

ALASKA NATIVE SCIENCE COMMISSION



**YUKON-KUSKOKWIM ALASKA
REGIONAL MEETING
REPORT**

Front Cover: Yupik Eskimo Artist Weaving Traditional Coiled Grass Basket. Photo Credit © Alaska Division of Tourism.

YUKON-KUSKOKWIM ALASKA REGIONAL MEETING

A report of the Alaska Native Science Commission



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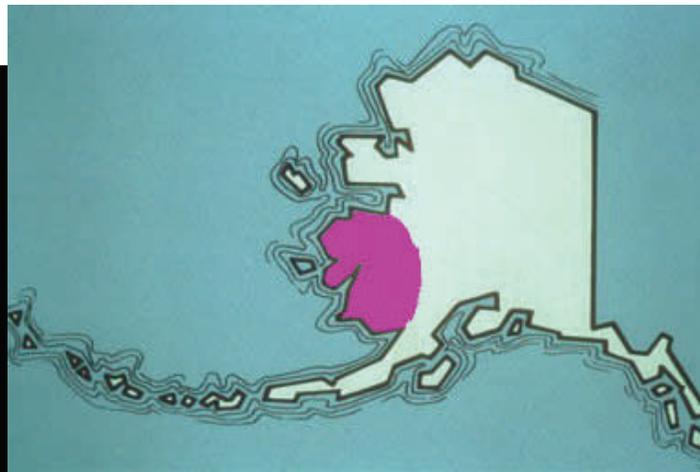
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EXECUTIVE SUMMARY

On March 11 - 12, 2004 the Alaska Native Science Commission (ANSC), funded by a grant from the National Science Foundation (NSF), gathered approximately 30 individuals to discuss opportunities, interests, and concerns for developing community research priorities in the Yukon-Kuskokwim region of Alaska. These participants included: Native leaders, Elders, hunters and young people from many communities in the Yukon-Kuskokwim region; Yukon-Kuskokwim regional Native organizations; the University of Alaska; NSF staff; and ANSC board members and staff. This was the fourth meeting in a series conducted by the ANSC to develop future research projects and to find out the Native communities' priorities for research of interest to communities and regional organizations.

This report summarizes key concerns and research ideas for the Yukon-Kuskokwim Region of Alaska. Quotes from participants in the talking circle are organized by the topics: climate, community, development/industry, education, environment, health, language, and traditional knowledge and Western science. Participants also provided recommendations for action and collaboration in the Yukon-Kuskokwim Alaska region.



The communities represented in the Yukon-Kuskokwim Regional Meeting are Kalskag, Marshall, Tuntutuliak, Bethel, Mekoryuk, Anvik, Mountain Village, Chevak, Tuluksak, and Atmautluak.

BACKGROUND

In 1993 the Elders' Conference at the Alaska Federation of Natives (AFN) Convention, a recommendation was made to form the Alaska Native Science Commission . This recommendation was passed by the full body of the AFN.

That's how we got our start. The Elders felt that our Native villages were not being fairly represented in the science and research going on in their communities. There were many instances where researchers were coming into villages but the villages didn't know what the researchers were doing. The researchers would leave and not come back. They wanted us to help make better partnerships; make researchers and communities work better together. Our start was through the AFN and the University of Alaska and the NSF. NSF has funded us from the very first planning grant. They have continued to help us to grow and build some of the Science Commission programs. NSF has been visionary. It is one of the few major research organizations that funds research for traditional knowledge ("TK"). They understand that TK is just as important as physical sciences are. They understand the knowledge and wisdom that comes from communities--they actually fund projects to do our own research.

~Patricia Cochran, ANSC

ANSC was created to bring together research and science in partnership with the Native community. It serves as a clearinghouse for proposed research, an information base for ongoing and past research and an archive for significant research involving the Native community.

Part of ANSC's mission is to facilitate positive relationships among local, regional and statewide organizations and federal agencies, including, specifically in this case, the National Science Foundation (NSF), and Alaska Native communities. To do so, the ANSC has held regional meetings throughout the State, and invited interested Native leaders, Elders, hunters and young people from many communities as well as NSF-funded researchers to share their concerns, interests, and priorities for a research agenda. The intent is to forward information to the NSF and other NSF-funded researchers. That is the purpose of this report.

The regional meetings are conducted according to Native ways of knowing and Native ways of building consensus. Each regional meeting takes place over two to three days. The selection of participants to the Regional Meetings is an interactive process, involving a local steering committee from the region that assists in identifying Native Elders, culture bearers, hunters, youth, gatherers, resource managers and Native scientists. The project team notifies all regional profit and non-profit Native corporations, health corporations, tribal organizations and councils, and municipalities about the Regional Meetings and the participants representing their communities.

METHODOLOGY

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The meetings are held in a traditional “talking circle” format. The talking circle begins with a prayer and traditional introductions. The circle order of speakers proceeds clockwise in respect for the cycle of life and mother earth. These basic rules apply to the talking circle: (1) respect for confidentiality; (2) respect for each person in the circle; (3) each person is given a chance to speak without interruption or comment. The circle of speakers can go around multiple times to give those who want to share more time to do so. Then the order of speakers varies according to the topic being discussed. The circle ends with a closing prayer



Yukon-Kuskokwim community members gather in a talking circle to discuss their environmental concerns.

MEETING OVERVIEW

The Yukon-Kuskokwim Regional Meeting was held on March 11 - 12, 2004. in Bethel, Alaska. The meeting was opened with a prayer shared by ANSC's Commissioners: Elaine Abraham, Tlingit Elder from Yakutat, and Oscar Kawagley, Yupik Elder originally from Bethel. Formal presentations were made by Patricia Cochran of ANSC, Dr. Karl Erb of NSF, Lilian Alessa and Martin Robards from the University of Alaska Anchorage, and Elaine Abraham of ANSC. (See Appendix B for full text of their presentations.)

Patricia Cochran, Executive Director of ANSC, began the meeting with a presentation of ANSC's on-going projects, and gave an orientation to those present of the resources available on the ANSC website. (See Appendix B-1.)

Dr. Karl Erb, Director of the Office of Polar Programs, NSF, talked about the long term relationship that the ANSC and the NSF have shared. This partnership has taken many paths, beginning with service by Elaine Abraham and Patricia Cochran on an advisory committee at NSF that helps develop plans and gives feedback; funding by NSF for part of the ANSC program; promotion of a stronger understanding at NSF of the culture, tradition, and heritage of Alaska Natives; a recognition at NSF that traditional knowledge and scientific knowledge are integral to understanding the "web" of knowledge. (See Appendix B-2.)

We are all in this together. We have been able to help each other to understand what we can do in the future. The ANSC has been a very important partner at the NSF in understanding how to do research in the arctic in a way that provides the most benefit to the science community... The Commission is helping us better understand culture, tradition, and heritage. These are values that Alaska Natives bring to the research they do.

~Dr. Karl Erb, NSF

At each of the regional meetings, the ANSC has invited NSF-funded scientists to share their current research project with the invited participants. These presentations are intended as examples of current research and to raise greater awareness of the scope and breadth of research going on in the communities by scientists funded by NSF. Dr. Lilian Alessa and Martin Robards from the University of Alaska Anchorage presented their current research project in which they are developing new methodologies for integrating socio-cultural (human) aspects with biophysical systems.

