

# “I’m always watching...”: Local Observations of Change by Subsistence Harvesters in Emmonak, Alaska

drying pike, 2009



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Good afternoon, my name is Nikki Braem. I am a researcher working for the State of Alaska, Department of Fish and Game. I’ll be presenting findings from research conducted between 2009-2011 in a small Yupik community located on the Yukon River near the Bering Sea coast .

Many researchers observed that northern indigenous peoples have always lived with a high degree of environmental variability and as a result, the capacity to change is an important part of their cultures. Indeed, many of our respondents impressed upon us that change itself isn’t remarkable, but rather is the only constant.

The quote in the title comes from a local spear maker, describing the process by which he modifies his designs. He said, “I’m always watching...and some of the things that they do, I change around a little bit...they got to have certain lift of the spear but I change that...now I have my own measurement.”

He refers to the nuances of spear construction, but also suggests a level of attention **to** or watchfulness **of** his entire environment.

# The BEST-BSIERP project

- Bering Ecosystem Study (BEST)
- Bering Sea Integrated Ecosystem Research Program (BSIERP)
- 2007-2012: Multi-disciplinary study of the implications of climate change for the Eastern Bering Sea
- Human communities included as part of the ecosystem subject to environmental change



This information was collected as part of the BEST-BSIERP project, which engaged over 100 scientists in field research and ecosystem modeling to explore climate change effects in the Bering Sea, including all trophic levels from the benthos to people.

Climate change and reduced ice cover could significantly impact the Bering Sea ecosystem, a diverse, biologically rich one that sustains commercial fishing industries and ocean-based subsistence economies.

5 Bering Sea communities were part of the project: Savoonga, Emmonak, St. Paul, Togiak, and Akutan. What follows are findings from research conducted in the community of Emmonak.

BEST-BSIERP Bering Sea Project

bsierp.nprb.org

# Subsistence and LTK

(Local and traditional knowledge)

Study objectives:

1. Document, characterize and quantify local harvest practices
2. Document and characterize local understanding of Bering Sea ecosystem structure and function
3. Integrate the results across communities
4. Incorporate the results of (1), (2) and (3) into ecosystem models and other syntheses developed through BSIERP

This research had four primary objectives listed here.

Humans are an important part of the Bering Sea ecosystem; this research documented subsistence harvests and “local and traditional knowledge” (LTK) as a part of understanding the entire system.

In Alaska, “subsistence” refers to the customary and traditional hunting, fishing, and gathering of wild foods. It also has profound cultural and spiritual implications. For thousands of years, communities of Alaska Natives (the indigenous peoples of Alaska) have depended upon the natural resources of the Bering Sea. Their survival is linked directly to the availability of fish and wildlife, effective harvest technologies, and detailed environmental knowledge accumulated across generations and applied through direct experience. In the early 21<sup>st</sup> century, these communities’ ways of life are based on a mixed subsistence/cash economy.

## About Emmonak

- Located on north bank of Kwiguk Pass, Yukon River (~10 miles upstream from Bering Sea coast)
- Estimated population of 792 (98% Alaska Native, predominately Yup'ik)
- Mixed subsistence-cash economy
- Subsistence cycle patterned towards salmon, supplemented with other species – marine mammals, birds, plants, etc.

Here's a bit of information about Emmonak itself:

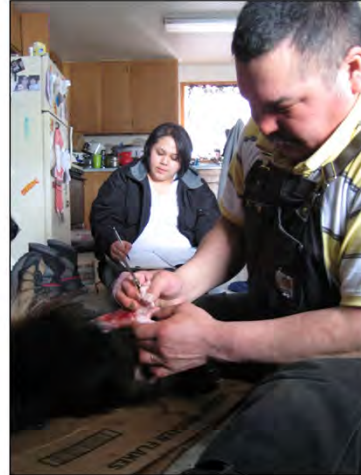
In Yupik referred to as the “Kwipakmiut”, or “people of the big river”, Emmonak people in the past moved seasonally to take advantage of subsistence resources. Today, Emmonak is a sedentary and relatively large Alaska Native community with access to both terrestrial and marine resources. The subsistence cycle is patterned around the harvest of salmon and non-salmon fishes supplemented by various marine mammal, land mammal, and migratory bird species, along with various plants and berries. People in Emmonak have always lived with a high degree of environmental variability -- adaptation is a part of Yup'ik culture.

