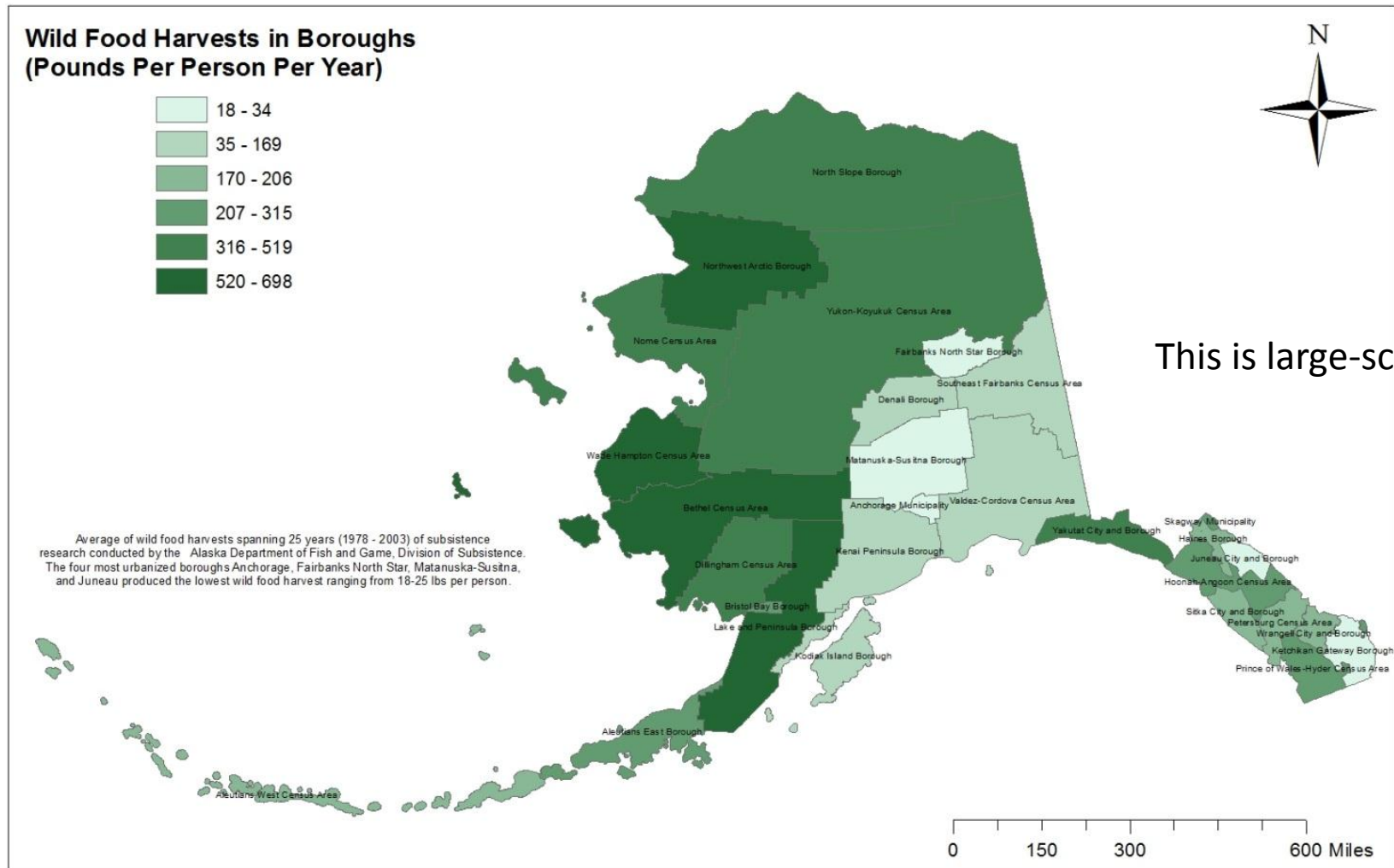
Bird Songs are Changing—

but not just about birds:

“They're, they're missing, they're missing some notes. ...When I was a child um, the robin would sing the whole song...now its just skipping. It skips parts of the song...it ends the same way, starts the same way but it's missing some...notes, and so does... [other small birds]. The one that has a cap....That one doesn't sing the same way it, like it used to... It's also skipping some tune, notes and there.” (interview JS, Allakaket, 2012)

