Richard Glenn Comments
U.S. Senate Commerce Committee Field Hearing
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Inupiat Heritage Center
Barrow, Alaska

The Changing Arctic

Thank you to members of the Senate Committee on Commerce, Science, and Transportation for coming to Barrow, Alaska – the heart of Alaska's Arctic- to address this important theme. As you are aware, you are in the land of the Inupiat. Our villages in this region are home to Alaskan Native culture are storehouses of traditional knowledge; and they are on the "tip of the spear" when it comes to witnessing our changing Arctic. Traditional Knowledge takes today's witnessed change and sets it against a backdrop of centuries of experience. The knowledge does not reside in books, but is passed generation to generation and resides in our people.

Our understanding of the Arctic is changing. Startling is it may seem to others, I feel that the Inupiat people are adept in this era of change because in many ways our culture is built up change and adaptation. There are many examples, from whaling camps perched on the sea ice, to villages on an eroding shoreline, where it never pays to predict that things will stay the same.

Firstly, it is plain for us to see that the Arctic Ocean is changing. Freeze-up begins later and breakup begins earlier - measurably so. Hence, the ocean ice cover is relatively thinner than it was in years past. The reduced ocean ice cover means many things, and begs many questions. Here are just two:

- There is less multi-year sea ice, but is the corresponding increase in seasonal sea ice good or bad for ice-dependent species and other marine mammals? Is there a measurable change in the current systems of the Arctic Ocean or in the introduction of new species?
- There is more fetch for late fall season storm waves, but has it gotten stormier than in the times of greater ice cover?

I believe overall, that the Arctic Ocean system screams for greater understanding. Without understanding it how can we understand its

changes? What may appear to be a "change" might instead be something that we are seeing for the first time.

A cabled marine observatory will give us greater understanding of the Arctic Ocean system. There are materials here which describe the cabled marine observatory concept. They exist elsewhere already (there is one near the Monterey Canyon and another near Astoria on the Oregon coast). The Arctic Ocean lacks such a tool and it can be immensely important in measuring fundamental parameters like sea chemistry and ocean currents and answering questions like those above. In addition, the observatory can document the migration of marine species, observe and measure the effects of increased vessel traffic, seismic exploration and other influences that mankind has on the Arctic Ocean environment.

Barrow has what is called the best characterized air column in the world. The NOAA GMCC lab is one of three in the world that are responsible for measuring the trace gases in our atmosphere. We have a newly renovated National Weather Service station. The US Dept of Energy has established the Atmospheric Radiation Monitoring site here; it studies the effects of clouds, albedo, wind profiles on incoming solar radiation. Barrow is also host to hundred of research plots on the tundra extending inland in every direction up to a hundred miles studying everything from plant succession to carbon exchange. This part of the Arctic is wired for research. What is lacking is a similar infrastructure for studying the ocean.

My background is in the natural sciences, and I have made a personal focus of studying permafrost-related geology and sea ice processes. Combining traditional knowledge with academic study and what is called Western Science is an incredibly rewarding experience. Here where the permafrost is up to a thousand feet thick and where the ocean has a frozen cover for most of the year, we are in the heart of the US Arctic. With permafrost a thousand feet thick (and up to two thousand feet thick at Prudhoe Bay), we understand that the bulk of it is not going anywhere fast. But the warming of the climate is changing that top few feet that freezes and thaws every year, and it may be affecting things at greater depth. Relationships between permafrost, carbon and carbon dioxide, methane, and the ocean seabed and tundra subsurface are important to us, and important to the world.

Like peatlands and bogs everywhere, the tundra landscape is rich with

carbon. The tundra environment is especially enriched because the permafrost allows its contents to be trapped by being frozen. And within and underneath our permafrost (and on the bottom of the Arctic Ocean and oceans around the world) are trapped the ice-methane compounds called methane hydrates-which are the premier hydrocarbon sources, as well as other conventional hydrocarbons. Naturally-occurring methane and oil seeps were the reason President Warren Harding created the 23-million acre Naval Petroleum Reserve No. 4 here in 1923. The shallow natural gas fields of Barrow, discovered by the Navy in the 1940's are excellent windows into the study of permafrost and methane hydrates. Indeed we may be the only community in the world that relies upon natural gas that is recharged by a methane-hydrate source.

Change in the Arctic is not limited to the physical environment, of course. Our communities are changing. Alaska is home to more than two hundred villages. The term "village" keeps us at a loss when we push for quality of life improvements. When the outside world thinks of "villages" they do not think of real-world quality of life improvements. Villages in the Arctic have always been and will always be gritty, hardscrabble places. As our villages grow, so does our need for real world improvements. Basic items taken for granted elsewhere such as running water, sanitation, reliable power, and access to the outside world are achieved here at great cost.

In our region, where our villages are dependent upon the land and ocean for food and the roots of our culture, we are also dependent upon the natural resource development industry that has given us our only economy. It has allowed us to build schools, health clinics, airports, and to install running water and safe sanitations systems. So it may seem that we are conflicted when it comes to issues like oil and gas development. But we feel we are appropriately conflicted.

The Arctic is changing. But some things stay the same. The idea of the Arctic as a frontier is indelible in Western culture. This is a mixed blessing. What needs to stay the same is the fascination and need for understanding of the Arctic system. The downside of the frontier mystique is that we are perceived as a far-away place. I find more value in keeping an "Arctic-centric" mindset and considering the low latitudes as the far-away places. The interest in our region mixed with our traditional knowledge has produced sustained, world-class research and a mutually beneficial relationship between visiting researchers and those who have been observing

the Arctic and all of its changes for thousands of years. In many ways all of that began here. It continues here and it should be recognized and identified as a national priority.

Arctic Policy is changing – as it should. Here I would like to leave my final comment and request. Today's field hearing is in Barrow. We are one village. There are many other villages in the Arctic. I respectfully request that when this Committee, and you individually, consider changes to Arctic Policy, that you seek out input from all Arctic communities. Singularly, we are a village; together, we are the Arctic.