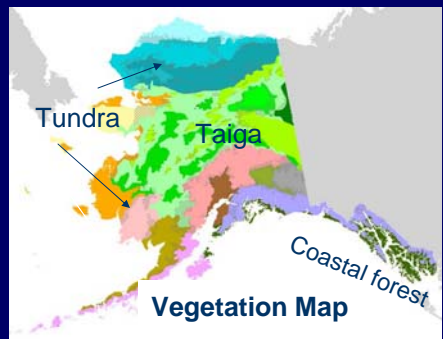


Including the Human Dimension in the BNZ LTER: Towards Regional ISSE Research



Gary Kofinas
University of Alaska Fairbanks
6-23-07

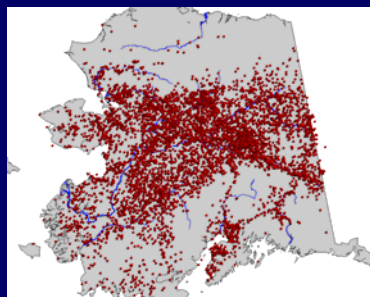


Ecological and social dimensions of Alaska historically have been tightly coupled

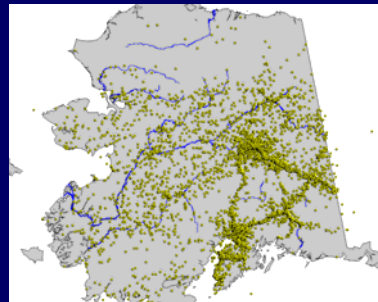
Today indigenous peoples as well as many other Alaskan's of the interior have a close relationship with land and animals. This provides BNZ LTER an opportunity for integrated long-term social-ecological research



Humans are part of the Alaskan Landscape



Lightning-caused Fires
1956-2000

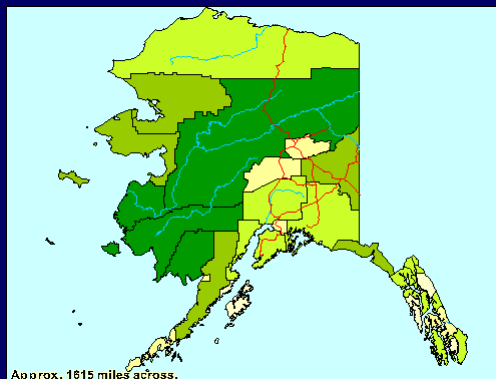
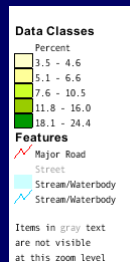


Human-caused Fires
1956-2000

Rural communities now fixed in place by infrastructure

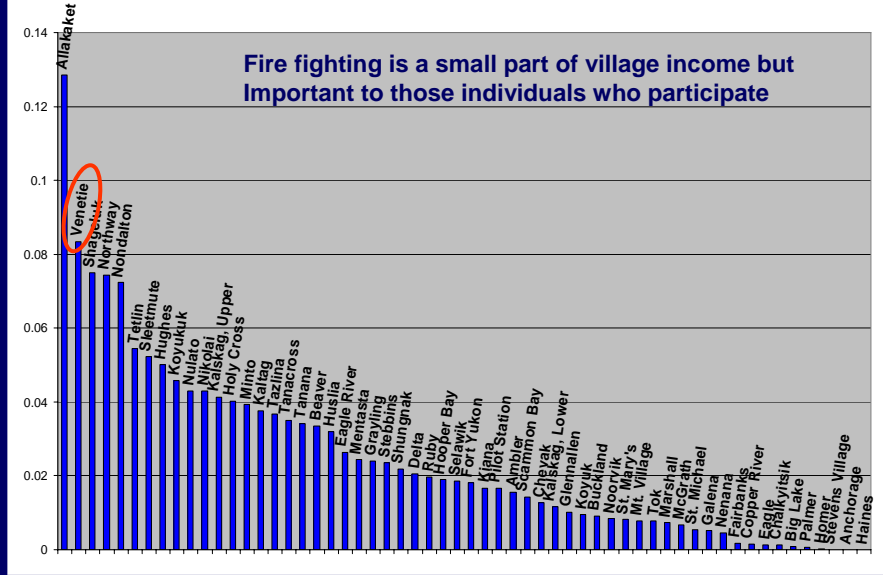


Percent of Families Below the Poverty Level in 1999: 2000

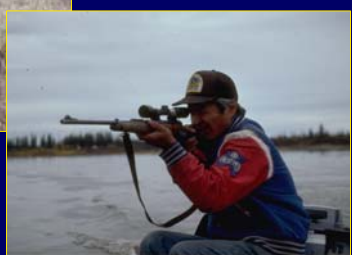


U.S. Census, TM-P069.