Food Harvest Average 1978-2003

Wild Food Harvests by Residence of Alaska Census Areas

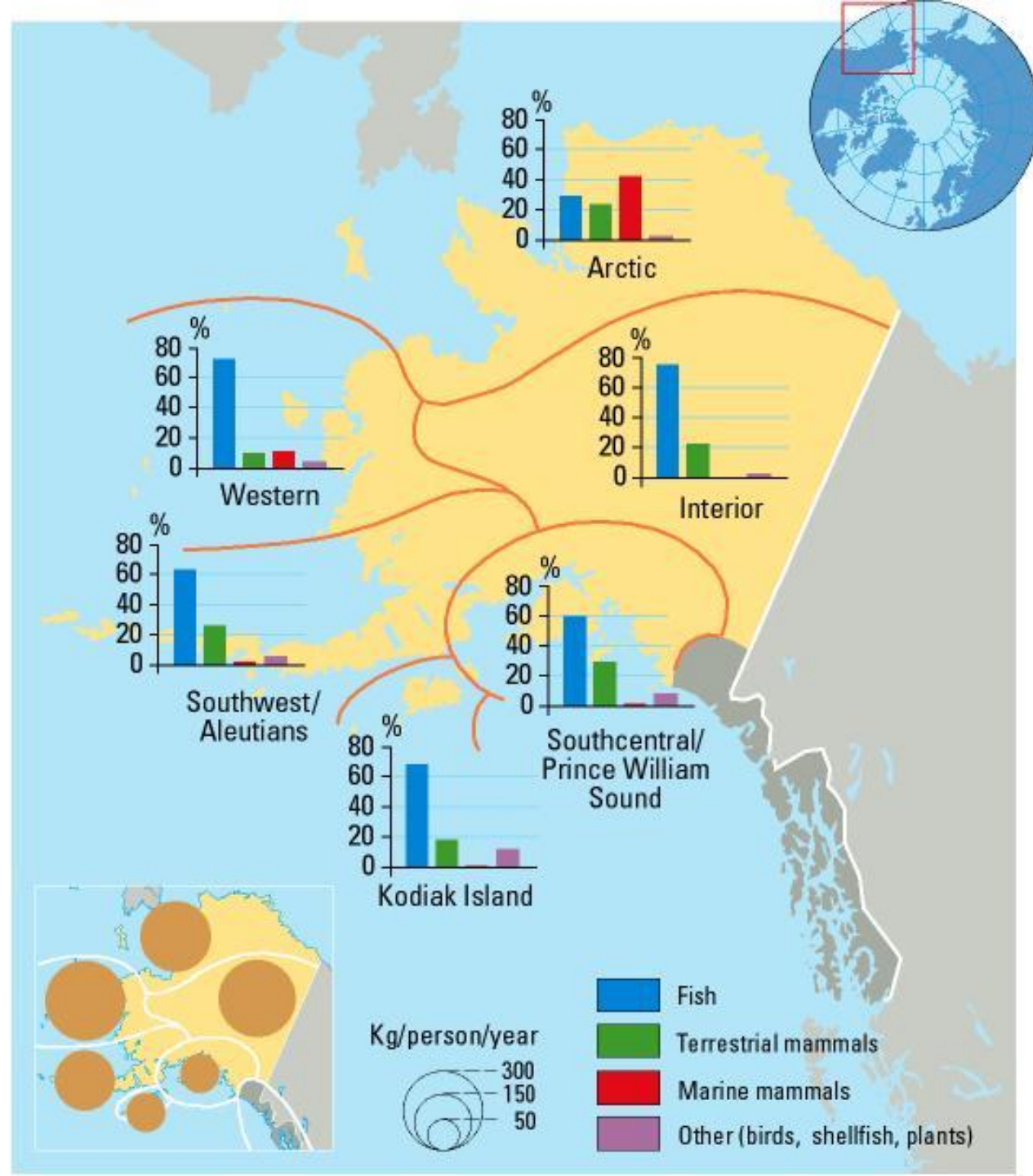


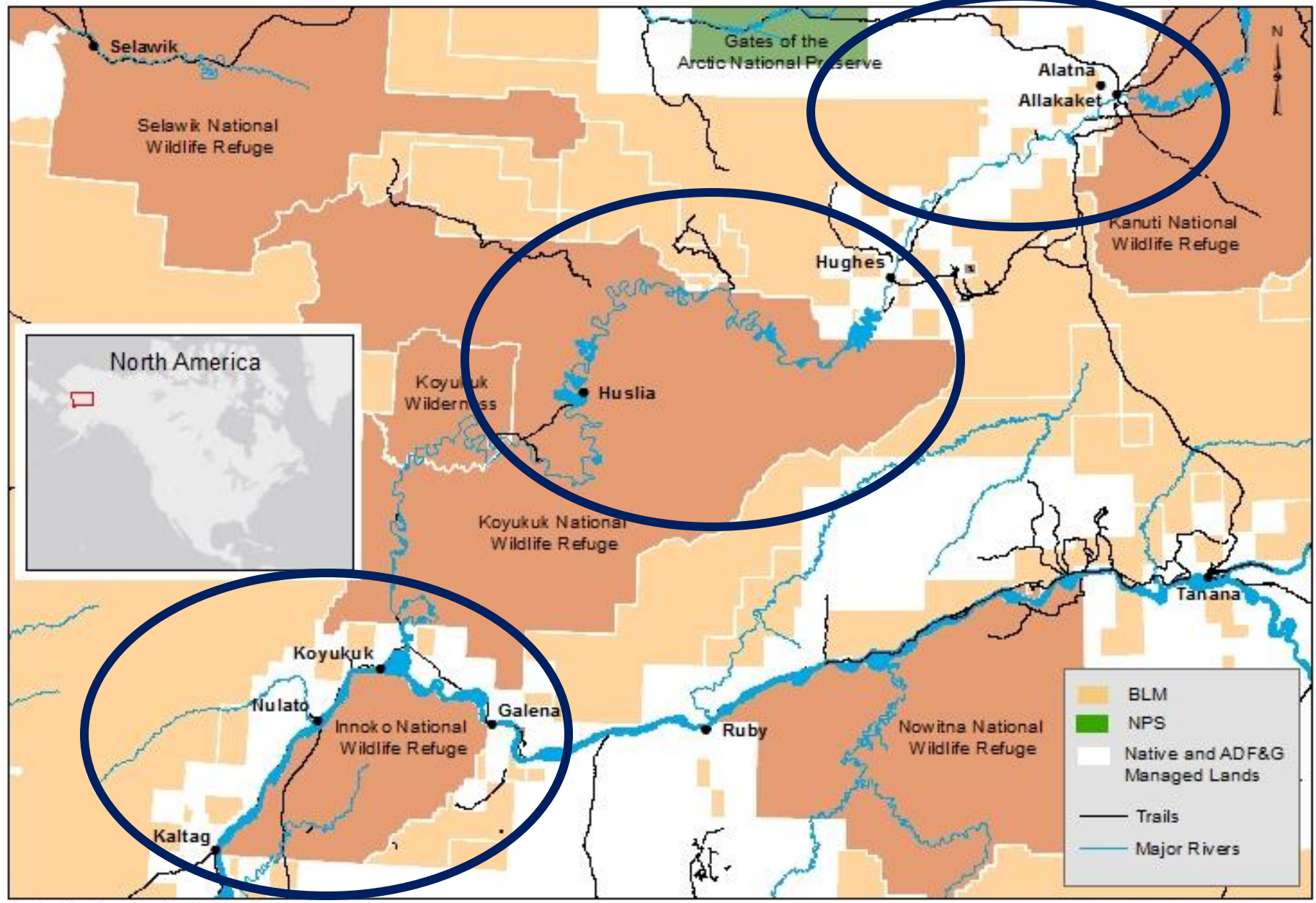
Subsistence Resource Use

Sources : Robert J. Wolfe,
Alaska department of
fish and game,
division of
subsistence, Juneau,
Alaska.

Published in : AMAP
Assessment Report :
Arctic Pollution
Issues. Arctic
Monitoring and
Assessment
Programme (AMAP),
Oslo, Norway, 1998.

Figure number : 5.5





Huslia

Geese, first to arrive in spring...

“Used to be like music” (Attla 1995)

Decrease in white-fronted geese



Fishing has changed:
Historically, fished
everything, year round,
set nets and rod/reel

Many from Huslia used
