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CLIMATE CHANGE AND THE ARCTIC: NEW FRONTIERS OF NATIONAL SECURITY

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CLIMATE CHANGE AND THE ARCTIC: NEW FRONTIERS OF NATIONAL SECURITY

WEDNESDAY, MARCH 25, 2009

HOUSE OF REPRESENTATIVES,
COMMITTEE ON FOREIGN AFFAIRS,
Washington, DC.

The committee met, pursuant to notice, at 9:30 a.m. in room 2172, Rayburn House Office Building, Hon. Howard L. Berman (chairman of the committee) presiding.

Chairman BERMAN. The committee will come to order. I will now recognize myself for an opening statement on our hearing, "Climate Change and the Arctic: New Frontiers of National Security."

There is no place in the world where global warming is having a more profound effect than the Arctic. In recent years, we have witnessed the rapid disappearance of Arctic ice. Over the past two decades, the region has lost an area of thick ice roughly 1.5 times the size of Alaska.

These changes have had serious impacts on the environment. They also have significant implications for U.S. foreign policy and for national security, as well as the economy. Yet, despite the growing importance of the region, the Arctic has been a comparatively low priority on Capitol Hill. That should change.

A top national priority should be to address the root cause of global warming, in part by making a concerted effort to reduce U.S. greenhouse gas emissions. We should also work cooperatively with other nations in the U.N. climate change framework.

As the scientific community has repeatedly warned us, our failure to act quickly and decisively on global warming could have catastrophic consequences. For example, receding ice could release massive quantities of methane gas trapped in the permafrost. Methane is a greenhouse gas 20 times more effective in trapping heat than carbon dioxide. The more the ice recedes, the more methane is released, thus causing more ice to melt. Once we get trapped in this vicious cycle, it will be very difficult to get out.

Strangely enough, disappearing ice in the Arctic may also create commercial opportunities. It could transform the Arctic into a major transit route for global shipping. Trips from Japan to Europe could be cut by days. Shipping costs could be reduced up to 20 percent.

How will the United States protect these new sea lanes and the surrounding environment? The changes expand the responsibilities of the Coast Guard and the U.S. Navy.

The disappearance of ice could also unlock the region's abundant natural resources. By some estimates, the Arctic could hold as

much as 22 percent of the undiscovered, recoverable energy resources in the world, including 90 billion barrels of oil. American and foreign companies are lining up to develop these resources. For example, in 2007 a Norwegian company launched the first commercial energy operations in the Arctic and is now shipping liquefied natural gas from Norway to American consumers.

Due in large part to commercial interests, the Arctic coastal nations of Canada, Russia, Norway, Denmark, and the United States are attempting to claim precious territory, but there are several areas of dispute. Canada, Norway, and Russia have disagreements over the extent of the Eurasian continental shelf, and the United States has differences with our close ally, Canada, on the Northwest Passage, the Beaufort Sea, and a number of other unresolved territorial disputes. How will we work with these countries to settle overlapping claims?

Climate change in the Arctic is also having a profound effect on animal and human life. Polar bears have experienced weight loss and birth rate declines due to the loss of ice floes. Fish that normally inhabit warmer waters in the south are moving north, and fish that already live in the Arctic waters are moving even further north. Indigenous people who have relied on sea ice for travel and hunting for generations have been forced to change their age-old traditions.

All of these issues and questions are complicated. That is why it is important for the United States to address them comprehensively and in cooperation with other countries. Shortly before he left office, President Bush issued a directive on U.S. Arctic policy—the first update since 1994. It covers a wide range of policies from protecting national security to involving indigenous people in decision making to ensuring the environmental sustainability of natural resources.

Does this directive reflect the right policy? How should Congress prioritize issues related to the Arctic? I believe Arctic conservation should be at the top of the agenda. I recently joined over 60 of my colleagues in sending a letter to President Obama recommending that he employ a science-based approach to safeguard this fragile region and manage U.S. activities. That letter also calls for the suspension of new industrial activity in the Arctic until a comprehensive Arctic conservation and energy plan has been completed.

It is clear we still have much to learn about the changes occurring in the region, and it will be difficult to gather the data we need unless we increase our capabilities.

The United States faces a drastic shortage of personnel and equipment in the region. The Coast Guard has only two temporary Arctic stations to cover an area 1.5 times that of the United States. It could take hours just to reach a ship in distress. We have only two polar icebreakers deployed and a third in mothballs. By comparison, Russia has 20 icebreakers, including seven that are nuclear powered.

Other Arctic countries are rapidly increasing their capabilities in the region. Canada is building an Arctic Training Center, expanding its northern armed forces, and plans to upgrade a deepwater port in Nunavut. And Russia intends to spend billions of dollars to

double the capacity of its port in Murmansk by 2015. The United States is far behind in this new race to the North Pole.

But good Arctic stewardship requires more than enhancing capabilities. It requires cooperation.

Last May, the United States and the other four coastal Arctic states met in Ilulissat, Greenland, and agreed to work cooperatively to settle any overlapping regional claims. They also concluded there is no compelling need for a comprehensive, international regime to govern the Arctic.

The United States has also been working through the Arctic Council—a group of eight Arctic nations and representatives of various indigenous groups—to address environmental and developmental issues. But the Council's decisions are not binding.

Experts such as Dr. Borgerson, whom we have here today, argue that a new governance structure is needed. Other experts believe the United States should first ratify the Law of the Sea Convention. In practice, the U.S. Government abides by the Convention, but is not a party to it. As a result, we are missing an opportunity to work cooperatively with Arctic nations in determining territorial boundaries.

I think I will now cut myself off because my time has expired and recognize the ranking member for her opening statement and include my entire statement in the record.

Ms. ROS-LEHTINEN. Thank you so much, Mr. Chairman. First I would like to point out that I have some constituents from my district, some students from Temple Samuel Orr in Kendall, and I have had the pleasure of visiting that temple several times, so thank you so much from the PANAM Organization for being here.

I am pleased that we have such a distinguished panel of witnesses before us today. All of us look forward to your testimony. I would like to make special mention of the truly extraordinary effort made by one of our witnesses, Mr. Treadwell, because Thursday when he accepted our invitation to testify he was in New York. He was obligated to fly to Anchorage for an engagement yesterday that couldn't be changed.

Immediately after he finished his duties there he headed for the airport, caught a plane and once again flew over the continent through the night, and he came straight from the airport to be with us today, so thank you, Mr. Treadwell. We appreciate your effort, but I hear from you that your real sacrifice was to miss one of the best powder days for skiing today, so we thank you for that true sacrifice as well.

Mr. Chairman, my congressional district in South Florida is vulnerable to hurricanes and tornadoes. As a result, I have paid careful attention to reports that the increasing intensity and frequency of natural disasters, including tornadoes, hurricanes, tropical storms, are linked to a change in our global climate, and there is further documentation noting that a change in our earth's atmosphere is currently affecting some of South Florida's most precious natural habitats such as our coral reefs.

Several marine scientists have indicated that coral bleaching could be caused by changing atmospheric temperatures. This poses both a serious environmental and financial concern as our precious

marine ecosystem and pristine beaches are major sources of economic revenue for our South Florida economy.

For that reason, I have taken several proactive steps to increase awareness of this issue in Congress, including forming, along with my colleague, Congresswoman Lois Capps of California, the Bipartisan National Marine Sanctuary Caucus, but there is much work that needs to be done to better understand what has been termed as global climate change.

Other countries are taking action to extend their control in the Arctic. Plans are being made to greatly increase the exploration and exploitation of natural resources, but our overall knowledge of the problem and its many components are still very limited. Extrapolating trends based on limited data is always a risky business. It is risky to act without adequate information and mistaking possibilities for inevitabilities.

As it has recently received a lot of publicity and continues to be cited as proof of the need for urgent action is the National Intelligence Assessment on Global Climate Change released last year by the CIA. Too little mention has been made of its vague and tentative conclusions and its admitted lack of evidence.

The NIA's authors openly admit that the factual basis and the models that they used were inadequate to the task that they face. Let me read some of the caveats by Dr. Thomas Fingar, the deputy director of the National Intelligence for Analysis and the chairman of the National Intelligence Council, included in his testimony last June at the hearing by the House Permanent Senate Committee on Intelligence and the Senate Committee on Energy Independence and Global Warming: "Assessing the future of society's evolution will, by necessity, be a scenario-driven exercise and an imprecise science." "From an intelligence perspective, the present lack of scientific understanding of future climate change lacks the resolution and specificity that we would like for a detailed analysis at the state level." And the last quote: "Our analysis could be greatly improved if we had a much better understanding and explanation of past and current human behavior."

Mr. Chairman, we should take a sober approach resting on a solid body of evidence. The Directive on the Arctic issued on January 9 of this year offered such an approach. It laid down a comprehensive set of guidelines for U.S. policy in the region, covering international scientific cooperation, maritime, economic and energy issues, environmental protection and boundary disputes, among others.

With this directive, U.S. national security interests in the region were defined, our determination to defend them made clear to the world and our future course mapped, but this is just a starting point. We have a responsibility to continue to identify current and long-range potential challenges and opportunities in the Arctic and take on the hard work of developing real world options to address these.

To that end, Mr. Chairman, I look forward to the testimony of our witnesses today. Thank you, Mr. Chairman.

Chairman BERMAN. I thank the gentlelady.

Does anybody wish to be recognized for a 1-minute statement? The gentlelady from California, Ambassador Watson.

Ms. WATSON. Thank you, Mr. Chairman, and thank you for holding this timely hearing on the implications of the melting ice cap in the Arctic and the emerging Arctic frontier.

The frontier offers new waterways and access to natural resources, such as oil, natural gas and even solar power. As we consider the next steps forming the U.S. Arctic policy, Congress must remember that the Arctic has been barely touched by humans. In this frontier we have the opportunity to behave conscientiously.

Our policy toward the Arctic must preserve and protect the environment. We must strive to halt the diminishing number of polar bears and ensure the natural beauty of the Arctic tundra is not destroyed by new oil drilling projects.

Mr. Chairman, I look forward to listening to the testimony of our witnesses, and I thank you again, and I thank the committee for its cooperation. I yield back the remainder.

Chairman BERMAN. The time of the gentlelady has expired.

The gentleman from California, Mr. Rohrabacher, is recognized for 1 minute.

Mr. ROHRABACHER. Thank you very much. Mr. Chairman, this is an important hearing because there clearly is a change in the temperature in the Arctic areas of the world, and it will cause us to have to come up with new policies and how to relate to that.

However, let me just note for the record that this has nothing to do with global warming. I have quotes that I will insert in the record at this point with unanimous consent from five major Ph.D.s from major universities from around the world suggesting that it has nothing to do with global warming.

I would put that in the record here, Mr. Chairman.

Chairman BERMAN. It will be included in the record.

Mr. ROHRABACHER. All right. Thank you very much. Also let us note there has not been global warming in the world for the last 8 years. There has been no warming, which is again certified by major universities throughout the world.

If we have climate change, yes, there is climate change, but it is cyclical and we must deal with it. That is why this hearing is important. But to blame it on global warming, which means man-made global warming, is not the way to find some progress in this area.

I appreciate that, Mr. Chairman. I also submit for the record quotes talking about how the changes in the Arctic are probably cyclical, and I would put those in the record as well.

Chairman BERMAN. They will be included, and the time——

Mr. ROHRABACHER. Yes. Thank you.

Chairman BERMAN. You will get those to us.

[The information referred to follows:]

Global Warming Quotes

On CO2 . . .

"Believe it or not, Global Warming is not due to human contribution of Carbon Dioxide (CO2). This in fact is the greatest deception in the history of science. We are wasting time, energy and trillions of dollars while creating unnecessary fear and consternation over an issue with no scientific justification. For example, Environment Canada brags about spending $3.7 billion in the last five years dealing with climate change almost all on propaganda trying to defend an indefensible scientific position while at the same time closing weather stations and failing to meet legislated pollution targets."

-Dr. Timothy Ball
Quote from "Global Warming: The Cold, Hard Facts?"
The Canadian Free Press (online) Monday, February 5, 2007
http://www.canadafreepress.com/2007/global-warming020507.htm

"As measured recently by satellite, and published in Science magazine, Greenland is losing .0004% of its ice per year, or 0.4% per century. All modern computer models require nearly 1000 years of carbon concentrations three times what they are today to melt the majority of Greenland's ice. Does anyone seriously believe we will be a fossil-fuel powered society in, say, the year 2500?"
"A small but very vocal band of extremists have been hawking a doomsday scenario, in which Greenland suddenly melts, raising sea levels 12 feet or more by 2100." "...it is repeated everywhere, and its supporters are already claiming that the IPCC" ... "is now wrong because it has toned down its projections of doom and gloom".

-Dr. Patrick Michaels
Quote from an article "Global Warming: So What Else Is New?"
in the San Francisco Chronicle on February 2nd, 2007.

"... in the theory the claim is that if CO2 goes up, temperature will go up. The ice core record of the last 420,000 years shows exactly the opposite. It shows that the temperature changes before the CO2. So the fundamental assumption of the theory is wrong. That means the theory is wrong."

- Dr. Timothy Ball
Quote from the Politics of Global Warming interview in the Pittsburgh Tribune-Review
http://iceagenow.com/Climatologist_Dr_Timothy_Ball.htm

"I DEVOTED six years to carbon accounting, building models for the Australian Greenhouse Office. I am the rocket scientist who wrote the carbon accounting model (FullCAM) that measures Australia's compliance with the Kyoto Protocol, in the land use change and forestry sector. . . . There is no evidence

to support the idea that carbon emissions cause significant global warming. None. There is plenty of evidence that global warming has occurred, and theory suggests that carbon emissions should raise temperatures (though by how much is hotly disputed) but there are no observations by anyone that implicate carbon emissions as a significant cause of the recent global warming. . . . The new ice cores show that in the past six global warmings over the past half a million years, the temperature rises occurred on average 800 years before the accompanying rise in atmospheric carbon. Which says something important about which was cause and which was effect."

-Dr David Evans
consultant to the Australian Greenhouse Office from 1999 to 2005.
"No Smoking Hotspot" in *The Australian*
July 18, 2008
http://www.theaustralian.news.com.au/story/0,25197,24036736-7583,00.html

On natural cycles and oceans . . .

"The record-breaking losses in the past couple of years could easily be due to natural fluctuations in the weather, with summer ice increasing again over the next few years,"

-Dr. Vicky Pope
UK Guardian, February 11 2009
http://www.guardian.co.uk/environment/2009/feb/11/climate-change-misleading-claims

"Evidence is presented that the recent worldwide land warming has occurred largely in response to a worldwide warming of the oceans rather than as a direct response to increasing greenhouse gases (GHGs) over land."

-Compo,G.P., and P.D. Sardeshmukh, 2008:
Oceanic influences on recent continental warming.
Climate Dynamics, in press.

"Our study confirms many changes seen in upper Arctic Ocean circulation in the 1990s were mostly decadal in nature, rather than trends caused by global warming."

-James Morison, lead researcher based at the University of Washington's Polar Science Centre Applied Physics Laboratory.
Global warming not to blame for warmer North Pole?
The Register, 15th November 2007
http://www.theregister.co.uk/2007/11/15/ocean_currents_melt_planet/

Chairman BERMAN. The time of the gentleman has expired.

The gentleman from Texas, Mr. Green, is recognized for 1 minute.

Mr. GREEN. Thank you, Mr. Chairman, for holding this hearing today. I would like to welcome our panel. In addition to this committee, I serve on the House Energy and Commerce Committee, which will be responsible for moving legislation on climate change this Congress.

The opening of the Arctic provides opportunities, as well as challenges, for all bordering Arctic countries, particularly when it comes to natural resources. U.S. Geological Survey found that the area north of the Arctic Circle holds an estimated 22 percent of the undiscovered recoverable resources in the world—oil, natural gas and natural gas liquids.

Because of these discoveries, there are a number of territorial disputes in the Arctic as issues of territorial sovereignty and access to these resources are intertwined. As such, I think it is important that during these hearings we have the best way to settle these territorial disputes, including whether the U.N. Convention on the Law of the Sea is the best way to do it. Settling these disputes becomes a national security issue, along with other Arctic countries.

Mr. Chairman, I know there is some concern about producing hydrocarbons up there, but the Russians will probably do it and the Norwegians are doing it already above the Arctic Circle. I yield back my time.