We are mapping (GIS), making information explicit on the ground. We are taking lots of biophysical information like vegetation, where animals are located, and chlorophyll; and we are taking human perceptions like what people think is important, human values, why it's important. Then we're identifying areas of land that are used traditionally for specific activities (14 in this case). What we found on the Kenai, our pilot area, was how the people of Homer perceived and valued their local area. We have a boundary of what that local area looks like. Then we have areas that exist outside of Homer that

are important for sustaining Homer for a wide variety of values: fish, salaries, spiritual values, recreation values, education, these are a series of “hot spots.” Human perceptions and values and biophysical values converge to make those areas the most valuable from a community and scientific perspective. If we just looked at Homer, itself, we would miss this other area as important to the people of Homer.

~Dr. Lilian Alessa, UAA

The key question in my research is what we can learn from the past to help us with the future. E.O. Wilson said, “We are drowning in information while starving for knowledge.” There is all this information out there but we don't have the knowledge to deal with the situation. A lot of people now are talking about interdisciplinary science--a way to take science and bring it together. Interdisciplinary science is the synthesis of many diverse sciences. We hope we can bring together the different angles and make them useful to people.

~Martin Robards, UAA

To provide an orientation to the history of Alaska Natives that shapes their world view, Elaine Abraham, Elder and ANSC Commissioner, shared some stories and a slide presentation of her days in Bethel as a nurse in the early 1950s.

“ When I first came, people were dying of infectious diseases, mostly TB. I collected sputum's, sent them out and when I got results back, I would go back to the household. If there were 3-4 young children in the household, I took the children to Social Services and I gave treatment to the adults with TB. We had no place to send the sick people from this area so we had to treat them at home. I would have to go in and take your baby away from you and the baby would go into a home in Anchorage or Fairbanks or Juneau.” (*Elaine Abraham, ANSC Board*)

After the formal presentations, this meeting was conducted in the traditional “talking circle” fashion which invites all participants to share openly in the discussion. Patricia Cochran invited each community representative to make a statement about any concerns they or people of their community have that they want to be sure Western researchers, scientists and Native scientists should be working on. Local community and regional Native representatives shared concerns about climate, problems in their communities, concerns about development in their areas, education, the environment around them, their health and the health of the subsistence species they consume, language, and traditional knowledge.

After voicing concerns and priorities, participants made recommendations on collaborative efforts for further research and mitigation of concerns, as well as suggestions for action to begin resolving problems in the Yukon-Kuskokwim region.

KEY ISSUES AND CONCERNS RAISED BY NATIVE PARTICIPANTS

Ms. Cochran invited each community representative to make a statement about concerns they want researchers and scientists to focus upon.

The issues and concerns raised by the Native participants follow in their own words and are grouped in subject areas similar to those cited in other ANSC Regional Reports for comparison purposes.

I. Climate

◆ Water issues

“In my days in the Tuluksak River, the barges used to go up to all the way to half way to Nyack, but now they can only go to the mouth of the Tuluksak in summer because the water measures only a foot or foot and half...because of these gravel barges dumping the gravel in, all over our main rivers.” (*John Napoka Sr., Tuluksak*)

“Every year we have more and more dried up lakes.” (*Willie Phillips, Tuluksak*)

“I was born and raised here in Bethel. The land speaks to me. I grew up in Bethel when there were only 400 or so people. There were many lakes where I went hunting and fishing. The lake I swam in is now gone.” (*Oscar Kawagley, ANSC Board*)

◆ Palm trees coming back?

“It won't be long before we have palm trees again. In Glenallen we found palm tree leaves. We're going to go back to that--bathing on the Arctic Coast.” (*Oscar Kawagley, ANSC Board*)

◆ Increase in different kinds of spiders/bugs not native to Alaska

“[There are] more insects such as the fiddlehead spider in Anchorage. They have a fiddle shaped deal on them. There was one in Anchorage brought in with the Air Force. There is increase in different kinds of spiders coming in. Spiders and bugs in general.” (*Brenda Waska, Atmautluk*)

◆ Freezing weather has slowed down, freeze-up is later

“Freezing weather has slowed down. It doesn't freeze as early as it used to. Its now late November and it used to freeze up in October.” (*Mike Moses Sr., Mountain Village*)

“I remember before Halloween everything used to be frozen -- now it's not.” (*Christine Waska, Bethel*)



Fifty gallon undisposed gasoline drum in YK Delta Region village. (Photo by Larry Mercurieff, ANSC)

2. Community

◆ Sewage

“Where I come from, we’ve had water/sewer leaks. The utility is run by the city. Some of that sewage is going into the river. I suppose I think that every community has this problem in some way, in some manner.” (Mike Moses Sr., Mountain Village)

“Every village has lagoons to dump human waste in. We dump leftovers and the crows eat them and then they fly around in our small villages and we drink their droppings. Our modern houses nowadays have water tanks. Every time it rains, the tank inside our house is filled with rainwater. Plus those droppings cause sickness.” (John Napoka Sr., Tuluksak)

◆ Land fills, location, type, safety

“We have sewage leaks and we have a lagoon that’s untreated. I don’t know what happens. I think we have an incinerator in our landfill. As far as lagoons go, does it just go in the lagoon and then into the river?” (Valerie Andrew, Marshall)

“Land fills: one of the most important things to look at in each village is location. A lot of land fills are above the village. Higher than the site of the village, and then there are streams alongside and anything that is leaching through the site goes into the stream and then the river. Location of land fills. Some more elaborate land fills have liners to hold whatever contaminants might leach out through there.” (Robert Aloysius, Kalskag)

◆ Waste batteries

“Computers are another source of batteries. There are hundreds of computers being introduced into the villages. When they get older, they get thrown into the dump. All the batteries have lead in them. Acid, that eventually leaks out. No one seems to really care. They only see big batteries as a problem.” (Robert Aloysius, Kalskag)

- ◆ Mildew/molds/fungus in homes

“My mom used to have a heater but it broke and she got a Toyo stove, and because the heat doesn't go into the back rooms, mold is growing in the bedrooms which are not getting direct heat.” (*Christine Waska, Bethel*)

“That's what happened to me. The bedroom is off from the Toyo stove heat range and my bedroom floors molded.” (*Elaine Abraham, ANSC Board*)

3. Development/Industry

- ◆ Mining / Dumping of chemical waste, byproducts, equipment

“Big companies are hurting us, like the mining companies causing contaminants. They are using heavy equipment and dredges, arsenic, mercury and selenium and other toxics under ground which are then dumped into the main river. They have settling ponds, they call them settling ponds, but every time we have rain and high water those settling ponds overflow and flow into the main rivers and we drink the water. Not only humans are hurting, it's also the animals. Fish and sea and land animals are hurting like us. With no other choice, they have to drink the water; the water that is dumped from these contaminants. One time we went up to a mining camp and I noticed that the human waste line was directly draining into our main river, and I think all the mining camps were that way. These mining companies have roads all the way to the campsites along our river, and they leave their barrels next to the road to the mining site. Lots of those aren't oil drums. Lots have acid in them and all the other chemicals. When those barrels are rotted, all the contamination and whatever toxics go into the river and the animals and humans drink it.” (*John Napoka Sr., Tuluksak*)

- ◆ Deforestation

“My grandmothers took me aside and said ‘look at what happened in the day of the steamboat. The steamboat was the main transportation up and down river. There was no coal or oil, they needed wood. They decimated the Kuskokwim valley of timber. It was like killing our relatives. We were taught to only use dead and down trees if we were building a house we would say a prayer and apologize to our relatives the trees we used to build. These steamboats hired Native people to cut down trees to fuel the steamboats.” (*Robert Aloysius, Kalskag*)