Emmonak's economy is grounded in subsistence resources but also dependent on a market economy. Wages earned in jobs are used to purchase store-bought food and reinvested in subsistence activities, such as buying gas, boats, nets, and guns. Until recently, the major source of cash income was commercial fishing for salmon, Chinook salmon in particular.



## Methods

- Household survey in April 2009
- 61% random sample, 109 of 179 households surveyed
- Comprehensive - all species



- Ethnographic interviews in September 2010, April 2011
- Ages 55-82
- Active marine mammal hunters and fishermen
- 11 men and 2 women

To document Emmonak peoples' role in the larger ecosystem, we quantified subsistence harvests through a comprehensive harvest survey that asked about harvest and use, and sharing and distribution of over 100 subsistence resources. We also mapped harvest areas.

We collected qualitative data through ethnographic interviews using a semi-structured interview protocol based.



# Responding to change

Coping mechanisms: short-term responses, usually on individual or household level



Adaptive strategies: longer term modification of local patterns, usually on community or regional level

Place specific analyses are critical to understanding human adaptation to climate change, as many of the important lessons of these changes will unfold on the regional and local levels where hunters and harvesters interact with their landscape.

In analyzing Emmonak residents' observations of and reactions to environmental change, we follow Berkes and Jolly's distinction between coping mechanisms and adaptive strategies. Briefly, coping mechanisms are short-term responses to situations that threaten livelihoods; they often take the form of emergency responses to unusual seasons or years. In contrast, adaptive strategies are the ways in which individuals and communities actually change their productive activities or modify local patterns to secure their livelihoods.

The difference between the two can often be measured along both a temporal scale and a spatial scale, which we will explore in the following two examples looking at seal hunting and salmon fishing.



## Observed changes, Emmonak



\* Species availability

\* Seasonality/  
predictability

\* Landscape

\* Weather

There are 4 major categories in which changes observed by Emmonak residents manifest:

### **The first is species availability:**

- Whitefish species are less abundant
- Chinook salmon in particular are less abundant, and smaller
- However, Moose are much more abundant near Emmonak than decades ago

### **In terms of Seasonality/predictability:**

- Natural indicators used to predict species abundance or arrival are less patterned with observed natural changes such as the arrival of birds, snow levels, seasonal wind direction and intensity

### **Landscape**

- River ice used to be about 2 to 2 ½ meters thick, now it is half that; sea ice is also thinner and residents say they see fewer icebergs, referring to multi-year ice
- Breakup is less severe, faster and comes earlier.
- As a result, the timing of qamigar, or when they go to the coast to hunt seals at open leads in the ice, is changing
- Finally, temperatures in the Yukon River and ocean have become warmer

### **Weather**

- Winters are warmer overall, with less intense cold and less snow
- River freezeup comes later
- Summers are stormier with more rain, but it is unclear as yet if these are consecutive abnormal seasons or indicative of long-term changes



## Case study 1: seal hunting in Emmonak



A comparison of results from harvest studies conducted in 1981 and 2009 in Emmonak suggest some interesting shifts in patterns of the harvest and use of seals. We see marked differences in species harvested, harvest timing or seasonality, and harvest location.

