

United States Arctic Research Commission

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Testimony by Mead Treadwell, Chair U.S. Arctic Research Commission

U.S. Senate
Committee on Commerce, Science and Transportation
and the Committee on Foreign Relations

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Mr. Chairman and members of the Committees:

On behalf of the U.S. Arctic Research Commission, thank you for holding this hearing. The more people know about the exciting research going on in the Polar Regions during the International Polar Year, the more likely we are to see the legacy of a strong polar science program.

Today, I would like to address actions Congress may want to make this session that could make the International Polar Year more successful.

I will also speak to the legacies of IPY the Congress may want to help foster, which could mean a robust Arctic research program for years to come.

A successful IPY will do more than gather vast knowledge in the next two years. With IPY, we should establish long-term monitoring networks and other science infrastructure, including the ship and land based research platforms as well as remote sensing technologies, to keep the knowledge coming.

Within the government itself, IPY will help us focus on our goals in the Arctic – in science and in policy. The Commission believe we must use IPY to craft a more coordinated and sustainable long-term Arctic research program.

Background on the U.S. Arctic Research Commission

I have had the honor of serving on the U.S. Arctic Research Commission since 2001, and as chair for less than two months. Six other Commissioners, whose names are listed on the cover of this testimony, also serve. This Commission, Mr. Chairman, reports to you in the Congress and to the President, on goals and priorities for The U.S. Arctic Research Program. With our counterpart, the Interagency Arctic Research Policy Committee, (IARPC), we work to see those goals accomplished. Much of that work is building cooperation – among U.S. agencies, universities, the State of Alaska, the private sector, indigenous and other Arctic residents, and other nations.

Two immediate calendar items face the Commission.

First is the kickoff for the International Polar Year. Within the Commission, we're committed to making this a successful broadening and strengthening of Arctic science in many places and many disciplines. It is cooperation – across disciplines,

between the Poles, around the world. We will participate in outreach. With the Congress and within the Executive Branch, we're encouraging a level of funding and participation in IPY appropriate to the nation's leadership in polar research.

Our Commission's second calendar item is a goals report due for delivery to the Congress and the President in late January, as specified by law. In formulating that goals report, Commissioners are focused on how we can ensure that the excitement of IPY results in long term, sustainable legacies in Arctic research.

The International Polar Year

The first International Polar Year was in 1882-1883. The last International Polar Year, in 1932-1933, helped inspire the first International Geophysical Year fifty years ago, in 1957-58. The excitement surrounding this event was palpable, and while I recall little of my reading in second grade, I do remember an article in "My Weekly Reader."

Last time around, IPY and its global counterpart, the International Geophysical Year, happened as the world entered the atomic age...the jet age...the space age...and soon, the digital age. The excitement of exploration – the assault on the unknown – was contagious. This time, we hope for a similar epidemic – a continuing thirst for knowledge.

Whatever we gain in knowledge this time around, this IPY has important differences. Like never before, the IPY will involve the people who live in the Arctic. Political barriers that existed during the Cold War are behind us, and Arctic cooperation is strong. Physical access barriers are disappearing, not just with receding ice, but also with improved technology and navigation, at sea and in the air. Communication barriers to exploration and data collection have disappeared, with the availability of fiber networks and low-earth orbiting communications networks like Iridium phone and data systems that allow polar research to be conducted, literally, from afar. Barriers in scientific disciplines, and those between "western science" and traditional knowledge, are also fading. That trend suggests that the knowledge we get, in the end, will itself be more whole.

Thus, we begin this IPY with the prospect that its real legacy will be a connected Arctic – one that will continue to reveal itself, know itself and share its mysteries.

Immediate actions the Congress may take in support of IPY

There are two ways the Congress can help make the IPY a rousing success.

First is getting the word out. We encourage you to have more hearings, as IPY progresses. I have heard Senator Murkowski tell the science community, several times; we must share the excitement of exploration in the polar regions. This is a risky and adventurous frontier, with great rewards from solving its mysteries.