Chairman BERMAN. The time of the gentleman has expired.

Does anyone else seek recognition? The gentleman from California, Mr. Costa, is recognized for 1 minute.

Mr. COSTA. Thank you very much, Mr. Chairman, for holding this I think important hearing. I concur with my colleagues.

As the chairman of the Subcommittee on Energy and Minerals, we take great interest clearly in the policy that is being considered today as we look at an overall effort to develop a comprehensive energy plan. The administration certainly has their proposal, and there are other proposals in the Congress.

The area that we are talking specific to this hearing, the Arctic, is part of the Federal lands that are a part of our national heritage. They are also a part of our resources, and so the Subcommittee on Energy and Minerals, along with your committee and others, are currently working on what is the best overall policy as we contemplate how we should move forward with these very important resources that are part of our Federal lands, and I look forward to the testimony.

Thank you very much.

Chairman BERMAN. Thank you. The time of the gentleman has expired.

And now I am pleased to introduce a very distinguished panel of witnesses that possess both breadth and depth of experience: Dr. Scott Borgerson is the visiting fellow for Ocean Governance at the Council on Foreign Relations and an adjunct senior research scholar at Columbia University's Center for Energy, Marine Transportation, and Public Policy.

Before joining the Council, Dr. Borgerson was the director of the Institute for Leadership and an assistant professor at the U.S.

Coast Guard Academy. Dr. Borgerson earned a B.S. from the U.S. Coast Guard Academy, as well as advanced degrees in international relations from the Fletcher School of Law and Diplomacy at Tufts University.

Dr. Borgerson holds a U.S. Merchant Marine Officer masters license and is a principal of Rhumb Line LLC, an independent maritime consulting firm consulting in complex strategic projects, and I guess this is one. Dr. Borgerson was raised in Mr. Carnahan's district, Jefferson County, Missouri, where his family still lives.

Dr. Robert Corell is the vice president of programs at The Heinz Center. He joined the Center as the global change director in December 2006. Dr. Corell is actively engaged in research concerned with the sciences of global change and the interface between science and public policy, particularly research activities that are focused on global and regional climate change.

Before coming to The Heinz Center, Dr. Corell served as a senior policy fellow at the American Meteorological Society. Dr. Corell has also been an assistant director at the National Science Foundation and a professor and academic administrator at the University of New Hampshire.

He is an oceanographer and engineer by background and training, having received a Ph.D., M.S. and B.S. degree at Case Western Reserve University and MIT.

So, Dana, you have your Ph.D.s and we have our Ph.D.s.

Mr. Mead Treadwell currently serves as senior fellow at the Institute of the North. His research at the Institute focuses on strategic and defense issues facing Alaska and the Arctic region, management of Alaska's commonly owned resources and integration of Arctic transport and telecommunications infrastructure. He was appointed to the U.S. Arctic Research Commission in 2001 and was designated chair of the Commission by President Bush in 2006. He also sits on the boards of several companies.

Throughout his career in Alaska, Mr. Treadwell has played an active role in Arctic research and exploration. His focus has been on the development of natural resources, protection of the Arctic environment, and fostering international cooperation after the Cold War. In business and government, Mr. Treadwell has helped establish a broad range of research programs and technology, ecology, social science, and policy.

I want to thank you all for coming. I want to thank you for putting up with us for an hour or so. And now, Dr. Borgerson, why don't you lead off the witnesses?

STATEMENT OF SCOTT BORGERSON, PH.D., VISITING FELLOW, COUNCIL ON FOREIGN RELATIONS

Mr. BORGERSON. Thank you very much for the honor to be here today. The Arctic is an important issue for our country that we are just now waking up to, and my family in Festus, Missouri, from Congressman Carnahan's district, might seem far removed from the Arctic, but this is an issue of geostrategic importance to our country and its foreign policy that affects the entire nation and every district.

I submitted my comments for the record. I will paraphrase them very briefly here, but first I will speak to the climate change driv-

ing the geopolitics, which Dr. Corell and Mr. Treadwell will go in to far greater detail.

Then I think, Mr. Chairman, you stole my notes because your opening statement did an excellent job I think of framing the grandiose strategic issues and I agree with I think every point you said, and so I will end my testimony with specific recommendations for U.S. policy and issues that the committee might consider as it relates to the Arctic.

So, first, whether the Arctic is melting because of global warming or not, I think there is scientific consensus that Dr. Corell and Mr. Treadwell will speak to. In the end it doesn't matter because the fact is the ice is melting. It is melting much faster than I think policymakers appreciate, and the models have been consistently overly conservative.

They used to look at perhaps 2150. They keep moving up in terms of when the Arctic will be ice free in summer, and just the current projected trend lines, just extrapolating out from the pace it is melting now, the Arctic will be ice free in summer by 2013. That is soon, and our country is not prepared.

Second, the state of international relations. I think you covered very well at the beginning Russia's approach to the Arctic, as well as the other Arctic coastal states. Washington, DC, I think, because Alaska seems so far away, forgets that by virtue of the Alaskan coastline we too are an Arctic nation, and the geopolitics of the Arctic, although we have been ignoring them for several years, are moving quickly without us.

I think Russian foreign policy in general and actions in the Arctic should give pause to the United States and our allies, including Canada, which is a close NATO ally with troops committed in Afghanistan supporting our missions there, and I think that the Arctic is at this moment at a critical crossroads in its future.

I think it could be one of international cooperation, the rule of law and peace, which we all hope it unfolds in that way, but I also think that there are all the ingredients for trouble. There are a tremendous amount of oil and gas resources. There are blurred lines of state sovereignty. Every border except for one has at least one significant area of dispute between the coastal states.

Those have been sleeping dogs up to now, but with the dramatic climate change happening there the sleeping dogs might not lie, so let me use the bulk of my time to make specific policy recommendations that I think the Congress and this committee should consider.

First, I think the overall spirit of the U.S. approach to the Arctic should be one of spirited diplomacy and wanting to cooperate and build this peaceful future for the region, but responsible statecraft also requires that we hedge as a nation and take certain actions now so as to protect our national security interests there.

The NSPD HSPD released in the last week of the Bush administration I think was pretty good, and I give it a B+, but I think it fell short in three important areas, the most important of which it did not call for new funding for Coast Guard icebreakers. We have a geriatric fleet—one, the Polar Star, mothballed at a pier in Seattle—and compared with the resources of our other Arctic countries this isn't good enough.

Second, it didn't prioritize all of our issues and interests in the Arctic, and that leaves the various agencies with interests there to work that out amongst themselves. I think that we need to give some guidance to the Federal Government and our interests there. Some of the issues that I have heard already in the statements this morning: What is our priority in the Arctic?

And lastly, and I will speak to this a bit more because I think it relates to other policy recommendations. We have a special relationship with Canada, and I think that the policy really missed an opportunity to highlight that and where we might work collaboratively in the future Arctic.

Second, the United States is far past overdue to join and accede to the U.N. Convention of the Law of the Sea. One hundred and fifty-six countries and the European community have joined this treaty, and we remain amongst a rather illustrious group of Libya, North Korea and Iran to have yet to formally join this treaty.

There are strategic imperatives that I would be happy to get into if of interest during the questions after the testimony about why it is important to join this year. The Arctic tops that list, is at the top of the list at least, of why it is in our interest for national security, economic and environmental reasons to become formally a stated party to the treaty.

Third, as mentioned in Canada, I think Ottawa—I know Ottawa—would be very receptive to the United States approaching it to cooperate on Arctic issues. We should not under appreciate how important the Arctic is to Canada. Indeed, it even speaks at the heart of what it means to be Canadian.

There are a host of issues in which I think the Canadians would be open to collaborating with us to create a unified North American bloc on Arctic issues. I think it might make sense to present a grand deal where Canada gets much of what they want, we get much of what we want.

Such ideas I think would include an Arctic Navigation Commission modeled on the St. Lawrence Seaway, unified regulatory standards probably adopting their Arctic pollution prevention regulations after our oversight so that we have a unified set of standards across North America, working as we do now in NATO and NORTHCOM, expanding our military cooperation and pooling our resources for the various maritime challenges that exist there.

Next, climate change is important from a mitigation perspective, but we shouldn't lose sight of adaptation, which is really what is happening in the Arctic, so we need to reduce greenhouse gas emissions, whether that is a carbon tax, which I support, or a cap in trade plan for the country, but we also need a national adaptation plan, and I think Alaska gives us a lot of lessons to learn in which we might model. We have heard from other districts where adaption to climate change is important.

In the spirit of enthusiastic diplomacy and cooperation, I think the world, the community of nations, is ready for an invigorated foreign policy. We are stepping out in this in other areas of the world. The same should be done in the Arctic.

I heard from Congressman Ros-Lehtinen the idea of marine sanctuaries. The United States just created several huge ones in the Pacific. I think there is an opportunity to do the same at the North

Pole, two degrees of latitude, for a polar park dedicated to science, and I would be happy to speak further on those ideas, a mandatory polar code for shipping regulations and other information sharing on ice conditions and so forth with our Arctic neighbors.

Last, and I think Mr. Treadwell will also speak to this, but in the Lower 48 we shouldn't lose sight of all of the Americans and patriots who live in Alaska, the indigenous communities who are there, who are ready to help our country respond to this change.

We should remember them both in the adaptation that they are facing with the change in the Arctic, but also think of them as a resource as they are now in places like the Barrow Arctic Science Consortium or the First Alaskans Institute.

I think whether it be to augment search and rescue or even learn from their experience that they have a lot to offer our country as we determine our foreign policy in this important region.

Thank you.

[The prepared statement of Mr. Borgerson follows:]

Statement of
Scott G. Borgerson
Visiting Fellow for Ocean Governance at the Council on Foreign Relations[1]
Before the Committee on Foreign Affairs
U.S. House of Representatives
Washington, DC
March 25, 2009

Mr. Chairman:

Thank you for this opportunity to testify before the House Committee on Foreign Affairs about U.S. national security interests in the Arctic.

The order of my opening remarks will first be about the climate change driving the Arctic's transformation; then I will paint a quick future of the current state of international relations in the Arctic as I see it; and I will end with specific policy recommendations the U.S. should take to advance its interests in this strategic region.

1) U.S. policy has not kept pace with climate change. Ice in the Arctic Ocean is melting much more quickly than most people appreciate and U.S. policymaking is lagging far behind environmental realities. *The Arctic is the fastest warming region on earth and is on pace to be ice free in the summer by 2013.* The past few years have witnessed extraordinary melting and last summer the two fabled Arctic passages over Eurasia and North America opened together for the first time in history. Recent satellite images of the Chuchki and Beaufort Seas show dramatically less ice than what is historically normal for this time of year. By every measure, from huge ice shelves breaking free to complex environmental dynamics that scientists do not fully understand, the polar ice cap is disappearing and all indicators point to another record sea ice minimum this coming summer. We may be approaching a tipping point past which the melting sea ice cannot recover.

2) This dramatic and unprecedented climatic change is affecting the geopolitics of the region. The Arctic is home to an estimated twenty-two percent of the world's remaining undiscovered hydrocarbon reserves as well as access to the fabled shipping routes over Eurasia and North America, both of which have led to balance-of-power struggles in the region. The next few years will be critical in determining whether the Arctic's long-term future will be one of international harmony and the rule of law, or of a Hobbesian free-for-all with dangerous potential for conflict. This is a story still being written with a plot full of characters who speak of multilateral cooperation but pursue their own self-interest. There is, however, reason for optimism, as governments in Washington, Moscow, Ottawa, Oslo and Copenhagen have issued

[1] These views are my own and not those of the Council on Foreign Relations, which takes no institutional position on matters of public policy.

public commitments to behave peacefully in the Arctic region, in addition to the general goodwill that has developed during the ongoing International Polar Year. Several Arctic states are closely collaborating on mapping the seafloor, with scientists from one country sailing aboard icebreakers of another. On the face of it, everyone seems to be getting along swimmingly.

But there is reason to worry, especially considering Russia's increasingly aggressive behavior in regards to military and economic expansion in the region. Russia has resumed long-range bomber flights and naval patrols in the Arctic and has assumed a more belligerent foreign policy overall that should give the other four Arctic coastal states pause. They are beginning to notice. Canadian Prime Minister Stephen Harper held a cabinet meeting last August in the Arctic town of Inuvik, more than 2,500 miles north of Ottawa, to pledge his conviction to defend Canadian Arctic sovereignty. In 2008, Canada conducted its largest military exercise ever in the region and blocked the sale of Canadian radar technology to a U.S. buyer on national security grounds. Meanwhile, Greenland passed a home-rule referendum in November that will eventually lead to independence from Denmark; the European Union has a new Arctic policy and has announced plans for building its own icebreaker; and at the end of January, NATO held a conference in Iceland about its future mission in the Arctic.

Even Asian countries with no Arctic coastlines are getting into the game. The Chinese sent its icebreaker, the Snow Dragon, on its third Arctic expedition last summer. Beijing successfully earned observer status to the Arctic Council and also plans to install its first long-term deep-sea monitoring system in the Arctic to keep an eye on long-term marine changes and the impacts of global warming on China's climate. South Korean and Singaporean shipyards are building massive new icebreakers and ice-strengthened tankers to navigate new Arctic routes. Japan is closely watching the shorter shipping routes opening up in the region, which will benefit Japanese businesses due to the country's northern latitude.

When taking a pan-Arctic view there are also a number of nagging sovereignty disputes. Every single bilateral relationship where Arctic countries share a physical border, except one, Norway and Denmark, has at least one significant point of disagreement. Like previous assumptions that the icecap is melting more slowly than it actually is, it would be a mistake to assume that all these potential flashpoints will remain sleeping dogs. The combination of new shipping routes, trillions of dollars in possible oil and gas resources, and a poorly defined picture of state ownership make for a toxic brew.

3) The U.S. should approach the Arctic with enthusiastic diplomacy and in a spirit of cooperation, while hedging in order to protect its interests. While the U.S. has a critical leadership role to play in helping the Arctic develop peacefully, responsible statecraft requires immediate corrective action to address strategic vulnerabilities as a result of the sea change on America's fifth coast.

Specifically, the U.S. should:

a. Strengthen the Arctic policy released in the last week of the Bush administration in three key areas. First, the policy did not specifically outline funding for new icebreakers. *The Coast Guard needs at least two new ships to replace the geriatric Polar Sea and mothballed Polar Star.* The country finds itself in a dire predicament considering the cost of more than one billion dollars per acquisition, and that each ship will take a decade to build given the egregious inefficiencies imposed by the Jones Act. Even if Congress appropriated the money today, this would mean the U.S. would be launching its first new ship five years *after* the Arctic was already seasonally ice free. This is unacceptable, especially in light of the fact Moscow has pledged to build at least three new nuclear ships to join what is already the world's largest icebreaker fleet. A little known and embarrassing fact is that the U.S. is now forced to contract some of its polar missions to foreign operators. Although the need to build new icebreakers may seem counter-intuitive because there is less ice, the Arctic remains a hazardous environment and icebreakers are still needed to project sovereignty, conduct science and manage new maritime activities. Second, the recent Arctic NSPD/HSPD did not prioritize policy interests, leaving various government agencies to sort that out amongst themselves. Lastly, the policy failed to recognize the special relationship the U.S. enjoys with Canada and potential areas where the two countries might collaborate.

b. Formally join the Law of the Sea. There are numerous strategic imperatives for why the U.S. should immediately accede to the convention. In the Arctic, more specifically, the convention provides solid legal bedrock on which to build elegant governance structures. The Law of the Sea also includes provisions for extending U.S. sovereignty over its extended continental shelf in the Beaufort and Chuchki Seas; defending the U.S. position that the Northwest Passage is an international strait and not Canadian internal waters; allowing stricter environmental standards over Arctic shipping; establishing rules for managing the Bering Strait which will become a key shipping choke point; and protecting the mobility of U.S. flagged vessels and those of our allies in new Arctic transit routes, to name but a few.