- ◆ Exploitation

“How do we get that across to powers only concerned with immediate gain with no regard for the impact of what they are doing right now? How it will impact our children and their descendants? As Native people we care. How do we get that message across? Exploitation is not right. We are exploiting Mother Earth. I'm only 69 years old and I have hundreds of

experiences and memories that emphasize the importance of being a human being. Ever since I was able to sit and listen, my grandmothers taught me. Love honor, respect everything around you and be careful with everything you do because it will have a lasting effect on you and your descendants. The western world has forgotten this because they want immediate gain. I hate to say it, but they have no concerns about what's going to happen 7 or 14 generations from now. They want immediate gain and it's a shame!" (Robert Aloysius, Kalskag)

"It affects our area in Anvik every summer. We have a couple guides in Anvik that bring people in and our hunters have to compete with them. A lot of them go in just for the horns; they don't even want the meat. Some donate the meat for Elders, but I don't know what others do with it." (Violet Kruger, Anvik)

"As you probably know, the Bering Sea is the last, biggest fishery in the world. It is being raped of its resource. King crab is being disseminated. Snow crab will be gone soon too. Cod will be gone too--we used to have lots and lots of cod. The salmon stock, we have streams that salmon spawn in all around the island. They are holding their own, but for how long I don't know. The rest of the sea mammals and seals and whatnot, are holding their own right now." (Larson King, Mekoryuk)

◆ Noise pollution

"One thing we forgot because we're so used to it is noise pollution. Its something that is unreal anymore and we take it for granted." (Robert Aloysius, Kalskag)

◆ Hydrocarbons dumped daily

"You hear all kinds of stories of how these natural foods have changed. They are natural foods, not wild foods. They're not introduced by somebody else. Natural foods are all the plants and berries that we eat. The moose, caribou, otter, whatever, the fish are all natural foods. They have changed so much because of the pollution of the streams and ground and everyday, day after day and year after year. The fallout that is dumped by the jets, nobody ever thinks about that, but the pollution coming from up there landing in our land and water, that changes our fish and game and how they adapt. They get ill because of all these hydrocarbons that they eat." (Robert Aloysius, Kalskag)

◆ Biogenetically changed foods

"Just last week, I read a report whereby the monarch butterflies that fly from the south--are being endangered by biogenetically changed corn. If it is going to have that kind of effect on the butterfly, what effect will it have on us as people? . . . The biogenetically changed foods, vegetables and animals are a source of worry for me, because they are a time bomb. It will affect our environment and us as human beings." (Oscar Kawagley, ANSC Board)

4. Education

◆ Global as well as local

“The global issues weren't important. I wonder if it's because people didn't care about what's happening in the world, a lot of people said. ‘well that's down there.’ They didn't think it was important for us in Marshall. There's no connection to what's happening globally and how it affects us locally. I'm trying to figure out how to help people understand the connections.”
(*Valerie Andrew, Marshall*)

“I want to address the global perspective. We worked with AVCP on how we felt about the brant molting area, the entire flyway of the Black Brant molt on this entire area--thinking about where your resources migrate, and knowing where they go and what's going in those areas is something to think about.” (*Taqulik Hepa, ANSC Board*)

◆ Native education of our youth

“The major concern the Elders in my community have is the lack of local Native education on environment, natural foods, fish and game resources, you know, the ability to hunt, fish, trap and gather in a sensible way. If there is a famine, or the like, what's going to happen to our young people? As Native people we have relinquished our role as first teachers. We have turned over the education of our children to people that have no concept of how to be a human being and how to relate to all of creation, yourself, your community, all of creation, all animals, plants, birds, fish, water and how everything is connected. We have not followed the direction of our ancestors on how to be teachers. My grandparents' generation was the last of the real Native teachers.” (*Robert Aloysius, Kalskag*)

“I think it is important to get our young people to learn more about our traditional ways. We push our young people to get educated and learn. Sometimes there's a bit of conflict. You can go and get educated in Fairbanks or Outside, but in my mind there is a conflict. Much of our education lies with our people and our Elders. It's part of my heart right now. We don't want our young people to lose our traditions because that's important, the tradition, culture, language is very important.” (*Ina Jenkins, Bethel*)

“We need to encourage the young people to respect our Elders, to listen and thank them the way we were taught. We see a lot of young people today that show hardly any respect. . . . you see a lot of young people who went Outside to boarding schools, and stripped them from the culture and language, and they are raising their kids without some of those values on the way. For us that do know, I don't know a lot, but what I do know, I want to pass onto the younger generations.” (*Ina Jenkins, Bethel*)

“I’m curious how some women rear children. One woman I know has a little boy who has chronic respiratory illness and I see her out with the baby and he’s not covered up. He’s a little boy and she told someone he needs to learn how to breathe cold air. My child’s about the same age, but I layer her if I’m taking her out.” (*Valerie Andrew, Marshall*)

“In the older days we still had women’s houses where young women went and got training from aunts and grandmas and learned how to take care of your families.” (*Patricia Cochran, ANSC*)

“They do that in Marshall, but what happens is a lot of the things they talk about is a lot different than what is taught in Head Start and Home Visitors. They don’t match up so parents do what they think they should do.” (*Valerie Andrew, Marshall*)

◆ Education and testing skewed

“I have heard Native people around the state talk about how in our nation we have to take nationwide school tests. They are worried about the Native population not scoring well on those. My daughter didn’t do well on the sciences. She scored low on science. The questions they have on those types of tests were things she had no idea about. They had a multiple choice questions that said “What would you most likely find in the ocean?” The multiple answers included yachts, trees, ice. She circled “ice.” The correct answer, according to the nationalized test, was yachts. Our kids are knowledgeable if you ask the right question about things they deal with every day, they are smart.” (*Taqulik Hepa, ANSC Board*)

“At a local level, one of the questions for my guide license was “Where does the porcupine herd migrate to?” - I live on Nunivak Island. What does that have to do with my guide license? When we answer these questions, we are written off as if we’re dumb.” (*Larson King, Mekoryuk*)

5. Environment

◆ Flooding every year since the 1964 earthquake in Tuntutuliak

“Robert reminded me of the earthquake: before that we never had floods at my village, we now have floods almost every year at my village. We are at the mouth of the Kuskokwim River.” (*James Charles, Tuntutuliak*)

◆ Tundra vegetation is changing; new bugs

“Last summer they had a lot of people coming to the hospital with bites on their legs from the tundra. I think it has to do with the global warming.” (*Sharon Lindley, Bethel*)

- ◆ Changes in wildlife: new to area, patterns of feeding, location

“My mom was telling me yesterday that when her husband went out to get seal and got a walrus instead, they cut open the stomach and it had seal inside the stomach.” (*Christine Waska, Bethel*)

“A guy from Nightmute told me they got a walrus--this one had blubber and sealskin and the other one had a baby seal in the stomach. Diet change of the walrus. That's new to me, but was witnessed by the whole community.” (*Leo Moses, Chevak*)

“Some birds I used to see when I was a kid are gone. The little black birds like robins and no one talks about them. But those are the ones that I don't see anymore. Little black birds the size of a robin.” (*James Charles, Tuntutuliak*)