Median EFF Wages 1995-2004 as Percent of Total Village Income (2000 Census)



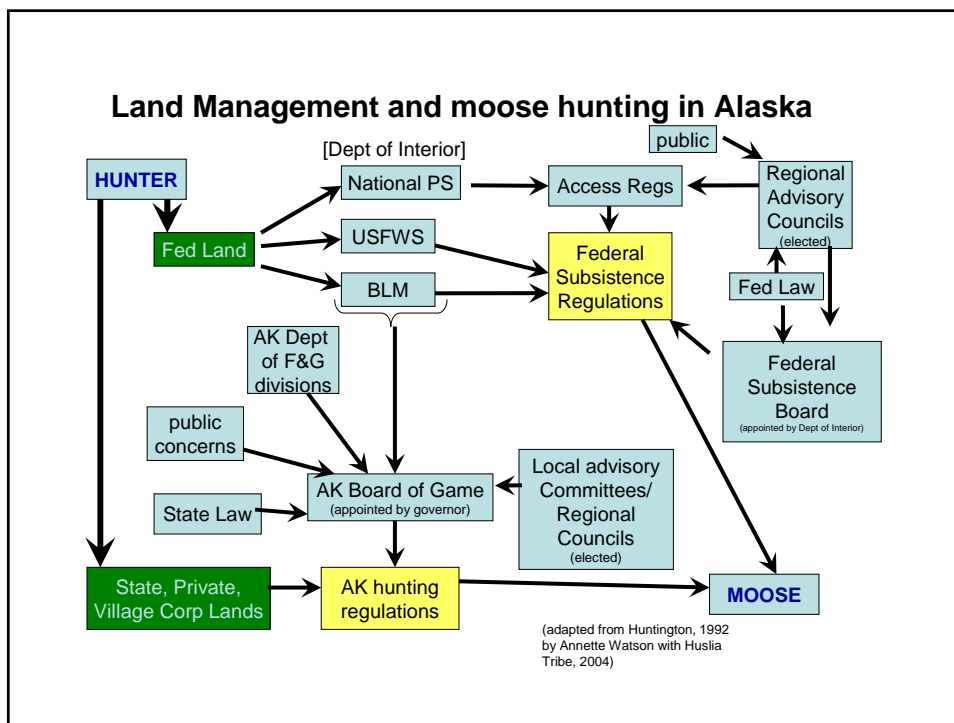
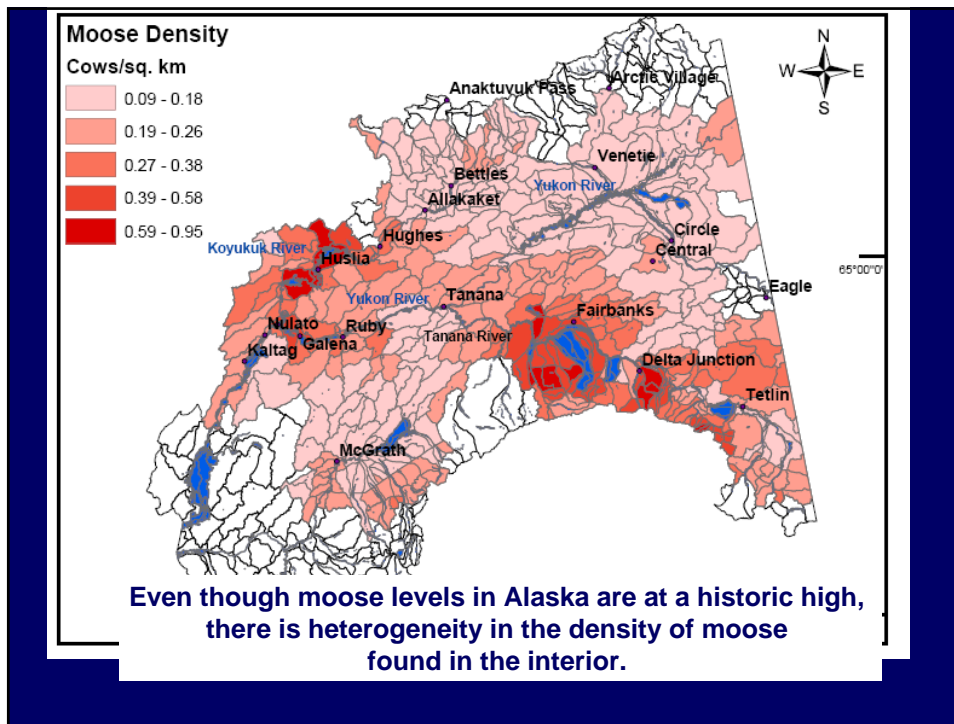
Human-Moose System of Interior Alaska