The Law of the Sea and the 1994 agreement on its implementation have been signed and ratified by 156 countries and the European Community. Although the United States treats most parts of the convention as customary international law, it remains among only a handful of countries — and one of an even smaller number with coastlines, including Syria, North Korea, and Iran — to have yet to join the convention. The convention actually enjoys broad bipartisan support in Congress; has been endorsed by both the Clinton and George W. Bush administrations as well as the National Governor's Association; is championed by the Joints Chiefs of Staff; and has been recommended by a wide array of interest groups in the United States, including the foremost national security, commercial, and environmental organizations. It's past time we formally became a state party to the overarching governance framework for nearly three-quarters of the earth's surface and what lies above and beneath it.

c. Develop a national climate change adaptation strategy. This should be done in tandem with ongoing mitigation efforts and include planning for a host of other emerging challenges such as rising sea levels, droughts and fresh water shortages.

d. Invest in our special relationship with Canada. Ottawa would be receptive to a collaborative partnership on Arctic issues, which should include deepening and widening the 1988 Agreement to Disagree on the status of the Northwest Passage and building an Arctic Navigation Commission modeled on the St. Lawrence Seaway. It would be a mistake to under appreciate how important the Arctic is to Canada, our largest trading partner and strategic ally. The U.S. should elevate the Arctic in bilateral discussions and work actively to create a unified North American bloc on emerging Arctic issues.

e. Champion Arctic diplomatic initiatives. Arctic countries, and the world as a whole, are desperate for the return of a U.S. voice interested in multilateralism. The U.S. should get the ball rolling on creating a internationally protected marine preserve at the North Pole for peaceful scientific research, institutional reform to empower the Arctic Council to address security issues, and other joint efforts like sharing weather information and pooling search and rescue resources. These actions, combined with finally joining the Law of the Sea, would send a clear message that American diplomacy is back and as a nation we are attuned to the climate crisis.

f. Partner with indigenous communities. The Barrow Arctic Science Consortium (BASC) and the First Alaskans Institute offer terrific models on which to emulate. BASC, a regional support organization built from 125 years of experience supporting western science and millennia of traditional knowledge, facilitates over 100 research projects each year from around the globe. With congressional support, BASC facilitated construction of the new Barrow Arctic Research Center. BASC's funding is in jeopardy and needs to be protected in order to maintain America's one-stop-shop for scientific logistics support in the American Arctic as well as a vital link to North Slope indigenous communities. These Americans are experiencing the Arctic's transformation firsthand and are ready and willing to answer the call of duty for their nation.

There are a host of other issues I did not cover in this testimony including the fact that the Arctic is currently divided among three combatant commanders, the lack of mandatory shipping safety regulatory codes, our inability to respond to oil spills in such an extreme geography, fisheries management or the fast growing tourism industry. There is also an interesting discussion to be had about how the Arctic figures into the broader milieu of American foreign policy and bilateral relationships.

Thank you and I look forward to responding to your questions and expanding on any of the points in my testimony.

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Chairman BERMAN. Thank you very much.

Dr. Corell.

STATEMENT OF ROBERT CORELL, PH.D., VICE-PRESIDENT OF PROGRAMS, THE HEINZ CENTER

Mr. CORELL. Thank you very much. I compliment you, sir, both on calling this hearing, as well as your very comprehensive opening remarks.

Much of what I will say has been drawn from major scientific assessments, recent peer reviewed literature, because things in the Arctic are changing extraordinarily rapidly, and the summary at the top of my submitted documents sort of summarize that the things are happening in the Arctic very rapidly, and over the next 100 years we are going to see changes across the full range of interests for our country from major physical, ecological, social and economic developments, and those will have major impacts around the world.

On page 3 there is a slide that shows something that has been published only recently and follows up on the fourth assessment of the IPCC. That diagram shows the worst scenario, the red line, and that in 2007 we are statistically above that already, so things are moving much more rapidly, and that is on a global scale.

The IPCC and the Arctic Climate Impact Assessment make it clear that the warming is unequivocal and that the CO_2 concentrations we are seeing now exceed anything in the last 650,000 years, so this worst case gives us pause and worry.

On page 4 I showed a small, little cut from the IPCC that indicates the scale at which the North American continent is likely to see warming over this century, and that is based on what we would call a midrange scenario. You can see that it is between three and seven degrees toward the end of the century. In fact, it shows there at 2050.

The reason I put this in here is this is drawn from a whole series of model runs, each of which has different ways of implementing the physics and chemistry, but all with a goal of projecting into the future, and that green bar is the pathway and the statistical range at which the planet would occur if it had not received the bulk of the greenhouse gases that have been put into the atmosphere in the last 50–100 years, so it gives you some idea that it is very difficult to project the future without seriously giving credence to the addition of greenhouse gases.

Here I want to talk about several things: The sea level rise issue, reduction of sea ice in the Arctic Basin and then take a look at one of the things very important to our nation, fisheries in that region.

On the sixth page of the testimony it gives you some sense of what is happening to Greenland, and the reason I used Greenland is that it is a place at which the meltwater does contribute significantly to sea level rise.

We know that 100,000 years ago we had a warming somewhat comparable to what we have today. In fact, it peaked out at only a degree more than we have at the moment. Many of the projections, virtually all of the projections, suggest that on the current path we are going to exceed that one degree.

During that time we had between 2½ and 3½ meters of sea level rise over several hundred years, so this is a serious source of sea level rise conditions, but we have to give credence to the fact there are two reasons for sea level rise. One, it is just the warming of the ocean, the expansion of the water, and to date most of the sea level rise we have seen has come from that, but during this century that will be overtaken, we believe, by meltwater from glaciers such as Greenland.

On the fifth page I show you what one level of sea level does to the region around New Orleans, pretty devastating as that depicts, but on an international scale Nichols and Leatherman that one meter of sea level rise will affect 6 million people in Egypt with a reduction of some of their agricultural lands, as much as 15 percent.

Thirteen million people in Bangladesh, major loss of rice production and 72 million people in China with tens of thousands, so there will be as sea level rise reaches these lowlands a major, major effect on things like food supply. I only point that out here because it is in that context that foreign policy issues will come to the fore.

Then we talk about what is happening in the Central Arctic Basin. You mentioned it and others have made note of it, and on the eighth page, or I guess it is the fourth page, you will see two pictures that I think give you some sense of what is happening. The melt rate up there far exceeds anything, and it is noted already that we might see an ice free summer certainly in the decade ahead.

The ice cover here in 2007 is roughly one-half of what it was in 1950, and the lower picture gives some credence to the idea that the seaways that are so important to many of the nations, including ours, who reside here in the north are opening up.

In 2007 and 2008, the Northwest Passage opened up for 2 weeks. According to the Canadian Ice Service, that is a brand new development. You can see in that image that on the Russian side there is wide open waters for a far longer period and over a much larger extent than in Canada.

If we look at the fisheries issue just very briefly, one of the things that happens when the water warms is the fish seek new ecological niches, and I just suggest in the next picture that is on page 5 of the testimony what is happening just to the cod fishery in the northeast part of the Atlantic.

You can see two things happening. Capelin are the feedstock, and the feedstock do go through cyclical behavior, but overall the feedstock is moving north and depleting, and of course that is going to have a direct impact on the productivity of the northeast cod that is so important to many fisheries, including our own.

There was mention made of the study by the National Security Committee, but I would also suggest looking at the CNA report. Eleven flag officers of the United States military have produced what I consider a seminal report, and they report that

> "Projected climate change poses a serious threat to American national security. The predicted effects of climate change over the coming decades will produce extreme weather events,

droughts, flooding, sea level rise, retreating glaciers and so forth."

It is a very good report, and I am sure it is at your disposal, and at some time General Sullivan and others would be more than willing to talk to you.

Then turn to the opening of the seaway. The Arctic Council, as you mentioned, is active in this arena and has appointed a study of the opening of the seaways as a consequence of the melting, that there are some of the pathways that are likely to be open and that the primary driver for this will in fact be natural resource development.

There are going to be major interests in oil and gas, hard minerals, tourism, fishing and even potable water and that the marine maritime industries are going to be the key stakeholders in this regard.

It was mentioned also, and you can see in this picture at the bottom of page 7, where much of that quarter to a third of the known reserves reside, and it is mostly in Russia, and it is in our best interest I think to include that perspective in our discussions with our colleagues from Russia because most of that oil and gas development will have a long-term impact on our energy interests.

Chairman BERMAN. Dr. Corell, I think if you could just——

Mr. CORELL. Yes. I just want to conclude by noting that there has been major interest in the governance issues over time.

A team of individuals from all of the eight Arctic countries have been assembled and supported by six foundations from the United States and elsewhere to study the governance issues and over the 18 month period try to get a landscape of that documented so that you and others will have at your disposal a broad insight of the kinds of issues that are being raised from every source from complete, new treaty arrangements to others where we should be basing our action on existing arrangements.

Thank you.

[The prepared statement of Mr. Corell follows:]

Climate Change and the Arctic: New Frontiers of National Security

Committee on Foreign Relations
U.S. House of Representatives
Wednesday, March 25, 2009 9:30 AM Rayburn 2172

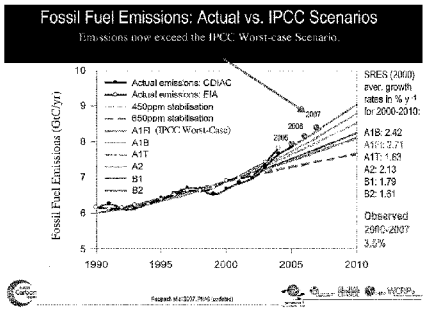
An Overview of the Science and National Security Interests of Climate Change in the Arctic

The Arctic is now experiencing some of the most rapid and severe climate change on Earth. Over the next 100 years, climate change is expected to accelerate, contributing to major physical, ecological, social, and economic changes. Changes in the Arctic climate will also affect the rest of the world.

A Statement
by
Dr. Robert W. Corell
Vice President for Programs and Policy
The H. John Heinz III Center for Science, Economics and the Environment
and Chair of the Arctic Climate Impact Assessment

Introduction

Mr. Chairman, Members of the Committee, and all gathered here today, I thank you for the opportunity to participate in today's hearing to explore the implications of climate change in the arctic on our nation's national security interests, specifically U.S. territorial sovereignty, control of new waterways, access to natural resources, and environmental protection. I am honored to join you to report on recent developments in the science that underpins our understanding of the past and projected effects of climate change, especially in terms of the consequences within North America, across the Arctic region, and around the world. In offering these perspectives, I will be drawing from the findings of major scientific assessments and recent peer-reviewed publications that draw together the collective findings of the scientific community.



Context for Today's Hearing

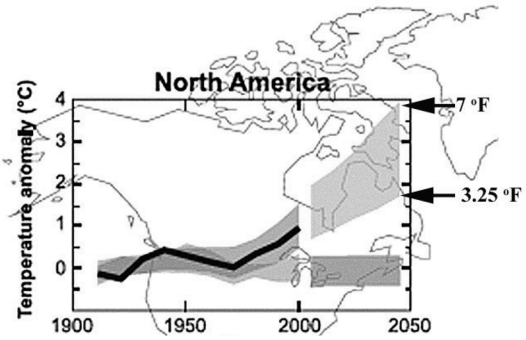
The Intergovernmental Panel on Climate Change (IPCC's) Fourth Assessment Report[1] summarized the peer-reviewed scientific evidence that the Earth's climate continues to warm more rapidly and persistently than at any time since the beginning of civilization, in particular it concludes that:

- Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level,

[1] *IPCC, 2007: Climate Change 2007: Working Group I Report "The Physical Science Basis see http://www.ipcc.ch.*

- The atmospheric concentrations of CO2 in 2005 exceed by far the natural range over the last 650,000 years. As depicted in this figure above, the 2007 fossil fuel emissions world-wide exceeded the "worst case" IPCC scenario (the top red line). The IPCC states that the global increases in CO2 concentrations are due primarily to fossil fuel use, with land-use change providing another significant (20%) but smaller contribution.
- Most of the observed increase in global average temperatures since the mid-20th century is *very likely* due to the observed increase in anthropogenic GHG concentrations
- In the Arctic region, the main projected biophysical effects are reductions in thickness and extent of glaciers, ice sheets and sea ice, and changes in natural ecosystems with detrimental effects on many organisms including migratory birds, mammals and higher predators.

The overall temperature projections for the North American region is shown to the right in this 2007 IPCC figure which projects average temperature increases across the North American continent by 2050 from about 3.25 °F to 7 °F. This temperature increases for the Arctic region is likely to be about twice this or about 6.50 °F to 14 °F. While some of the fluctuations are likely a result of natural factors (e.g., variations in solar irradiance and major volcanic eruptions), the 2007 IPCC evaluation concluded that the strength and patterns of these change makes clear that human influences will be responsible for most of the warming during the 21st century.



(Note: the Light Blue/Green Band depicts the IPCC climate model projections for the condition where human activities ***are not*** increasing the greenhouse gases).

Patterns of Climate Change in the Arctic Region

There are three major changes in the Arctic region that will have profound consequences for the U.S. and the rest of the world, namely:

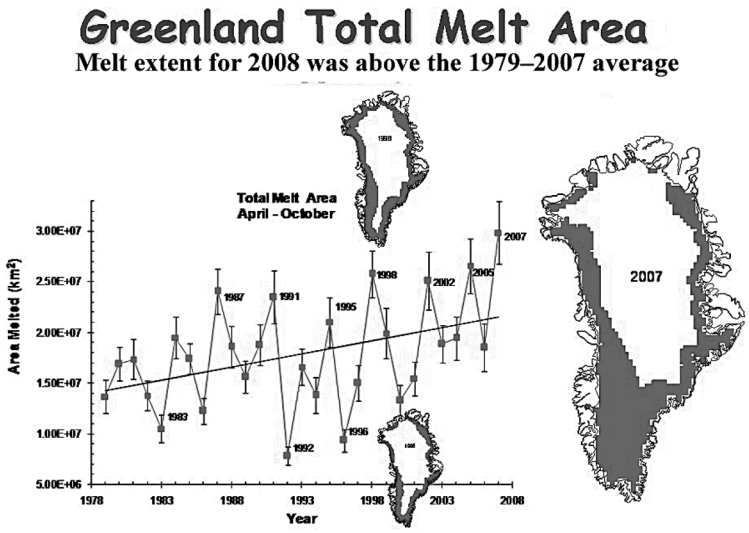
(i) Sea level rise from the melting of land based glaciers and ice sheets (e.g., Greenland) and continued warming of the world's oceans,

(ii) Continued reductions of sea ice in the Arctic oceanic basin, and

(iii) Changes in fisheries as a result of the warming of the oceanic waters into and within the Bering and Barents Seas.

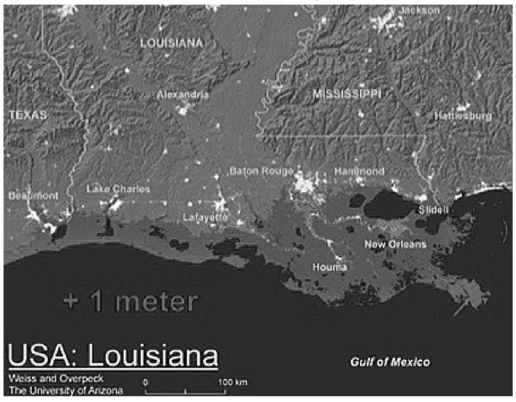
Sea Level Rise: Sea level rise is the consequence of two factors, first the expansion of oceanic waters simply due to the warming of the water, which accounts for roughly half of the sea level rise since the beginning of the industrial period (i.e., late 18th and early 19th centuries), with the other half from the melting of land-based glaciers, such as Greenland. It is projected that land-based glaciers, particularly Greenland, will increasingly account for future sea level rise. Recent papers suggest that on the basis of calculations presented in this paper, it is projected that an improved estimate of the range of sea level rise

to 2100 including increased ice dynamics (i.e., melting of land-based glaciers) lies between 0.8 and 2.0 meters[i]. The melting of Greenland is depicted in the graphic that follows.