to harvest locally or in
fish camps at the Yukon
for King Salmon; but
King Salmon decreased



Huslia



Although dog (chum) salmon populations have increased, individuals harvesting have decreased across the region

Huslia



Decrease in use of dog teams (and increase in use of snow machines) also correlates to decrease in summer chum fishing

Huslia

Berry harvests vary more
from less stable climate
conditions



Huslia

Moose essential staple for this village now
Came into Koyukon territory in the 1930s
Local harvests/effort stable in this GMU only



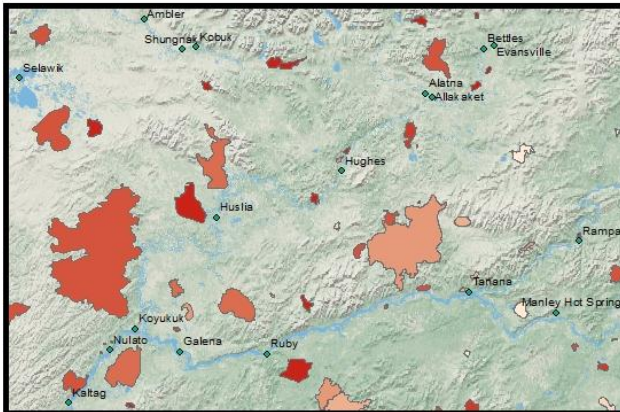
Hypothesis: Fire affecting habitat for moose browse; willow ideal for moose approx 20-25 post-burn, up to 50 yrs



