ALASKA NATIVE SCIENCE COMMISSION

SOUTHCENTRAL ALASKA REGIONAL MEETING REPORT

Front Cover: View of Mt. Susitna, also known as Sleeping Lady (http://d21c.com/Alyaska/CookInlet/slide1.html)

SOUTHCENTRAL ALASKA REGIONAL MEETING REPORT

A report of the Alaska Native Science Commission

This report is published by the Alaska Native Science Commission with funding provided by the National Science Foundation (NSF) under Cooperative Agreement OPP-0231085. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the NSF.

This document is available on the World Wide Web. You can view it by accessing the Alaska Native Science Commission Web site at: http://www.nativescience.org

For further information or to obtain additional copies, please contact:

429 L Street
Anchorage, Alaska 99501
Telephone: 907-258-2672 or 1-877-478-ANSC
Fax: 907-258-2652

Publishing date: March 2005

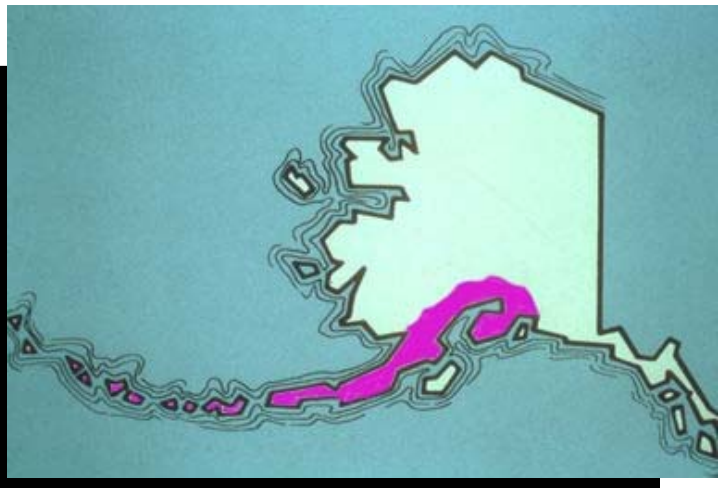
ANSC Publication No. 05-100

TABLE OF CONTENTS

EXECUTIVE SUMMARY

On May 13 and 14, 2003, the Alaska Native Science Commission (ANSC), funded by a grant from the National Science Foundation (NSF), brought together a group of 30 individuals to discuss opportunities, interests, and needs for developing community research plans in Southcentral Alaska. These individuals included representatives of local communities, Southcentral and Aleutian Native organizations, the Alaska Native Marine Mammal Hunters Committee, the Alaska Native Tribal Health Consortium, the Alaska Native Fish and Wildlife Society, the We Can Coalition of Alaska Natives, the Arctic Research Consortium of the United States, the Alaska Native Harbor Seal Commission, the Native American Fish & Wildlife Society, the University of Alaska Anchorage; Alaska State Fish and Game, and the ANSC board members and staff. This was the 2nd meeting in 2003, a series conducted by the ANSC to develop future research projects to find out the Native communities' priorities for research of interest to Alaska Native communities and regional organizations.

This report summarizes key concerns and research ideas for the Southcentral Region of Alaska. Quotes from participants on the May 13 talking circle are organized by the topics: climate, community, economy, education, environment, health, language, research, and traditional knowledge. Participants divided into four working groups to discuss: Learning Center; Education and Communication; Social, Cultural, and Economic Implications; and Research and Community Involvement. Group reports are presented along with highlights of challenges and recommendations.



The communities represented in the Southcentral Regional Meeting span from Willow to Seward and Homer. The Aleutian Islands were also included.

BACKGROUND

In 1993, the Elders' Conference at the Alaska Federation of Natives (AFN) Convention, made a recommendation to form the Alaska Native Science Commission (ANSC). 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 the ANSC's mission is to facilitate positive relationships among local, regional and statewide organizations and federal agencies, including, specifically in this case, NSF and Alaska Native communities. To do so, the ANSC began holding regional meetings throughout the State, and inviting interested Native leaders, elders, hunters, gatherers and young people from many communities as well as NSF-funded researchers to share their concerns, interests, and priorities for a research agenda. The main purpose of these regional meetings is to gather information about Native concerns for NSF and NSF-funded researchers.

METHODOLOGY

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 (See Appendix A) 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.

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 goes 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.

From left: Carl Hild *(UAA)*, Larry Merculieff *(ANSC)*, Flore Lekanof *(St. George Island)*, Mary Lekanof *(St. George Island)*, Adelheid Herrmann *(Bristol Bay)*, Fred Elvsaas *(Seldovia)*, Joel Blachford *(Seward)*, DJ Blatchford *(Seward)*, Muriel Morse *(Koyuk)*.

MEETING OVERVIEW

The Southcentral Alaska Regional Meeting was held on May 15 and 16, 2003, in Anchorage, Alaska. On the first day, participants heard formal presentations from Patricia Cochran of ANSC, Dr. Will Harrison of the University of Alaska Fairbanks, Dr. Lilian Alessa of the University of Alaska Anchorage, and Bob Clark of the American Fisheries Society. See Appendix B for the full text of their presentations.

Patricia Cochran, Executive Director of the Alaska Native Science Commission, began the meeting with the reminder that Native communities are taking greater responsibility about what is going on in the research arena. She stressed the importance of NSF's interest in knowing what are important research goals and concerns to Native communities. The Regional Meetings are an opportunity to make an impact on shaping NSF funding priorities. See Appendix B-1.

> And the most amazing thing I want to share before we start is a statistic I learned at a meeting I attended recently. We were talking about the Southcentral area and I learned that the Institute of Social and Economic Research (ISER) at the University has come out with the figure that there are 40,000 Alaska Native people living in Anchorage right now, and over the next 10 years they expect that number to double! There will be 80,000 Alaska Native people in this area! That is one of the things I want us to remember and focus on when we are sitting here in this meeting. We have people here from everywhere in the state, and we have to think in those terms. We have more and more people coming here and we have to look at how to adequately represent not only the local Native people who are the original inhabitants of this area, but all of us who come here and make this our home.
>
> *~ Patricia Cochran, ANSC*

Dr. Harrison discussed a NSF funded project studying the relationship of climate change and sea level on glaciers. He also noted that calving of icebergs and the surging of glaciers is not simply due to climate change. Glaciers are disappearing and it is important to find out why. See Appendix B-2.

> The impact to Yakutat and its Tlinglit inhabitants is that the upper glacier will block off the fjord, the fjord will fill up, and run down to the Situk River which is a major sport fishing stream, and quite important for the locals. This then will become a major river and the whole character of the river will change and, at least in the short run, the tourist industry will be seriously disrupted. Perhaps Yakutat airport will be impacted too, but I think that's less immediate.
>
> *~Will Harrison, UAF*

Dr. Alessa presented a case study on Dutch Harbor where stealth contaminants (that is when chlorine meets fat) and industrial contaminants are affecting Harlequin Ducks and Stellar's Eiders. She argues that hydrogen peroxide could be used instead of chlorine which affects the production of sperm, causes leaky cell membranes, and wasting of fat storage. See Appendix B-3.

> Chlorine is an incredible compound. Sort of like somebody's practical joke, it's something you can't live with and can't live without. So now we're talking about the outputs. What do lipid chlorine outputs have to do with eiders? This is yet another interesting almost practical joke. Eiders feed on the benthos, the arthropods in the near-shore. They feed in areas that are rich in arthropods because they are not stupid and they want to get the most calories for their diving time. It costs energy to dive. Because this area is being enriched with fat, the arthropods in this area are growing fat, they are getting enriched. So they eat a lot of the gurry. There's tropic transfer of these nutrients into the arthropods. So guess what? The eiders feed in these areas where this gurry has been output. So it's kind of a lure, if you have fat arthropods, the ducks come in and feed on the arthropods, but the arthropods are loaded with chlorine from the industrial outputs. It's like giving somebody a power bar laced with arsenic.
>
> *~Dr. Lilian Alessa, UAA*

Bob Clark introduced participants to the Hutton Program which partners a high school student with a scientist for a summer research project. See Appendix B-4.

After the formal presentations, this meeting was conducted in the traditional "talking circle" fashion which invites all participants to share openly in the discussion. ANSC's elder representative, Elaine Abraham opened the meeting with a prayer followed by Ms. Cochran who thanked the Eklutna Tribe for permission to meet on their land. Ms. Cochran gave background information on the role of the ANSC in helping communities and western science researchers to come together and further science needs and agendas at the community level. She emphasized the importance of engaging the western scientists to work together with the local community on projects of interest to both parties.

Local community and regional Native representatives shared concerns about effects of climate change, the health of their communities, responsiveness (or lack thereof) by state and federal agencies to the needs of Alaska Natives communities, compensation for and recognition of the need for traditional knowledge shared by elders/Natives with researchers, and changes in wildlife they depend on for subsistence. The group was made up of people indigenous to the area, as well as Natives now living in the Anchorage area who had relationships with or background in a broader range of Alaska. Some of the recommendations encompassed perceived needs beyond the Southcentral Region of Alaska and included the state as a whole.

Unlike the previous Regional Meetings which were held entirely in a talking circle format, this meeting broke into four groups on the afternoon of the second day. The four small working groups discussed in more detail the issues and concerns, itemized into four categories: Learning Center; Education and Communication; Social, Cultural, and Economic Implications; and Research and Community Involvement.

Each group had a recorder and a reporter to report their priorities, recommendations and action items to the plenary group at the close of the meeting.

KEY ISSUES AND CONCERNS RAISED BY NATIVE PARTICIPANTS

Ms. 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 researchers and scientists and the Native scientists should be working on.

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 previous regional reports for comparison purposes.