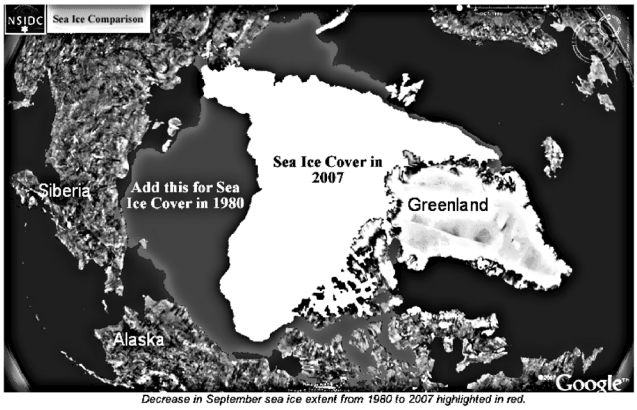
Source: Adapted from Steffen and Huff, CIRES, Univ.of Colorado

According to Nicholls and Leatherman[ii], a 1meter rise in sea-level would affect 6 million people in Egypt, with 12% to 15% of agricultural land lost, 13 million in Bangladesh, with 16% of national rice production lost, and 72 million in China and "tens of thousands" of hectares of agricultural land. The IPCC 2007 reports similar conclusions, noting that many "millions of people are projected to be flooded every year due to sea-level rise by the 2080s. Those densely populated and low-lying areas where adaptive capacity is relatively low, and which already face other challenges such as tropical storms or local coastal subsidence, are especially at risk." The impact of one meter of see level rise, which is currently emerging in the literature and the projection of many scientists, will have a profound on the U.S. in places like the New Orleans delta region. Similar impacts are expected and projected for low land countries

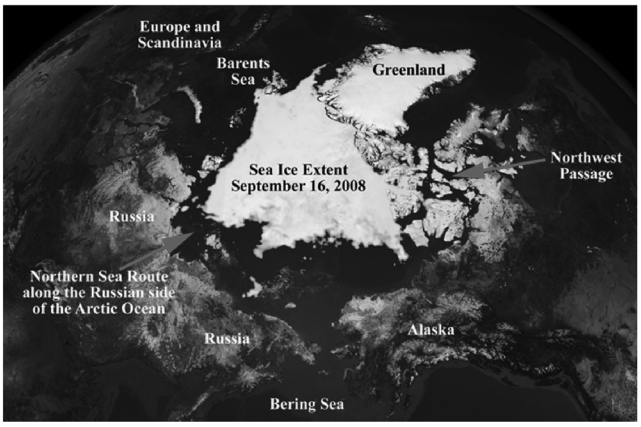


such as Bangladesh, other lowlands countries in Asian and the many small island states with little or no topographical relief (e.g., many with only a few meters maximum height). The consequences of these changes in sea level and related coastal changes during this century have important national security and environmental implications for our nation.

Reductions of Sea Ice in the Arctic Oceanic Basin: Reductions of areal extent of sea ice in the Arctic oceanic basin are substantial compared to past records, over 35 % since 1979. The National Snow and Ice Data Center and NASA have tracked these changes by satellite since 1979. A longer time series of sea ice extent, derived primarily from operational sea ice charts produced by national ice centers, suggests that current September ice extent are over 50% lower than conditions in the 1950s to the 1970s (Stroeve et al. NSIDC 2008). The 2008 areal extent of sea ice dramatically shows the opening of the seaways both along the Russian and Canadian coasts. The opening of these areas along these coasts not only opens navigation and shipping lanes, but also opens access to oil and gas development, new fishing grounds, and other natural resources development. It further complicates issues of territorial sovereignty, control of waterways, boundary delineation, and serious issues for indigenous peoples of the region,



Decrease in September sea ice extent from 1980 to 2007 highlighted in red.

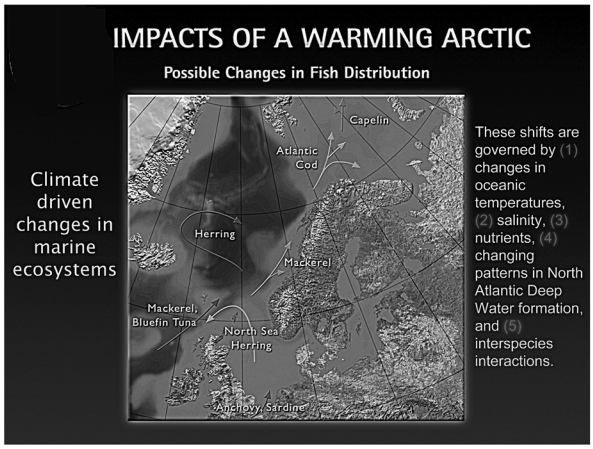


Changes in Fisheries: Changes in fisheries as a result of the warming of the oceanic waters into and within the Bering and Barents Seas have been real and are increasing. The shifts in the Norwegian Sea and Barents

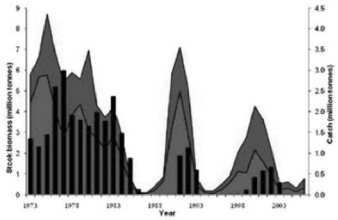
Sea are depicted at the right.

These shifts in the marine ecological structure leads to new fishing grounds, some of which are not under any fisheries regimes or agreements. The changes in the Cod/Capelin fishery are projected in the graphic to the right from the Arctic Climate Impact Assessment (2005) and are then depicted in the pair of graphics below.

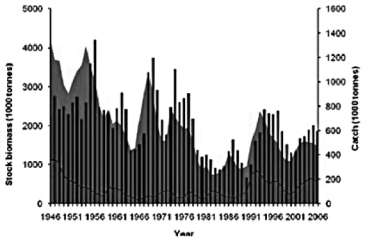
Such changes are likely to increase during the 21st century as warming of the oceans continue and the acidification of the oceans



A Comparison of the Reductions in Cod feedstock (Capelin) in the Barents Sea with the Concomitant Reductions in Northeast Arctic Cod



Barents Sea capelin. Total stock (blue area) and maturing component (red area) during autumn, and total landings (columns), 1973–2006. From PINRO/IMR report.



Northeast Arctic cod, development of spawning stock biomass (red area), total stock biomass (age 3 and older, blue area) and landings (columns). From PINRO/IMR report.

become more severe. The Fourth IPCC Assessment (2007) reports, with high confidence, that it is likely that there will be local extinctions of particular fish species at edges of their normal ranges with changes in their distribution and productivity. In particular with continued warming it also likely that there will be local extinctions at the edges of ranges, particularly in freshwater and diadromous species (e.g., salmon, sturgeon). It is projected in the IPCC Fourth Assessment (2007) that North Pacific oceanic ecosystems are likely to be characterized by 'regime shifts' (fairly abrupt changes in both physics and biology persisting for up to a decade). These changes have major consequences for the productivity and species composition of fisheries resources in the region. Major changes in Atlantic ecosystems can also be related to regional climate indicators, in particular the North Atlantic Oscillation (NAO), and therefore will have an impact on north-east Atlantic plankton, fish distribution and production. Production of fish stocks, such as cod in European waters, has been adversely affected since the 1960s by the positive trend in the NAO. Recruitment is more sensitive to climate variability when spawning biomass and population structure are

reduced. In order to reduce sensitivity to climate, stocks may need to be maintained at higher levels by fisheries management agreements. Climate-related reductions in production cause fish stocks to decline at previously sustainable levels of fishing; therefore the effects of climate must be correctly attributed and taken into account in fisheries management. The obvious consequence is a potential change in overall fish availability, and most particularly in the traditional availability of seafoods in lesser-developed regions of the world.

An Overview of Climate Change on National Security: One of the more important studies published in 2007 is the Center for Naval Analysis (CNA) *"National Security and the Threat of Climate Change"* report. This team of senior military officers concluded that "projected climate change poses a serious threat to America's national security. The predicted effects of climate change over the coming decades include extreme weather events, drought, flooding, sea level rise, retreating glaciers, habitat shifts, and the increased spread of life-threatening diseases. These conditions have the potential to disrupt our way of life and to force changes in the way we keep ourselves safe and secure." They further stated that "in the national and international security environment, climate change threatens to add new hostile and stressing factors. On the simplest level, it has the potential to create sustained natural and humanitarian disasters on a scale far beyond those we see today. The consequences will likely foster political instability where societal demands exceed the capacity of governments to cope." To expand on these overarching perspectives, the remaining discussions in this testimony will focus on (i) the opening of the Arctic seaway to new opportunities and challenges in navigation and marine shipping, and (ii) a study underway to examine the governance issues in a rapidly changing Arctic.

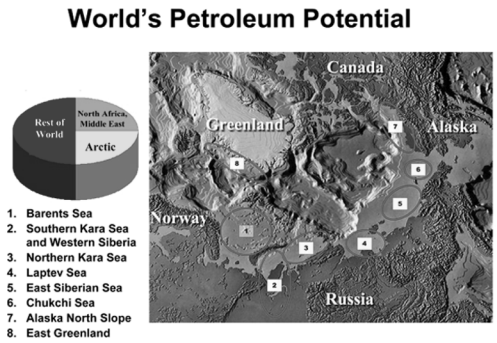
The Implications of the Opening of the Arctic Seaways to Marine Shipping and Resource Development: A draft of the principal findings[2] of the Arctic Council's Arctic Marine Shipping Assessment concludes that:

- Continued sea ice retreat will increased access
- Winter arctic sea ice cover will remain for the rest of the 21st century
- The primary driver for marine shipping across the increasingly open ocean, particularly in summer months, is regional & global natural resource development
- The primary sectors are: oil & gas, hard minerals, tourism, fishing and water,
- The global maritime industry are the key stakeholders,
- New ship technologies will allow greater access and independent operations (no icebreaker convoys needed),
- There is a serious lack of an integrated governance-regulatory framework,
- Minimal Arctic infrastructure is now

[2] The Report will be submitted to the Arctic Council at its 2009 Ministerial meeting in Tromos, Norway in late April 2009.

available to support expanded marine activity and provide adequate safety net,

- Greatly enhanced monitoring will be required,
- Intense development is most likely in the Northwest sectors of Russia and in the Norwegian-Barents-Kara Seas region,
- There is a need for balance to ensure freedom of navigation, coastal state marine safety, and environmental protection interests, and most importantly,
- There is a lack of Arctic experienced mariners from ship captains to seamen.



From a national security perspective, the opening of the seaways leads a series of geopolitical issues that are currently unresolved and will require thoughtful policy and international attention:

- **Access:** Issues of Access and Rights of Passage through the Northern Sea Route (Russia) and the Northwest Passage (Canada).
- **Seaward Claims:** Claims of seaward ownership within the Arctic oceanic basin. Median Line Method (i.e., Divide into areas proportional to the amount of coastline of a country), and the Sector Method (Divide into areas by essentially longitudinal line from the countries to the pole). The seaward claims issue is of critical importance as it defines mineral, oil and gas, and fisheries rights. Given that most of the petroleum reserve potential is within the Russian coastal margins, these issues are as vital as marine seaway access.
- **Maritime claims and boundary issues:** Issues involving claims to jurisdiction over areas beyond the territorial sea within the Arctic oceanic basin (including claims under the provisions of UNCLOS Art. 76 to continental shelves extending beyond the limits of Exclusive Economic Zones) and the resolution of offshore boundary disputes.
- **Commercial shipping and oil and gas development:** Issues regarding the development of effective codes of conduct for shipping under Arctic conditions and for the conduct of offshore oil and gas drilling and production.
- **Arctic fisheries:** Issues concerning the management of northward moving commercial fisheries that takes into account the principles of ecosystem-based management.
- **Land claims:** Issues arising from longstanding use and occupancy and the still unresolved claims of a number of indigenous peoples as they relate to the governance of human-environment interactions in the Arctic.
- **Conservation of Arctic ecosystems:** Issues regarding the protection of marine and terrestrial ecosystems in the Arctic under pressure from human actions as well as biophysical changes.
- **Regional Governance:** Issues relating to multi-level governance and collaboration among regional, national, and international bodies in guiding northern development toward mutually desirable ends.
- **Venue:** Is the Law of the Sea the venue or will other international frameworks be sufficient to resolve these geopolitical issues?

A study to Examine the Governance Issues in a Rapidly Changing Arctic: Climate change -

coupled with the impacts of globalization - has triggered a cascade of events leading to profound environmental and socioeconomic changes in the Arctic and beyond. If anything, this cascade is accelerating. This, in turn, has generated a profusion of ideas about the need to restructure existing Arctic governance arrangements together with a range of concrete proposals for specific alternatives. This study, to be completed by Fall 2010, is designed to contribute to informed, timely, and effective policymaking that addresses the challenge of governance arising in conjunction with the impacts of rapid change in the Arctic. The study strategy is based on the following precepts:

- **Engage in an end-to-end process:** Engage members of the policy community at every stage in the study rather than simply presenting conclusions to policymakers after the analysis is completed.
- **Target all stages of the policy process:** Effectiveness depends on addressing the policy process at every stage from the framing of issues through the selection and implementation of specific policies to the stage of evaluation and assessment.
- **Address multiple policy windows:** Work with members of the policy community in multiple settings including gatherings of parliamentarians (e.g. the Standing Committee of Parliamentarians of the Arctic Region), officials representing governments in international settings (e.g. the Senior Arctic Officials in the Arctic Council), and representatives of sub national governments (e.g. participants in the activities of the Northern Forum) as well as agency personnel within the governments of individual Arctic states.
- **Choose Project team members with extensive Arctic experience.** Include individuals who have participated in the policy community themselves as well as individuals from the science community who have experience working in a variety of policy settings.

The study (The Heinz Center is a participant in this study) employs a three-stage strategy that is designed to facilitate policy considerations and development that address the challenges of governance in a rapidly changing Arctic.

Stage 1 - An Arctic Governance Compendium: Stage 1 will focus on assembling and sorting out the various ideas, suggestions, and proposals regarding Arctic governance that are pouring forth at this stage. This ***Arctic Governance Compendium*** will be prepared and posted on a continuously updated website. Project personnel will assemble this compendium in consultation not only with national officials but also the region's sub national governments, indigenous peoples organizations, and other key stakeholders. The compendium will include existing or newly developed materials from:

- The governments of the eight Arctic states[3]
- Sub-national Arctic governments
- Governments of non-Arctic states with ongoing interests in the Arctic
- The Arctic Council and/or its Subsidiary Bodies[4]
- The Indigenous Peoples Organizations of the Arctic region[5]
- Appropriate intergovernmental organizations, such as the Standing Committee of Parliamentarians of the Arctic Region
- Nongovernmental Organizations or Regional Entities with Established Arctic Programs and/or Interests (e.g. World Wildlife Fund)[6]

[3] Canada, Denmark (including Greenland and the Faroe Islands), Finland, Iceland, Norway, Russian Federation, Sweden, and the United States of America

[4] The Arctic Council is composed of the eight states listed above in footnote 4 and the six indigenous peoples organizations listed in footnote 6

[5] Aleut International Association (AIA), Arctic Athabaskan Council (AAC), Gwich'in Council International (GCI), Inuit Circumpolar Council (ICC), Saami Council, Russian Arctic Indigenous Peoples of the North (RAIPON)

- Sectoral and/or Business/Industry Organizations[7]
- Colleges, Universities, and Individual Scholars.

Example of Arctic policy considerations that will be in the Compendium are the January 2009 U.S. Arctic Policy Statement (www.whitehouse.gov/news/releases/2009/01/print/20090112-3.html) issued by the President and the Ilulissat Declaration (www.oceanlaw.org/downloads/arctic/Ilulissat_Declaration.pdf), adopted by the Ministers of Foreign Affairs of Canada, Denmark, Norway, Russia, and the United States on May 28th, 2008. The declaration states that

> *The Arctic Ocean stands at the threshold of significant changes. Climate change and the melting of ice have a potential impact on vulnerable ecosystems, the livelihoods of local inhabitants and indigenous communities, and the potential exploitation of natural resources.*
>
> *By virtue of their sovereignty, sovereign rights and jurisdiction in large areas of the Arctic Ocean the five coastal states are in a unique position to address these possibilities and challenges. In this regard, we recall that an extensive international legal framework applies to the Arctic Ocean as discussed between our representatives at the meeting in Oslo on 15 and 16 October 2007 at the level of senior officials. Notably, the law of the sea provides for important rights and obligations concerning the delineation of the outer limits of the continental shelf, the protection of the marine environment, including ice-covered areas, freedom of navigation, marine scientific research, and other uses of the sea. We remain committed to this legal framework and to the orderly settlement of any possible overlapping claims.*

All the contributions to the Arctic Governance Compendium will be prepared and submitted by authors on their own behalf. The compendium will be "published" as a set of pdf files and updated as appropriate.