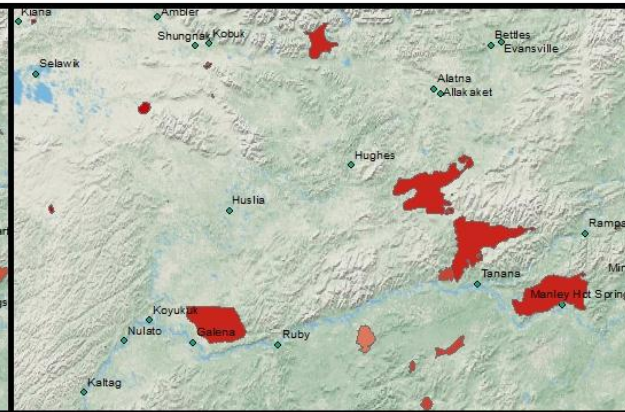
Interior Alaska Fire History by Decade 1950 - 2006
Includes areas burned greater than 1,000 acres between 1950 and 1987
and acres burned greater than 100 acres between 1988 and 2006



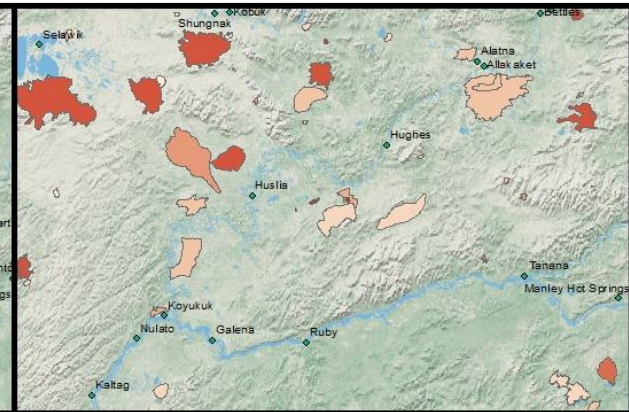
Fires 1950-1960



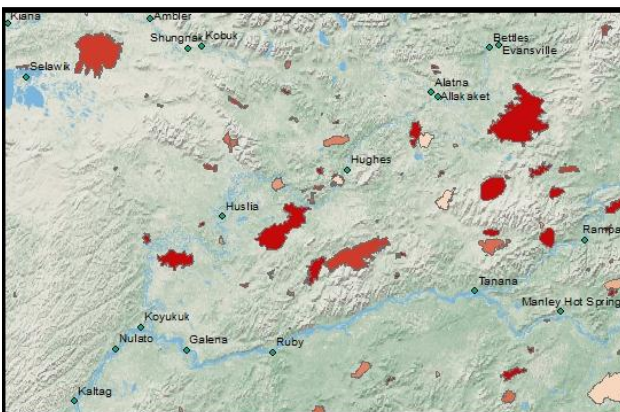
Fires 1960-1970



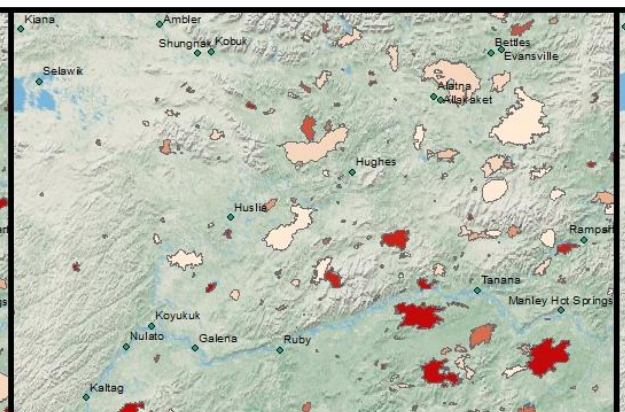
Fires 1970-1980



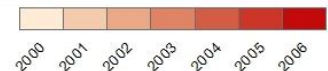
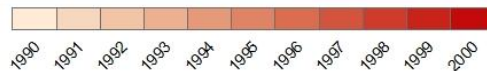
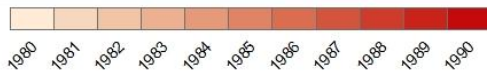
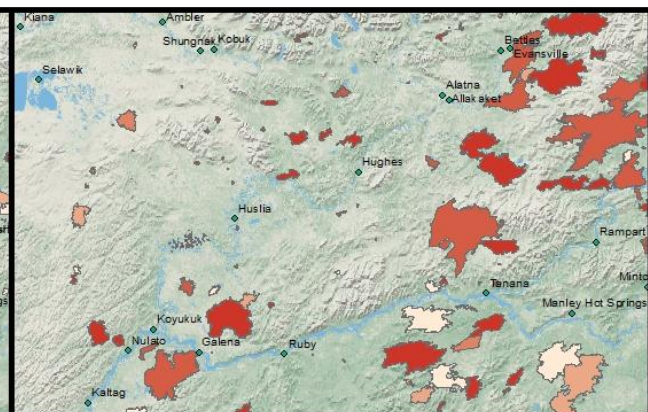
Fires 1980-1990



Fires 1990-2000



Fires 2000-2006



0 12.5 25 50 75 100 Miles

Created by Jennifer Gross November 17, 2012

People adapt by being
inventive, inspired,
creative—not
necessarily direct
passing down of
knowledge

Huslia



Upper Yukon, 1910,
Smithsonian collection

Huslia

Wisdom =
(knowing how to USE your knowledge)
comes from orientation to nature via
subsistence economy



Nulato



Nulato





Nulato



- The emphasis on harvesting King Salmon recent, came with the commercial fishery selling eggs to Asia; drifting and fish wheels newer technologies adopted for efficient harvest
- like in Huslia, Nulato residents harvest all fish, many seasons....