- ◆ Erosion / Sand Bars in Kuskokwim and Yukon Rivers

“Every time the gravel barges dump gravel in the main river of the Kuskokwim and Yukon Rivers, the sand bars are forming and the erosion starts. Every time the sand bar rises, the main channel shifts. If these gravel barges have proper people that are driving these, they wouldn't have many dumps in our rivers. [W]hen they get stuck they have no choice but to dump.” (*John Napoka Sr., Tuluksak*)

- ◆ Overpopulation of wolves, declining moose

“The Elders want me to mention that there is a wolf community now in Anvik, and they're trying to control it. There hasn't been a moose count in a couple years now. The fish and game board has not responded to the request for a moose count.” (*Violet Kruger, Anvik*)

“Another thing someone brought up was the wolf problem, predation on moose and caribou. We have that too now. Since we got caribou in the area we have more wolves. I remember when I was a boy, we had a lot of reindeer around here, but wolves moved in and wiped away the reindeer. Then we had no more wolves (after they wiped out the reindeer). Now the moose and caribou are moving in and there are more wolves behind them.” (*James Charles, Tuntutuliak*)

- ◆ Don't see/hear birds, ducks, cranes

“I remember years ago during breakup, ducks and geese were flying by for weeks. Now you hardly see any big V's up there. In the fall the river was a huge sound--swans, cranes, and geese--nowadays you don't see or hear that anymore. And talking about song birds, from Kaltag to Aniak every bend in the river had a fish camp--you used to have 20 different types of song birds singing. Hardly see any songbirds around villages any more.” (*Robert Aloysius, Kalskag*)

- ◆ Beaver population and location

“As we did four years ago, we still have the beaver problem. They are clogging up the streams where the whitefish go and we're getting less whitefish than even last year.” (*Brenda Waska, Atmautluak*)

“Local people here say that beaver dams prevent fry from getting back to main rivers. It may be one of the reasons the salmon populations have gone down.” (*Allen Joseph, Bethel*)

“Abandoned beaver dams are killing streams and lakes and stopping the migrating native fishes to enter the streams where they traditionally spawn. The fishes that are affected are the 6 salmon species, sheefish, all 3 white fishes, pike, black fish, besides the predatory fish like trout, dolly varden, rainbow, and grayling.” (*Robert Aloysius, Kalskag*)

- ◆ Atmosphere changes from China/Russia

“The other day I heard of a dust storm in China. A little bit later I found out from the media that the reason our snow is brownish is it is fallout from the China dust storm. We're not as clean as we think we are with our foods.” (*Larson King, Mekoryuk*)

6. Health

- ◆ Sickness/deformity in salmon/fish

“The concerns I have in Bethel are salmon returning from the ocean, it's also a concern for us from the abundance and health viewpoints. We are concerned about sickness showing up on salmon in recent years.” (*Allen Joseph, Bethel*)

“We are concerned about salmon on the Yukon River. They seem healthy at the mouth of the river, but as they head up the river they get spotty.” (*Mike Moses Sr., Mountain Village*)

“One of the things that I've noticed over the years is the quality of the salmon that we get -- especially the king salmon are weak. They are not as strong as they used to be. Because when I



YK-Delta Community members inspect salmon for deformities/lesions. (Photo by Larry Mercurieff, ANSC)

was growing up, when you would get a king salmon it would rock the boat and almost drown the boat. If you get a king salmon today it doesn't fight. When you bring it back to the raft, and not even 1/2 hours after you catch it you head it, gut it and filet it out and the meat falls apart rather than binding like it used to. That's one of the biggest things that old people are talking about. Not only king salmon--that's good to say salmon. The taste is not like it used to be--it has a flat taste. It doesn't have the richness that it used to from what I've observed." (*Robert Aloysius, Kalskag*)

- ◆ Asthma/respiratory problems increased

"One of the things that causes [asthma] is the mold and mildew and fungus in the homes. It's hard to get across to people that they need to get rid of those things because they cause the respiratory problems. It's a new problem." (*Robert Aloysius, Kalskag*)

- ◆ Importance of Native foods (natural foods)

"The Subsistence School where the kids are into eating and preparing traditional foods. They put a traditional spin on more modern food – moose pizza made from scratch!" (*Jon Grover, Bethel*)

"We go back and describe the nutritional value of the subsistence foods--caribou vs. hamburger, differences and benefits from subsistence foods. We're working with high school kids and a video and brochures and attending city council meetings to get the word out." (*Taqulik Hepa, ANSC Board*)

"Being a young mother too, and breast feeding all my kids, it has a lot to do with how you raise your children on food. When my son was two years old, we went out to eat at a restaurant. When we ordered, he thought it was tuktu [caribou]--but it was beef. He wouldn't eat it because he wanted caribou. It's about teaching them early." (*Taqulik Hepa, ANSC Board*)

"We want to bring subsistence food to our families, but lots of times we are stuck with the regulations. In those days when I was a kid, we did not have limits. Now, we are allowed to go hunting when the season is open, and have to stop when the season is closed. The bag limits--how much we can get, all those changes we have now. We're stuck with the regulations even when we want to bring food to our family, and not use the store bought food all the time." (*James Charles, Tuntutuliak*)

- ◆ Information vs. Misinformation

"I'm concerned about a study that was done on the East Coast about halibut. That study said that it was unsafe for pregnant and nursing women to eat halibut. We disagreed with that and I got YKHC interested in applying for funding to do a study on halibut in this region. I left YK in 2001, and the person that was supposed to do the study was unable to do it. I would like to

champion the cause and make sure that it gets done and shows the world that halibut is okay and safe for people to eat. If we don't do that, the other study will continue to say halibut is unsafe for pregnant women and nursing mothers.” (*Allen Joseph, Bethel*)

“That study did not look at any fish beyond the Mississippi River and does not impact the Alaskan people. It didn't mean anything to us. It does raise an important issue, which is how people release information. Of course, you'd say-what's going on? That's one of the big issues we have to talk about--how to let this information out to the communities so it doesn't scare everyone.” (*Patricia Cochran, ANSC*)

- ◆ Water

“I mentioned water because even here in Bethel, I can't drink Kuskokwim water anymore. We have to drink bottled water. Water is the source of life. We all began in the water in the mother's womb. It's absolutely necessary. How can you and I not be able to drink the Kuskokwim water and expect the ducks and geese and everything else to drink it? What will it do to the animals we depend on for food?” (*Oscar Kawagley, ANSC Board*)

- ◆ Boils, allergies, skin conditions increased

“There are a lot of skin problems popping up. Most of the patients we see have skin problems -- all different kinds of boils now. A couple months ago there was like a boil that was an abscess-- small ones all over the body and then maybe a big one and after a couple days a bunch more will pop up. They didn't culture them. We have a lot of impetigo.” (*Brenda Waska, Atmaultluak*)

7. Language

- ◆ Tradition, culture, and heritage

“One thing that I notice is that whenever there are reports written, they use words that, I guess in the western way, lump culture, traditions and heritage together. It is important to understand the difference between culture, traditions and heritage. Traditions are what we do on a cyclic basis. Culture is a way of life. Heritage is what we have inherited from our ancestors. A lot of Elders I work with tell me, “Tell these people to make sure they understand what they are talking about.” Culture traditions, heritage -- these are strong ways of expressing where we get our knowledge. It is important to make sure when we talk about traditions, culture and heritage, that we make sure it is specific to those areas.” (*Robert Aloysius, Kalskag*)