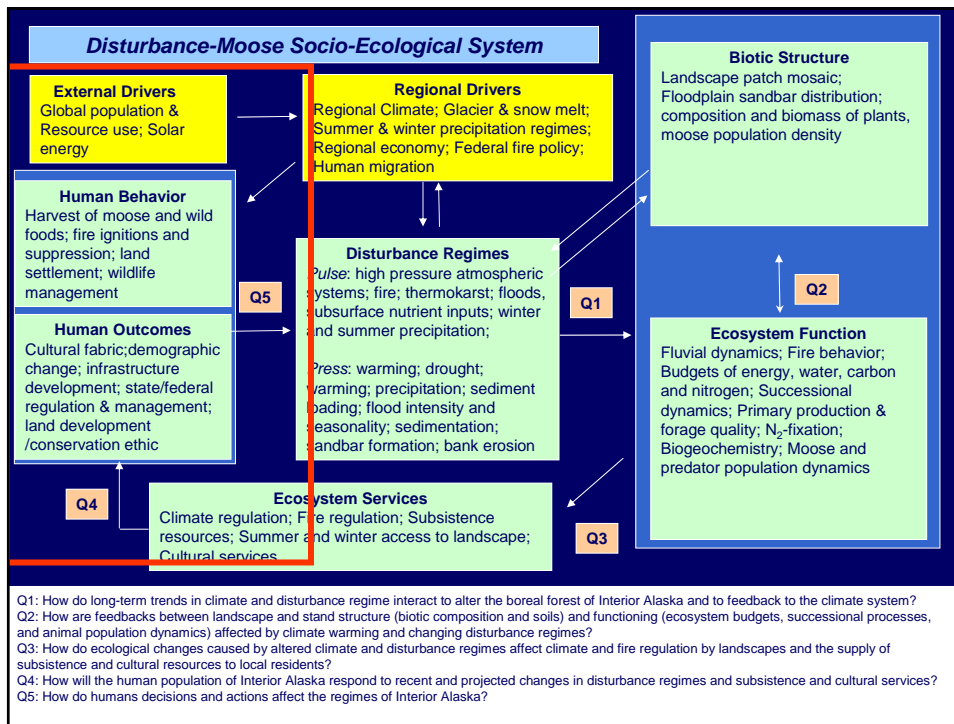


Subsistence harvesting

Sport, recreational, guided hunting

We begin the process of social-ecological integration by focusing on Human-Moose Systems





Q3: How do ecological changes caused by altered climate and disturbance regimes affect climate and fire regulation by landscapes and the supply of subsistence and cultural resources to local residents?

Q4: How will the human population of Interior Alaska respond to recent and projected changes in disturbance regimes and subsistence and cultural services?

Q5: How do humans decisions and actions affect the regimes of Interior Alaska?

Doing research with Native communities of Alaska requires special considerations because of differences in worldview between science and local culture and past conflicts and mistrust



- How do local residents perceive changes in ecosystem services related to moose?
- What are the implications of those changes to ecosystem services?
- How have people responded to those changes; how might they respond?
- How can modeling inform our understanding of interior Alaska as a social-ecological system?
- What are the possible synergies for collaborative research among LTER researchers, agency managers, and rural residents with an interest in human-moose sustainability?