Nulato

But the fish camps are largely empty during fishing season:

Larger-power motors, and closing the commercial fishery for Kings in the early 2000s



Nulato

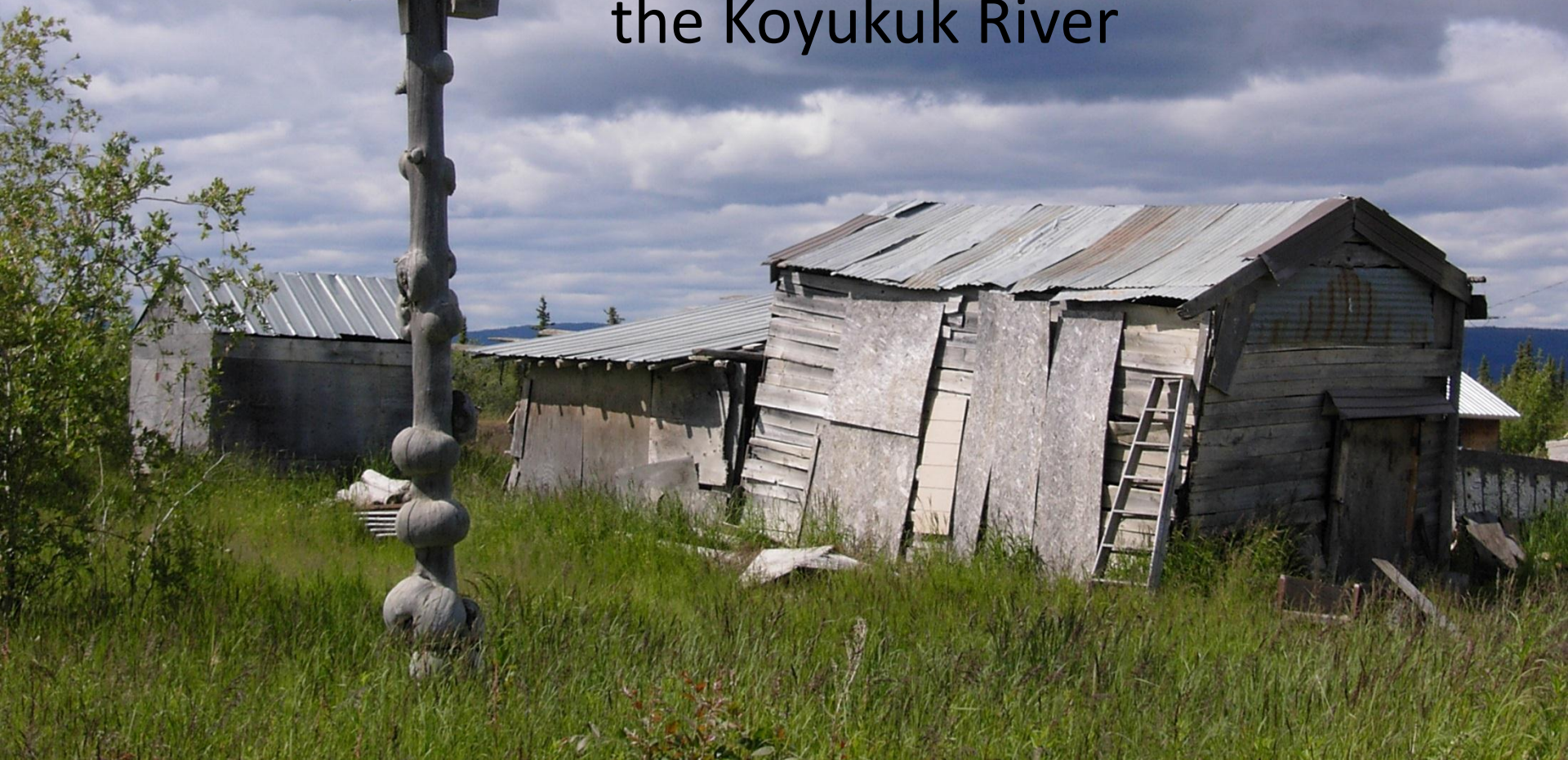
King salmon are today in decline because of many factors, not just the commercial egg harvest, but because of bycatch from the pollock industry and climate change

(Strange 2008; Welch et al 2008; Richter and Kolmes 2005)



Nulato

- Geese/duck harvests declined
- Rely more on moose, but also have to travel more—often up the Koyukuk River



Nulato

- This year no King Salmon fishing, but people shifting their subsistence activities....
- Also more capitalist enterprises, local small businesses (e.g., real estate, fish plant at Kaltag; biomass project in Koyukuk)





Allakaket and Alatna

Measured to be
the most food
insecure out of ALL
Alaska Native
villages (Holen et al 2012)

Allakaket and Alatna

Moose became important element in the local subsistence economy: 520lbs per capita/yr, used by 100% of households (Holen et al 2012; Brown et al 2004; Andersen et al 2004b).