- ◆ Young people need to learn the language

“We also need to remember to keep our language alive. That's part of who we are. Today, many of the people in each village are affected and what I mean is they are losing their language

slowly. As a young mother, I have to tell myself this because I have one child who speaks English and no matter how much I use my language, he's stubborn. We have to encourage our language. Always encourage the language. Otherwise, we're weak without it." (*Rose Kalistook, Bethel*)

8. Traditional Knowledge

◆ Traditional Knowledge corroboration with scientific data

"As part of our research, we are doing some historical compilations. One of the recent stories is the Inupiat legend of the 'summer that didn't come.' Researchers correlated that oral tradition with the Laki eruption in Iceland that caused huge amounts of ash in the air." (*Martin Robards, UAA*)

"It took 15 years for the western scientists to do a study that showed exactly what the whalers were saying all along. The whales are being diverted 15-20 miles from the traffic. We Natives kept saying that the whales move under the ice, but it took a long time to convince the western scientists. Scientists have to have faith in what the people are saying." (*Taqulik Hepa, ANSC Board*)

◆ Storytelling is fading as Elders die

"Our Elders are dying fast nowadays and it seems like the story telling is going too. The storytelling days stopped with Robert's generation. Maybe they need to open their mouths to young people and start storytelling." (*Willie Phillips, Tuluksak*)

"My wife's grandmother told us there is one more -- these three players of war, sickness and famine, and she said that we might have famine in our lifetime. When those old people used to tell stories about how the famine gets started, they used to say, that we are going to see weather changes; we're going to see different animals that we didn't used to see in our area; and that some of the foods we've seen are going to change. The insight--back in those days they didn't have all kinds of mammals we have today. But the Creator, when he loves all the people in the world and when he wants to test them, he's going to do his wake up call to his people." (*Willie Phillips, Tuluksak*).

◆ Spirituality

"My grandfather, every time he would eat he would make the sign of the cross and I was curious. I wondered how our people prayed before the priests came around. I asked him. He said, 'You don't eat like a dog.' [I said,] 'How's that?'" Well, when you gave a dog some food that dog would start eating without a thought, but even before Christianity came, we closed our eyes and looked at the plate and thought of it as an ocean, our food source, first you take a little from your plate and discard it in the memory of those who came before you. Make sure the first bite

is from your side of the plate so when you go seal hunting you don't have to venture too far. You think things out." (Leo Moses, Chevak)

9. Western Science

◆ How to do research in villages

"One of my biggest concerns with research in our region is the principal investigators' (PI's) method in recruiting people. I feel they should be more up front and tell subjects what they want and why--rather than skirting around the issue. If they want blood for a genetics study, they should say this is what we want the blood for -- not under the guise of a cholesterol level check. They should not be sugar coating the purpose of the research, but tell it like it is. People's lack of research knowledge and taking advantage of the people, it's like coercion and a lot of people in the village don't have jobs so being paid \$25-50 goes a long way. I guess my main concern is for the researchers to be up front and say this is what we want the study for and not sugar coating anything." (Sharon Lindley, Bethel)

"We want a holistic approach to the research. We want to empower the people in the village being researched. We need to hear what people have to say. It adds more layers to it. It may make it easier to understand because politics do play a role. When you go into the village you may talk to a man and what he says may not be what his wife says or the same as the student or a college graduate. It will all be different perspectives. Getting the information from each of them it gives a better picture." (Valerie Andrew, Marshall)

"Love, honor and respect our ways of doing things, spiritually, mentally, emotionally, physically. They are gifts of the Creator." (Robert Aloysius, Kalskag)

"Something that concerned me is that whenever we sit in meetings like this, it really concerns me that scientists always talk science and they don't talk people. There is a simple way of explaining all of these concepts you used. What is synthesis? All these fancy words that most people don't have a clue about bio-this and bio-that. Why can't you just learn to speak people so that everyone understands, not just your colleagues?" (Robert Aloysius, Kalskag)

RECOMMENDATIONS

Participants made recommendations on collaborative efforts for further research and mitigation of concerns, as well as suggestions for action to begin resolving problems in the Yukon-Kuskokwim region.

I. Collaboration

- ◆ Combine villages in proposals for funding

“When funding agencies look at individual proposals to deal with these issues, it might be a good idea to put together regional comprehensive plans to deal with it--dealing with many different communities is helpful. On the North Slope we make proposals as regionalized as possible. It’s something to think about.” (*Taqulik Hepa, ANSC Board*)

“I know there is a real concern on the mining that might happen. And it’s your corporation, but I think each village could send a resolution and say you’re concerned about the environmental impact to people. You don’t have to be pushy, but if enough concern comes in, it might help. We talk about a lot of these things and it’s hard to come to a solution. I’ve said before, I am part of the ANSC because we’re not part of a tribe, or a corporation, I belong to ANSC because we want to hear grass roots people, so we try to stay out of the political arena. I think if all the villages in the impacted region send a nice resolution from your village, once it happens and if there is a catastrophe, say ten years from now, you will have documentation that says you asked to be protected. You’ll have a document for your kids and grandkids if they need it. You can say if you are going to mine we can’t stop you, but protect our land and our people and our village.” (*Elaine Abraham, ANSC Board*)



Yukon-Kuskokwim Community members participate in ANSC’s mini-grant project which enables tribes to identify and address their environmental concerns through community-based research. (Photo by Larry Mercurieff, ANSC)

- ◆ Ensure Elder representation on boards, councils, and commissions

“We should encourage Elder representation as knowledgeable educators on boards, councils, and commissions and other entities that affect the Native people, the fish and game and natural resources that are ours here for us to help us live. The reason they say that is if you look at many of the

councils and boards and commissions, they seem to be made up of young people or people educated in the western way. There is no representation of the real learned people on these commissions, boards and councils. They said that the only way we can educate these boards, councils and commissions is to include Elders on them.” (*Robert Aloysius, Kalskag*)

◆ Liaison (objective/neutral) between village and science researchers

“It would be good to have a way that ANSC become established as official liaisons between villages and researchers. It would be good to be able to do a public service announcement saying ‘if you have questions on what’s ethical or not ethical for a particular research project contact ANSC about your concerns.’ These researchers have contact persons, but they are usually the principal investigators, and those people they are affiliated with, so their response is going to be biased. They are going to say any concerns people have they will twist. I’m not saying they do, but they will interpret it in their favor. It would be nice if the Natives in the village had an objective and neutral contact organization that they can contact that can liaise between the village and the researchers. They’re ethical, at least their rights will not be violated; that they are not being taken advantage of.” (*Sharon Lindley, Bethel*)

◆ Create a think tank

“Listen to learn. Maybe that’s a process we lost. The men’s house was a think tank of our communities. That’s where the problems were addressed. Possible solutions like you are addressing at the moment. Maybe at the rudimentary level we should have a beginning of something like that. You should have your own in each community to address problems unique to you, men, women, and children. Maybe start with those interested at first, and maybe it will grow--a think tank for the communities.” (*Oscar Kawagley, ANSC Board*)

“It could be a living room and start with a hand full of people concerned about what’s going on in their village.” (*Robert Aloysius, Kalskag*)

◆ Address problems through village partnerships

“The villages are trying to get together--those villages I have mentioned, in the long run they will probably start a consortium to work together to protect the subsistence area near their villages because there are lots of fish but they are starting to see a lot of pollution, garbage and batteries, left behind. They want to start going to each community and talk about what happens if we don’t take care of our land.” (*Rose Kalistook, Bethel*)

“In Marshall, our tribe is sort of new in organization, we’re trying to empower our tribe by becoming more active in our community--at the same time it’s hindering our need to create partnerships.