Stage 2 - Synthesis Workshop on Governance in a Rapidly Changing Arctic: Stage 2 will center on a Synthesis Workshop on Arctic Governance that seeks to identify a small set of critical questions relating to Arctic governance, to clarify the full range of perspectives and proposals regarding these questions, to determine areas where the development of consensus is possible, and to develop a set of key findings that can serve as a foundation for a ***Synthesis Statement on Governance in a Rapidly Change Arctic***. This workshop will explore ways and means to ensure the engagement of Arctic residents - both indigenous and non-indigenous - in the discussions about governance systems. In cases where consensus is not possible, the workshop will focus on identifying the main points of disagreement and clarifying the options for dealing with them

Stage 3 - Dissemination of findings and engagement of the policy community: Once the findings of the Synthesis Workshop have been distilled and articulated in a clear and accessible way, Stage 3 of the project consists of a multi-dimensional communications strategy and implementation program to ensure that the findings are brought to bear in influencing policy. This third stage consists of the following elements:

- **An Overview Document:** Overview Document will be prepared that ***articulates Key Findings and Issues regarding Governance in a Rapidly Changing Arctic*** and publish it both in hardcopy and as a web-based pdf document. Following the models of the *Arctic Climate Impact Assessment* (ACIA)[8] and the *Arctic Human Development Report* (AHDR),[9] the overview

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[6] World Wildlife Fund (WWF). The Northern Forum, Barents Region Council, Canada's Royal Commission on Aboriginal Peoples the Royal Commission, and others be determined by consultations with the Arctic Governance Partners and Collaborations

[7] Clearly fisheries, oil and gas consortia, with the specific to be invited will be determined by consultations with the Arctic Governance Partners and Collaborations

[8] See the ACIA Overview Document available at www.acia.uaf.edu

[9] See AHDR available at www.svs.is/AHDR/

document will address the issues in simple and accessible language, devoid of complex terminology, with appropriate commanding graphics, and short in length. It will be widely accessible.

- **Policy Briefings:** Policy briefings will be held across the governance landscape in the Arctic from the Arctic Council to the organizations of the indigenous peoples of the Arctic to NGO's and business/industry groups. The purpose is not only to communicate our results to key people in the policy community, but also to ***stimulate continuing discussions on the issue among stakeholders with the purpose of establishing a foundation for action*** on issues of governance in a rapidly changing Arctic.
- **Publications in Scholarly and General Audience Literature:** An important contribution of the project will be to publish key findings in leading policy journals (e.g. *Foreign Affairs, Foreign Policy),* major newspapers as op-ed articles, and scientific journals (e.g. *Science, Nature*). as well as in appropriate electronic formats.

Summary: Climate change - coupled with the impacts of globalization - has triggered a cascade of policy considerations leading to profound national security issues, natural resources development and environmental protection consequences, and socioeconomic changes in the Arctic and beyond. If anything, this cascade is accelerating. This, in turn, has generated a profusion of ideas about the need to restructure governance arrangements together with a range of concrete proposals for specific alternatives. As noted earlier, the Arctic is now experiencing some of the most rapid and severe climate change on Earth. Over the next 100 years, climate change is expected to accelerate, contributing to major physical, ecological, social, and economic changes, which will also affect the rest of the world.

Greenland Icebergs at the entrance to the Ilulissat Icefjord

Thank you for this opportunity to testify at this hearing on "Climate Change and the Arctic: New Frontiers of National Security"

[i] Climatology: Threatened loss of the Greenland ice-sheet Jonathan M. Gregory, Philippe Huybrechts, and Sarah C. B. Raper, *Nature* **428**, 616 (8 April 2004) | doi:10.1038/428616a
[ii] Sea Level Rise: History and Consequences, By Bruce C. Douglas, Michael S. Kearney, Stephen P. Leatherman, Contributor Bruce C. Douglas, Michael S. Kearney, Stephen P. Leatherman, Published by Academic Press, 2001, ISBN 0122213459, 9780122213458, 232 pages

Chairman BERMAN. Thank you.
Mr. Treadwell.

STATEMENT OF MR. MEAD TREADWELL, SENIOR FELLOW, INSTITUTE OF THE NORTH

Mr. TREADWELL. Thank you, Mr. Chairman, and I would like to thank your colleague also for recognizing the travel that got me here.

Let me just start out by saying as a resident of this region of Alaska it is the same distance both ways, and I would like to invite you to come up and see this yourself at some point. Thank you for the opportunity to be here today.

In my written testimony I talk about the Arctic's role in national security today, especially the role in the military defense of our nation and in the energy security of our country. I talk about the changes, some of which you have heard about from my colleagues on this panel, and what caused us as a commission to call on the White House and the Government to revise Arctic policy, which had not been reviewed since 1994.

Then the testimony will talk about six tasks in science and diplomacy that we have before us coming out of this policy that I wanted to emphasize. I also talk about the important role of international cooperation in Arctic research.

This is a small neighborhood at the top of the world, and we cannot do the job that you ask us to do—to get good climate information, for example—without very strong cooperation with other Arctic nations.

Finally, I would address a little bit the Arctic treaty and the overall Arctic governance issues that were discussed before.

Since the late 1800s when the Naval Arctic Research laboratory was built in Barrow to this very week when a camp on the Beaufort Sea ice north of Alaska is helping to improve U.S. submarines' capabilities in the Arctic Ocean, national security has been a major driver for Arctic research. Defense programs dating back to the Cold War have been major collectors of ocean and atmospheric data, and our strategic communications needs have driven close to a century's work on understanding space, weather and the magnetosphere.

Today, the Arctic region plays a major role in air defense, training and global logistics for our armed services. Our assets in polar orbit and ground stations in the north support our nation's intelligence capability and secure military telecommunications. Ground based missile defense, accompanying radars and test beds are stationed in this region in order to get the best shot at attacking missiles.

As an alternative to the Panama Canal, the Arctic Ocean offers the Navy a money-saving way, under cover of water and ice, to quietly move submarine assets between the Atlantic and Pacific Oceans. The Arctic may also in time serve as a venue for surface military sealift. That is the current role of the Arctic in national security on a military basis.

In energy security it is also significant, and I think the point made in some of the opening statements is clear. Not only do you have the 22 percent potential number discussed by the U.S. Geo-

logical Survey this summer, but if you take a look at the impact of energy development on the economies of Arctic regions:

Alaska, 93 percent of its budget comes from oil development; Russia, something like 22 percent of its GNP comes from Arctic oil development; Norway, a significant number; Iceland, from geothermal and hydro development something like a quarter of the nation's exports; Denmark, Denmark's Greenland, essentially needs to have economic sufficiency for independence. So the issues of energy security in this region will be significant for some time to come.

But it was all these factors of change that you have heard about that led the Commission to formally recommend the White House initiate a review of policy, and that resulted in the Presidential directive released January 9 of this year.

Whatever differences may have existed between former administrations and the current one on Arctic, climate or security issues, I believe that policy has broad, common objectives in the north that we can all agree upon. Since the early 1990s when Arctic cooperation began, through several administrations——

I was dispatched by our governor at one point to visit the White House to say we will go along with you on international cooperation if we make sure that you keep Arctic residents involved and don't try to impose rules on us, but work in partnership with the people in the Arctic who are very interested in self-determination. That kind of consultation with the State Department continues, and I think it is a tradition that we should all be very proud of.

Now, this policy reflects a reality on global economic, energy, transport and security issues. The Arctic matters. Arctic assets feed our nation, they fuel our nation, they supply our nation and they defend our nation. Features in the Arctic from reflective sea ice to carbon storing forests and permafrost moderate our climate.

We are just beginning to understand the region's unique ecosystems that produce half the fish consumed by the United States. The Arctic's unique, hardy and resilient human cultures enrich our life on earth. In the face of Arctic change, these people and the critters need our help.

We have an opportunity to exercise great leadership now in the Arctic region. Let me lay out some of the things in the policy that are the homework before us for both scientists and diplomats.

In global climate change you know we are all headed toward trying to revise the Kyoto Protocol in Copenhagen in December. The point I would like to make about the Arctic is that the Arctic is not only an aggrieved party experiencing very quick climate change, but it is also beginning to experience feedbacks, which makes us a large contributing party to climate change.

You spoke about the methane releases in your opening statement. In my testimony I include an email from Katy Walter, one of the world's leading experts on outgassing of methane in the Arctic. Today there are 5–10 teragrams of methane per year emitted in the Arctic, and that is about 125–250 million metric tons of CO_2 equivalent. That is about equal, Mr. Chairman, to the transportation emissions from the whole State of California. That is very large.

The Arctic Science Summit Week, a convention of scientists meeting this week in Europe, had a presentation by Professor Hajo Eicken, who is working on some statistics to show what is the heat effect of losing that sea ice, of losing the reflectivity into space.

My point is this: Because of that science, mankind cannot build an effective regime to limit its own emissions without understanding the emissions coming from natural sources in the Arctic. We have to have a very strong monitoring program.

I worked with Dr. Corell when he headed the Arctic Climate Impact Assessment, and I am very happy that the nations are working together to have a good monitoring system following the impact assessment, which he chaired. That is a very important science objective that this Foreign Affairs Committee I hope will follow.

On sovereignty, Dr. Borgerson has talked about the vast undersea lands and resources at stake. The point I will leave with you today: We have worked as a Commission to get the research going on for the United States to make a claim. The claims off all our coasts could be larger than two Californias.

It is time to resolve their dispute over Law of the Sea in the U.S. Congress and time to resolve the sovereignty issues with our neighbors in the north. An accessible Arctic demands this happen, and it is very important that we do this before the world shows up at our doorstep.

I would only say to you as chair of this committee that while the ratification of the Law of the Sea is a Senate matter, implementation of the law, including such issues as Article 234 where we extend international regulations, is something that may yet come before this committee.

On biodiversity, the United States shares responsibility for Arctic fish stocks, marine mammals and migratory birds with several other nations, notably Canada and Russia. I can report that management of these species is hampered because essential scientific exchange is weak, underfunded and too often ignored or shouldered aside by larger diplomatic issues, especially between us and Russia.

I cannot stress how important it is to build better scientific cooperation with Russia. Without it the scientific community cannot deliver the data and the knowledge the world needs.

One issue in this respect, and an important one with Law of the Sea. The United States is pressing Russia for greater and more predictable access to their waters for Arctic research, and, as their claim toward the North Pole grows, 45 percent of the Arctic Ocean, our scientists may not be able to take even the most simple bottom grab samples there without Russian permission. Eleven of the last 13 requests we have had for ship access to those waters have been denied, so that is a very important issue.

On shipping, the status of the Arctic Ocean today——

Chairman BERMAN. Mr. Treadwell, just if you could conclude?

Mr. TREADWELL. I will resolve very quickly, sir. I just wanted to say that shipping is open to ships of any nation, whether or not those ships are prepared, and some kind of international regime, starting with IMO, is contemplated by the policy.

I concur with Dr. Borgerson's idea that we need to work also on an investment vehicle, something like the St. Lawrence Seaway, to address that issue. Shipping should be safe, secure and reliable.

I have spoken to energy and security, and I guess my last point is that as we look at the idea of an Arctic treaty I think you should consider it really as an Arctic partnership. The eight nations of the Arctic Council work very effectively together to do this.

Rather than imposing rules from outside, I think we should work with the eight nations and the aspirations of the people who live in the Arctic to help them do what they want to do, which is to live sustainably and contribute as they do now in a very significant way to the affairs of the world.

Thank you very much.

[The prepared statement of Mr. Treadwell follows:]

Testimony by Mead Treadwell
Chair, U.S. Arctic Research Commission and
Senior Fellow, Institute of the North

Before the House Committee on Foreign Affairs
March 25, 2009, 9:30 a.m.
2172 Rayburn House Office Building

Climate Change and the Arctic: New Frontiers of National Security

Mr. Chairman, members of the Committee, thank you for the opportunity to testify today.

I am Mead Treadwell, Chair of the U.S. Arctic Research Commission, a seven member body appointed by the President to advise the President and the Congress on goals for the U.S. Arctic Research Program and to set policy for that program.[1] U.S. Arctic research, conducted by at least 15 federal agencies, focuses on a variety of issues and questions, in league with University, private and international partners, the State of Alaska, and indigenous groups in the Arctic. My comments today do not necessarily reflect U.S. government policy.

In private life, I am Senior Fellow of the Institute of the North, a research institute based in Anchorage Alaska, founded by former Alaska Governor and U.S. Secretary of the Interior Walter J. Hickel. I lead the Institute's Defense and Security Program, which has focused on issues related to missile defense and

[1] Mead Treadwell has served on the U.S. Arctic Research Commission (www.arctic.gov) since his appointment by the President in 2001, and as chair since 2006. The seven-member Commission was created by the Arctic Research and Policy Act of 1984. Treadwell is a Senior Fellow at the Institute of the North, a research institute founded by former Alaska Governor and U.S. Interior Secretary Walter J. Hickel, and his work focuses on strategic issues in the Arctic, natural resource policy and national security. In private life, he is chair of Venture Ad Astra., LLC, a technology development firm. As a private citizen in 1988, Treadwell helped open the U.S.-Russia border; and as Deputy Commissioner of Alaska's Department of Environmental Conservation, 1990-1994, he helped the State of Alaska and the United States establish instruments of Arctic cooperation, including the Northern Forum –an organization of regional governments in the North, the eight-nation Arctic Environmental Protection Strategy, and its successor, the Arctic Council. He is a graduate of Yale (BA, History, 1978) and Harvard (MBA, 1982), and can be reached at meadwell@alaska.net.

As required by Clause 2(g)(4) of House Rules XI, to ensure disclosures of conflicts of interest, Treadwell does not earn compensation from U.S. government supported programs at the Institute of the North. Work on energy, transportation, and fisheries issues is conducted there under grants or contracts from several U.S. agencies, with funds appropriated over several fiscal years.

critical infrastructure. We also study ways to improve international cooperation in the Arctic and North Pacific region.

Since the late 1800's, when the Naval Arctic Research Laboratory was built in Barrow, to this very week, when a camp on the Beaufort Sea ice north of Alaska is helping improve U.S. submarines' capabilities in the Arctic Ocean, national security has been a major driver for Arctic research. Defense programs dating back to the Cold War have been major collectors of ocean and atmospheric data. Our strategic communications needs have driven close to a century's work on understanding space weather, and the magnetosphere.

Today, the Arctic region plays a major role in air defense, training, and global logistics for our armed services. Assets in polar orbit and ground stations in the North support our nation's intelligence capability and secure military telecommunications. Our nation's ground based missile defense, accompanying radars and test beds are stationed in this region in order to get the "best shot" at attacking missiles. As an alternative to the Panama Canal, the Arctic Ocean offers the Navy a money-saving way, under cover of water and ice, to quietly move submarine assets between the Atlantic and Pacific Oceans. The Arctic may also, in time, serve as a venue for surface military sealift.

Energy security, Mr. Chairman, is also tied closely to the Arctic region. Most Arctic nations have made it their interest to provide safe energy to the world. America's northern-most oil fields, Prudhoe Bay and environs, have led the nation in production since 1977. Our nation's largest reserves of natural gas, also on Alaska's North Slope, await transportation infrastructure to reach a market. Since the fall of the Soviet Union, Russian Arctic oil and gas has found a larger market in the West. Canadian oil, from the Arctic or subarctic, has also grown in U.S. market share. North Sea oil produced off Norway is a major contributor to that nation's economy and to European supply. If current plans of our nation, Canada, Russia, Greenland, and Norway continue, Arctic oil and gas will supply world markets in even larger proportion. Just as the US Geological Survey reported last summer on the tremendous potential reserves of conventional oil and gas inside the Arctic Circle, our unconventional/alternative tar sands, gas hydrates, wind, tidal, geothermal, wave, and hydro resources are also vast. In the summer, even our solar resource outshines the rest of the world!

The Committee called this hearing today because the Arctic is changing. Climate change, joined with technological change and global demand for resources would be enough, alone, to require our nation to consider new implications for the United States security in this region. The end of the Cold War made the Arctic a friendlier neighborhood, but it is still a place where NATO forces and Russia test each other's capabilities even as they cooperate on environmental matters, counter-terrorism, and search and rescue. But there is political change afoot, too, as five nations are moving to acquire new territory

beneath this suddenly accessible Arctic Ocean, as the United Nations Convention on the Law of the Sea has come into force.[2]

These factors led the U.S. Arctic Research Commission to formally recommend the White House initiate a review of Arctic policy in 2007. That effort resulted in the Presidential Directive (NSPD/HSPD) released January 9 of this year. I compliment those who spent so much time hammering out this policy. Whatever differences may have existed between former Administrations and the current one on Arctic, climate or security issues, there are broad, common policy objectives in the North, included in this policy we can agree upon. Since the early 1990's, through several administrations, the U.S. has established a tradition of conducting its foreign policy in the Arctic with active consultation between the federal government, the State of Alaska, Arctic residents including indigenous groups. We trust that will continue.