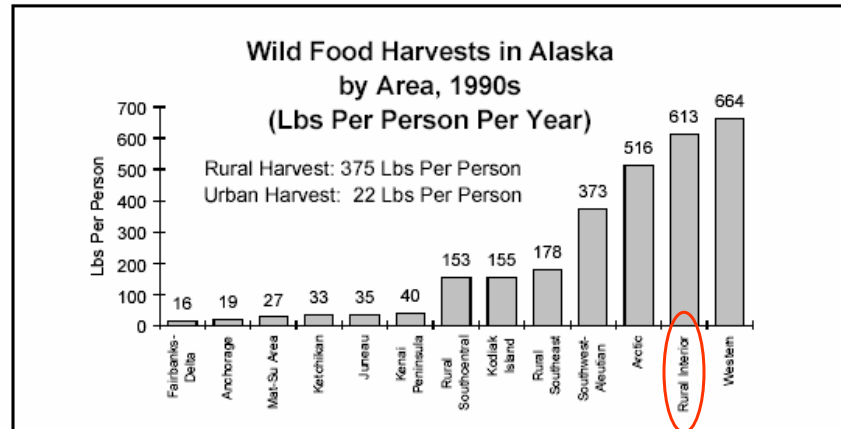
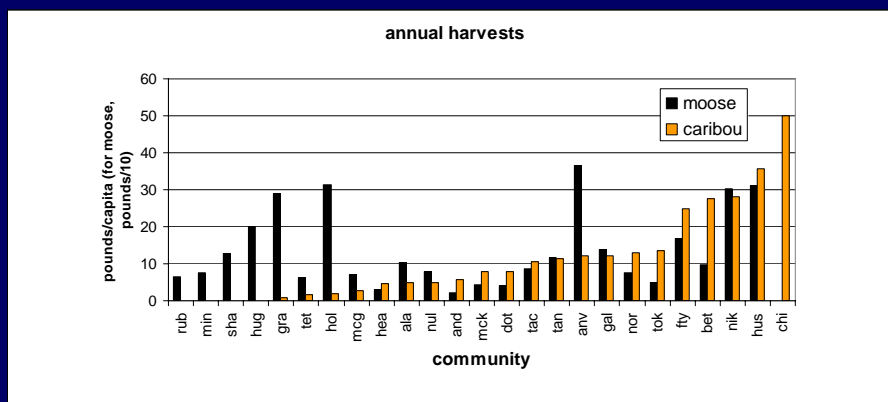
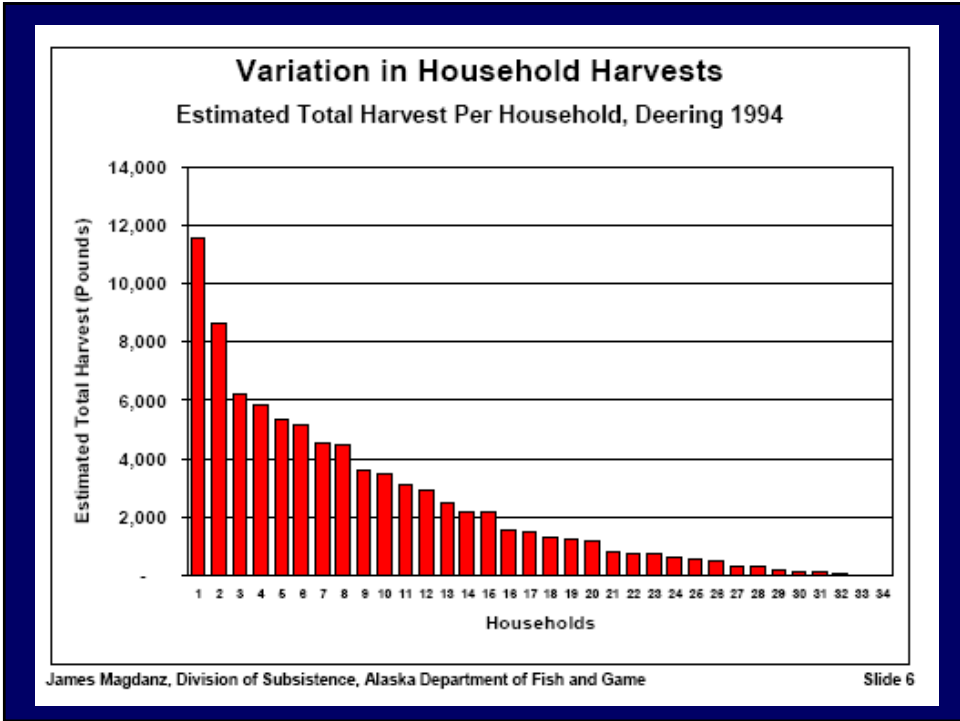