1. Climate

- Adaptation

  "It's important to be documenting how we are adapting to the changes that are occurring. I think that it's important to capture while it's happening and not to do it after the fact. You need to record what the people are doing while it is happening as they adapt to the change in climate." *(Taqulik Hepa, ANSC Board)*

- Economy

  "We were talking about the issue of what affect climate has to change when resources are low in one species you adapt and use another. Then with the change of the climate, it changes the 'economic' system which they [elders] say is their way of life." *(Sid Smith, New Stuyahok)*

  "I think that in terms of what climate does to an economic system either western or Native, it depends on how rapid the climate change is and whether people have time to adapt to it." *(Will Harrison, UAF)*

- Ice / Permafrost / Glaciers

  "I was in the Kotzebue region for two years and we have holes in the earth there that were never there before. Does that have anything to do with glaciers?" *(Muriel Morse, Koyuk)*

  "No, but it has to do with permafrost. Holes erupt where you can see that there had been a massive ice that has melted away." *(Will Harrison, UAF)*

- Migration

"It may change the way that the animals travel with the rising temperatures, they may go to different areas so their routes would change. They might be more accessible, and if they're more accessible, with the amount of roads that are being built in Alaska, the populations will go down." *(DJ Blatchford, Seward)*

"It's already happening. There were no moose in Yakutat 50 years ago or so, but there are now. They probably made it down from the Interior and Northern Alaska. Some people believe that anyway, so already you can see some of what's happening among animal populations." *(Will Harrison, UAF)*

2. Community

- Fish, wildlife, and habitat access

"We need to be aware of how fish, wildlife and habitat access regulations are changing Native cultures around Alaska. Nobody's looking at that and eventually every single one of these regulations will change the way we practice our traditional ways." *(Larry Merculieff, St. Paul Island)*

- Sharing scientific data

"Another issue is sharing the scientific data with the communities so that the communities can use the benefits from the data that is provided. All too often scientists do the research, they go away, they put it in a report, and the communities don't get a chance to use that information." *(Taqulik Hepa, ANSC Board)*

"A lot of the times in my experience, research is done and completed and taken back to the community and the scientists are asking for community review. In my mind, there's not enough response to that type of review. It would be really nice to have more of this, like we have fishermen, we have hunters that are gone all the time, sometimes if you give them a report and say what do you think about this? They say, 'I don't want to look at that, I've gotta go work on my boat motor' or something like that." *(Rex Snyder, Alaska Native Harbor Seal Commission)*

- Traditional ways

"One of the biggest challenges is bringing the elders and youth together to help our young people understand our traditional ways. They need an understanding of our sense of time. For example, when we had our first spirit camp back in 1992 on St. Paul, we couldn't get the kids to be quiet – the silence that we talked about that is so important in connecting to the creation,

so we had to start by saying, okay, you're going to be quiet for five minutes. You're going to sit out there for five minutes. When our kids are so programmed and moving through time so fast with their minds, they are completely unable and incapable of connecting to the understanding of the traditional ways. It's a critical concept that I don't see anyone addressing." *(Larry Merculieff, St. Paul Island)*

3. Economy

- Subsistence

"A lot of the elders talk about subsistence in our way of life being like the banking system in an economic way of life. Their way of life is like an economic system where you trade off for salmon or moose. Like the western culture has an economic system, this is our system." *(Sid Smith, New Stuyahok)*

- Development of our Customary and Traditional Use Products

"Another topic would be economic development of our customary and traditional use products. Fish eggs to seal skins to hand crafted items that we use for traditional hunting and gathering. Find out ways through economic development how we can increase those opportunities which would include an education aspect for the children in many communities." *(Rex Snyder, Alaska Native Harbor Seal Commission)*

4. Education

- National Science Foundation

"A really important thing I need to say about NSF is that, although when people think of the NSF, they think it is all science and research, but you should be aware that a huge component of what they do is in education. They do a lot of funding of education as well. They are the ones that funded the Alaska Rural Systemic Initiative project, which is one of the other larger programs, so we need to keep that one of our topics." *(Patricia Cochran, ANSC)*

- The Public

"I like the suggestion of synthesizing some of the data out there because we need to educate, not only the powers that be, the policy makers and the corporation system about contamination and pollutants, but we also need to educate all the rest of the people, including the environmentalist groups to not just look at one small item. We need them to begin to look at things holistically rather than singularly." *(Oscar Kawagley, ANSC Board)*

"One other thing I think we need is the media to help us out. Do we have any means of doing that today? Is there a Tundra Times of today? We have beautiful ideas here, but if we don't spread it out, it's not going anywhere." *(Flore Lekanof, St. George Island)*

- Traditional Education

"The only way you can learn how your ancestors lived, is to live on their land because of the spirituality of our land. You have to absorb it. You need both kinds of education, but most of all you need to be on your own land and the spirits of your land will help you. We need our young people back in the villages and the rural areas. We constantly have a brain drain out of our villages." *(Elaine Abraham, ANSC Board)*

"I was educated on the environment all my life. Like most of the Natives out there in the rural communities, we are educated on our environment. We need to believe the village people on their concerns. When we are speaking of the truth, the people coming from agencies need not label them radicals or militants for the country, but our people are fair witnesses." *(Ole Lake, Hooper Bay)*

"I think as parents we need to be reminded that if we want our children to speak Inupiat, or to participate in subsistence activities, we have to take that responsibility. It has to start within the family. The parents or the guardian or grandparent who is raising the child needs to make that commitment to teach the children the knowledge they have." *(Taqulik Hepa, ANSC Board)*

"Coming from a family of artists, I think it is important for us to realize that a major part of our education comes from the creative mission of our artists, whatever form it takes." *(Martha Vlasoff, Village of Eyak)*

From left: Elaine Abraham (*ANSC Board*), Christina Wilson (*ANSC*), Rex Snyder (*Alaska Native Harbor Seal Commission*), Taqulik Hepa (*ANSC Board*), Karen Stickman (*Native American Fish and Wildlife Society*), Holly Cusack-McVeigh (*Alaska Native Fish and Wildlife Society*), Ole Lake (*Hooper Bay*).

"That's interesting, because a lot of the mythology comes from experiences that the everyday person has while picking berries or going out and doing some hunting, if they have an unusual experience, they deify that experience by using wood, bone, stone, feathers, skin, whatever, to make that mythology, or that experience visible." *(Oscar Kawagley, ANSC Board)*

- Western Education

"Anyone who's been through the Anglo system knows that it's not easy to try to cram your brain full of information that doesn't seem relevant to living in the village." *(Martha Vlasoff, Village of Eyak)*

"How do we change the direction education is going in Alaska? Down through the years I think we have been educating our young people into the urban lifestyle. All the texts, the teachers that we bring in, all teach that. I don't know of any texts that have come out emphasizing the desirability of living a rural lifestyle or the rural culture. I think we need to do something to change that. I think we need to encourage our young people to become teachers and teach in rural Alaska and we need to have people changing the textbooks that are being used out there. It's a lot of work." *(Flore Lekanof, St. George Island)*

"How do we get our people interested in education and in teaching and bringing our Native lifestyle, the rural lifestyle right into the communities to save our communities out there? We're losing people from our villages. That's why they are coming here. How do we stop them?" *(Flore Lekanof, St. George Island)*

"We're stealing the words of Martin Luther King. 'I have a dream.' But it's not a dream about me. It's a dream about my relatives, my cousins and everybody else, my peers. Many of them have not had the same support and opportunities that I have had. Many of them feel like their life has little value, and they turn to drugs, alcohol and things like that. Many of my family have had that problem. Many of you know this situation. My dream is to have tribes use their sovereign authority and governance and powers to develop their own curriculums in their communities to look to these young people that are not successful in the western education system that's changing right now. A lot of them won't succeed because of their world view. Because of the world view of their aunts, uncles, and parents that are going to teach them how to survive in this world. A lot of them don't have that support. If the tribes were given the opportunity with, say NSF funding, to develop a curriculum where they move away from the main village and establish their cycle of moving camps, I know there's a lot of models of little camps and things that happen, but this would be a full seasonal cycle curriculum. And they would not totally focus on arithmetic, mathematics and science, but it would also focus on customs and traditions and world views. The elders would be the teachers, not a person that's shipped in from out of state to get their requirements finished. But they would be the elders teaching these people and they would be the keepers of the traditions. They would become

the masters of the old ways. There could be some elements of applying science or other education, but I would really like to see a school, not a state school, not a state-funded school or anything like that, but it would be tribally owned, and they would get their degree, not engraved on nice paper or anything, but they would be the ones, the hunters and the providers to the community and it would give them the value they deserve and need, because there are so many of them that are left behind in the current system. *(Rex Snyder, Alaska Native Harbor Seal Commission)*

"There is a lot of collective knowledge in this room. What I see lacking all the time is how to put that into action. For instance, if I saw a need for young people to be educated in a certain field, how do I encourage that? I think we need more people educated in public policy. We, as a people, need to know processes. We are going to need to understand the political processes especially in dealing with fisheries and resource disasters that are likely coming up. I would like to propose that we list areas in which we would like our young people educated." *(Adelheid Herrmann, Bristol Bay)*

5. Environment

- Natural Resources

"We are interested in our natural resources and we hope that we can do something to preserve those for our children and our childrens' children." *(Flore Lekanof, St. George Island)*

"The environmental concerns in Alaska are an on-going issue. We need to look and work toward maintaining the resources that we have, but still be able to do things within our state. We need to work toward a happy medium that fits everybody, especially in regard to our Native lands. We don't want to ruin those lands, but yet we need to use them." *(Fred Elvsaas, Seldovia)*

"My grandmother taught me, 'love your people and love your land. If you don't take care of your land and don't teach your children to take care of the land, no one else will and you won't have it.'" *(DJ Blatchford, Seward)*