Mr. Chairman, the new Arctic policy reminds us all that the United States, since 1867, is an Arctic nation. Moreover, the policy reflects an increasingly apparent reality -- on global economic, energy, transport, environmental, and security issues -- the Arctic region matters. Arctic assets feed the nation, fuel the nation, supply the nation, and defend the nation.

Features in the Arctic, from reflective sea-ice to carbon-storing forests and permafrost, moderate our climate. The North and South magnetic poles establish a shield from cosmic rays and allow life on earth itself to exist. We are just beginning to understand this region's unique ecosystems that produce half of the fish consumed by the US. The Arctic's unique, hardy and resilient human cultures enrich our life on earth. In the face of Arctic change, these people and critters need our help.

The United States has an opportunity to exercise great leadership now in the Arctic region, and a mandate to do so with this new policy. Let me highlight a few of the issues discussed in the policy, and the tasks it set out for our nation's diplomats and scientists:

--In the global dialogue on climate change, the Arctic region comes to the table with two roles. First off, Arctic residents are an aggrieved party – disruptive change is happening in our region now, and quickly. Yet Arctic research is warning us now that Arctic "feedbacks," already observed from the loss of sea ice, the release of stored carbon, and the acidification of the ocean are

[2] Article 76 of UNCLOS allows nations to claim Extended Continental Shelf, outside the 200-mile limit, where appropriate bathymetric and geological conditions apply. While the United States has not yet ratified UNCLOS, it is preparing a claim which could equal twice the area of the State of California, in the Arctic Ocean and elsewhere.

dramatically "raising the bar" for the global climate mitigation strategy the world seeks to agree upon in Copenhagen later this year.[3]

These two factors alone require us to commit to long-term Arctic research and monitoring. Mankind cannot build an effective regime to limit its own emissions without understanding emissions coming natural sources in the Arctic. The U.S. is committed, with other Arctic nations, to build a sustainable Arctic Observing Network, known as SAON. Further, because the Arctic region is one of the largest terrestrial storage zones of carbon on earth, research could help us find ways that the Arctic can be part of the global mitigation solution. Forest and fire management, carbon sequestration, development of new energy sources in the Arctic, and other products of research, including so called methods of "geoengineering," may ultimately add to an effective global mitigation strategy.

--On sovereignty, the United States has vast undersea lands and resources at stake in the extended continental shelf claim available to us in the Arctic region. We can gain these subsea resources if we do the research necessary to make a claim, and ratify the United Nations Convention on Law of the Sea. We have a disputed border with Canada, unfinished business setting our maritime border with Russia, and differing views with both nations on whether the Northern Sea Route and the Northwest Passage are open to freedom of navigation. It is time to resolve the dispute over Law of the Sea in the U.S. Congress, and time to resolve these sovereignty disputes with our neighbors in the North. An

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[3] Dr. Katey Walter, a University of Alaska Fairbanks researcher reports, in personal correspondence to Mead Treadwell dated July 16, 2008, "Today there are 5-10 Tg CH4 (1 Tg = 1 MMT) per year emitted from ecosystems in the Arctic where permafrost is thawing. In CO2 equivalents, this is 125-250 MMTCO2E."

To put this number in perspective, 235 MMTCO2E was the level of emissions made by all transportation in the State of California in 2005, according to the Energy Information Administration. http://www.eia.doe.gov/oiaf/1605/state/excel/CA_05_details.xls

"During the last 30-40 years," Walter added, "CH4 emissions from Siberian thermokarst lakes has roughly doubled. These lakes currently emit ~4 Tg CH4 per year.

"The icy, organic-rich permafrost, called "yedoma", contains ~500 Gt C, or half of the arctic permafrost carbon pool. Yedoma occurs largely in North Siberia, though it occurs in patches in Alaska and Canada as well.

"Last summer was very hot in Siberia. During the past couple of weeks I have been visiting my long-term study lakes and am surprised by the huge expansions of permafrost degradation along the lake shoreline. This rapid increase in thaw results in large increases in atmospheric methane emissions.

"Within a decade of a rapid temperature increase of 5 deg C, yedoma permafrost thaw in Siberia would result in the release of hundreds of Tg of methane per year. This methane would come from decomposition of organic matter currently sequestered in permafrost."

accessible Arctic demands this happen, and before the world shows up at our doorstep to exploit our differences.

--On biodiversity, the United States shares responsibility for Arctic fish stocks, marine mammals, and migratory birds with several other nations, notably Canada and Russia. I can report that management of these species is hampered because essential scientific exchange is weak, underfunded, and too often ignored or shouldered aside by larger diplomatic issues, especially between us and Russia.

The new Arctic policy recognizes the necessity of building stronger scientific cooperation with Russia. I cannot stress how important this is, for without better cooperation between us and Russia, the science community cannot deliver the data and knowledge the world needs.[4] The United States is pressing Russia for greater, and more predictable, access to their Arctic waters for research. The prospect that Russia may soon be able to put more of the Arctic Ocean floor off limits to our scientific research vessels– because of Law of the Sea – gives the scientific community great pause. Further, the goal of a regional fisheries agreement is broached by the policy as a necessity because fish stocks are now moving north in our part of the Arctic.

--On shipping, the status of the Arctic Ocean today is that it is open to ships of any nation, whether or not those ships are properly prepared for Arctic ice conditions, properly defended against oil spills, or properly served by navigation and search and rescue infrastructure. Rules to prevent harmful interactions with marine mammals, or subsistence hunting, are not in place. Arctic shipping technology is improving quickly, with self-contained, ice breaking cargo ships and tankers coming from shipyards in Europe and Asia. Research underway aims at using cleaner fuels and methods to avoid emissions of soot, black carbon which

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[4] Arctic research cooperation with Russia has often been aided by larger geopolitical drivers in the U.S.- Russia relationship. A 1972 agreement negotiated by Henry Kissinger with the Soviet Union on environmental issues, during "détente," helped establish research exchanges with results that continue to be significant today. In the early 1990's, the Nunn-Lugar process to stem nuclear proliferation helped employ scientists to track radiation contamination in the Arctic left over from the Cold War period. USAID's efforts and those of the Eurasia Foundation to assist Russia in establishing a market economy and a pluralistic society brought social researchers from our countries together, with benefits to Arctic residents on both sides of the border, notably subsistence hunters. From the early 1990's until recently, the U.S., under Administrations of both parties, sought greater Russian energy development in the Arctic and Russian Far East.

Today, our joint efforts lack a driver. Even before Russia's 2008 military action in Georgia further chilled our relationship, and led to the postponement by the U.S. of a joint military exercise against terrorism in the Arctic region last fall, three NOAA sponsored joint cruises scheduled for 2008 in the Bering and Chukchi Sea regions were cancelled, due to high fuel costs or budgeting/contracting problems. The Commission recommends the United States engage Russia on a bilateral basis in the Arctic with the same high level/working level interagency coordination and attention that exists with the multilateral Arctic Council

promotes Arctic warming. Next month, the Arctic Marine Shipping Assessment (AMSA), a report our Commission helped the United States lead, with Finland and Canada, will be delivered to Arctic ministers. It is the most significant review of Arctic shipping in over a decade. It will show that "destinational" shipping – the carriage of goods in and out of the Arctic – is growing, but it predicts trans-Arctic shipping may be a ways off.

The new U.S. Arctic policy lays out a goal for "safe, secure and reliable" Arctic shipping. To get there, we will need the help of the International Maritime Organization. We should consider arrangements, like those we have with Canada on the St. Lawrence Seaway, that jointly deliver a reliable route to the world's shippers. And we should build icebreakers, ice monitoring, and other aids to navigation, security and search and rescue. The cost of these improvements, in real terms, is minimal compared to what was spent building or maintaining the Panama and Suez Canals. For 500 years, nations have sent explorers North to find shortcuts between the continents, and as this ocean becomes accessible, we must be ready for the ships that would follow.

--On energy, the Arctic is increasingly a player in the global picture. Oil, gas, gas hydrates, geothermal, wind, hydro, tidal, and biomass resources in the Arctic are vast. Exports of conventional energy resources, or minerals refined with geothermal and hydro derived electricity, are fundamental to the economies of Alaska, northern Russia, Norway, Iceland, and Canada. Greenland is moving toward political independence from Denmark. A self-sufficient economy there may rely on energy exploration and development. While global climate change has produced additional ambivalence on the part of many related to Arctic energy development, the fact that energy is central to the economies of these regions cannot be overlooked -- nor can the effect on security that Arctic energy development plays by diversifying our energy sources.

Mr. Chairman, when you add together a newly accessible ocean, conflicting views of sovereignty, the prospect of major short-cuts for global shipping, growing and moving fish stocks, and new estimates of vast energy resources in one region, that brings us right back to security issues. Security issues are at the top of the new U.S. Arctic policy.

--On security, the policy recognizes that defending an accessible Arctic requires new commitments. U.S. military planners, NATO planners, the U.S. Coast Guard, and the intelligence community are responding.[5] Congress could help

[5] On the security front, already this year, NATO has held a workshop on Arctic security issues in Iceland. The National Geospatial Intelligence Agency hosted a St Louis conference this month, partly classified, on Arctic Domain Awareness. The U.S. Navy, with international partners, is conducting a biannual ice research camp north of Alaska, in the Beaufort Sea with submarine trials. In June, the U.S. Naval Academy will serve as the venue for a third conference on Arctic Ice Operations, organized by the National Ice Center with support from our Commission. The U.S. Coast Guard will resume Arctic Domain Awareness flights, and perhaps this year will be allowed to conduct an icebreaker training mission north of the Bering Strait. Land based

with new assets – such as polar class icebreakers – to ensure U.S. security needs in the Arctic. Furthermore, because the American Arctic is the confluence of boundaries of the European Command, the Pacific Command, Northern Command, and NORAD, more coordination in planning and outreach by U.S. forces responsible for the region may be necessary.

There you have it: dramatic change in the Arctic, with effects on six major issues in international diplomacy. Doing the work that comes with each of these issues will require research first and throughout. Further, the work itself –and the necessary cooperation on science behind the work – is likely to further strengthen the institutions of Arctic cooperation. The U.S. Arctic Research Commission will work hard to ensure that our research is focused, robust, and effective.

International cooperation is key to success on every goal we have set for the U.S. Arctic Research Program:

- Researchers have added much to the understanding of climate change and ecosystems in the Arctic Ocean and Bering Sea – and we're moving forward with a legacy of the International Polar Year in establishing an Arctic Observing Network to have much better, real time, data on Arctic change.

- The academic and clinical communities are coming together to address serious problems in Arctic Health, including a suicide epidemic among groups of young Alaskans and neighboring nations. Throughout the North, there is continuing concern about heightened levels of contaminants in Arctic foods, coming mostly from outside the Arctic.

- We have agreement in the government to better map and assess Arctic Resources – from the new undersea territory we might claim in the Arctic under Law of the Sea, to the significant and extensive mineral and biological resources on public lands onshore. Ocean drilling in the Arctic, and other activities conducted from space, ships at sea, and research on land, has helped us understand much more about the geophysical processes on our planet that provide for life itself on earth.

- A new initiative throughout the government, working closely with the State of Alaska, will be focused on Arctic infrastructure – including the challenges of dealing with eroding shorelines and changing permafrost.

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activities of the Coast Guard, in support of search and rescue, homeland security, law enforcement and fisheries and environmental protection, will continue to move north in Alaska. Our own work in this area is being matched by activities of many other nations, all aware of the fact that this is a newly, increasingly accessible ocean.

Arctic energy development, both for export and for use by Arctic residents, presents a host of research problems, and we depend on Arctic cooperation to raise standards throughout the North. Oil spill research in the Arctic, for example, is very much an international enterprise.

- Preservation of indigenous languages, identities and culture – among the intangible assets of the North – also requires international cooperation. Our efforts in the United States—conducted with the help of government bodies including the National Science Foundation, the Smithsonian, the National Endowment for the Humanities and others – tie closely, and learn from, efforts in other nations of the world.

With all this work to do the idea of some more formal, global Arctic agreement continues to gain legs. I am involved with an NGO studying this idea, the Aspen Institute. The World Wildlife Fund has commissioned two notable papers on this subject. Arctic Parliamentarians visited the issue in Fairbanks last summer, and recently, the European Union has fostered an academic inquiry, aimed at protection measures for the high seas of the Arctic. When Antarctic Treaty nations convene near here in Baltimore next month, some people may ask again, "Is it time for an Arctic treaty?"

It is appropriate that we manage the Arctic commons, as former Alaska Governor Wally Hickel has said, "for the benefit of the total: people, people's needs, and nature." Like the Illusisat Declaration of five Arctic Ocean nations last May, the Arctic Policy document rejects the Arctic Treaty idea, but it does not reject a comprehensive approach to strengthening Arctic cooperation. Indeed, it commits us to go to work for a number of formal regional or global agreements on issues I've discussed today – climate science, scientific access, shipping, regional fisheries, search and rescue

Mr. Chairman, people who live in the North seek self-determination still, in many different ways. The U.S. policy in place now is based in part on the idea that governance should be formed by the people who live in the North, from the Arctic regions and nations themselves, not imposed from Outside. Foremost in this time of great change, the Arctic needs partners –partner nations willing to invest in, understand and respect the Arctic. With that help, I believe we will mitigate the change we can, adapt to the change we can't and maintain peace at the top of the world.

Thank you for the opportunity to be here today.

Chairman BERMAN. Thank you, and I thank all of the witnesses. Very fascinating stuff.

I am going to yield myself 5 minutes at the beginning to start with a couple of questions, and then we will go around the committee.

The Law of the Sea—Dr. Borgerson briefly touched on it. Mr. Treadwell spoke a little bit about it. Russia made a claim regarding the extent of its continental shelf that was rejected in 2001. Norway has now made its own submission to the United Nations under the Law of the Sea. It is expected that more countries will make claims in the next few years.

If the United States continues to delay accession, what happens to U.S. claims if the United Nations accepts the claims of other Arctic countries? How would becoming a party to the treaty help the United States better manage resources in the Arctic? Any or all of you.

Mr. BORGERSON. The portion of the Convention that it directly speaks to is Article 76, which is about extending continental shelves.

There is a commission established that oversees such claims. You mentioned Russia's earlier submission where they were sent back to collect more geological evidence, which ostensibly their flag planting mission last year was to support, although it had tinges of sovereignty.

The issue as it relates to the United States, and it is the ultimate irony I think in the Law of the Sea debate, is instead of not sacrificing our sovereignty by becoming a state party to the Convention, we are actually giving up sovereignty because we have no standing in this Commission; not just in the Arctic but elsewhere on the coast. We could claim additional territory that holds valuable resources as large as half of the Louisiana Purchase.

So the United States does not have a literal seat at the table at the Commission to either oversee other claims that are coming in, and I would add that based on when other states join the Convention a procedural clock began ticking when they must make their claim.

There is a huge influx of claims that are coming—26 this May—in which the United States can't participate in an oversight process, nor despite the fact that the State Department is overseeing collecting the evidence for what our claim might be, which in the Arctic it is considerable, nor can we formally submit our claim before the Commission.

So there are many other areas in which the Law of the Sea is relevant to the Arctic where I would be happy to go into further detail, but as it relates to claims on the extended continental shelf the United States does not physically have a seat at the table. It cannot participate in the institutional process that the Law of the Sea creates.

Chairman BERMAN. Any of you, either of you, have something to add? Mr. Treadwell?

Mr. TREADWELL. Thank you, Mr. Chairman. I agree with what Dr. Borgerson has said.

I guess I would also add this: If you look at the dispute in the U.S. Senate on ratification of the Law of the Sea it doesn't really

have very much to do with the Arctic. The concerns that the military had had have been addressed by the Joint Chiefs of Staff. I can recommend the experts to you who have looked at that issue.