Figure 5

Source: ADFG Div of Subsistence

Communities differ in moose/caribou dependence



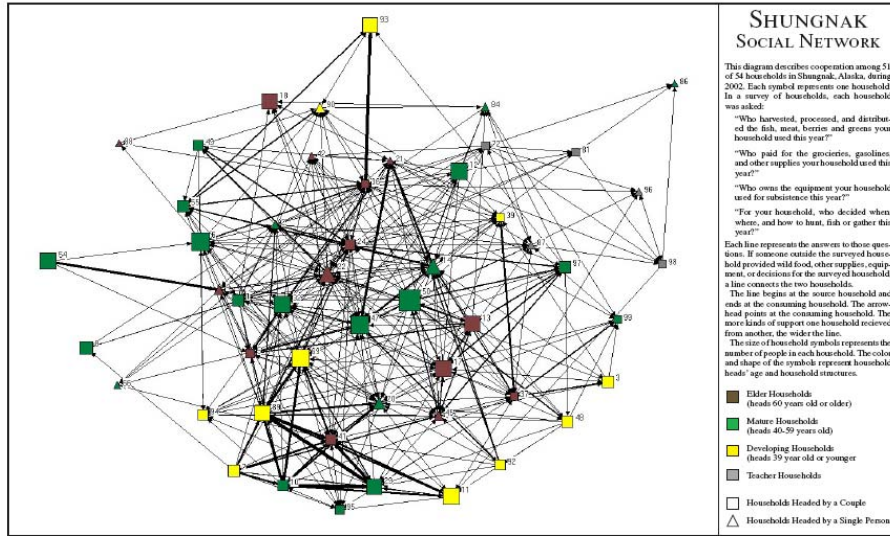


Moose harvest in interior Alaska villages (2002)

community	% using	% hunting	% harvesting	% sharing	% receiving	Mean lbs/hh
Alatna	67	67	50	83	6	180
Allakaket	80	60	24	60	20	73
Anvik	57	57	32	29	17	104
Bettles/ Evansville	8		31	89		
Galena	55	40	31	60	45	873
Grayling	59	43	51	76	32	100
Holy Cross	75	59	39	44	46	138
Huslia	68	53	29	68	63	62
Kaltag	57	43	43	78	28	90
Ruby city	64	40	20	54	20	82
Shageluk	61	55	35	58	24	134
Tanana	72	39	36	86	53	156

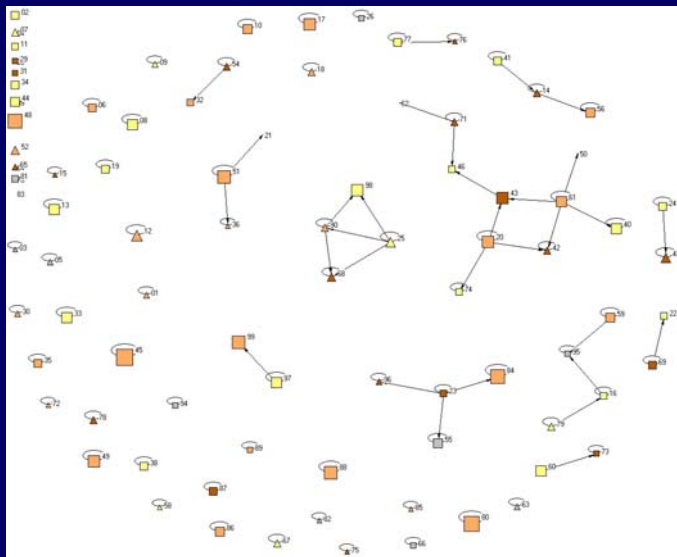
Source: ADFG Div of Subsistence

SHARING OF WILD HARVESTS



Courtesy of James Magdanz, ADFG

SHARING OF CASH



Courtesy of James Magdanz, ADFG

Community-based monitoring

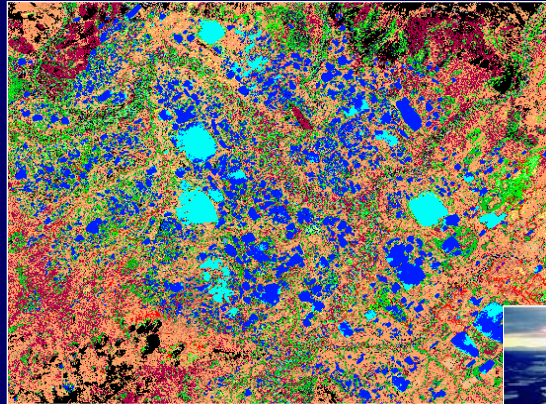
- Unusual Observations
- Long-Term Trends
- Local scale
- Emergent patterns
- Implications of change
- Rules of Thumb
- Adaptive Processes
- Social construction of change