6. Health

- Contaminants

"My dad and all his siblings died from the effects of contamination. That's why I work for Alaska HUD Zone, a new little entity that goes to the rural communities and addresses environmental and health issues. We actually train the people in villages to clean contaminated sites." *(Muriel Morse, Koyuk)*

"The education process on both the village level and the agency level needs to take place. Too much is happening and too little has changed since 1968 or even since statehood. Our people are dying out there. The renewable resources we have are being affected and our people are being affected, but nobody seems to be hearing us." *(Sid Smith, New Stuyahok)*

"If our people are dying out in the villages, all this stuff about education and programs and everything else doesn't make any difference. It's really sad. Remediation that's going on is just a band-aid effect. They're only looking at the surface, but the soil under ground is contaminated. All this stuff about subsistence doesn't mean anything if you don't clean the land." *(Sid Smith, New Stuyahok)*

- Treatment Centers

"There is a treatment center in Canada called Poundmakers Lodge. It's a treatment center that was started by the Cree Nation in Edmonton, Alberta in 1984. The provincial government gave the Cree a boarding school and millions of dollars to start their program, with an apology for all the years of abuse suffered by First Nations peoples in Canada. The elders worked with the architects to design a culturally appropriate treatment center. I don't know what it's going to take to get recognition of the historical trauma that indigenous peoples in the State of Alaska have gone through and are going through today. I think the only way to deal with those issues is to tell the story. There are treatment centers all over Canada like Poundmakers now. They are centers where people are doing their healing work on an individual level and not just throwing millions of dollars at the state like some of the programs we see here in Alaska. It's an individual healing that needs to take place and we need to be responsible for our own healing. We also need to get to a point in telling our truth that the State of Alaska admits to and apologizes for the harm that they have done in indigenous peoples' history." *(Martha Vlasoff, Village of Eyak)*

7. Language

- Native

"When you prepare your reports, I have heard the elders ask, 'What is 'Native'? Maybe you could find out exactly what does that word mean? Is it a term used just to please the state or federal government? Some people are saying that it's a bad word." *(Sid Smith, New Stuyahok)*

"In some places in Canada if you use the word Native, it's like swearing at them. People really don't like that, but if you say 'Aboriginal' in Canada, some people in Canada don't like that either. Some prefer First Nations. I think that we fall into the trap of using a commonality rather than saying we are all who we are, Inupiat, Yupik, or Chupik or Athabascan, or whatever your own tribe or race is." *(Patricia Cochran, ANSC)*

- Power of Words

"The power of words is very important. One of the things the elders have always known is that the language is birthed from the land. So the language is an encodement of the vibration of that land. It also contains the type of vibration that is used in words in the ceremonies for healing of those lands. This is why the elders say the language is very, very important to every single village and every single community and every single culture throughout the entire world." *(Larry Merculieff, St. Paul Island)*

"One thing I miss about our knowledge and world views is our really progressive understanding of physics. I wish that would be recognized somewhere. A few people in physics are starting to realize that they have come to the end of their abilities in defining or talking about the universe in English so they are coming back to indigenous languages because we hang on to all of our early knowledge about physics whether we have language or not. I mean, that's the purpose of language, is to define our physics." *(Chaille Yasuda, Anchorage)*

- Subsistence

"Subsistence is a very divisive issue in the State of Alaska and it's not the correct word to use in dealing with the resources out there in rural Alaska. When they're talking about subsistence, sometimes other people or other cultures understand it as the way of human beings. An elder from the Interior of Alaska was telling me, instead of using the word 'subsistence' why don't we start saying 'livelihood.' It's very generic, even the simplest minds can understand livelihood." *(Ole Lake, Hooper Bay)*

8. Research

- Collaboration

"It seems like we need to come up with some kind of research plan that's integrated. That takes in the healing and takes in the education." *(Adelheid Herrmann, Bristol Bay)*

- Diagnostic Lab

"You've all seen and heard about problems or abnormalities with animals, and you wonder what they are. You see all kinds of stuff. One thing we'd like to do is to establish, somewhere in Alaska, a diagnostic lab that will be available to take animals to find out what exactly is the problem when you see things like this. I would like to have some representatives from rural Alaska and Alaska Native interest groups." *(Mike Bradley, Alaska Native Tribal Health Consortium)*

"What we need here is a lab that is cost effective. The directions we got from the elders initially, was to put it through the hospital, but they are very leery of the hospital because they are concerned they will only want to make money from us. So when we researched it, the route the elders wanted to take was to get a tribal lab that everyone in the Alaska tribes would own; that they could have a voice in it. It's really interesting because having a lab in the state would cut diagnostic costs by 70%. That's one of the things the Alaska HUD Zone is looking into." *(Sid Smith, New Stuyahok)*

"There is a lab in Washington State called Shoalwater that is tribally owned. I have a connection with them now and they have offered to share with us where they get their money and how they're doing it to help us get a Native-owned lab going here in Anchorage. I'd like to say there is hope. If they can do it Outside, we can do it up here. We do need a lab of our own and we can train our own people in doing this lab work here in Anchorage as well as anywhere in Alaska. Nothing's impossible, especially if you're creative." *(Muriel Morse, Koyuk)*

- Ownership

"There's something about taking ownership of research or issues. We went to the Bering Sea meeting in Girdwood. It's like our issue, but someone else is controlling it. That's the position we're put in now, we don't have ownership of these issues. Somebody else takes them on and addresses them. We need to do that ourselves somehow." (*Adelheid Herrmann, Bristol Bay)*

9. Traditional Knowledge

- Elders

"We need a synthesis document of what every elder has said over the last 5-10 years." *(Larry Merculieff, St. Paul Island)*

- Importance of Women

"We need to remember the importance of women in understanding fish and wildlife habitat, environments and cultural preservation. It's something that is constantly ignored, is the importance of women. It's not visible. We need to make it visible." *(Larry Merculieff, St. Paul Island)*

- Life views

  "What we are trying to do is understand the unspoken language about our life views and the relationship between the land, the animals, and ourselves; what exists between us from our world point of view, our existence with the universe. That, all by itself, is a whole science that is not very well understood by the educational systems that rely on the written word. When people start to understand the languages of the animals, the land, the air, the water, there's all different perspectives that we place on everything. We call it the spirit of all things. It could be a whole curriculum by itself." *(Ole Lake, Hooper Bay)*

- Sacred Lands

  "There are places in this state that are still very sacred and that's the land. The land knows how to heal itself, but it will not start that process without the people, because the people are connected to the land, just as the plants, the animals and the rocks. That's how I was taught to believe and to respect all those things. When you respect all those things, there is a balance. If one gets levied over another, it throws everything off." *(DJ Blatchford, Seward)*

  "We need to tell the agencies, policy makers, and learning institutions, about the sacred names of these places. What these places are and how we as humans relate to them. If all humans can understand that, they'll have better respect for coming into a town or region, and looking at the resources, and maybe they will leave with a little prayer." *(Ole Lake, Hooper Bay)*

- Scientific Knowledge

  "You know, our people, our elders, are educated whether they are Tlingit, Eskimo or Haida. Maybe one day you'll be using our traditional knowledge in place of your photographs, because in our elders' minds they do have photographs, and that's how we survived from generation to generation—by word of mouth. Maybe the scientists should be listening to the elders." *(Muriel Morse, Koyuk)*

  "Traditional knowledge needs to be valued. Sharing freely may be demeaning. We need to be careful with each person's knowledge because what you will find is that what comes out of a group like this could suddenly end up in someone's masters' thesis, or PhD." *(Elaine Abraham, ANSC Board)*

RECOMMENDATIONS – GROUP SUMMARY REPORTS

After sharing concerns in the general forum, participants divided into four working groups to discuss: Learning Center; Education and Communication; Social, Cultural, and Economic Implications; and Research and Community Involvement. Those group discussions were presented in reports to the plenary group. Full text is available in Appendix C.

1. Learning Center Group Report:

- Establish an Indigenous Learning Center
- Encompass a vision of traditional values through elder's leadership
- Establish an elder/youth council with equal representation of men and women
- Include major functions according to Native world view: have body, soul, mind and spirit
    - i. Body would be the lab, or diagnostic lab
    - ii. Soul would have the healing and treatment center
    - iii. Mind would have the education and outreach and information clearing house
    - iv. Spirit would be the aspect of traditional celebration and ceremony which includes sports, games, and foods of our people
- Designate an organization to facilitate and coordinate the development
- Recommend that ANSC explore the best process to get everyone involved in the process including the eventual funding of this center

From left: Fred Elvsaas (*Seldovia*), Martha Vlasoff (*Village of Eyak*), BJ Blatchford (*Seward*), Muriel Morris (*Anchorage*), Aaron Peters (*ANSC*), Larry Merculieff (*St. Paul Island*) brainstorm the Learning Center.

- Establish an operational council that includes elders
- Obtain advice and spiritual background from elders to ensure the interest of the people stays to the vision of the elders and purpose of the center

Clockwise (bottom): Christina Wilson (*ANSC*), Flore Lekanof (*St. George Island*), Oscar Kawagley (*ANSC*), Angie Santa Anna (*Anchorage*), Taqulik Hepa (*ANSC*), Chaille Yasada (*Anchorage*) brainstorm on Education and Communication.