We encourage members of the Congress to visit the field during the International Polar Year, to see the science firsthand, and to understand the value of what we're learning. Understanding the earth's processes –and man's impact – is just the start. IPY research will help human health, energy security, safer, sounder homes, and will increase culture sustainability.

We believe the U.S. will be well represented in IPY if appropriate funding is provided in several agency budgets. The Administration's current proposal for \$62 million funding from NSF should be approved by the Congress this year. It remains to be seen what the President and NSF will propose for next year. If we are to move beyond fragmented and leveraged funding for IPY, that number should be significantly greater, and should take into account the long-term need for monitoring and data management

Second, we're hopeful that enough funds and encouragement will be provided to other agencies to make sure we are able to fulfill our commitments. Two agencies under the purview of the Senate Commerce Committee – NOAA and NASA – could play a pivotal role.

Mr. Chairman, I was appointed by the President, and we are team players with administration. At the same time, based on statute, legislative intent, and our oath to support it, we are obliged to tell you and the Congress where the Arctic program funding requests may not effectively meet the nation's Arctic Research Plan.

NOAA has recently reduced its office, by eliminating the Arctic Program, and just prior to the IPY. Nevertheless, NOAA has a lot of work to do. Through negotiations on Capitol Hill in 1996, the Arctic Research Commission convinced Congress to establish an Arctic Research Initiative (ARI) within the budget of NOAA with the understanding that the ARI would be institutionalized as part of NOAA's annual budget request. Instead, the ARI, which provides funds for extramural research through a competitive process that is managed by CIFAR (the Cooperative Institute for Arctic Research), has been zeroed out in the past two years. Additionally, the Joint Russian-American Long Term Census of the Arctic

(RUSCALA), the result of the memorandum of understanding between NOAA and the Russian Academy of Sciences in 2003, is an on-going collaboration between US and Russian scientists in the northern Bering and Chukchi Sea. Funds are needed for this program to make awards for proposals already competitively selected and approved by NOAA for work beginning in FY07 for the next major Russian-American cruise in 2008. Without the requisite commitments to such research infrastructure -- so critical to mobilize -- in light of the upcoming IPY, it will be difficult to ensure a strong U.S. presence in the initiative.

NOAA funds sought for Arctic research in the coming year must support further construction of the Barrow Global Climate Change Research Facility. Funds provided must also support NOAA's leadership of the Arctic Council's Arctic Monitoring and Assessment Program, and NOAA's participation in the development of integrated monitoring networks. To make these things happen, the Arctic program of that agency -- recently downgraded -- needs more visibility and support.

At NASA, the pressure on the earth science budget is well documented. Much of NASA's current earth sensing infrastructure is in polar orbits, meaning that coverage of the Arctic and the Antarctic is robust, but therefore at greater risk with delays and cancellations of key remote sensing systems. Japan's cooperation with the United States on Arctic research could be much more productive if the work being done at the International Arctic Research Center in Fairbanks had greater NASA participation. Congress can help make this happen.

Within our government, it is important to encourage each appropriate agency of the U.S. government to participate in IPY. Further, this is a great time for Congress to stress to agencies that they identify their role in Arctic research and integrate their work with other agencies.

Toward that end, Congress has called for an integrated Arctic research budget from federal agencies since 1984, to be delivered in enough time for your analysis and ours from the Commission. The data call made this year, done only after Senator Murkowski's request, lacked input from several key agencies. I'm happy to report that the Commission, IARPC staff, and the staff of OMB are working together to solve this problem. We will try again this year to see that the budget presented to Congress in January clearly shows what we're up to during the IPY. And even though the requirement is in the law, we are helped in this process when Congress asks for the information.

The Commission believes that knowing what we're doing –across the board – can promote much stronger cooperation.