Pooling money together might work better. Right now we have to compete with the bigger tribes for grants.” (*Valerie Andrew, Marshall*)

“We're tied in with the World Wildlife Fund with an on-going project on subsistence foods and we're tangled up with the University with near shore studies currently, under the guise of near shore. We deployed drifters which are monitored at the University of Alaska Fairbanks. Two of them showed up on St. Paul after we deployed them. Then some showed up in the Bering Straits. That's still ongoing, if we find more monies to do that. From the perspective of local science, without the help of western science, we couldn't do it. I know this is the Native Science Commission, but looking at it from that perspective we are on the receiving end of it, even if we are scientists.” (*Larson King, Mekoryuk*)

- ◆ Ensure communication between Western scientists and Native people

“We Native people “know” what's going on. We see it every day. We know what the changes are and what the impacts of those changes are. We've seen the progress of change coming on so fast. Yet we are helpless because we are not listened to and not given the credit of knowledge. The scientific community is seldom looking at us as true scientists. We need to get the credit due us for letting the unknowing people know what is happening to Mother Earth.” (*Robert Aloysius, Kalskag*)

2. Actions

- ◆ Fund destruction of beaver dams

“There is a program in the EPA called environmental, stream restoration program. When I was in Michigan, we had a Native American Wildlife Society meeting there and the EPA has a program that can help with stream restoration by destroying these abandoned beaver dams and bringing the water quality back to what it should be. They just need someone from up here to fund their transportation and they will help us take care of that. Maybe the ANSC can find funds to bring the people up here who can help restore the streams by destroying the beaver dams in a safe and legal way. They say they can do it. They just need the money to bring the people up here.” (*Robert Aloysius, Kalskag*)

- ◆ Develop eco-villages

“Look at the houses we live in now: lumber is treated chemically; carpets are manmade materials that are treated to resist mold and insects and even the houses we live in have a lot of chemicals that are being released into the air we breathe. We have to begin to think about eco-villages--check with engineers developing housing different than we're used to. Alternative energy--begin to develop our villages so we can stand alone and not depend on the outside world for everything.” (*Oscar Kawagley, ANSC Board*)

◆ Listen to our ancestors

“My grandma used to say that when they were growing up there were no beavers. Now there are millions of beaver everywhere. If you walk by on the river you'll see a beaver house across from the town. My grandma used to say the beavers are the starting point for famine. There was an old man who used to tell stories. I loved to listen to his stories. He used to tell us that in our lifetime we are going to see caribou back here in this area. That was in the early '70s. In those days we didn't know what caribou looked like, but the old people used to say we are going to see caribou in our area again. It happened a couple years ago. The caribou came back.

“Our ancestors are, maybe we could call them our professors in the lifestyle of our ancestors and we need to spread the word to our people since we've all these issues.

“A couple years back, when they were talking about why the fish were running late, I asked my dad why they were late, he said in his lifetime he had seen it happen, he said the king salmon didn't reach up where we are by July and then he said there wasn't enough rain up where the king salmon spawn. The people got word and then when the rainfall came, the water filled up the river and an abundance of fish came up -- king and chum running together with sockeye. A couple years ago we saw that happen here.” (*Willie Phillips, Tuluksak*)

“I was never sent to formal school until I was 14 years old. Instead, I was dressed up like I was going to school and then I was sent to the men's bath house to listen to the good stories. Immediately when I got there I would sit and listen. I was taught that whoever is talking to you should not be disturbed by you, because you will hinder your education. When it's done, you absorb everything and go on your way.” (*Leo Moses, Chevak*)

◆ Respond instead of reacting

“Reaction is something you do right away. Native people “respond.” That is something we have lost. We have become so westernized we react instead of taking time to think about it and respond-
-how is it best to respond to this? What is best for me, my land, my family, the fish in the water? Being a Native person, I was taught very early that we must love, honor, and respect all of creation. Sometimes we forget that we are all connected. We are all creatures of the Creator, everything that flies, roosts, climbs, walks, crawls, burrows, slithers and swims are our relations. It is our responsibility as human beings to be the stewards of the land.” (*Robert Aloysius, Kalskag*)

◆ Recycle

“We need recycling.” (*Oscar Kawagley, ANSC Board*)

“Our tin cans are often used as spittoons. I don't want to collect those and burn them.” (*Valerie Andrew, Marshall*)

“Recycling is a whole new subject on its own.” (*Sharon Lindley, Bethel*)

◆ Research on natural subsistence foods/chemistry

“From the research concept, Mekoryuk is on the cutting edge. We're a community of 200 Eskimos. All the water around us provides subsistence fishing. We are doing research on the fish with the help of World Wildlife Fund. Our samples they are probably down at Texas A&M being analyzed. We were tasked to test seagull eggs and learned we can consume 149 a year and not be impacted by pollutants.” (*Larson King, Mekoryuk*)



Larson King from Mekoryuk speaks at the YK Regional Meeting.
(Photo by Gregory Nothstine, ANSC)

“Our up-north cousins say they are finding mercury in their research of blubber. We haven't done seals yet. We also have reindeer on the island, which we consume and sell. We haven't tested them yet. If pollution showed up in the Siberian herds, we're not exempt from that either. We'll have to start on that soon too.” (*Larson King, Mekoryuk*)

◆ Dispose batteries properly

“My tribe managed to collect batteries and put them in a plastic tote and Northern Air Cargo will fly them out for you. One of the guys goes out and collects the batteries and then puts them in a tote to ship them out.” (*Mike Moses, Sr., Mountain Village*)

The meeting closed with a prayer offered by Robert Aloysius of Kalskag and thanks extended to all participants by Patricia Cochran, ANSC.

Appendix A: Participants

NAME	ORGANIZATION/COMMUNITY
Abraham, Elaine	Alaska Native Science Commission, Board
Alessa, Lilian	University of Alaska Anchorage
Aloysius, Robert	Kalskag
Andrew, Valerie	Marshall
Cochran, Patricia	Alaska Native Science Commission
Charles, James	Tuntutuliak
Edtl, Nancy	Alaska Native Science Commission
Grover, Jon	Bethel
Hepa, Taqulik	Alaska Native Science Commission, Board
Ho, Chris	Bethel
Jenkins, Ina	Bethel
Joseph, Allen	Bethel
Kalistook, Rose	Bethel
Kawagley, Oscar	Alaska Native Science Commission, Board
King, Larsen	Mekoryuk
Kruger, Violet	Anvik
Lindley, Sharon	Bethel
Moses, Mike, Sr.	Mountain Village
Moses, Leo	Chevak
Napoka, Sr., John	Tuluksak
Nothstine, Gregory	Alaska Native Science Commission
Petrivelli, Alice	Alaska Native Science Commission, Board
Phillips, Willie	Tuluksak
Robards, Martin	University of Alaska Anchorage
Springer, Mark	Bethel
Waska, Brenda	Atmautluak
Waska, Christine	Bethel

APPENDIX B: TRANSCRIPTIONS FROM SPEAKERS

I. Opening Remarks - Patricia Cochran

“This series of meetings is to generate Alaska Native research plans and recommendations to help NSF and researchers to look at the concerns, priorities and observations from our communities. These meetings will help us as Native communities to identify our own research priorities.