2. Education and Communication Group Report:

- Ensure that Native world become the new visions of Native education
    i. Remember the power of the word and the power of silence
    ii. Remember that education needs to be experiential: wisdom from and spiritual connection to nature
- Ensure that the responsibility of education not only falls upon the family but also the community
    i. Create schools to be the reflection of the community
    ii. Principal and teacher show utmost respect for the source of intelligence
- Ensure that education is experiential: it has to be cyclical to take into account the things that we do according to the season
- Model successful programs like the language immersion schools, or subsistence programs of the Arctic Slope area
- Teach the Native language and Native cultures
- Create accurate histories by writing history of heritage

- ANSC, Alaska Rural Systemic Initiative, and other Native teacher education associations draft a resolution for consideration by the AFN whereby we would ask the University of Alaska system to establish a college of Native Studies
- Write our own history
- Measure the success of students in language, and cultural competency
- Make use of student profiles which contain observations of the teachers, elders and community upon the profile of a youngster
- Adapt and regenerate our language and world views
- Learn our own language and culture

3. Social, Cultural and Economic Implications Group Report:

- Involve the tribes and villages in the decision making process, since many of the rules and regulations don't fit our villages
- Solve nepotism through honesty
- Create economic development opportunities that are sustainable
- Use local knowledge
- Become proactive in management of sport fishing, commercial fishing and hunting
- Involve media
- Create a transition center for people who come to Anchorage and don't know where to go, who to talk to
- Team up with other agencies and companies
- Emphasize a multi-directional, cross cultural education

From Left: Ole Lake (*Hooper Bay*), Alice Petrivelli (*ANSC Board*), Mary Lekanof (*St. George Island*), and Sid Smith (*New Stuyahok*), review priorities of Social, Cultural, and Economic Implications.

- Create marketing plans to get our story out to the world
- Hire locals for the clean up of hazardous waste and training concerning remediation and

social, economic and natural disasters

- Create more and better training
- Include women in decision-making
- Involve villages in tourism by setting up village companies
- Advocate for co-management of climate change and regulation issues like making decisions on how or when we can fish

4. Research and Community Involvement Group Report:

- Coordinate research
- Review current projects that are incorporating traditional knowledge and wisdom and see how it fits with new research
- Set up Memorandums of Understanding that limit how that particular local or traditional knowledge will be used
- Identify barriers on how research is done in communities like human resources and capital resources for communities to do their own research or to work with agencies like MMS, BLM, EPA, etc.
- Collaborate to avoid duplication
- Create a lab/learning center where we can do biological studies for our natural environment such as berries, seals, whales, caribou, and water samples; training
- Do research on contamination and genetics in the laboratory

From left: Karen Stickman (*Native American Fish and Wildlife Society*), Susan Mitchell (*Arctic Research Consortium of the United States*), Joel Blatchford (Seward), Rex Snyder (*Alaska Native Harbor Seal Commission*), Elaine Abraham (*ANSC Board*) brainstorm Research and Community Involvement.

- Respond to that research in the community (i.e. have a research plan as part of their over all community plan)
- Encourage more community review of results and recommendations by scientists and research that goes on

CONCLUSION

The Southcentral Regional Meeting brought together scientists, researchers, and Native communities to identify research needs and develop future research ideas specifically for the Southcentral Region of Alaska.

The following research topics were proposed by the participants:

1. Earth Science Research

- Glaciology: Glaciers are melting in both the arctic and worldwide. Research efforts should determine what changes are occurring in Alaska's glaciers compared to changes on a global scale, determine what is causing these changes and the results on the local arctic ecosystem, i.e., animal migrations that affect indigenous livelihood efforts, moose disappearing, introduction of new insects, and affect on water availability.
- Exploration of changes in the local ecosystem, i.e., decline in health and number of wildlife, marine life and birds, introduction of new species and understanding the reasons for these changes and the affect upon the lifestyle of Alaska's indigenous people.
- Continued research of the effect of the Exxon-Valdez oil spill as it applies to wildlife, flora, fauna and marine life.

2. Arctic Social Science

- Establishment of a Learning Center based on traditional values with Elders in leadership roles and involved in the creation of all aspects of center. Elements of the center include:
  - i. Major functions to be based on a Native world view: body, soul, spirit and mind:
    - Body includes diagnostic lab and research center
    - Soul entails healing and treatment
    - Mind focuses on education and outreach
    - Spirit has traditional celebrations/feasts
  - ii. Center is led and maintained by the Native people and serves as a repository and coordination center for current and past research projects
  - iii. In the next 10 years, 80,000 Natives are expected to be living in Anchorage area

iv. This Learning Center is seen as an Education center and a transition center for people moving from villages to Anchorage

v. Learning Center is seen as being a Native marketing/media mechanism

vi. Conduct a study of the role of women in the Native culture and their effect upon the retention and passing of traditional values and customs

vii. Roles of the Center include: Education of children, food, mannerisms, conversation, caretakers, and preparers in the community

Martha Vlasoff (*Village of Eyak*) presents key points from her group.

- Research Native worldviews to discover commonalities throughout. Reviewing worldviews, language, mythology, place names, singing, dancing and drumming; understanding of the connections. Worldview is the underpinning of Native cultural, i.e., infrastructure, languages, and values.

- Research the effectiveness of a western science-based education system in regards to Native students as it relates to special needs determinations, opportunities to learn and apply Native knowledge, cultural awareness of educational staff and make appropriate recommendations to state education officials:

    i. Language immersion schools

    ii. Curriculum changes to allow for Subsistence & Native Camps

    iii. Move to student profiles/personal growth plans

    iv. Teacher education courses

    v. College of Native Studies

The following challenges were discussed and recommendations were offered:

3. Native Knowledge and the Research Process

- Application of Traditional Research Needs with Western Funding Criteria: A challenge to the Native communities when completing applications for research projects is having to align traditional needs with that of western science application requirements. Because the two areas often approach a subject from opposing views, it is difficult to submit an effective application.
    i. When applying for grants, money can't be received unless filled out "their way"
    ii. How do grantees take western science & Native science to compliment both sides and vice versa?
    iii. Western scientists get into a change mode—villages don't fit the criteria
- Communicating Research Information to the Community: Information relayed to the community before, during and after research is not done in a way that allows for understanding. Technical terminology and elevated language does not permit effective communication to all members of a community. Relaying information in basic terms and areas of importance to these communities will help to ensure understanding of the research topic.
- Barriers to Community Research: Limited human and capital resources, physical space limitations, duplication in research areas and competing funds. Creation of Community Research Plans and research processes include oversight and peer review, community input on research needs and applications.

4. Continuity in Research

- Research Coordination: Many organizations participate in research projects throughout the Arctic region, often researching different aspects of the same issue. Projects conducted by the National Science Foundation, National Park Service, University of Alaska, Environmental Protection Agency, U.S. Geological Survey, and the Department of Fish and Game were all mentioned during this meeting. With many different agencies researching topics that have clear impacts on the local communities, it is difficult to align research projects and collect relevant information. The proposed Learning Center would be an active partner in the Arctic research process, assisting communities with the application process and serving as a development and coordination center for proposed, on-going and past research. Coordinate research and use equally weighted priorities.
- Action-Oriented Results: Studies are conducted over several years with no action taken. Example: The *Super Fund* identified sites for clean-up and nothing happened in the Native communities. Committees should include Native representation and these representatives

should be part of the decision-making process. An action plan is needed and roles and responsibilities must be clearly defined and outcomes documented. Process and committees that make decisions need to be identified. Decisions should be made by villages, not imposed by state or federal governments. Currently, the land remains contaminated, not cleaned up.

APPENDIX A: PARTICIPANTS

NAME	ORGANIZATION AND/OR COMMUNITY
Abraham, Elaine	Alaska Native Science Commission, Board
Alessa, Lilian	University of Alaska Anchorage
Blatchford, DJ	Seward
Blatchford, Joel	Seward, Marine Mammal Hunters Committee
Bradley, Mike	Alaska Native Tribal Health Consortium
Clark, Bob	Alaska Fish & Game
Cochran, Patricia	Alaska Native Science Commission
Cusack-McVeigh, Holly	Alaska Native Fish & Wildlife Society
Edtl, Nancy	Alaska Native Science Commission
Elvsaas, Fred	Seldovia Native Association
Fredenberg, Connie	Aleutian Pribilof Island Association
Harrison, Will	University of Alaska Fairbanks
Hepa, Taqulik	Alaska Native Science Commission, Board
Herrmann, Adelheid	Bristol Bay
Hild, Carl	University of Alaska Anchorage
Kawagley, Oscar	Alaska Native Science Commission, Board
Lake, Ole	Hooper Bay
Lekanof, Flore	Village Corporation Board, St. George Island/ Seattle
Lekanof, Mary	St. George Island/ Seattle
Leming, Kim	Alaska Native Science Commission
Merculieff, Larry	Bering Sea Council of Elders, St. Paul Island
Mitchell, Susan	Arctic Research Consortium of the United States
Morse, Muriel	Koyuk
Nothstine, Greg	Alaska Native Science Commission
Peters, Aaron	Alaska Native Science Commission, Student Intern, University of Alaska Anchorage
Petrivelli, Alice	Alaska Native Science Commission, Board
Santa Ana, Angie	Anchorage/Mekoryuk
Smith, Sid	New Stuyahok
Snyder, Rex	Alaska Native Harbor Seal Commission
Stepetin, Larry	Pribilof Islands Researcher
Stepetin, Viola	Alaska Native Science Commission, Student Board Advisor
Stickman, Karen	Native American Fish and Wildlife Society
Vlasoff, Martha	Village of Eyak
Walker, Anne	Alaska Native Science Commission, Board
Wilson, Christina Salmon	Alaska Native Science Commission, Student Intern, University of Alaska Anchorage
Yasuda, Chaille	Anchorage

APPENDIX B: TRANSCRIPTIONS FROM SPEAKERS

1. Opening Remarks – Patricia Cochran

"I want to acknowledge our student interns. One of the best parts of what we are doing at the Alaska Native Science Commission (ANSC) is our student interns: both students that work in the office and the students who serve on the board. It is an example of what we've been working toward in the Science Commission, to bring young people together with elders to work on a board and to work more closely with the science and research communities. These young people have been able to offer us new insights; new ways of looking at the world. They are excited about what they are doing now and want to bring back what they learn to their communities.