Kofinas et al 2002

Topics Covered through Community-based Monitoring Program

<ul style="list-style-type: none"> ◆ Local Experts <ul style="list-style-type: none"> ▪ Age categories ▪ Time on the Land ▪ Language Use ▪ Lifetime and annual area travelled 	<ul style="list-style-type: none"> ◆ Caribou <ul style="list-style-type: none"> ▪ Migration and movement patterns ▪ Availability to communities and meeting needs ▪ Body condition (seasonally) ▪ Unusual observations ▪ Sightings of groups - locations and timing ▪ Calves and calving conditions ▪ Observations of predation and disease
<ul style="list-style-type: none"> ◆ Comments on the Co-op <ul style="list-style-type: none"> ▪ Suggestions for the program, for questions ▪ Information needs ▪ Evaluation 	<ul style="list-style-type: none"> ◆ Other animals <ul style="list-style-type: none"> ▪ Hares, lynx, bears, wolves, wolverine, moose, muskoxen, ground squirrels, muskrats, marine mammals, waterfowl, other birds, insects ▪ Trapping and furbearers: reasons why trapping is good/bad, fur quality, furbearer numbers ▪ Other observations on animals
<ul style="list-style-type: none"> ◆ Weather, General Environment <ul style="list-style-type: none"> ▪ Unusual weather ▪ Conditions at different times of the year ▪ Freeze-up and break-up timing and conditions ▪ Effect of weather on animals and on people getting out on land ▪ Changes in plants ▪ Permafrost changes 	<ul style="list-style-type: none"> ◆ Observations <ul style="list-style-type: none"> ▪ Culture change ▪ Hunting and fishing ▪ Employment and economy ▪ Environment (in general) ▪ General observations ▪ Levels of different types of human activities and impacts on environment
<ul style="list-style-type: none"> ◆ Berries <ul style="list-style-type: none"> ▪ Meeting needs for berries ▪ Quality, amounts, what affected berry crops 	
<ul style="list-style-type: none"> ◆ Fish <ul style="list-style-type: none"> ▪ Important species ▪ Fish quality, including livers, parasites ▪ Fish runs: numbers, timing ▪ Meeting needs for fish 	



Local observations of lake drying in 1995 by Vuntut Gwitchin prompted analysis using satellite images that confirmed and quantified drying.

Crow Flat, Vuntut National Park, Yukon

Arctic Borderlands Ecological Knowledge Co-op

Unusual Weather and How Weather Affected Getting Out on the Land: 1996-97 to 2001-02

This poster summarizes the responses to questions about unusual weather and about how the weather affects people getting out on the land. The questions were asked during interviews done in the winter by local interviewers, with people who were active on the land during the year.

Each year, the information was brought to the community for the local inquiry and presentation of findings. Over the winter the information was brought to the following interviewers: Dorcasland, Co-op staff, and interviewers: Carol Arny, Christine Haines, Cathy Peterson, John Tatham, Geneva Tatham, Myra Hartyon, Ellen Shale, Susanna Moore, Donald Gordon, Norman Greenwood, Stuart O'Connell, Steve G. Gordon, Susan Hines, Vicky Lane, Margaret Ross, Nancy Young, Pamela Tatham, and Dr. Tom Lee, Wildlife and Culture Specialist.

How many people find that the weather makes it hard to get out on the land (percent of all who were asked)

What Questions were Asked?

1996-97 to 1998-99: How many people find that the weather makes it hard to get out on the land? What are the weather conditions that make it hard to get out on the land? How do you feel about the weather? How do you feel about the weather conditions that make it hard to get out on the land?