Patricia Cochran (ANSC)

“One of the projects we're also doing is the traditional knowledge and contaminants project. This project documents environmental issues across Alaska. One of the interesting things available on the project website is a “Resource Guide” which was designed to help tribes do their own research projects. It's a ‘how to’ do everything from a planning concept; developing a program; then all the way to a QAPP (Quality Assurance Project Plan).

“There is a listing of Native concerns from every region in the State; research summaries from each meeting; website information on what we already know about science, what science can already tell you about things like moose with sores and lesions. This will link you to what the cause might be.

“We're also working on the Resource Directory. It is a directory of our own Native community resources. People are always asking who they can contact about global warming or moose hunting, etc. This is a directory that includes people like you who know about these issues. One of the things we will do at this meeting is to fill out forms to add people to this directory. It includes contact people, their area of knowledge and contact information.

“We're involved in a traditional food safety program. We know people in our villages are concerned about whether our food is safe to eat, but we need to look at the benefits of eating our traditional foods as well as the quality of the food.

“We have a ‘mini grant’ program providing research funds to communities to look at issues such as contaminant testing in fish, animals and plants, traditional knowledge and burn barrel projects.

“We are involved with the Alaska Native Health Board (ANHB) in the Alaska Traditional Diet Project which began with a major food survey in a number of communities in Alaska. Now we're doing major testing and sampling in two of those villages.

“Last year we conducted a national subsistence workshop. We brought together representatives from other states across the nation and looked at the concerns and issues of tribes across the U.S. and how they relate to one another.

“The Alaska Native Science Commission has an internship program. Aaron Peters from Ruby and Christina Salmon from Igiugig are two of our student interns working at ANSC. We also place students with other Native organizations and researchers.

“Another program we were working on with Oscar Kawagley and Ray Barnhardt is the Center for Learning and Indigenous Knowledge Systems. We think this is one of the most critically important pieces that can come from what we're doing here in Alaska. This is a system important to all indigenous knowledge systems across the world.

“We are participating in a workshop at the IASSA (International Arctic Social Science Association) titled “Partnering with Arctic Communities. That workshop is bringing in other indigenous communities from around the world such as the Sami, Russian Federation, Canadians, Alaskans, and Greenlanders. This will be a session of people talking about Native communities working in partnership with researchers.

“Several more projects we are looking into include: doing an intellectual property rights workshop; a research rendezvous which we'd like to become an annual meeting of Alaska Native research so that all of our communities can get together and find out who is doing what; and an arctic survival skills training program. We have been working with VECO. VECO provides training for researchers coming into the Arctic. We want them to learn how to work within our communities as part of their survival training.”

2. NSF and ANSC: Dr. Karl Erb

“The Commission has a long history with the National Science Foundation. I believe we are currently supporting 12 projects in the Y-K region. I think in the larger regions of the state, we have 7 or 8 projects headed by Native Primary Investigators (PI's).

“We are all in this together. We have been able to help each other to understand what we can do in the future. The ANSC has been a very important partner at the NSF in understanding how to do research in the arctic in a way that provides the most benefit to the science community. At NSF we only do science because it benefits people. To get funding from NSF, you have to send a proposal in and we send it back out to members of the community and we ask them to look at the intellectual merit of the project.

“The values that we bring to science are very important. So the first value that NSF looks for (I don't mean most important), is ‘what is the intellectual merit of the research?’ The second value helps us understand the first. We want to know ‘what are the broader impacts of the activity?’ There are all kinds of broader impacts--a research project in chemistry might help biologists know something they didn't know. Or it could be that a particular project helps children in 5th grade understand something better, or it could help us cope with climate change. Broader impacts involve anything that you might describe as knowledge not just for its' own sake. It requires important knowledge to qualify as



Dr. Karl Erb (NSF)

intellectual merit. Anyone that tells you western science does not apply value judgment doesn't know western science.

“Going back to the relationship of ANSC and NSF: The Commission is helping us better understand culture, tradition, and heritage. These are values that Alaska Natives bring to the research they do. We at NSF support the ANSC for our own selfish reasons, you might say. To help facilitate contact between scientific people we support, Native Alaskans or people in Florida, or wherever, and members of the Native communities where they often conduct their research. Today we have a presentation from two scientists. One important function of the Commission is to bring people together like this to give you an opportunity to understand research projects currently under way.

“We also work together to inform the NSF of issues that are important in Alaska and of particular importance to the Native community. That will help us know what we should pay attention to as we evaluate intellectual merits and broader impacts and help us, therefore, develop our own value system to decide where the taxpayer's money is best invested.

“The ANSC and the NSF have been working for two years with friends in Barrow to develop guidelines for conduct of research in arctic communities. This is a document, currently in draft form, that we will expect our funded researchers to follow when they work in communities. First, so they don't cause problems and second, so they can benefit from knowledge and assistance from you. It is called *Guidelines for Conduct in Research in Arctic Communities*. It will also help to get a broader reaction from communities. We'd like to put these guidelines forward on the international scene for consideration by funding agencies in other countries that support research in arctic regions. I think that could be an important step to take between us to better understand each other's values to enable research to go forward to benefit everyone.

“I would like to conclude with a comment triggered by Robert's remarks. . . . I was just at a meeting in Seward where there was a discussion about values. The question was, should someone doing science say “*this glass has 4 ounces of water in it*”, instead of “*this glass is half empty/full*”; should we simply say “*there are fewer willow leaves this year*,” or should we also add “*therefore the moose will be hungry*”. I think that's an important part of the conclusion.

“There was also a discussion about the web of scientific knowledge or the web of knowledge. That things are connected to each other -- you really cannot understand what's happening to a certain species of fish unless you understand water temp, predators, food chain, every aspect of the web. The way we think about knowledge and learning is a web also--culture, heritage, traditional knowledge. In western science we also have traditions and culture and heritage. Most universities around the world have been organized into departments. . . .so, if you go to the university today, or at least when I did, you would be in a chemistry or biology department. You probably would not know anyone in a different department.

“That's changed a lot in the past 10 - 15 years. It is part of western science. To understand what's going on in the real world you need the chemists, physicists, and atmospheric scientists all working together. In the last 10 years we have learned we have to find ways to cross link these different kinds of sciences. The NSF has, increasingly, in the last several years, been supporting research programs that cut across these

different lines. Universities are trying to organize to help do that too but they have 1000 years of tradition--some of the strengths come that way, but we have to find a way to build the web. I offer those remarks, when we talk about western science, we western scientists, because it is important to understand how traditions, culture, heritage are different aspects that sometimes mingle together but sometimes have different impacts on how we do things. I ask for your understanding as we western scientists work together to move forward.”

3. NSF-Funded Scientist Presentations: Dr. Lilian Alessa and Martin Robards

“We have a number of projects going on -- all dealing with how we perceive and cope with change. Now we know that change is inherent in all systems. Change is. It happens. If things didn't change we wouldn't become better, we wouldn't cope or adapt. The perception of change is powerful because decisions are made ultimately on how people perceive the world around them.

“When things change, systems, organisms, people adapt to it. Adaptation is critical for coping with surprise change or change that is unavoidable. People have been adapting for millennia. So, how do we adapt? Well, this requires a shift in the way we view coping, particularly in western science culture.



Dr. Lilian Alessa (UAA)

“We are interested in understanding how strength can come from change. Because each community is different because of different traditions and cultures, the strategies of adaptation of will vary between communities. You can't assume all communities will respond with a blanket strategy.

“Adaptation should be based on foresight. Data might give us information on what might be happening. With adaptation and mitigation (which is helping lessen severity of change) there are strategies that can work together and if they work well, you have synergies that maximize resources and ideas. Implications for change are important and we need to understand them better.