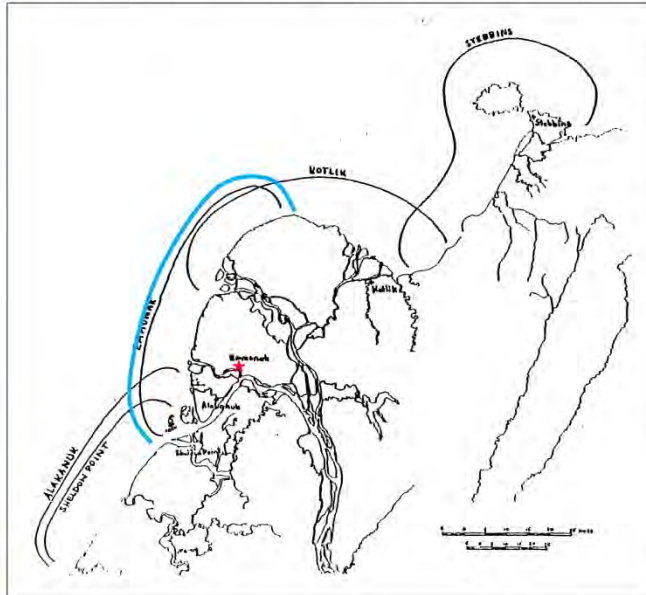
During the twelve month period between June 1980 and May 1981, ringed seals were the largest portion of the community's total seal harvest by edible weight. Households harvested an estimated 9 kilograms of ringed seal per person compared to an estimated 5 kg of bearded seal and spotted seal per person. Nearly half of the households reported harvesting ringed seal, compared to only about 20% of households harvesting bearded seals.

Taken as a category, marine mammals made up 15% (by edible weight) of the community's total subsistence harvest;





## Emmonak fall seal hunting, 1981



Intensive sealing occurred from late August until October (prior to freeze up.)

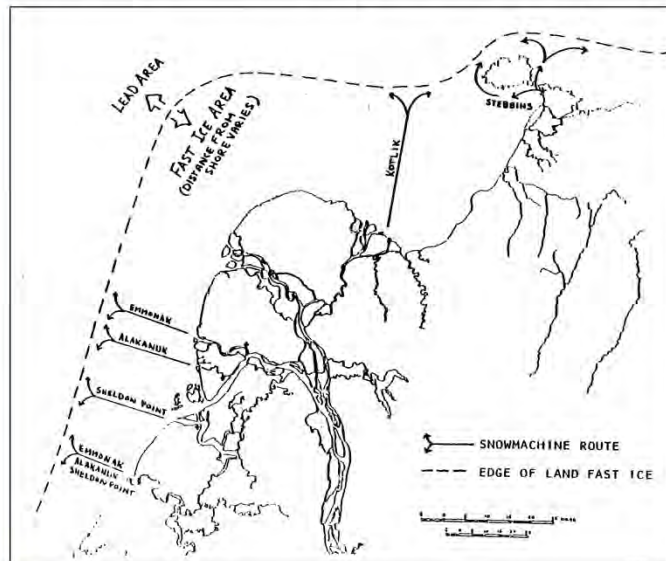
"In the hunting areas of south pass villages, the species taken most commonly during the fall were spotted seals, which at times migrated in large groups along the coast, and adolescent bearded seals."

Source: Wolfe 1981.

In the 1980-81 harvest year, Emmonak hunters harvested spotted seals in the fall; the seals migrated in large numbers near the coast, along with juvenile bearded seals.

This map shows the fall seal hunting areas used by several coastal Kwipakmiut communities, including Emmonak; the bright blue line traces the boundary of the Emmonak area.