Patricia Cochran (*ANSC*)

"I also want to share my impression of a meeting Larry and I just went to in Alegnagik. We spent some time with people out there working on issues confronting their village. The GAP coordinators and others who are getting involved are very sharp people. They know what they're doing. They are really concerned about what is going on in the community. It was obvious the people cared, and they weren't looking to everyone else to solve their problems for them. They were going to solve their problems themselves. It was a very important moment for me, seeing that the communities are taking responsibility themselves for the actions that are going on.

"And the most amazing thing I want to share before we start is a statistic I learned at a meeting I attended recently. We were talking about the Southcentral area and I learned that the Institute of Social and Economic Research (ISER) at the University has come out with the figure that there are 40,000 Alaska Native people living in Anchorage right now, and over the next 10 years they expect that number to double! There will be 80,000 Alaska Native people in this area! That is one of the things I want us to remember and focus on when we are sitting here in this meeting. We have people here from everywhere in the state, and we have to think in those terms. We have more and more people coming here and we have to look at how to adequately represent not only the local Native people who are the original inhabitants of this area, but all of us who come here and make this our home.

"Let me tell you what's going on with this particular regional meeting and why you're here. The National Science Foundation gave a grant to the Alaska Native Science Commission to work with the Native communities across the State of Alaska over the next several years to go out to those communities, hold regional meetings as we did before, but this time to really concentrate on looking at

research issues and priorities; questions of ethics; all these kinds of things that the National Science Foundation is really interested in. They want to know what our Native communities think should be going on in research from their perspective.

"NSF is one of the biggest funding agencies of science and research. It was good to see that they realize that it is important to know from the Native community what is important to us. We don't want to just be somebody's topic of research. We don't want to be somebody's dissertation paper. But we would like to be able to work with those scientists who want to work in those areas. So if we can say, 'we want to do this kind of a project in Kenai,' we can try to find a scientist who is interested in doing that and put people together. That's part of what we're trying to do here; to identify the research concerns that we have; the issues that we think are really most relevant and important and that NSF researchers can work on with us.

"In the 10 years I've been working with NSF and the Science Commission, there have been amazing changes. 10 years ago, NSF would never have even thought about funding a traditional knowledge project. It would never have occurred to them. But these are some of the things that have changed, because of efforts of the communities to bring these kinds of things to the table. There are things now that NSF does, for instance they are putting out an ethical practices paper for researchers that work in communities. That would never have happened before. There has been an impact and I think we have an opportunity to make a larger impact on what NSF funds and what their priorities will be. They have asked us to do this, so we have an opportunity to present to them what we see as critical areas of research and concern from our communities. That's really what we will be doing over the next couple of days." *(Patricia Cochran, ANSC)*

2. NSF-Funded Scientist Presentation: Will Harrison

"We have a snow, ice and permafrost group at UAF. What we do is currently funded by the National Science Foundation, but it has a global focus. Our research is on basic problems in glaciers and climate. Now it is, perhaps, driven mainly by global change to which glaciers are unbelievably sensitive, and the more applied issue of it's affect on sea level. Sea level is going up about 1.5 millimeters a year, that's quite a bit. It is important to millions of people around the world, including the northwestern parts because of the sea level erosion. As far as Alaska and Natives are concerned, I think that the immediate impact of glaciers is at its maximum in Prince William Sound and Yakutat.

"The theme of this talk is how glaciers are changing and how that rate change is changing. And then there are some side issues. We recently published a paper on our first state of the project where we measured the volume changes of Alaska's glaciers. It attracted a lot of attention because it compared the current volume of Alaska's glaciers with USGS maps made in the early 1950's.

"One of the side issues, but a fairly major one, is that the airplane results indicate that almost all of the glaciers in Alaska are shrinking at an accelerating rate. How is it, then, that the Hubbard Glacier, the one near Yakutat, has advanced twice in the last twenty years? How can that be? That's one of the things I want to take up.

"The issue is there are more things than climate that force the glaciers to behave this way. Glacier surges are periodic catastrophic advances that have only, at best, an indirect relation to climate. The Andrew glacier, a big glacier in the Alaska Range on the Parks Highway, recently had a surge. When glaciers surge they often crack up. It's an episode of very rapid motion.

"With most glaciers you see kind of a 50/50 balance. Half of the system is white and half of it is gray. The upper half replenishes the lower half. But if we look at the Hubbard Glacier, there is only a little bit of ice that is exposed, and there's this huge ice field up in Canada that replenishes this little bit of ice down at the mouth of the Hubbard. There is about 10 to 1 if not 20 to 1 times as much snow up here. What's going on? What's weird about Hubbard Glacier and where is the ice going?

"The ice comes off at the face of the glacier as icebergs. We call that calving of icebergs. So anything that affects the rate at which icebergs are calved off in front of the glacier, will affect the position of where the front is, because that's a major source of ice loss. It's not that the loss is by melting, here most of it is by calving. So that's a process that's not directly related to climate, so things can happen at Hubbard Glacier like the advance, that are not due to climate, at least not in any simple way.

"A variegated glacier is one where the upper half is white and snow covered. And the lower half is dark covered ice. Here are two pictures of Hubbard Glacier in '64 and then a year later. You can see there's been a massive change. Where did all this ice come from? Well the volume of the ice is probably about the same, but the upper basin is lower in elevation in the '65 picture, so there's obviously been this terrific flow of ice down into the low part. That's the textbook example of glacier surge. That's not really due to climate either. So here's another complication that you get when you try to interpret glacier behavior because of climate.

"There's a simple answer to why glaciers surge like this. It turns out there is a lot of water around here in the summertime and it has to go somewhere. It turns out there is an internal plumbing system that goes out through crevasses and sticks holes in the ice. These surges are due to failure of the plumbing system. That's the reason known for surges. This has been well documented, and some of these have been in the Twentieth Century, the most recent was in '96.

"The impact to Yakutat and its Tlinglit inhabitants is that the upper glacier will block off the fjord, the fjord will fill up, and run down to the Sutik River which is a major sport fishing stream, and quite important for the locals. This then will become a major river and the whole character of the river will change and, at least in the short run, the tourist industry will be seriously disrupted. Perhaps Yakutat airport will be impacted too, but I think that's less immediate.

"These photographs show the position of the Hubbard Glacier at different times in history. In 1960 the Hubbard actually ran down to Russell Fjord. It's way farther back in '95. This picture gives us a clue as to the behavior of these white water glaciers like Hubbard. The clue is that the fjord was blocked off, not by ice, but by this moraine dam. It turns out that this moraine goes across the snouts of all these white water glaciers and is quite mobile. The glaciers are always pushing these moraines forward. Where the moraine is, controls the position of the glacier more than climate. Here it gave the show away by pushing a little bit of

moraine up on the surface. The fjords in Alaska are full of these submerged, crescent shaped moraines which mark the former extent of glaciers that come down our fjords. You see a lot of them on the marine charts.

"A moraine is a conglomeration of rock and mud of odd sizes carried by a glacier. In this case it's brought down by erosion and by streams under the glacier and then bulldozed forward by the glacier, you can't see them because they're under water. The moraine protects the glacier from the melting by the ocean. As the glacier extends down the fjord, there will be more and more melting, there will be less ice coming to replace that lost by calving, in that case the glacier will retreat off the moraine, then it finds itself in deeper water and then it breaks up. It's a mechanical process. The Columbia Glacier is in that phase now. It's breaking up while this one's advancing. Both processes have very little to do with climate. Of course, ultimately there's some kind of connection or there wouldn't be any glaciers, but it's a pretty tenuous one.

"You can see in these pictures what the moraine dam looked like in 1986. Since then the glacier has advanced into Russell Fjord and on down to Yakutat through these outbursts.

"The height was 70 meters that's 230 feet. That's fairly typical of tidal glaciers in Alaska. It's certain that this is going to continue because the glacier has such a little melting area it will keep pushing that moraine out. It may block up Russell Fjord temporarily, a couple times before the final blockage. Each time it outbursts, it destroys the moraine and the moraine has to be rebuilt. But in the next two decades it's bound to close up the fjord, so we might as well plan for it.

"These pictures were taken at the same place 40 years apart. In the first picture you can see that part of the Columbia Glacier is just gone. This is perhaps the third or fourth complicated factor about glaciers and climate. How glaciers change with respect to climate change depends on their shape. When they are low and flat, they are incredibly sensitive to climate. A half degree temperature change is sometimes enough to cause the disintegration of a whole glacier.

"In some glaciers we have profiles that are 5 or 10 years apart. There we see that the rate of change has almost doubled in the last 10 years. Things are going down real fast. We have worked out volume change from the early 50's and early 90's in terms of an average thickness change per year, and we see it's typically 1 meter. That would be about 3 feet a year that glaciers are losing. In the recent 7-10 years the rates have almost doubled.

"A few glaciers have actually gained for various reasons. The retreating tide water glaciers, like Columbia, are not simply related to climate but the changes are fantastic. We've worked out the total amount of change and it's about 3,000 cubic kilometers which is enough to cover Alaska in 7 feet of water or Texas in 15 feet of water, with the water that was generated by melting glaciers. That's about one tenth of the world contribution to sea level. It's more than all of Greenland, surprisingly. Things are going downhill faster here.

"Glaciers respond differently to climate depending on whether or not they are flat. In fact, the climate could become more favorable to glaciers and these areas would still be lost because they are so flat.

Ninety-four percent of our glaciers are thinning. We're contributing quite a bit to sea level. A surprising amount, given the small amount of glacier cover, only five percent of the area of the state.

"Now we just allude to the climate connection. Broadly speaking, we say there are two factors that determine the health of glaciers, summer temperatures, critical because that controls melt, and winter snow, which controls the amount of stuff we have to work with. A big question is which of these two is the more responsible. We don't have an answer for that yet. My impression is that they are both about equally responsible.