One of the issues really comes down to what is customary international law and how will environmental regulation be forced on the United States by signing on, and I think that is an issue which when I mentioned that the committee can work on implementation can make it very, very clear how we sign a treaty, but we don't sign onto things that you as the Congress haven't had a chance to consider under the law. And so implementation, that discussion, may end up helping solve the ratification debate.

I should also say that by being part of the——

Chairman BERMAN. Are you suggesting the implementation discussion should start before the ratification decision?

Mr. TREADWELL. I think if you look at the reports of the Senate Foreign Relations Committee they have certainly discussed how some of the questions raised by the opponents could be dealt with, but some of them could be iced down, I guess is the best way to put it, with an implementation discussion first.

There are a couple of very pregnant issues in the implementation that——

Chairman BERMAN. I mean, does the treaty give sort of a national treatment opportunity for——

Mr. TREADWELL. Some very simple questions that ultimately Congress would probably deal with. Once we get all this extra land, how do we manage it? A simple question.

One of the questions is Article 234. We have the right to extend environmental regulation outside the 200 mile limit in traditionally ice covered waters. How are we going to do that?

Chairman BERMAN. Dr. Borgerson wanted to just jump in on this.

Mr. BORGERSON. Sure. I think you should think of the strategic imperative for the U.S. acceding to Law of the Sea in three general baskets: National security, economic and environment. Extending the continental shelf speaks to the economic, but we are sort of mixing baskets here.

Also in the Arctic specifically, but for U.S. foreign policy and national security strategy overall, specific things in which the Convention supports. For example, the United States and Canada disagree on the status of the Northwest Passage, one of the key shipping routes. We say it is an international strait. They say it is internal waters.

We are now party to the Law of the Sea and those discussions. We can't seek the arbitration settlements

Chairman BERMAN. It has a dispute resolution mechanism.

Mr. BORGERSON. Which we would chose as arbitration, and no other dispute resolution can be forced upon us.

Chairman BERMAN. I have to tip over the basket, all the baskets, because my time has expired.

Mr. BORGERSON. Okay.

Chairman BERMAN. The 5-minute limitation is unfortunately a limit on both the questions and the answers.

The gentlelady from Florida, the ranking member, Ms. Ros-Lehtinen.

Ms. ROS-LEHTINEN. Thank you so much, Mr. Chairman. Since I am here for the duration and some of our members have pressing duties, I would like to yield my 5 minutes to my good friend, Mr. Inglis of South Carolina.

Mr. INGLIS. Thank you. I very much thank the gentlelady from Florida for that opportunity. Very kind of you.

I am somewhere between science and foreign affairs on this question, literally actually, because I am between two meetings. So perhaps this sounds a little bit too scientific or maybe a little bit too much into economics, but I wonder if you might want to comment on a possible solution that does involve international cooperation when it comes to dealing with climate change and the national security risks that we are running?

There has been a lot of talk about cap and trade. The problem with cap and trade is this is a huge tax increase in the midst of a recession. Very few economists would support that. It is also true that a system of trading credits seems a little bit disfavored in today's headlines with Wall Street. Perhaps they could turn them into derivatives and have derivatives of carbon credits?

So we need something a little better. The better that I am hoping we can get to is a revenue neutral carbon tax. We actually reduce taxes somewhere else. This is leading up to a foreign affairs question soon. You reduce taxes on something else like payroll, and then you increase taxes or put a tax on carbon emissions.

The result would be no net increase or take to the government. The government doesn't get any additional revenue. It is revenue neutral so it is not a tax increase, but it would send price signals to change behaviors.

Here is the key foreign affairs kind of angle. I would like to figure out a way, and we are working, striving mightily to figure out how this would work: A WTO compliant way of applying that transparent tax to goods imported, as well as domestically produced.

I am wondering if any of the countries that we are discussing here, what might be their reaction or how open might they be to that sort of cooperation, in a transparent system that would hopefully make it so that is workable? Anybody have any thoughts about that?

Mr. CORELL. I think you are raising some really exciting ideas to explore how we move from where we are to come to grips with this reality. We have been talking with a number of nations, China included, on how to come to the COP15 meeting in Copenhagen.

The thing that keeps coming back is not the details of how the United States responds, but that the United States responds in a very constructive, positive, clear, forward moving way. Then these other countries are going to say okay, now it is time for us to think about how we respond. We have had conversations of that nature with industry and other folks in China and elsewhere.

So they are looking for a strong signal without saying what the United States should do—you know, you have to do X, Y and Z—but that the United States will play seriously at levels that address this climate change issue in a very constructive way as we move toward COP15.

The converse is that if that is not likely or if that does not happen, the word I am hearing in our discussions is that COP15 is going to be a very difficult time.

Mr. BORGERSON. I would follow up maybe with just three quick points. We all looked at each other to see who might answer this because tax is we know such a popular word in this town.

But economists I think will tell you that a tax makes the most sense. It allows the market to work most efficiently. There is all kinds of problems that come into play within a complicated cap in trade system in terms of how that is administered, who gets credits, how the money is spent, et cetera.

The point I want to make though quickly is you shouldn't think of this in a vacuum. It is also part of energy security, and so the two have to be thought of together, not alone, especially as it relates to China. China produces carbon intensive goods and you tax them, or we reduce our emissions and China's emissions actually go up and they are buying oil from countries that aren't necessarily our allies. That is a convoluted problem.

Second, we are starting to mix things here as it relates to the Arctic because much of the Arctic is about adaptation to climate change, not mitigation, which again speaks to the need for a national adaptation plan.

Lastly, whatever the United States does it is going to have zero credibility when we go to Copenhagen to try and discuss an international solution to this problem unless we have gotten our own house in order.

Mr. INGLIS. Thank you, Mr. Chairman.

Mr. TREADWELL. Mr. Chairman, I would only add one thing, which is in the research end in the Arctic we are helping to continue the sectoral approach.

Just one example. If you raised the cost where somebody is already paying between $10 and $30 a gallon for diesel fuel in an Alaska bush village, raising the tax may not necessarily help the problem, but that is a great laboratory to look at alternative energy, so there is that kind of option.

Chairman BERMAN. The time of the gentlelady has expired, and the gentleman from American Samoa, whose subcommittee has jurisdiction over a variety of the issues that we are touching on here, Mr. Eni Faleomavaega, is recognized for 5 minutes.

Mr. FALEOMAVAEGA. Thank you, Mr. Chairman, for calling this hearing and especially welcoming personally also our distinguished members of the panel.

In reading your testimonies and understanding your concerns and some of the problems that have been raised, it seems that everything centers on whether or not we participate as a member of the Law of the Sea. This treaty has been around for years. One hundred and fifty-six countries now participate. They are carving up all different regions of the world, touching on the questions of the Law of the Sea.

I realize also I think the main concern the Senate seems to have over the years in its deliberations and nonratification of the treaty is losing our sovereignty. I am just concerned. How long are we going to continue saying that for fear we are going to lose our sov-

ereignty these other countries are just having a field day doing what we are doing?

Exactly a prime example is the Arctic. As all of you have said, it is the least explored, least understood. Potentials for energy resources are just beyond belief.

I just wanted to ask Dr. Borgerson and Dr. Corell and Mr. Treadwell. Please help me. Define a little more why is it that the Senate has been so concerned that we should never become a member of the Law of the Sea Convention? Please.

Mr. BORGERSON. I am actually finishing a report now from the Council that speaks to that, which I would be happy to——

Mr. FALEOMAVAEGA. Could you submit a copy of that to my subcommittee? I really would appreciate that.

Mr. BORGERSON. Absolutely. A small minority has procedurally opposed the United States acceding to the Convention, even though an overwhelming majority of constituents who don't ever agree on anything together agree that it is in the interest of this country to join the Law of the Sea.

President Bush and President Clinton, the National Security Council, the Joint Chiefs of Staff, the head of the Coast Guards and Navies, every major industry group, environmentals, offshore energy companies who benefit from this. Everyone is in agreement it is in the interest for the country to join this.

So at the moment now it is a procedural issue that Chairman Kerry has to in the new Congress report out on the Convention, and then it is up to the Senate Majority Leader to schedule Floor time for debate and vote for the U.S. Senate to finally join.

In the Arctic specifically there are many issues in those three baskets, and I am not sure time allows to go into all of them deeply, but I will address them quickly. I have mentioned the Canadian Northwest Passage already. The same is true for our rights of innocent passage and our naval mobility not only for our naval ships, but also for commercial ships and those of our allies on which our economy depends.

From an international perspective, the United States is an island, and 90 percent of our imports and exports are carried by sea. The Bering Strait will become a choke point like Hormuz or Malacca. The Law of the Sea establishes rules for managing that.

From an international perspective, it establishes the governance framework for all commercial uses of the oceans, not just oil and gas, but others as well, and from an environmental perspective it really establishes the framework by which countries can collaborate.

And we haven't even gotten into issues such as ocean sedification and collapsing fishing stocks and issues of extraordinary significance to this country that the Law of the Sea speaks to. I think it shows why the United States was so quick to sign onto a follow-on fisheries agreement.

I guess I will end with just a brief snapshot of history. The reason why we didn't join the Convention originally and why President Reagan opposed it were because of provisions that were related to deep seabed mining, and those were all corrected by the international community in the 1994 agreement on implementation

to all of our concerns as President Bush and President Clinton have submitted for the record to the Senate.

The international community changed this Convention to meet our concerns, and we still have yet to join it even though it is hurting our national security, economic and environmental interests around the world, especially in this geostrategic region of the Arctic.

Mr. FALEOMAVAEGA. I am sorry, but I only have 47 seconds left.

Dr. Corell, you say that raising the sea level one meter causes tremendous damage, and I am talking about low lying islands. Can you comment on that for the number of seconds I have left, the climate change and the problems that we are faced with that?

Mr. CORELL. The one meter sea level rise is going to in your part of the world be devastating. As you well know, many of these countries have total relief of just a meter or two or three.

It is not only just topographical. As the sea level rises, it comes to parts of the land that have not been hardened by storms. They are soft, and they will go much more rapidly. So great sympathy for the concerns in your part of the world and a lot of the other lowlands where one meter of sea level rise, which we really do expect this century.

Mr. FALEOMAVAEGA. Thank you.

Chairman BERMAN. The time of the gentleman has expired.

The gentleman from California, Mr. Rohrabacher, is recognized for 5 minutes.

Mr. ROHRABACHER. Thank you very much, Mr. Chairman.

Let me ask you. We were talking about the changes in the Arctic, which are the basis of our discussion today. In the 1940s, were the summers ice free in the Arctic as well, this ocean? Is this something in the 1940s that we experienced before?

Mr. CORELL. There is no record of it being ice free in the summer of 1940.

Mr. ROHRABACHER. In the 1940s.

Mr. CORELL. Yes. In that region, no.

Mr. ROHRABACHER. Okay. So there wasn't a warming in the Arctic area during the 1940s?

Mr. CORELL. The Northern Hemisphere during the 1940s, '50s and '60s actually had a relative cooling.

Mr. ROHRABACHER. Yes. I am talking about the Arctic now.

Mr. CORELL. Yes. Right.

Mr. ROHRABACHER. So there was no warming in the Arctic in the '40s. I am just checking because there are some things people have told me. You are saying that is not accurate.

But there was a warming 1,000 years ago. I mean, Greenland was green. That wasn't just some name that they gave it to fool people?

Mr. CORELL. That is correct.

Mr. ROHRABACHER. And at that time——

Mr. CORELL. No.

Mr. ROHRABACHER [continuing]. Was the ocean ice free? Was there that much warming?

Mr. CORELL. No.

Mr. ROHRABACHER. No?

Mr. CORELL. There was not that much warming.

Mr. ROHRABACHER. Okay.

Mr. CORELL. We did have two periods in the last 10,000 years that we had some relative warming, but they were less than one degree, the Mesopotamian period and what we call the Medieval Warming.

Mr. ROHRABACHER. Right.

Mr. CORELL. Right after that we had about a degree of cooling, and we went into a little ice age.

Mr. ROHRABACHER. Right. And so the mini ice age ended around the 1850s, which is about the time that people claim that we should be concerned that it has gone up a point since 1850.

With that said, in the last 8 years—not talking about the Arctic, but in the last 8 years—every scientist, and I am on the Science Committee, that I have heard, and I have reviewed this, claims that there has been no warming in the last 8 years as verified by some of the quotes that I gave from various sources originally in my original statement.

In the last 8 years if there has been a major increase, Dr. Corell, as you have stated, in CO_2 why is it that if it is the CO_2 why do we now have no warming, yet there is a major increase in CO_2?

Mr. CORELL. There is no one that is claiming that the warming we are seeing is 100 percent from greenhouse effect.

The IPCC makes it very clear that the predominant factor in the warming, even in the last 8 years, has been from fossil fuels and from the burning of the tropical forests. Tropical forests contribute about 20 percent of the CO_2 in the atmosphere. The other 80 is coming from fossil fuels.

Mr. ROHRABACHER. Not the burning, but the actual tropical rainforests themselves emit these greenhouses gases, do they not, in the blotting of the woods?

Mr. CORELL. Yes, but the actual burning of them——

Mr. ROHRABACHER. Yes.

Mr. CORELL [continuing]. Is what contributes this 20 percent of the CO_2.

Mr. ROHRABACHER. Yes.

Mr. CORELL. Buried in here, Congressman, is very simply our natural variabilities, but the predominance of the warming we are seeing from every study that we have indicates even in the last 8 years——

Mr. ROHRABACHER. Yes.

Mr. CORELL [continuing]. Has been augmented by fossil fuels and clearing.

Mr. ROHRABACHER. Let me note there has been no warming in the last 8 years.

Mr. CORELL. Well, IPCC unfortunately would disagree with you.

Mr. ROHRABACHER. No. That is not the case. Some of the people who I have quoted in this actually were part of that study.

But let me just note I don't know anybody who now is suggesting the last 8 years has been warming, but with that said you have used the word climate change all the time now. You are not using the word global warming anymore.

Why is that? Because there is no global warming, and you know when you talk about that with your colleagues it is tough to defend.

Mr. Chairman, let me note this. Let me note this, Mr. Chairman.

Chairman BERMAN. That was a rhetorical? Okay.

Mr. ROHRABACHER. Yes, it was. I am a surfer, and I understand that you can see there are natural powers at play.

Chairman BERMAN. You just want more room to surf.

Mr. ROHRABACHER. When you have a wave coming at you, you find ways, like we say, of riding the wave. In this particular case what are panelists are suggesting, which I think is correct, we need to look at the wave and try to make sure we adapt ourselves to what is going on.

But for us to have the arrogance to think that we caused the wave, that we are the ones who are creating this change in the weather that seems to be happening—now it is cooling, it is warming—I don't think it is productive, and it leads us to increased taxes on our people and hurt their way of life rather than just looking at these as natural occurrences.

Thank you very much, Mr. Chairman.

Chairman BERMAN. The time of the gentleman has expired.

The gentlelady from Texas, Ms. Sheila Jackson Lee, is recognized for 5 minutes.

Ms. JACKSON LEE. Thank you very much, Mr. Chairman. It gives me always comfort to come after my good friend from California because I missed the eclectic excitement of being a science major, but in the practice of law and the study of law there is one premise that we operate under is certainly the issue of facts. Certainly there is also the question of precedent.

I believe that we have established sufficient facts for at least the premise that we have something going on that evidences itself in climate change and global warming, and the visibleness of it is from a number of codels, congressional delegations, that have gone to places like Alaska, places in the Arctic region, traveling in European nations that have typically had snowcapped mountains and certainly seeing the rough array of climate and weather changes, if you will, for our own nation.

So I think that in the issue concerning the question of national security, any form of disruptiveness can undermine governments. We saw some results—it wasn't a national security issue, but who knows if we had had all of our attention or misattention to Katrina what other crisis could have developed as we were focusing on what is a natural disaster.

So let me try to deal with those of you who are making the point that there is an intertwining of these particular issues and whether or not you think that this is an issue that should permeate the Congress. Whether you are on Homeland Security, whether you are on Foreign Affairs, is this an issue for our Armed Services Committee both in the House and the Senate which addresses those questions? Is it an issue for the Intelligence Committee?

And when I say that, in our responsibilities of oversight are we looking at something that is factually nonbased or do we have sufficient credibility in these issues and questions that, as Mr. Berman is doing, our chairman, we are continually engaging in oversight?