## Emmonak spring seal hunting, 1981



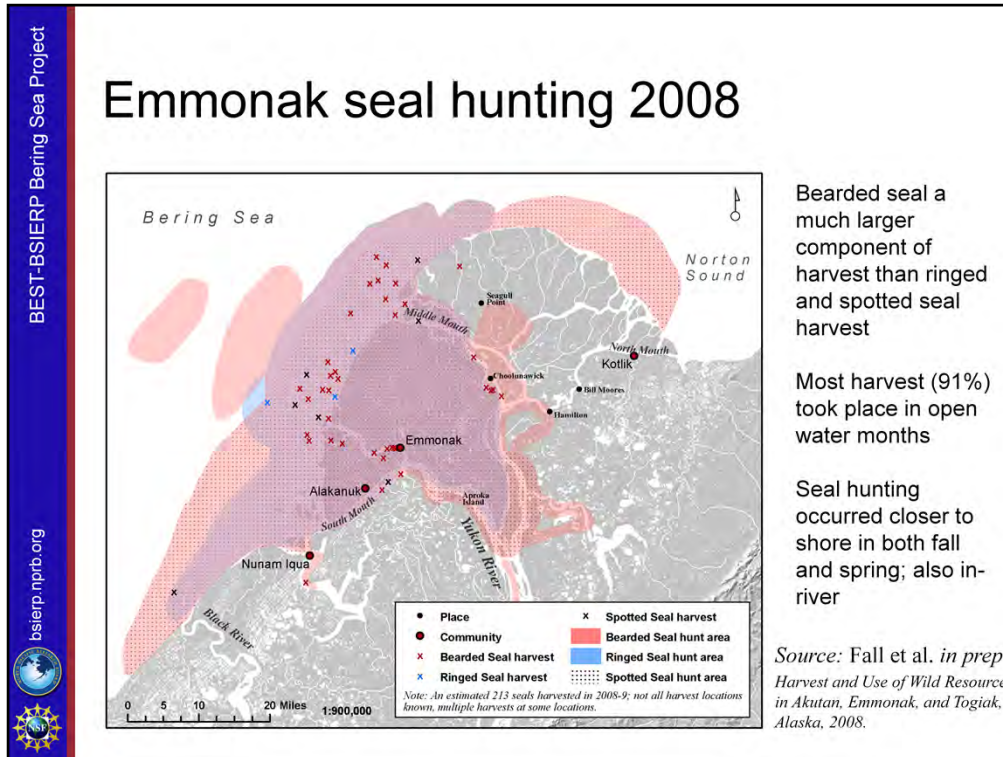
Typically, small parties of hunters would travel by snowmachine directly out from the village until they came upon the lead area.

"Hunting frequently occurred 20 to 30 miles from shore, and sometimes farther."

Source: Wolfe 1981.

Spring seal hunting typically began in March and April at the edge of the land fast (also called shorefast) ice where open water could be found, although it might begin as early as January and February.

Ringed and bearded seals frequented lead areas through the late fall, winter and spring; severe weather and ice conditions often precluded hunting trips until late winter or spring.



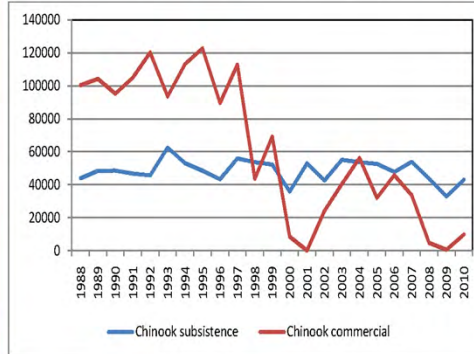
Nearly three decades later, in 2008, we saw changes in the composition of harvest, as well as in the timing and location:

- Marine mammal harvests became a smaller % of the total subsistence harvest , decreasing from 15% in 1980 to 11%
- Bearded seal were a much larger portion of the marine mammal harvest -- double the amount in the 1981 study
- As such, many more households reported harvests of bearded seal (compared to 22% in 1980)
- Households harvested much less ringed seal and only 10% of households harvested them (compared to 44% of HHs in 1980)
- Spotted seal harvest declined from about 5 kg in 1980 to just over 1 kilo per person in 2008.
- Nearly all of the 2008 seal harvest (91%) occurred during open water times of the year, in river or near shore, rather than at leads accessed from shorefast ice. In 1980 hunters sometimes went out as far as 64 kilometers in the spring to get to open leads, while in 2008 hunters reported generally going out only about 16-26 kilometers.