- “The very stable community harvest levels...are achieved by hunters in these communities only through dramatic increases in hunter-effort. This is a testament to the prominence of moose as a food resource in this region and the importance local hunters place on meeting subsistence needs with traditional foods” (Brown et al 2004, p. 25-26).



Allakaket and Alatna

There are localized increases in waterfowl, and local experts suggest that these are populations that formerly nested and molted further north

The trapping economy died out in the 1990s with the collapse of the European fur market



Allakaket and Alatna



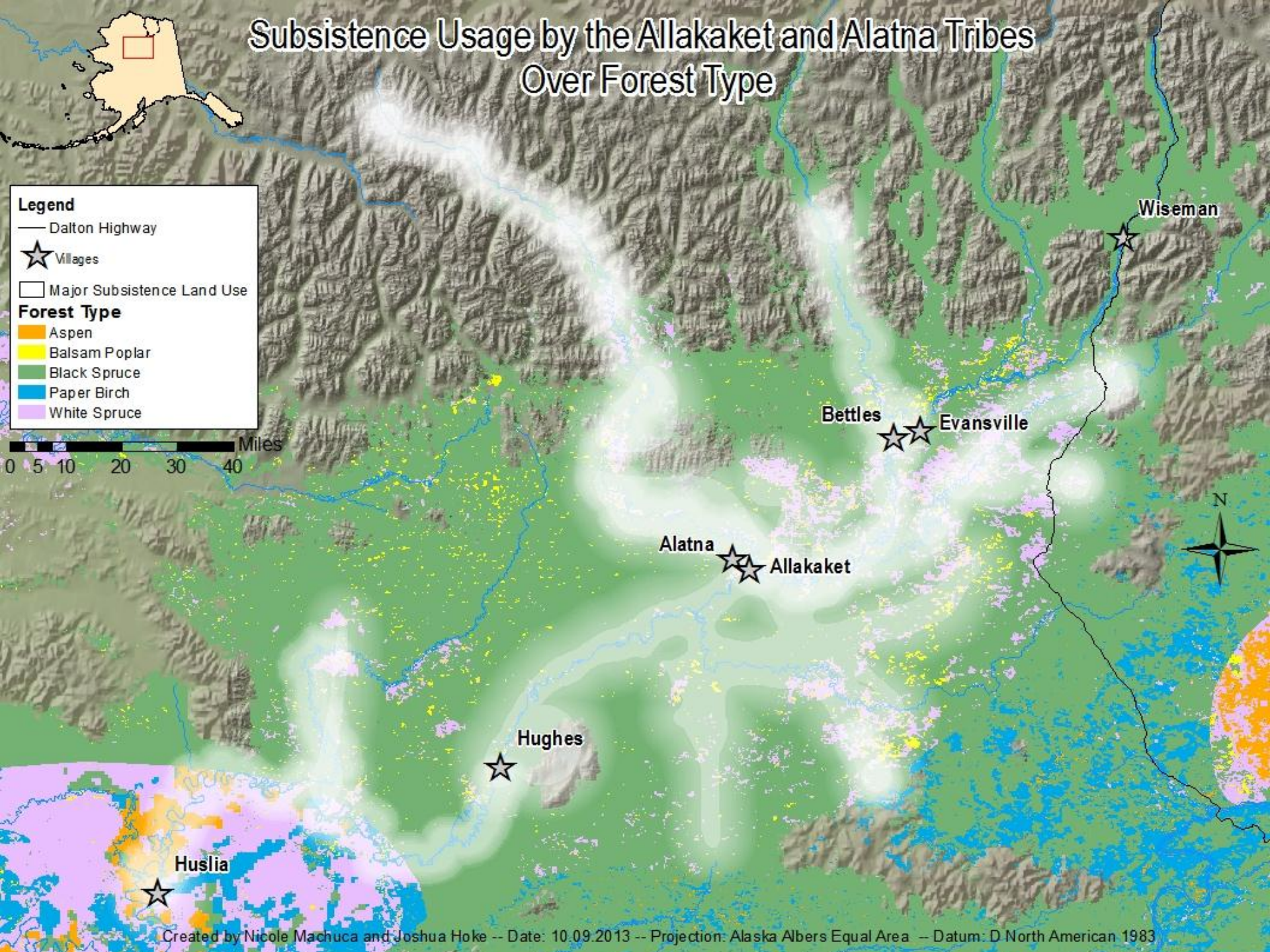
Serious declines
in salmon
fisheries; shifting
to non-salmon
species
(Andersen et al 2004)