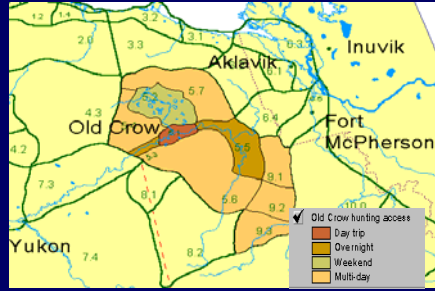
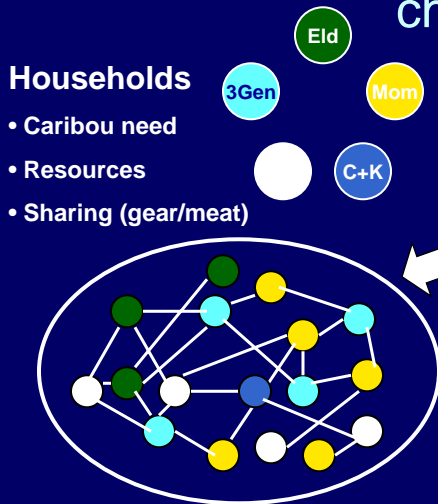
2000-01 and 2001-02: How many people find that the weather makes it hard to get out on the land? What are the weather conditions that make it hard to get out on the land? How do you feel about the weather? How do you feel about the weather conditions that make it hard to get out on the land?

	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02
Alaska, Inuvialuit
Arctic Village	---	---	---	---	---	---
Fort McPherson
Iskutuk	---	---	---	---	---	---
Old Crow

DRAFT DEC/02

Communication of results from community monitoring is critical

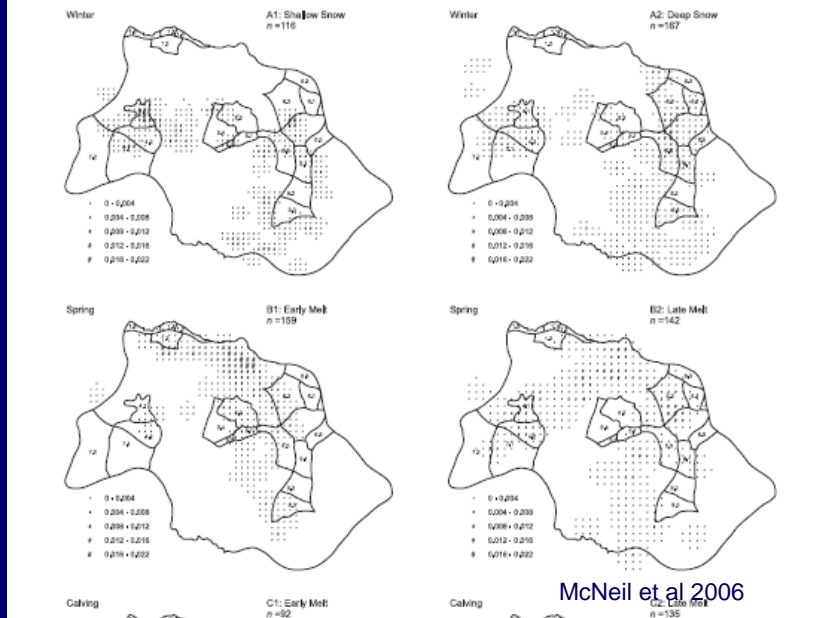
Agent based modeling of caribou hunting to study conditions of climate change



Geographic hunting zones

- Effort for a trip in each season
- Caribou availability

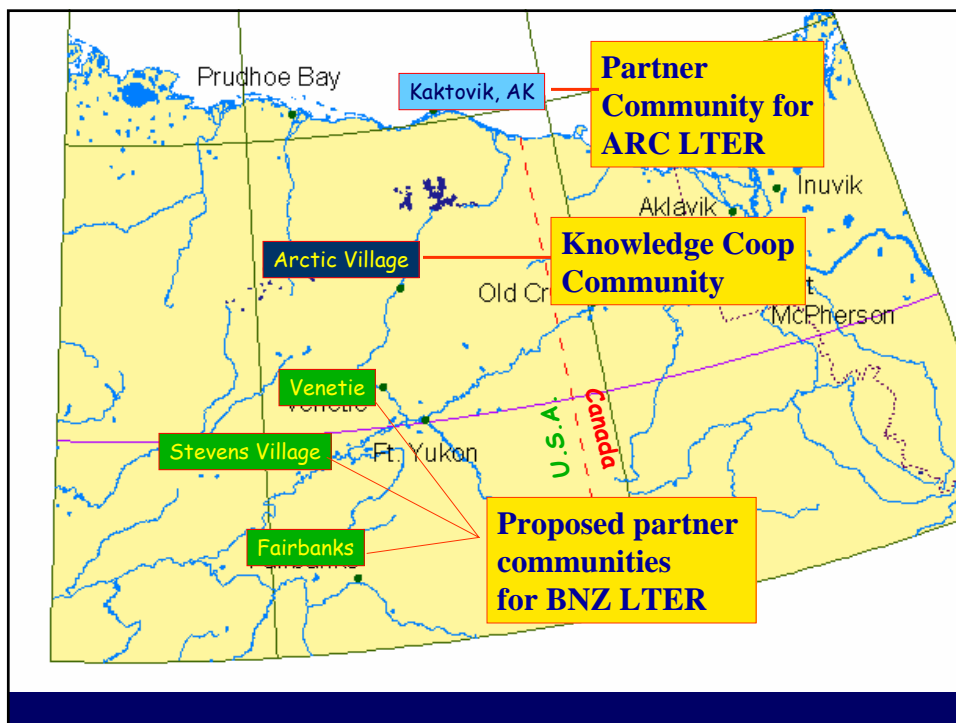
i.e. complex adaptive system (agent-based approach)