"There's been some pretty heavy snow around Yakutat in the mountains recently, and it's also been a little bit warmer. Warming worldwide mainly occurs in the wintertime rather than the summer, but it's a half degree warmer in the summertime too and that's a lot for a glacier. We don't know if this trend will continue, but we think it will. In many areas, whether it continues or not, the glaciers will just disappear they are so flat." *(Will Harrison, UAF)*

3. NSF-Funded Scientist Presentation: Lilian Alessa

"I went to school to study this subject because the issue of chlorine is significant in that it's something that a lot of agencies don't want to deal with for the very reasonable reason that chlorine drives industry. Without chlorine we couldn't have any industry and without chlorine we couldn't have the kind of sanitation that we need, so we trade off the chemical for the diseases. Chlorine is one of those weird compounds that we live with. There are alternatives. Hydrogen peroxide is used by the Swedes and the Norwegians because of the overwhelming chlorination solution that they experienced in the past 20 years. Hydrogen peroxide is very expensive to implement, not expensive to maintain, and at the end of the talk I want people to think outside the biology of it, and think about the drivers that have created the system in which we live.

Lilian Alessa (*UAA*)

"The industrial waste products that we have been looking at in our research apply to all areas. We have been looking actually at a sewage treatment plant that is just outside downtown Anchorage. But we aren't permitted to actually go and collect samples from there. So we have been working out of Dutch Harbor to develop some kind of base model. We've been working specifically with Stellar's Eiders at the request of a variety of people. However, although we're studying the eiders, the ducks, this research applies to all systems, all animals because I deal at the cellular level. This includes humans.

"I am going to talk about the location and the significance of Dutch Harbor as a case study, but this is something to think about in all areas, not just in the Aleutians. I'm also going to talk about the carriers of chlorine. We've called them stealth contaminants because these are not contaminants that are currently monitored. These are contaminants that form when chlorine meets a fat. As you know we have cold waters and because of the cold conditions, we have a lot of fats in animals. These fats are unsaturated. That means

they can stay liquid at cold temperatures which is what we need in the north. It also means that they are extremely reactive with chlorine. Where we have cold waters, chlorine doesn't break down and we have unsaturated fats in animals. That means that those fats react with the chlorine making the northern waters a great environment to form these chlorinated fatty acids which are bioactive contaminants.

"Stellar's Eiders are a small threatened sea duck. They over-winter in specific locales in Alaska. They summer in northern Russia. Two years ago I did a transect flight over northern Russia, to see what types of contaminants, what levels of industrial outputs are there, and they are significant. They're huge. So here we have a duck that over-winters in Alaska and then flies to northern Europe and gets hit with all these contaminants that are being put out into the rivers into the marine system.

"Stellar's eiders feed on benthic invertebrates in the shallow near-shore. They over-winter right here in Alaska. They summer in northern Europe and Russia. The industrial output in Russia, in areas by some of the big rivers, the Lena, the Olenek, are significant inputs into the marine system. They are heavily manifested in the near-shore where the eiders feed. And this is where the eiders spend the majority of their lifetime.

"In Russia there are few regulations that limit the kind of effluents through these big rivers into the coastal near-shore, so it's heavily loaded. One of the prime loading agents up there is chlorine.

"So we're working down here in Bristol Bay. And this is something that is also significant with respect to contamination and pollutants in the north: pollutants that are created or originate from these areas, particularly in these areas of Northern Russia which are significant outputs of contaminants, are actively carried in the positive. The circumpolar vortex is one of the large-scale physical processes that retain contaminants in the North. Deposition of contaminants, regardless of their origin, is almost exacerbated right here, by the vortex. So when we talk about contaminants in northern latitudes, we have to realize that contaminants are an issue globally.

"Because we refused to work with eiders directly, we are working with a surrogate species, Harlequin Ducks. We've been sort of criticized, and rightly so, for working with Harlequins as opposed to eiders. But, luckily coming from a cellular background, we can argue from a cellular point of view that it's a fine cellular model: as an organism model it has similar prey preferences; similar body size; and occupies a similar habitat. Its range overlaps with the eiders in Dutch Harbor, and it occurs throughout Dutch Harbor in areas with industrial contaminant influences.

"Dutch Harbor is an 'impaired water body.' It's classified 303D which is significant impairment, so it's significantly contaminated. It's an important location for commerce and industrial development. Industry is important. We cannot live without industry. Dutch Harbor has importance because it's a gateway to the Bering Sea. It's the most developed location between Kodiak and the Far East. It has a support infrastructure for the rich fishing grounds that are located there and a high volume of trade. The sources of contaminants have been traced to seafood processing; lipid rich waste products. This is important because remember that chlorine is very reactive. So when you mix chlorine with lipids, the fats, you get chlorinated fatty acids.

"The out fall lines carry all the waste, including chlorine-containing cleaning products which as all of you know in seafood process plants are very significant. Chlorine is the chemical of choice for all sewage out-falls. It's necessary to use chlorine to treat certain disease causing agents. It's a tradeoff. There's minimal treatment, the waste stream contaminants are not removed. This is important in terms of sewage treatment, everywhere, world-wide. Remember that we are an open system, so we receive chlorine inputs from British Columbia. We receive chlorine inputs from Northern Europe. It's not just Dutch Harbor.

"When we asked for storage reports from Dutch Harbor, we got basically a slate that said 'we store no chlorine'. This was signed and sealed and then mailed for research purposes. These are pictures of storage facilities, some of which contain chlorine – this was taken at high speed from the car. What was super interesting is the sign there that says 'Caution chlorine area.' In this building is enough chlorine to warrant a public record and it turns out there is a public record for it. A public record is required if there is anything over 5 tons of chlorine. So there is over 5 tons of chlorine in this building. That is a very significant amount of chlorine! And that's a facility that reported no chlorine storage. So that's significant in terms of assumptions that we make as scientists when we're doing science.

"I'm sure many of you have been out to the port area. There are more storage facilities which are relatively older and one of the things that occurs there is leakage and seepage into the marine environment. The leakage and seepage is affected by rainfalls. How much rain falls on the ground will affect how much gets transferred out to the environment. So the influx of chlorine into the seawater is variable, but can be quite acute. If there is a heavy rainfall you can get a lot of chlorine moving into the ocean at once.

"Chlorine is an incredible compound. Sort of like somebody's practical joke, it's something you can't live with and can't live without. So now we're talking about the outputs. What do lipid chlorine outputs have to do with eiders? This is yet another interesting almost practical joke. Eiders feed on the benthos, the arthropods in the near-shore. They feed in areas that are rich in arthropods because they are not stupid and they want to get the most calories for their diving time. It costs energy to dive. Because this area is being enriched with fat, the arthropods in this area are growing fat, they are getting enriched. So they eat a lot of the gury. There's tropic transfer of these nutrients into the arthropods. So guess what? The eiders feed in these areas where this gurry has been output. So it's kind of a lure, if you have fat arthropods, the ducks come in and feed on the arthropods, but the arthropods are loaded with chlorine from the industrial outputs. It's like giving somebody a power bar laced with arsenic.

"We have been observing eiders here for about 3 years, just to make sure that they are consistent. They are observed throughout the entire winter season by both us and our collaborators in the community that observe them all winter long. So we're pretty happy about the location of these. The purpose for this slide is to show that the gury may fill the entire bay. I'll show you some other slides, but more than 70 percent of the eiders in this area are found and associated with the outfalls. This is a statistically significant population of eiders feeding in areas where outfalls occur. There is a high consistency of spatial correlation of the eiders with the gury outfall areas. Seventy-one percent of the eiders observed each survey season are located in sectors containing, or adjacent to, outfalls, i.e., in areas where the gury is present.

"We talk about fidelity in feeding and that is if a gurry event or outfall event occurs when the eiders are feeding there, they won't relocate from the area. They will not leave. Basically they have established strong feeding site fidelity in this area. They're addicted to chlorine-laced arthropods. Maybe chlorine's a stimulant. This goes back to the irony of industrial enrichment. Some ducks are attracted by the fatty enrichment of the benthic fauna—these arthropods. They're going to feed where the arthropods are the richest. They feed specifically on enriched fauna, but the enriched fauna is chlorine loaded. So what is the significance of chlorine load?

"Chlorinated fatty acids are very interesting because they are basically long chains of carbon atoms. They are regular fats. At one end is this carboxyl group which is a carbon and oxygen and alcohol. That's the terminus of minifats. There are two types of fats. There are membrane fats which we all have. Membrane fats are what allow animals to live in cold environments because they allow the cell membranes – all your tissue, your skin, your bones, your muscles, everything -- to remain fluid. Your membranes have to remain fluid to be functional because materials have to pass through. ATP has to be generated. Nutrients have to pass through membranes, etc. so you have to stay fluid. If you live in a cold environment and your membranes become stiff, you die. Fats, of course, storage fats are stored until they are utilized during activity. There are two different cases of chlorinated fatty acids. One exists all the time. The other exists only when you need to use the fat.

"So chlorinated fatty acids are similar in structure to fatty acids, but chlorine atoms bound to the carbon atoms at varying positions in the chain. Now this makes a huge difference. Chlorine atoms are very big. When you have chlorine bound to a carbon in a long fat, it becomes a huge atom. Because it's so big, these carbons bend toward it. And it changes the entire structure of that fat. Now changing the structure causes significant problems to living cells. Normally unsaturated fats have bends in them. That's what allows fluidity because there is a little bit of space. They're not packed in as tight. When you put in a double bond, it kinks it and has the same effect as a chlorine.

"When you stick chlorine on there, the tail bends. What that means is that the enzymes (the enzymes are the foundation of life) can't cut bonds because those chlorines are basically preventing the enzyme from getting around the carbons. Now why does this matter?