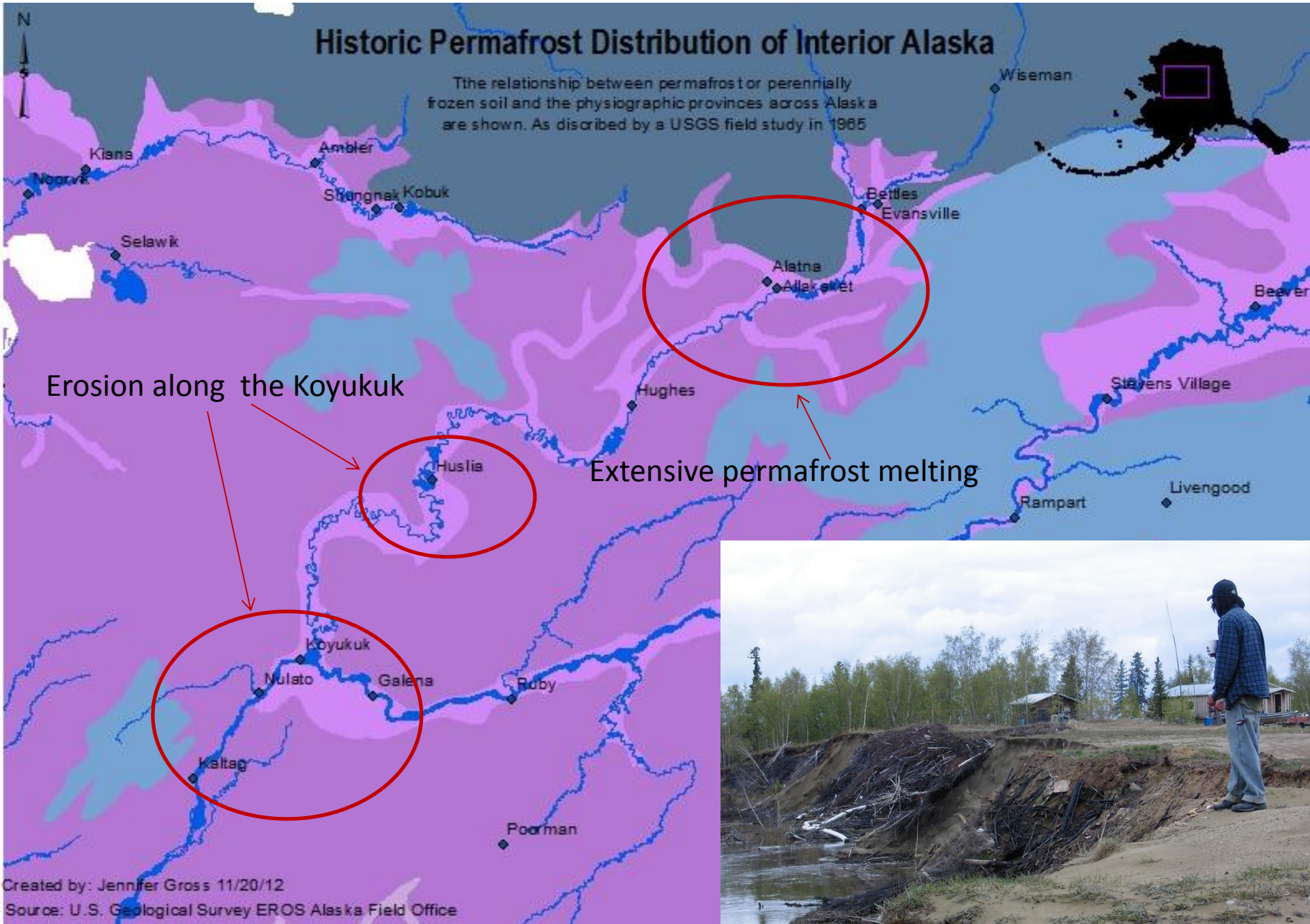
Allakaket and Alatna

- These village communities are particularly vulnerable from less mobility
- However, their mobility has been changing its pattern: people spending longer out for hunting (thus fewer kids involved at an early age), and travel further south along the Koyukuk



Subsistence Usage by the Allakaket and Alatna Tribes Over Forest Type





Allakaket and Alatna

Watson et al (2014) suggests that not fire, but changing hydrological processes caused by melting permafrost is affecting moose density in the area