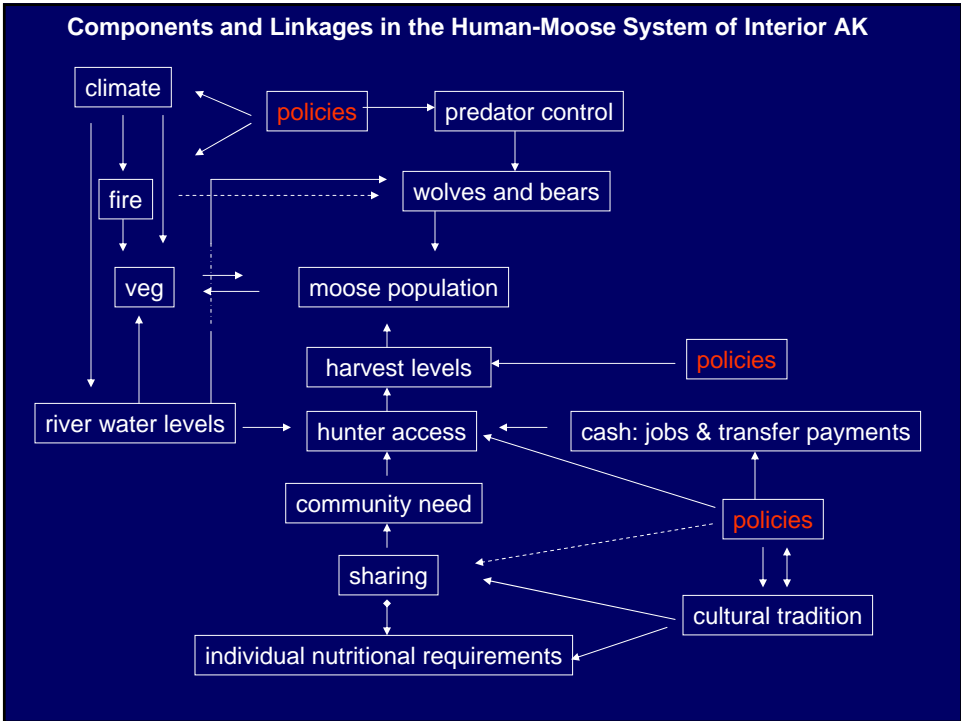
Modeling changes in caribou distributions and community availability

Our steps forward (the recent supplement)

- Build new partnerships with communities and agencies
- Compile data; gather new data
- Develop as an interdisciplinary research team
- Rapidly prototype SES models
- Begin testing relationships
- Explore opportunities for cross-site comparative studies



Community	Fairbanks	Stevens Village	Venetie
Latitude	64	66	67
Population	82,000	87	202
Median HH income	\$40,577	\$12,500 (60% of families below the poverty line)	\$21,000 (10.5% of families below the poverty line)
Ethnicity and race	67% White, 11 Black 10% Native American	95% Athabascan; 3.5% white; and other	92% Athabascan; 3.8% White; and other
Dependence	sport/ subsistence	subsistence	subsistence





Use of models as discussion tools with decision makers...

Looking ahead

- Rethinking of scale
- Including social-ecological interdependencies
- Seeking out value-added opportunities
- Cross-site comparative work (e.g., Arctic, Baltimore, Phoenix, North Temperate Lakes)
- Examining SES thresholds and limits to human adaptation
- Identifying disproportional impacts
- Societal relevance as a strategy for sustaining the LTER