"Well think about this. You have storage fat and you're living in a cold environment, your storage fat must mostly be unsaturated. You have to mobilize that fat when you need it. It might be during migration, it might be during winter, it might be in breeding, whatever it is you need to mobilize that fat. If you have chlorine stuck onto those storage fats, which is where we find most of these chlorinated fatty acids, and you go to use that fat, what's going to happen? You can't use it. So you get wasting. You can't use that fat so there are quite a few cases, where animals have been found (mostly fish) that have died. And they are trying to assess why these animals die – they look fine, they got fat, what's going on? And it turns out they've been heavily loaded with chlorinated fatty acids and even though they have all this storage fat, they can't use it.

"Chlorinated fatty acids are incorporated into both kinds of lipids so both storage and membrane calls for lipids. Now they are assimilated at similar rates to normal fats. This is significant because what that

means is that the more you load an ecosystem with chlorine, the more these chlorinated fatty acids are going to be incorporated into living things. The mechanism that creates chlorinated fatty acids in living systems exists because the breakdown of plant materials produces naturally occurring chlorine. So the system is primed.

"The difference, and where humans come into the system, at least humans in the broader picture, is that levels of naturally occurring chlorine are quite low. But when you actually start pumping chlorine into the system then you start creating much more of these chlorinated fatty acids. So the physiological impacts may be greatest on energy budgets. There are two kinds of impacts. One from the storage lipids where you can't access them and you have no energy; the second kind from when they are in the cell membrane or ATP the very molecule, the currency of energy that allows us to move around and have energy, ATP adenosine triphosphate, leaks out of the cell because the cell membrane has become leakier than it would normally be.

"It looks like in certain organisms it actually affects the production of sperm. Because male gametes are produced through some very active membrane modifications and if the membranes are too fluid, the gametes simply cannot move up and down. All the membranes in our bodies, all the cells in our bodies are surrounded by a lipid bi-layer; two layers of lipids. Because the long carbon chains interact with each other, they form the middle and the polar heads all attract each other and form the top part. Now the fluidity of the membrane is important because all these proteins that exist in membranes are required for life to occur. If you alter the fluidity of a membrane by kinking, you make it too fluid and then these proteins literally whip around out of control. When these proteins whip around out of control, they actually make holes in the membrane. And because membranes exist to keep cell contents inside, if you poke holes in the membrane, then you have things leak out of the cell. As you can imagine this causes a few problems.

"As many of you know, when we monitor that's all we do. We monitor for contaminants by looking at cytochrome P450 for the EROB enzyme system and we say 'yes or no' there are contaminants. Chlorinated fatty acids do not trigger the activity of either the P450 or EROB. So they can be there, but under standard monitoring protocols, we don't see them because they don't trigger these systems. So this is stuff that I've already mentioned, they disrupt membrane functions to less efficient regulation of membrane fluidity. That's a very nice, dry, scientific way of saying, you really blow holes in a membrane.

"So what's the big deal again of kinking that long carbon chain? Mammalian cells have a limited ability to introduce double bonds. So double bonds are a pretty specific thing. You can't just stick them everywhere and expect it to work. Mammalian cells cannot create double bonds at certain locations. For example, at carbon 12 they can't create double bonds. Chlorine, however, will bind to any of the carbons. So not only is chlorine a problem in creating chlorinated fatty acids, but it may create fats that do not otherwise exist in that kinked configuration in nature. So not only are we kinking more fatty acids, but we're creating kinks in places where they shouldn't be.

"The more you load a system with chlorine, the more chlorinated fatty acids you introduce into the lipid profiles, both cellular and storage. The more chlorinated fatty acids you have in lipid profiles, the greater the chance that you're going to have energy destruction such as ATP leakage. So what have we found? Eight levels of chlorinated fatty acids are higher in ducks obtained from the outfall areas. Yes. The

fatty acids may be transferred up the food chain including humans. We haven't gone there yet. We're trying to work with the Alaska Sea Life Center to do some tropic transfer experiments. This is something that needs to be quantified. We need to find out what the rate of transfer is up the food chain.

"I'm a mechanism person. The way we monitor contaminants is we say 'does it elicit a biomarker?' And we have a limited range of biomarkers. If it doesn't elicit a biomarker, then we deduce there must be no contaminants there. This really bothers me a huge amount because we have to monitor for chlorine. If we don't monitor then we won't know where contaminants are.

"We need to understand the social drivers and biological mechanisms. Why do we not use something besides chlorine? There are other chemicals, we have the technology. Why are we using chlorine if we know chlorine is a problem in cold environments? Why doesn't Alaska use something besides chlorine? We know about ATP leakage so we can do something to mitigate it.

"Hydrogen peroxide could be used instead. It's absolutely wonderful. It breaks down into water and oxygen. But it's very expensive, by an order of magnitude of about 5 to 10 times as expensive. Sweden switched over because they ended up killing entire fjords in Sweden. When I say killing, I mean completely lifeless areas. They actually had an enormous fatality rate for pulp mill workers for communities there, so much so that the United Nations actually put pressure on them to do this. But it's very expensive to begin, but it's cheaper to maintain. You don't have to buy it. You can manufacture the hydrogen peroxide on site, but that's the big expense. So that's a policy issue." *(Lilian Alessa, UAA)*

4. Bob Clark Presentation of American Fisheries Society Hutton Program

"The Hutton Program is basically a mentor-internship program where a person in high school can partner up with a scientist. This program funds that intern and the person doing the mentoring doesn't have to fund him or her. The scientist hauls the intern around during their summer activities. There is a learning process that goes on, as you can imagine. And there's a report that's given at the end. There's a website and some materials that I'll hand out. If you have any questions, you can call me. We have some folks over at Fish & Game who are familiar with this program. We've run it the last two summers and we've had two students. It was brought about for under-represented categories of people in the fisheries profession. I think it hasn't really gotten going in Alaska that well yet. It's been done here in Anchorage, but that's not really the purpose of it. The real purpose is to have a mentoring internship program go on say in a bush village or somewhere where Fish & Game service or ERD might be doing this." *Bob Clark, (Alaska Fish & Game)*

APPENDIX C: WORKING GROUP REPORTS

1. Learning Center Group Report:

"Our group had the task of more clearly defining the creation of a Learning Center. It was requested that we go in the order of priorities, recommendations and actions. So our first priority is to have this Learning Center be according to the vision of traditional values through elders' leadership. We want the elders to have a leadership role in determining all aspects of this learning center, including ownership, and the elders will even develop the creation of this learning center. To name the center, we are going to have the elders have a naming ceremony. We want everything to be done according to traditional values.

"We suggest that there be an elder/youth council established to create this learning center. And have different groups pursuing different components or functions of the center. These groups will be closely coordinated and facilitated by an appointed lead organization. We didn't designate that organization.

"The major functions of the center would be according to our Native world view. We would have body, soul, mind and spirit. We felt it was critical to keep all four of those components together. Not to separate the mind or the body as some world views have done. So according to that world view, we would have:

"The body which would be the lab, or the diagnostic lab, which would also contain the contaminants or detox center and research center. That's the function of the body.

"The soul would have the healing and treatment center.

"The mind would have the education and outreach and information clearing house.

"The spirit would be the aspect of traditional celebration and ceremony which includes the sports, the games and the foods of our people.

"We must, through traditional values, establish an elders/youth council with equal representation of men and women to maintain ownership, integrity and operation of the center, from conception and throughout the operation of this center. We also must designate a lead organization to facilitate and coordinate the development. Elders shall be a part of the process in each of the functions of the center.

"We recommend that the Alaska Native Science Commission explore the best process to get everyone involved in the process, including the politics of our Native organizations, the competition that sometimes exists between organizations, and the eventual funding of this center.

"Once the facility is established, consideration should be given to establishment of an operational council that includes elders. We feel that the traditional, spiritual values of indigenous peoples of Alaska are essential for the success of the center. We cited other organizations, other centers, and other programs that have been established in the State of Alaska that started out with a good purpose and got side-tracked

into other functions that didn't serve the people. We thought that was really crucial: that every step of the way we have a spiritual background and advice from the elders to make sure that the center has the best interest of all the people and stays to the vision of the elders and the purpose of center." *(Martha Vlasoff, Village of Eyak)*

2. Education and Communication Group Report:

"One of the things that were mentioned is that education is the responsibility of the state and therefore it is necessary that we pay some attention to the laws and regulations of the state. But the first thing that we saw as being very important is that the Native world views have to become the new visions of Native education. I think that says pretty much some of the things that we wrote down already.

"We want to remember the power of the word and the power of silence. Education needs to be experiential: wisdom from and spiritual connection to nature. Nature is consciousness. All those are included under the Native world views, and I think that is very important. That is a new vision. Without a vision, we cannot go forward. We will just become stalemated and we won't accomplish anything, so the vision is absolutely necessary.

"I think the second one that is important to us is that the responsibility of education not only falls upon the family but also the community. The community has to be in full support of the educational program that is established. And the school has to become the reflection of the community. We would require that the principal and the teacher show utmost respect for the source of intelligence. That's something that is very important to us. We're thinking about Hilary Clinton's "It Takes a Whole Village to Raise a Child" that's a term she borrowed from us. For us that is very important. It takes a whole village to raise a child.

"Education is to be experiential. It also has to be cyclical to take into account the things that we do according to the season. Our Native language changes slightly with different seasons and activities. We realize that there are certain stories to be told, certain ceremonies that are carried out during that time, and the flora and fauna changes from season to season, and our language changes somewhat.