Clearly, seal harvesting over the last 30 years+ has shifted in terms of harvest composition, seasonality, and location likely in response to several factors, such as changes in ice formation and species availability, technological changes in travel, and economic factors like fuel prices,... all of which, in turn, affect local experiential knowledge.

## Case study 2: Yukon River salmon

Chinook salmon  
subsistence and commercial harvests,  
Yukon River, 1988 - 2010



A second example of change I'd like to talk about involves Yukon River Chinook salmon.

Salmon, especially Chinook salmon, are harvested for both subsistence use and for commercial sale. Though inter-annual variation exists, subsistence salmon harvests of Chinook have been relatively stable, averaging around 2,000 fish by fishermen per year.

In the 1980s, commercial salmon harvests provided the largest and most consistent source of cash income in the lower river. In 1980, the commercial harvest of Chinook salmon was just over 140,000 fish valued at approximately \$3.3 million dollars, or an average of about \$5,000 per fisherman. As I mentioned earlier, much of this income would have been reinvested in the subsistence economy.

## Pressures on salmon harvests



- Changes in weather
- Natural indicators less reliable
- Declining salmon runs
- Loss of commercial opportunities
- Complex regulations

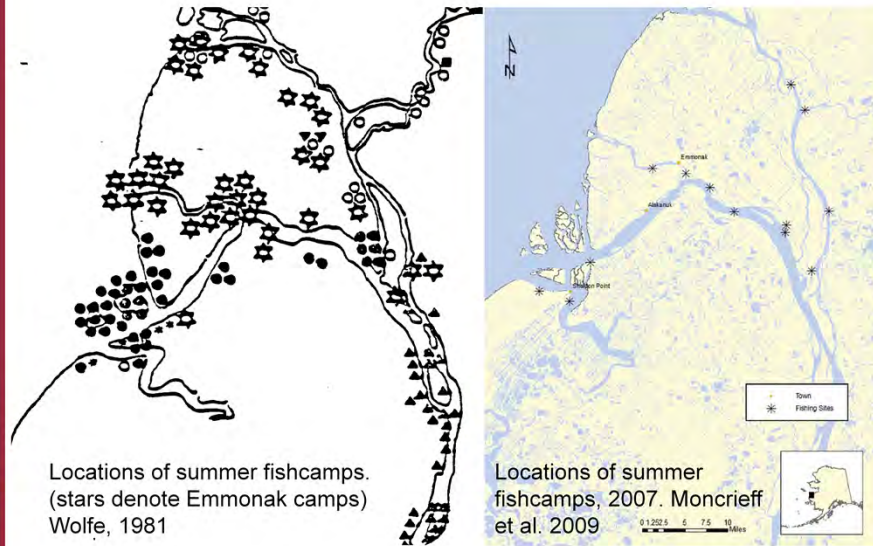
Lower river residents, including those in Emmonak, have been experiencing dual pressures on their traditional salmon harvesting practices.

The first [are local observations about], changes in the weather, have implications for several aspects of subsistence fishing. First, rainier summers interfere with optimal drying times, a main form of preserving salmon for winter storage. Emmonak residents also use natural indicators to predict salmon run timing and abundance; in fact, there's a poster that looks at these indicators in more detail. However, observed changes in weather patterns have decreased the reliability and predictive capacity of natural indicators.

The second pressure is the declining Chinook salmon runs returning to the Yukon River over the last decade. While the reasons for these declines are not fully understood, the impacts are great. Commercial harvests of over 100,000 Chinook salmon were common in the 1980s and early 1990s, which declined steadily until the last several years, when managers closed the commercial Chinook fishery. Commercial fishing income has come largely from harvests of summer chum salmon, a much less economically valued fish. Increasingly complex regulations to protect the runs have also put additional pressure on subsistence harvesting, with subsistence openings not always occurring during optimal processing times.