What we have learned so far is that our nation's commitment to Arctic research has grown significantly in recent years. IARPC reports that the U.S. Arctic Research Program, with expenditures approaching \$400 million a year, has significant work going on in a broad variety of areas. At least fifteen(?) federal agencies support this work, and the U.S. program benefits from important partnerships with the State of Alaska, our Arctic neighbors, the European Community, Korea, China and Japan.

The Commission, for much of the last decade, has worked to focus the U.S. Arctic Research Program on five key questions:

- What is the changing climate of the Arctic, and how will it affect the rest of the world?
- What processes govern the world's richest fishery in the Bering Sea?
- What can be learned to enhance the health of Arctic residents?
- What are the vast resources of the Arctic that we own in common?
- What changes to Arctic infrastructure must we make in response to changing climate?

To answer these questions, the research community has responded with a set of integrated science programs, some of which are reflected in budgets sent to Congress, and some of which exist as less formal initiatives combining contributions from many sources.

- SEARCH, the Study of Environmental Arctic Change, is the nation's integrated look at climate and environmental change in the region. Funding is led by NSF, but agency contributions come from a number of sources. Leadership exists both in the academic community and in the government.
- BEST, the Bering Ecosystem Study, is a part of SEARCH. It focuses on the Bering Sea, and is just getting started under NSF's leadership. The work of the North Pacific Research Board is adding greatly to the capabilities of this science plan.
- Arctic Health studies are coming together through a U.S. initiative at the Arctic Council. Dr. Alan Parkinson, speaking here today, can tell you how NIH and CDC are bringing a broad base together to address very important questions, from contaminants in the food chain to dealing with the high alcohol and suicide problems in the Arctic populations.

- The U.S. Geological Survey has taken the lead in the Resource Assessment program called for in the U.S. Arctic Research plan. Other agencies should join, and the Commission is formulating specific recommendations in that area.
- Infrastructure Research has no specific agency leader today, and we hope yet for integration. Candidates to participate in an integrated infrastructure research program include the Army Corps of Engineers, the Department of Transportation, the Department of Housing and Urban Development, the U.S. Department of Energy, and the U.S. Geological Survey. The Commission will be working with IARPC to bring this about.

Lastly, Congress may want to encourage a discussion about U.S. Arctic policy during IPY. The last time United States government agencies sat down to comprehensively review Arctic policy was in 1994. While the Presidential statement that survives that process is in force today, much has changed. We know much more about Arctic climate – and the change has brought imperatives in security, housing, infrastructure, transportation and research.

The world is looking to the Arctic much more now for its energy security. The Commission has recommended that new support for oil spill research programs, focusing both on prevention, detection, and response, become a national priority.

Even as the Senate considers the Law of the Sea Treaty, the Commission believes we should move forward with the mapping of the Arctic Ocean floor which other nations have begun to claim under Article 76. Congress could help make the submarine platforms available to do it more quickly.

What we've learned through Arctic cooperation, whether through the Northern Forum, the Arctic Council, or by other mechanisms, is that there are opportunities for common development, common protection, common exploration. The long-held goal of using the Arctic Ocean as a regular shipping route may soon be upon us. Other nations have recently held public examinations of their goals in the Arctic, and it is appropriate for the U.S. to do the same.

An IPY Legacy: Monitoring and other infrastructure

As the U.S. Arctic Research Program, we believe the legacy of IPY should be long-term, sustainable infrastructure for Arctic research.

As our past and present Commissioners deliberate with the science community on what research infrastructure is needed in the 21st century, there are a wide variety of needs.

Just this afternoon, a House Committee was briefed on a new National Academy study on the nation's needs for an icebreaker fleet.

In our upcoming goals report, you will hear much from us about icebreakers, research vessels, submarines, satellites and autonomous vehicles under water and in the air.