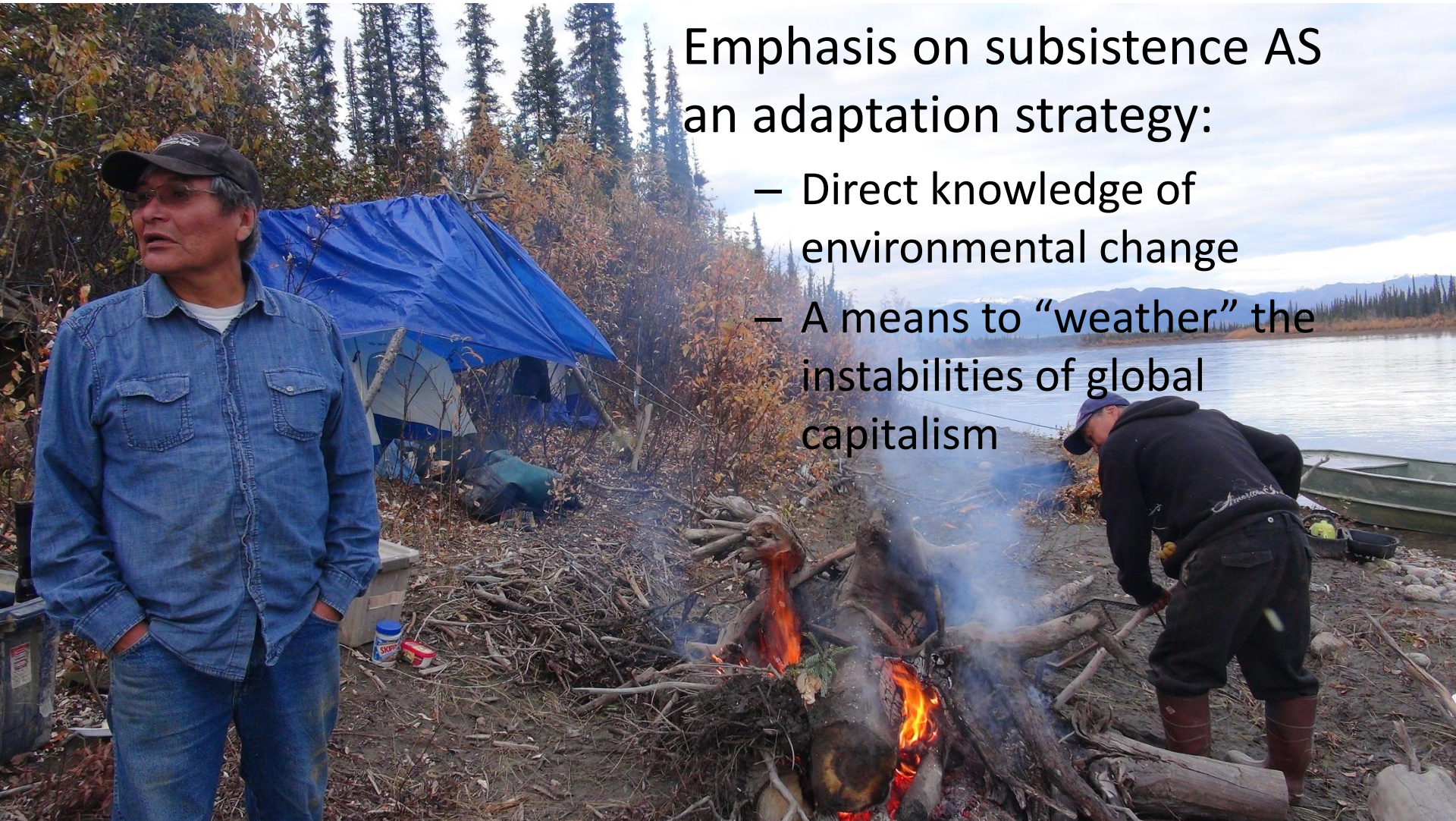
Allakaket and Alatna

- Criticism against welfare programs across the subsistence community—it is needed, but maybe wrong kind of assistance
 - Interviews in Allakaket indicate that Both robins and people changing what they do, so imp't to pay attention to incentives to economic behavior
- Yet continuities: trapping is returning as an economic activity across the region, spurred on by Asian markets

Allakaket and Alatna

Emphasis on subsistence AS
an adaptation strategy:

- Direct knowledge of environmental change
- A means to “weather” the instabilities of global capitalism



Preliminary Conclusions

- Envir scientists suggest that boreal ecosystems changing at twice the rate of other ecosystems (Chapin et al 2010)
- One way to adapt as individual communities is to reinforce their connections across the entire Koyukon territory—and across generations
- Transportation technologies are adopted to maintain relationships with nonhumans, not decimate animal populations—achieving food security is about sustaining those populations that feed them
- The subsistence economy is not isolated from global capitalism, and can be managed together
- Small-scale capitalist endeavors are flourishing in some communities as an adaptation strategy
- Flexibility at the local level for harvest is key for adaptation strategies (McNeeley and Schultski 2010)
- Need coordinated wildlife management, more place-based rather than species-based
- TEK is about innovation and wisdom, not just “tradition” or facts about things—and can inform NEW research questions and approaches to data—to adapt to changing social-ecological system

A large set of deer antlers, likely from a buck, lies on the ground in a grassy field. The antlers are light-colored with a textured, ridged surface. They are positioned horizontally, with the base on the left and the tips pointing towards the right. The surrounding vegetation includes tall green grass and some dry, brownish stalks. The word "Questions?" is overlaid in white text on the left side of the antlers.

Questions?