## Adaptive strategies and their implications



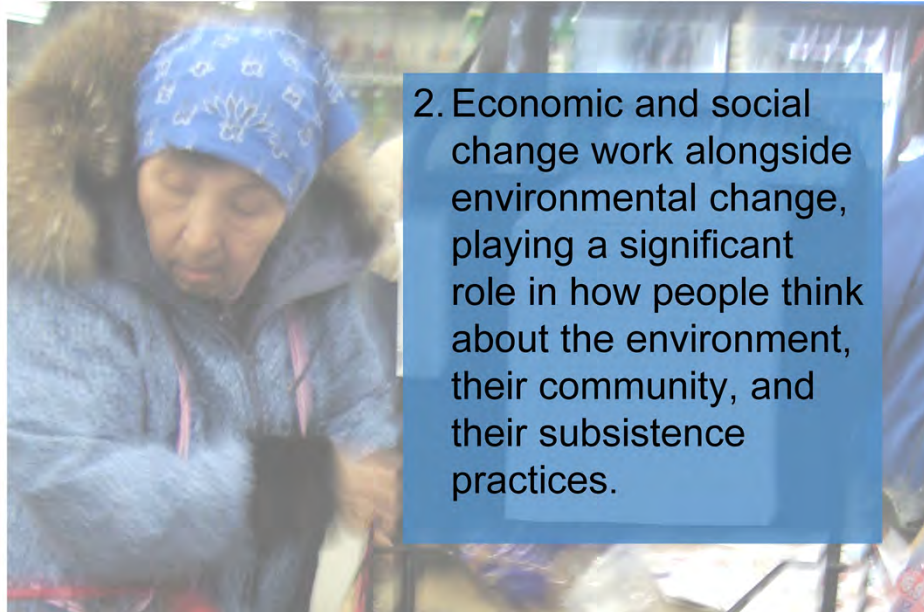
On the cusp of a disappearing commercial Chinook harvest, it is unclear how Emmonak residents will adapt over time.

In the short term, they may compensate for commercial losses by targeting other species – summer chum, lamprey, Bering cisco. Emmonak residents also have increased their use of wood for home heating to save money on heating oil.

However some long-term adaptive shifts can be seen: Changes in fish camp residence patterns have been occurring for a while now. Over time, the structure of commercial and subsistence openings as short bursts of activity have discouraged seasonal residence at fish camp. Increasing regulations and restrictions, along with economic factors such as increasing gas prices and employment opportunities, have further discouraged longer-term stays at fish camp. For many, commercial fishing income funds fish camp and other seasonal subsistence camps; without this input, summer fish camp becomes less of a possibility for many families. Declining camp residence has implications for the generational transmission of knowledge and time spent out on the land necessary for successful subsistence activities. Regulations, though important for conservation and allocative purposes, can also constrain fishermen's ability to accommodate short-term weather events or longer-term climactic shifts.

In sum, the declining Chinook salmon runs require the community to respond to more than just a decrease in an important food resource. Because salmon is the basis for an integrated subsistence and commercial economy, the effects of a declining salmon run cascade throughout the rest of Emmonak's subsistence activities, both in terms of harvesting and distribution of food and resources.

# The Context of Change



The short-term and longer-term responses we talked about earlier regarding shifts in seal hunting practices and the challenges facing salmon fishing in Emmonak come in part from environmental shifts, but also from social and economic factors that ultimately play a significant role in how people think about the environment and their subsistence practices.

However, the way they understand change and adaptation refocuses the question of change to understanding more holistically how the effects of various shifts filter through the entire system, influencing daily and longer term decisions from spending money on gas, to hunting seals on a particular day.....to altering residence patterns when families choose to catch and process fish from town instead of camp.

The different scales on which people respond to change demonstrate that environmental, social, and economic shifts are not discrete from one another, as one of our plenary speakers talked about yesterday. They often work in concert to amplify effects. One cannot really understand the true extent of climate change effects without locating them within a broader context of change.



# Questions?

Our thanks to the people of Emmonak and the Emmonak Tribal Council

Robbin La Vine, Seth Wilson and James Van Lanen

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