The Bering Strait has been described as the “choke point” of the Arctic and yet support for oceanographic moorings (that monitor currents, temperature, salinity, various measures of productivity, and nutrient status) in both Russian and American waters are funded on a year-by-year basis and at present, hinges in part on funding for the Alaska Ocean Observing System (AOOS). As an integral part of the Arctic Observing Network, long-term support for the yearly recovery and deployment of moorings in the Bering Strait is essential part of our IPY legacy and key to understanding how change will affect storm events in our coastal communities, marine mammal and fisheries resources so important to our citizens, as well as evolving transportation needs in the Arctic.

We must sustain onshore research platforms in the Arctic, such as the Barrow Global Climate Change Research Facility, or Toolik Lake in the Brooks Range, or our cooperative facilities in Greenland, Russia, or Svalbard.

Outside the Arctic, researchers rely on communications networks, supercomputers, ice core repositories, carbon-14 dating laboratories in Florida, and the National Ice Center here in Suitland, Maryland.

Mr. Chairman, there is hardly a member of the Senate who does not represent facilities – and researchers – participating in the important work of Arctic research.

But there is one key infrastructure legacy that is on the top of everyone's list. The United States will soon launch an Arctic Observing Network that must and will be one of the key legacies of IPY. It will be a “network of networks” actually, that will collect data, in as close to real time, with standards of measurement, across the Arctic. The ambition of such a network – nurtured by the very effective international cooperation which produced the Arctic Climate Impact Assessment two years ago in the Arctic Council – is strong.

In the next few years, new technologies will bring data sets we collect once a year to us in real time. Hydrology, humidity, temperature, rainfall, winds, atmospheric gas composition, radiation, ozone, ice thickness, currents, salinity – information collected by many agencies in many places – will be more prolific, more immediate, and most important, more organized.

While the observation capabilities the U.S. supports in the field today may be enough to declare that we have the AON going, the process of designing an improved system, identifying gaps, setting standards, and managing data has yet to take place. We urge the Congress to pay close attention as this process begins.

On so many key issues today, the Arctic is a bellwether for the globe. With suitable support, this could be an excellent and early working system of the networks envisioned as part of the Global Earth Observing System of Systems (GEOSS). It supports the goals, as my fellow Commissioner Dr. Charles Vorosmarty wrote, of the American Competitiveness Initiative.

“Mobilizing and harmonizing major land, water, air, and space-based observing systems across the pan-Arctic would also be an important vehicle to entrain the US private sector, stimulating innovation through technology along the lines of the American Competitiveness Initiative. The use of miniaturized, state-of-the-art sensors provides an interesting focal point private sector engagement. Training the next generation of scientists and engineers also provides critical long-term support to the ACI.

“What Congress could do: Call for an assessment (through the National Academies Polar Research Board) of US science and technology capabilities in this realm with the express aim of uniting academic, agency and private sector partners; stimulate private investment in instrumentation, data broadcast technologies, supercomputing, new mathematical and statistical approaches; commit to make appropriate instrumentation purchases...”

Exploration under IPY: the human legacy

As our explorers head to the field, I’ve heard Senator Murkowski say several times, it is up to them to share the excitement with the public.

When I speak to kids about Arctic exploration, we’ve got lots to discuss. NASA’s animation of receding ice cover, as seen from satellites in space, prompts a discussion not only of climate change and shipping routes, but whether the robot that took the picture had rockets in his shoes.

Alaskans, used to landing at runway 6 at Ted Stevens International Airport in Anchorage, learned that it is now runway 7 because the magnetic North Pole is constantly moving, and taking the Aurora Borealis with it.

Reports of mid-ocean ridge spreading in the Arctic Ocean bottom have forced instructors to rewrite the textbook on plate tectonics, and recent coring near the North Pole has revealed organic-rich sediments that could likely serve as source material for oil and gas deposits around the Arctic margin..

If you get no further than the freezers at the Institute of Arctic Biology at Fairbanks you will meet a number of sleeping ground squirrels. What we've learned about them may help in the fight against cancer.

Mr. Chairman, there is much going on, and knowing about it stimulates further curiosity, further interest in exploration. This discussion, surely, is to be continued...

Thank you very much.