“We are in a relatively lonely area of integrating socio-cultural, (human) aspects with biophysical systems. There is a program of the National Science Foundation called HARC which is a good example of a pioneering program that allowed us to start a lot of what we're doing. We are developing new methodologies that allow us to integrate socio-cultural and biophysical information.

“We are mapping (GIS), making information explicit on the ground. We are taking lots of biophysical information like vegetation, where animals are located, and chlorophyll; and we are taking human perceptions like what people think is important, human values, why it's important. Then we're identifying areas of land that are used traditionally for specific activities (14 in this case). What we found on the Kenai, our pilot area, was how the people of Homer perceived and valued their local area. We

have a boundary of what that local area looks like. Then we have areas that exist outside of Homer that are important for sustaining Homer for a wide variety of values: fish, salaries, spiritual values, recreation values, education, these are a series of “hot spots.” Human perceptions and values and biophysical values converge to make those areas the most valuable from a community and scientific perspective. If we just looked at Homer, itself, we would miss this other area as important to the people of Homer.

“What this allows communities to do is develop maps for themselves that are more than corporation boundaries or where vegetation is or where things are located. It allows communities to map communities that they exist in that have value for various purposes.

“We’re using existing science knowledge and trying to weave this together to synthesize this to come up with wisdom. Knowledge is one thing, you can *know* something, but what it *means* is a form of wisdom. In order to get there, we have to develop these new methodologies that allow us to bring together human values, perceptions, and culture to develop strategies for communities to cope and adapt.” (Dr. Lilian Alessa, UAA)

“I think there is a general consensus that climate change is real and ongoing. A human component exists. Over the last 100 years during the industrial revolution we have seen more gases that can contribute to global warming. We have also seen declining sea ice in the last few years. This graph says even if we stopped contributing to climate change right now, we would see those gasses in the next 100 years and it would be a millennia before you would see it decline. Even with mitigation, we need to address these issues. Adaptation is going to be vital.

“By environmental change, I’m thinking of sea ice, changes in the economic situation, opening or closing of a mine, place attachment and satisfaction. The good news, in relation to environmental change is there is lots of pre-existing information on how people adapt. If you go through scientific information and traditional knowledge, there are a lot of success stories to learn from. Our biggest challenge is how to bring together traditional knowledge and all this scientific data and make it meaningful and useful.

“The key question in my research is what we can learn from the past to help us with the future. E.O. Wilson said ‘We are drowning in information while starving for knowledge.’ There is all this information out there but we don’t have the knowledge to deal with the situation. A lot of people now are talking about interdisciplinary science--a way to take science and bring it together. Interdisciplinary science is the synthesis of many diverse sciences. We hope we can bring together the different angles and make them useful to people.

“There have been concerns about researchers going into communities and looking for information. We have to put the effort into synthesizing information we already have and sharing it, before

going into a community for new information. We need to learn how to take information that has already been gathered, add to it, and leave it as a legacy.

“Taking the Seward Peninsula as a focal area, people have spread outwards -- we start to see a complicated social system in this region. This is exciting for me because, as ecologists, we look at these systems as a system of connectedness. That isn't the way we used to look at social systems. I'm hoping we can provide new insight by looking at communities within the system they live in. A meta-population is a system of communities with a history. There is memory and experience within those communities. When we talk about movement within the system, there is also information, products, ideas and culture that move in the system. The connections made within a system allow movement.

“Overlaying this broader system, we're looking at the idea of resilience. Resilience is about how much change a community can cope with. How much change in sea ice can a community cope with and still maintain its way of life?

“Diversity is really important, for instance in food options. Social networks offer a lot more diversity. Self-organization is a good example of the ability to live in a self-determined manner. We also will be looking at learning and the ability to have a memory over different scales--oral history is a good example.

“It is interesting to note that those people who first learned to hunt large whales started in Chukotka and then the practice came to Alaska. Recently, after the breakdown of the Soviet era, people in Chukotka are going back to a more subsistence lifestyle. People from the North Slope of Alaska are going to Chukotka and helping them relearn how to go back to the traditional subsistence lifestyle.

“We are trying to work with communities. First, I think from a scientific perspective we can offer communities information. We are trying to synthesize information of the last 100 years and put it into a database to be used by us and the next set of researchers. Our visits to communities will be to look at what components of Alaska Native communities promote resilience to environmental change. We will say, this is what the researchers are saying about your community, how does that relate to reality?

“How can we continue to develop methodologies to take science and make it useful to people on the ground? We are trying to develop some wisdom from the information we have, TK Scientific knowledge of what we hear in communities; we are gathering what knowledge is there in the communities going on right now. We are exploring what tools we need to move into the future. I'm not sure we'll be able to develop those tools in four years, but we hope to identify what we need to move forward from here.” (*Martin Robards, UAA*)

4. Bethel: in the 1950's – Elaine Abraham

“I got off the plane here in Bethel on January 1, 1952. There was no airport--so we landed on the river. It was blowing like it is today; I had on high heels, nylons, a short dress and no coat! The pilot was Butch LaRue. Butch LaRue took his jacket off and carried me to the shed! Instead of a hospital, we had Quonset huts. We didn't have running water. Our surgical area and our nursing area was a Quonset hut. The night nurse had to boil water. We had to boil all our water in these great big pots by the nursing desk.

The Quonset huts were a couple feet apart from each other, so we would have the water wrapped with towels to get from one Quonset hut to the next. Now here in Bethel, you have a hospital that looks like a yellow submarine!

“In 1952 there were no 4x4s, no ski-doods; what we had were dog teams. These dog team mushers were on salary to the hospital and were paid for by the Indian Health Service. We had a team leader that took us everywhere up and down the river. They used to bundle me up in 3-4 sleeping bags and go up and down the river.

“When I first came, people were dying of infectious diseases, mostly TB. I collected sputum’s, sent them out and when I got results back, I would go back to the household. If there were 3-4 young children in the household, I took the children to Social Services and I gave treatment to the adults with TB. We had no place to send the sick people from this area so we had to treat them at home. I would have to go in and take your baby away from you and the baby would go into a home in Anchorage or Fairbanks or Juneau.



Elaine Abraham (ANSC Board)

“They sent me here because Bethel had a typhoid and diphtheria epidemic. The kids were dying. They couldn’t breathe because of the heavy phlegm in their throats. I was trained to do tracheotomies, so when there was an emergency, they came for me and I did the operation across the throat that allows you to breathe.

“We had a lot of impetigo. If it’s near the mouth we would ask them to bring the kids into Bethel because they can’t eat. We insisted if they had it near the nose or mouth that they come into the clinic. When I did visits, I usually had one or two sleds behind me and we brought them in. The mothers or sisters were usually boarded somewhere in Bethel and we kept the kids. In the summertime, we had maybe 2 dozen little kids with TB. We put 2-3 kids in a crib, because we didn’t have much space. If it was nice weather, we took them outside.

“When we went to villages, we usually worked 16 hour days. We had patients coming from all over and they would wait outside. We worked as long as we had light, sometimes 18 hours a day. Now we have a hospital. From Bethel, I went to the Alaska Native Medical Center in Anchorage. I flew back and forth. I knew where the TB patients were in many of these areas, so when we had 10 empty beds in Anchorage, I would go out and bring in the 10 cases that I thought had a chance to live.”

A large, empty rectangular area with a black border, intended for taking notes.



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