"In talking about the new vision being the Native world views, I think we have to talk about and cite some of the programs that are going on and seem to be quite successful, for instance the language immersion schools that have been established throughout the state. Not only that, but we also have to be very much aware of some of the other programs like the subsistence programs of the high school of the Arctic Slope area. Everything that we do, including these programs, is very relevant to the everyday lives of the youngsters. And we feel that when those programs really take on profound meaning for the students, they'll do a whole lot better.

"In the learning of the Native language and the Native cultures, one thing that is very important and something that has to be imbedded into our own minds as Native peoples is the fact that the language and culture are always one generation away from extinction.

"One idea that came about was that perhaps the Alaska Native Science Commission and the Alaska Rural Systemic Initiative and some of the other Native teacher education associations draft up a resolution for consideration by the Alaska Federation of Natives whereby we would be asking the University of Alaska system to establish a college of Native Studies. In this instance it would be very advisable, I think, because there we could set up courses especially for teacher education programs that would be very meaningful for them, and very useful in their teaching.

"One other thing is the accurate histories. We must write our own history, because heritage is a story of us. History is a story of them from the time that they came in.

"We talked a little bit about measurements of success in students, language and cultural competency. We feel you do that by observing the youngster and talking to them and also seeing how confident they are in being a Native youngster.

"The Lower Kuskokwim School District has gotten away from giving grades. Now they have student profiles. Although we do have a problem, saying how the heck are they going to get into college? But I think we can address that merely by taking a look at what the observations of the teachers, the elders and community members are to the profile of a youngster. I think they are a better indicator of how much that youngster has learned and is capable of learning, than giving a letter grade. I think that is something that is quite important.

"The other issue is resiliency: where an individual can be brought down to his knees but can bounce back up. The ability to adapt is another thing that the in our world view our language will also enable you to do. There is power in regeneration, both the power of regenerating the place where you are, but also regenerating your own language and your own world view if you've lost it. So the world view is very important for the confidence in being a Native youngster - the world views become the foundation of education.

"When we learn our own language and our own culture, we begin to absolve that shame that we developed because of the foreign educational system that we were brought up in, and that is very important. *(Oscar Kawagley, ANSC Board)*

3. Social, Cultural and Economic Implications Group Report:

"Our group talked about social, cultural and economic implications. Basically, the first thing we talked about was the political processes. We have a lot of things against us. Many of the rules and regulations we have in our state don't fit our villages. So we have political leaders in the same group with Fish & Wildlife and we need habitat and access and regulations changes. The decision-making process has to be from the level of the tribes or the villages. The knowledge is with us and so the decisions have to be made from the villages, not imposed on us by the feds or the state.

"Another issue we talked about is nepotism which is a big issue. We found out from some villages that they have tried to solve it by honesty. That usually takes care of a lot of the things that happen. If you have a decision within your village and there may be a conflict with brothers and sisters or uncles or

whatever, you can solve that by abstaining, or staying out of the decision making process.

"We want economic development opportunities that are sustainable.

"We need proactive management of sport fishing, commercial fishing and hunting. We need to be proactive in management because when the feds or state make decisions on management, they don't manage with nature. They manage under their traditional ways from the Lower 48, by numbers, not realizing that nature has ups and downs. They need our knowledge, that's what we mean by proactive.

"And we need co-management. We have federal co-management now, but we still need to be sitting down at the same table - you sit down with the state or the feds at the same table. Use the local knowledge. Use it, not just talk about it. And don't let it slip by. Use the local knowledge because it's so important to protect our way of life.

"We also need to have more media involvement. With the urban population of Alaska, in Anchorage we have 40,000 and we're going to have 80,000 in the next ten years. We need more media. There were a lot of discussions about media and how to solve some of the problems we are going to be facing.

"We need a transition center, maybe as part of our learning center, for people that come to Anchorage and don't know where to go. They don't know who to talk to. And then the other problem you'll run into that you'll find out is people coming from the villages, you can have all this here, the helping hand from the non-profits and other agencies and villages, you need to also have a teaming effort with the companies. Construction companies, you need that also in order to carry out the goal for those individuals that want to go to work.

"As we talked about teaming with other agencies and companies we included our regional corporations, village, non-profits and education foundations. The fact is, we do have them, but when people come into Anchorage, they don't know.

"We want to emphasize a multi-directional, cross-cultural education. The thing we talked about is that we need to teach both sides of the coin. You can call them non-native and Native, but we need to teach both and that's the media piece we're talking about; we need to teach both, what we're doing and how we're doing it. If we just teach one, the other one is not going to learn, but just keep fighting with us.

"And we need marketing plans about how to get our story out to the world. Our regional corporations have money. Is there a way to get some of that to do some of our marketing? I mean there must be a way. We have enough regional corporations. We also have one or two stations that do talk about it.

"On remediation and social, economic and natural disasters, basically, we went through a lot of different scenarios because a lot of these are tied into the others, whether it was economic development or fishing or hunting. The main thing that we looked at was what you call local hire and cleanup of hazardous waste and training. Local hire doesn't mean anything in our villages. They tell you most all contractors are

Sid Smith *(New Stuyahok)* reports back on the topic his breakout group focused on and listed priorities.

coming from Anchorage or Fairbanks and when they go out and do a project, whether they do cleanup or construction, the contractors are hiring local. The reason they are claiming to hire local is because they are an Anchorage or Fairbanks company hiring in Anchorage or Fairbanks for a job in the village. So that's where we lose out a lot. So we need to get out with the villages on the same table with some of the contractors and say what can we do with both? The contractor is still going to make his money. There are contractors that are willing to work with villages. If we sit at the same table to talk a project through, whether it's a school or an airport, a lot of this local hire could happen where the project is to be, not in Anchorage.

"We need more and better training. There's a lot of training that's going on in our villages that doesn't fit our village needs. And sometimes they are not trained correctly. No one's really guilty. It's just the way things are set up. The training has to be correct and it's up to the tribes to start learning how their people are supposed to be trained for the jobs.

"We also talked about women, food security, and declining wildlife across the state. All of us agree that they are pretty close together. Too often we don't include women who are very important in our villages. Women educate our kids, take care of them, feed them, and teach them. They also are out hunting. They also provide our food, they also conserve our food. They prepare it and a lot of times we don't include them. We talk about villages and leaders and a lot of things, but we often don't include the women.

"For most villages tourism is kind of a foggy idea, because when we talk about tourism we all say it's going to make big money. The state says the same thing. But how many villages are really involved in tourism? Not very many. The villages, look to Anchorage and say where do all these companies come from? They're from Outside Alaska. The only way tourism is going to work is if you have 4-5 villages working together. You could set up village companies. So tourism is kind of – it's there but it's not there.

"When we talk about climate change, it's almost what we talk about with fish and wildlife and the crisis of regulations. When the state or federal agencies make decisions on how or when we can fish, our people are telling them that it's either the wrong time of the year, it's too early or it's too late, the grass is not tall enough yet, green enough yet. There's not enough water in the bay. We already know we have reasonable agreement with the federal government on co-management. Our next step is co-management with the state. Co-management needs to be honest on both sides of the fence with the tribes, or whatever geographic area they are working in. They need to be honest and take for granted they are on equal terms. If we don't, we're still going to have this problem of trying to convince the state and federal government and they'll keep fighting. I'm glad we talked about cooperative management because it needs to happen. But the agencies have to be honest too. That's the only way it's going to work." *(Sid Smith, New Stuyahok)*

4. Research and Community Involvement Group Report:

"We went through the list that was set up for research and community involvement and prioritized it in terms of what was most important. We need to see more coordinating of research. We are going to need to look at some of the projects that are currently incorporating traditional knowledge and wisdom into the research and look into how it will fit with new research that's going to be happening. There are tools like memorandums of agreements and other things to help when working with researchers and communities, but they do have limitations. There may be a clause written in the MOA that may limit how that local or traditional knowledge will be used, so it is important to really look at your memorandum if you want to use existing TK projects in future projects.

"One of the priorities is to really look at some of the barriers and identify those barriers on how research is done in communities. The two that we looked at were human resources and capital resources for communities to do their own research or to work with these agencies like Minerals Management Service, BLM, EPA, etc. One of the biggest barriers we see is a lack of human resources and capital like office space.

"We also notice with collaboration, we need to avoid duplication. That's where a lot of research that gets done is being duplicated and there might be some fighting over the same amount of money to do the same projects but in different areas. So we thought that with this learning center idea we talked about if we just enlarge it a little bit, we could also make it a clearing house and repository for data and research that's already been done.

"We also thought it was important to have a lab where we do biological studies for our natural resources such as berries, seals, whales, caribou, and water samples. Lab space is pretty expensive and kind of limited here in the state, so a lot of samples are shipped out to other areas. We do have the university system, but we're not experts on how the university system uses its lab facilities. In any case, it would be nice if we had a learning center that it also be expanded into a laboratory to do research for contamination and genetics and other quality research. And we'd have training there as well, so we could train villagers who want to go on to higher education, biology and natural science.

"That was another thing. Once we've figured out what kind of information we have, what kind of research has been done, we need to respond to that research in the communities. I guess that's kind of an evaluation, response management type thing. It says right there at the beginning of the agenda that the community research plans need to be in place. A lot of that goes into the ordinances of the community, whether it's the city, the tribe or the borough or whatever that governing agency is in that community, to have a research plan as part of their over all community plan.

"Building the lab is one of the major action items. Another action item is that we need to have peer review or community review. We need to encourage more community review of results and recommendations by scientists and research that happens. There's not enough response to that type of review. It would be good to see if there could be a way, a new mechanism that could be institutionalized that looks at the people and finds a way to get village input to the review. *(Rex Snyder, Alaska Native Harbor Seal Commission)*

Alaska Native Science Commission

429 L Street • Anchorage, Alaska 99501

Telephone: (907) 258-2672 • Fax: (907) 258-2652

www.nativescience.org & www.nativeknowledge.org

Toll Free: 877-478-ANSC (2672)