Who are the believers in the concept of this title that says Climate Change in the Arctic: New Frontiers of National Security? I

would like to start with you first. Forgive me for being in another hearing.

Mr. Treadwell, you moved forward. Would you wish to start please, sir?

Mr. TREADWELL. Thank you. I guess I would say that as far as national security is concerned, whatever the cause is. We have a newly accessible ocean. The world can show up at our doorstep. We do not have appropriate rules in place and so it is very, very important that we consider all these changes in the Arctic and the diplomatic work to follow.

On the other point of your question, I will go back to my brief, which as chair of the Arctic Research Commission, which helps this nation form its science programs, I can tell you that the number of questions that are out in terms of how will mitigation work, how will we adapt, what kind of effect is the Arctic having on all this, are so large that we just have to ensure that we have the international cooperation.

One of my main messages here today is that we cannot give you the data that we need to give you without stronger international cooperation in the Arctic.

Ms. JACKSON LEE. Scott? Dr. Borgerson?

Mr. BORGERSON. Yes.

Ms. JACKSON LEE. Thank you.

Mr. BORGERSON. Yes, in the Arctic.

Chairman BERMAN. Is that a new border, a new frontier?

Mr. BORGERSON. Absolutely, and there are also new frontiers elsewhere in U.S. foreign policy and national security strategy thinking, whether it be exacerbating existing political tensions.

Now when you add the new climate sort of tensions and stresses there, contests over fresh water, forced migration, disease spreading to new latitudes where there are communities not capable to cope with them, drought, greater intensity and frequency of storms. All of those are hugely important from an environmental perspective, but also shape U.S. foreign policy and national security.

Ms. JACKSON LEE. Dr. Corell, do you want to finish?

Mr. CORELL. That is fine. I go back to the work of the CNA and the national security threat from climate change.

General Sullivan and his team—they are all flag officers—studied this very carefully and based their analysis on the IPCC work and the other scientific community work where there is broad consensus of the changes we are facing.

Just let me read the words that are in the testimony, but just remind people that in the national and international security environment climate change threatens to add new hostile and stress factors. At the simplest level, it has the potential to create sustained natural and humanitarian disasters on a scale far beyond those we see today. It goes on in that nature.

General Sullivan and I have had the privilege of working together because we see this as a very here and now issue that we need to address aggressively, thoughtfully. Both of my colleagues here at the table have indicated that we must work internationally with our colleagues.

Chairman BERMAN. Dr. Corell?

Mr. CORELL. We are going to have to work this together, so it is a here and now issue.

Chairman BERMAN. The time of the gentlelady has expired.

Ms. JACKSON LEE. Thank you.

Chairman BERMAN. The gentleman from Texas, Mr. Poe, is recognized for 5 minutes.

Mr. POE. Thank you, Mr. Chairman. I want to ask Dr. Corell a few questions just so I can get it clear. Is there climate change?

Mr. CORELL. Yes.

Mr. POE. Has it been going on for a long time, for years, for centuries?

Mr. CORELL. Well, the climate on the planet has always been changing.

Mr. POE. Is there global warming today?

Mr. CORELL. There is relative warming to that which we have seen over the last 10,000 years.

Mr. POE. Is it man's fault?

Mr. CORELL. Most of it is during the last 50 years.

Mr. POE. I want to read an article, portions of it and get your comments. There are ominous signs the earth's weather patterns have begun to change dramatically and that these changes are a drastic decline in food production with serious political implications for all nations.

The drop in food output could begin soon, perhaps 10 years from now. The regions to be heavily impacted are the wheat producing lands of Canada, Russia, Bangladesh, Pakistan, Indonesia. The evidence in support of these predictions has begun to accumulate so massively that meteorologists are hard pressed to keep up with it.

It goes on and on and on and talks about the next ice age. It is an article written April 28, 1975, by Peter Gwynn in Newsweek. It quotes the National Oceanic and Atmosphere Administration for its support, the National Academy of Scientists and basically says and does say meteorologists are unanimous in that we are experiencing the beginning of the next ice age.

Newsweek, April 28, 1975. I ask unanimous consent to have this article placed in the record.

Chairman BERMAN. It will be included.

[The information referred to follows:]

Newsweek

The Cooling World

Newsweek, April 28, 1975

There are ominous signs that the Earth's weather patterns have begun to change dramatically and that these changes may portend a drastic decline in food production – with serious political implications for just about every nation on Earth. The drop in food output could begin quite soon, perhaps only 10 years from now. The regions destined to feel its impact are the great wheat-producing lands of Canada and the U.S.S.R. in the North, along with a number of marginally self-sufficient tropical areas – parts of India, Pakistan, Bangladesh, Indochina and Indonesia – where the growing season is dependent upon the rains brought by the monsoon.

The evidence in support of these predictions has now begun to accumulate so massively that meteorologists are hard-pressed to keep up with it. In England, farmers have seen their growing season decline by about two weeks since 1950, with a resultant overall loss in grain production estimated at up to 100,000 tons annually. During the same time, the average temperature around the equator has risen by a fraction of a degree – a fraction that in some areas can mean drought and desolation. Last April, in the most devastating outbreak of tornadoes ever recorded, 148 twisters killed more than 300 people and caused half a billion dollars' worth of damage in 13 U.S. states.

To scientists, these seemingly disparate incidents represent the advance signs of fundamental changes in the world's weather. The central fact is that after three quarters of a century of extraordinarily mild conditions, the earth's climate seems to be cooling down. Meteorologists disagree about the cause and extent of the cooling trend, as well as over its specific impact on local weather conditions. But they are almost unanimous in the view that the trend will reduce agricultural productivity for the rest of the century. If the climatic change is as profound as some of the pessimists fear, the resulting famines could be catastrophic. "A major climatic change would force economic and social adjustments on a worldwide scale," warns a recent report by the National Academy of Sciences, "because the global patterns of food production and population that have evolved are implicitly dependent on the climate of the present century."

A survey completed last year by Dr. Murray Mitchell of the National Oceanic and Atmospheric Administration reveals a drop of half a degree in average ground temperatures in the Northern Hemisphere between 1945 and 1968. According to George Kukla of Columbia University, satellite photos indicated a sudden, large increase in Northern Hemisphere snow cover in the winter of 1971-72. And a study released last month by two NOAA scientists notes that the

amount of sunshine reaching the ground in the continental U.S. diminished by 1.3% between 1964 and 1972.

To the layman, the relatively small changes in temperature and sunshine can be highly misleading. Reid Bryson of the University of Wisconsin points out that the Earth's average temperature during the great Ice Ages was only about seven degrees lower than during its warmest eras – and that the present decline has taken the planet about a sixth of the way toward the Ice Age average. Others regard the cooling as a reversion to the "little ice age" conditions that brought bitter winters to much of Europe and northern America between 1600 and 1900 – years when the Thames used to freeze so solidly that Londoners roasted oxen on the ice and when iceboats sailed the Hudson River almost as far south as New York City.

Just what causes the onset of major and minor ice ages remains a mystery. "Our knowledge of the mechanisms of climatic change is at least as fragmentary as our data," concedes the National Academy of Sciences report. "Not only are the basic scientific questions largely unanswered, but in many cases we do not yet know enough to pose the key questions."

Meteorologists think that they can forecast the short-term results of the return to the norm of the last century. They begin by noting the slight drop in overall temperature that produces large numbers of pressure centers in the upper atmosphere. These break up the smooth flow of westerly winds over temperate areas. The stagnant air produced in this way causes an increase in extremes of local weather such as droughts, floods, extended dry spells, long freezes, delayed monsoons and even local temperature increases – all of which have a direct impact on food supplies.

"The world's food-producing system," warns Dr. James D. McQuigg of NOAA's Center for Climatic and Environmental Assessment, "is much more sensitive to the weather variable than it was even five years ago." Furthermore, the growth of world population and creation of new national boundaries make it impossible for starving peoples to migrate from their devastated fields, as they did during past famines.

Climatologists are pessimistic that political leaders will take any positive action to compensate for the climatic change, or even to allay its effects. They concede that some of the more spectacular solutions proposed, such as melting the Arctic ice cap by covering it with black soot or diverting arctic rivers, might create problems far greater than those they solve. But the scientists see few signs that government leaders anywhere are even prepared to take the simple measures of stockpiling food or of introducing the variables of climatic uncertainty into economic projections of future food supplies. The longer the planners delay, the more difficult will they find it to cope with climatic change once the results become grim reality.

PETER GWYNNE with bureau reports

Mr. POE. Now, I grew up in the '70s. I believed all this, that we are all going to freeze in the dark. It talks about how people from the north are going to move south—of course, that would be a concern for people like me in Texas—because it is too cold in the north. But I believed all of this. They said it is a fact. The next ice age.

Now we hear, and I am not really quarreling with you, but now we hear it is a fact of global warming. How do you reconcile these differences in expert opinion now just 30 years later?

Mr. CORELL. If I could, I grew up in the same era. I heard those same things, and I have a background in oceanography so those were words I heard as well.

Along about the 1980s we in the scientific community, particularly in the oceans, were depicting signals that we had not seen before. There was some warming going on, and it resulted that in the mid '80s we decided we really had to study this ocean and the atmosphere and ultimately the land very differently than we had in the past.

I would argue that the massive investments made by places like the National Science Foundation, NASA and our counterparts in 25 other countries of the world have enabled us to see more clearly what is really happening on the planet, and there was some relative cooling going on during that time that gave signals that we didn't have the scientific evidence that we have today.

So we have been able to, shall I say, get a better understanding about how the planet works, and we would say differently then if we knew then what we know now.

Mr. POE. Would you agree that there are experts in climate change that disagree that we are having global warming?

Mr. CORELL. One of the things that makes science exciting is that we are always challenging others. If we don't have people challenging us, we are going to make serious mistakes. We have to be able to duplicate what others have done in science.

So the nest of science is full of contentiousness, and it should be. That is what brings truth to the table. It is when the science arguments are made for other reasons than intellectual understanding of how the planet works. That is when we get in trouble.

Mr. POE. So you agree that there are scientists that disagree with your premise that there is global warming?

Mr. CORELL. Yes. I think the thing is it is not—yes, that is right. There are going to be some people like that.

Mr. POE. So how do people like me who are just lawyers or citizens know whether we are going to freeze or whether we are going to burn up? I mean, how do we know who to believe?

Mr. CORELL. The thing that happened in the '80s is we created an entity called the IPCC, the Intergovernmental Panel on Climate Change, for precisely that reason.

We engage well over 2,500 scientists who are all over the world to engage in an assessment of current state of knowledge. That is different than one person publishing a paper, and so there is a different set of——

Mr. POE. Let me interrupt. Let me interrupt, Doctor.

Mr. CORELL. Yes. Sorry.

Mr. POE. I am about out of time. Do you think we still should be able to have this discussion about whether there is global warming or not, or is that a done deal and let us just move on?

Mr. CORELL. The last 50 years it is clear from IPCC and all the other assessments, collections of knowledge, that we do have a relative warming that is now starting to take us out of the range that we have been in for the last 10,000 years.

Chairman BERMAN. Judge Poe, we are going to have to move on——

Mr. POE. Thank you, Mr. Chairman.

Chairman BERMAN [continuing]. In your terms.

Mr. POE. Let us move on, Mr. Chairman. Thank you.

Chairman BERMAN. Mr. Carnahan, the gentleman from Missouri, for 5 minutes?

Mr. CARNAHAN. Thank you. I am not a surfer like my friend, Mr. Rohrabacher, and I am not going to debate——

Chairman BERMAN. You are from Missouri. It is hard to be a surfer.

Mr. CARNAHAN. I do want to thank the panel. This is a great topic. Dr. Borgerson, again welcome. I appreciate your common sense approach. You can tell you are from Missouri.

This really points out so many different reasons why we have to get our Arctic act together, and I think you have really summed it up well, but I wanted to get back. Dr. Borgerson, I think Mr. Faleomavaega had asked about the reasons why we really hadn't gotten this through our political policy process, and I think you kind of got cut off on that.

I wanted to let you finish about that and also let the others address that as well, but also ask if you could assess where we are with the Obama administration in terms of new initiatives to take that forward because I think there is certainly a mindset with the new administration on more and better international engagement, and certainly it seems to me like this ought to be on their plate.

Mr. BORGERSON. Thank you, and it is fun to bring a Show-Me State approach to Arctic geopolitics.

Before answering that specifically about the Law of the Sea, if I could take 2 seconds to speak to some of the dissention I hear about climate change science?

Mr. CARNAHAN. Please.

Mr. BORGERSON. As a sailor's perspective, from a national security point of view, in the end it really doesn't matter. There is a point where you are sure enough and you better start taking action.

So if you are in a foxhole in Iraq you don't wait until you are 100 percent sure to get out of that foxhole or you are dead, and I think that is why the Pentagon and the Joint Chiefs of Staff and national security experts take climate change very seriously.

Insurance providers, for example, are very objective, analytical, quantitative people. They are worried about climate change because the risk of inaction is so much larger than doing nothing.

So with that as a preface to the Law of the Sea, the United States did not change prior to the 1994 agreement and implementation because the deep seabed mining provisions had not been corrected. By all accounts they have been corrected, and the Senate Foreign Relations Committee has twice reported out the Convention with advice and consent to the Senate to accede to the Convention, but the Senate Majority Leader in both cases did not schedule it for a debate and a vote.

The last time that happened——

Mr. CARNAHAN. Excuse me. Which Congress was that, the last time they did that?

Mr. BORGERSON. The last time was December 2007.

Mr. CARNAHAN. Okay.

Mr. BORGERSON. And when it came out of the Senate Foreign Relations Committee they had a draft very long, detailed list of interpretations and observations that are important from a sovereignty perspective to safeguard U.S. interests that were recommended to the Senate if or when we accede to the Convention.

To the point about now, I think the stars are really aligned and that this is the year. This should be the year. President Obama supports the Convention. Vice President Biden was chairman of the Foreign Relations Committee the last time it was released out. Secretary Clinton in her confirmation hearings said that U.S. accession to the Convention would be one of her top priorities.

Secretary of Defense Gates supports the Convention. The Joint Chiefs of Staff, CNO and the Coast Guards, support the Convention. Senator Kerry, currently chairman of the committee, supports the Convention. The interest groups and stakeholders in this issue all support the Convention.

So I think this is the year, and for the Arctic, in addition to other issues of strategic importance to this country, the United States needs to finally formally join the Law of the Sea.

Mr. CARNAHAN. All right. Dr. Corell or Mr. Treadwell?

Mr. CORELL. I think he has done a really nice job for us.

Mr. CARNAHAN. Okay. All right.

Mr. TREADWELL. Actually, I will add one thing. Governor Palin and the entire Alaska delegation support this accession to the Law of the Sea. For us, not being at the table as these issues are done in our neighborhood is very, very difficult.

And the point I had made before is that I understand the concerns that others have raised. I used to be an environmental regulator, and nobody likes to see rules imposed upon them from outside, but I think you as the Congress can make it very, very clear that the United States is not going to follow rules that you don't pass as a Congress. If you do that, that should answer those objections.

Mr. CARNAHAN. Thank you very much.

Chairman BERMAN. The time of the gentleman has expired.

The gentlelady from California, Ambassador Watson, is recognized for 5 minutes.

Ms. WATSON. Thank you, Mr. Chairman. It has been very fascinating listening to the challenges of science and hearing the response of our scientists.

I believe the climate is changing. I am from Los Angeles, and at one period we had 38 days of rain. Now, we welcome that, but it doesn't happen often. Something is happening.

And so I am concerned because we have not properly funded our Coast Guard or our Navy, and as a result they are not the strongest arm for our defense system so at this point it is unclear if our country is prepared to take a lead in the Arctic, be it in monitoring the waterways or changes in the environment.

Now, I would like all of you to respond. I am going to go to my second question with this, and all of you can respond to that. Can we quickly scale up enough resources to become and remain a leader in the region?

And, as we know, the weather in the Arctic, even during the summer months, will likely remain unpredictable with the ability

to cause shipping delays. Any oil or gas spills will be difficult to clean and very costly. Thus, opening shipping routes will likely have many negative environmental effects.

So should we continue, knowing what we know at this moment and by the fact there is a lot of unpredictability? With all these factors considered, are the Arctic shipping routes worth remaining as they are with the melting of the ice, the rising of the level of the sea?

I am thoroughly convinced that if we don't start now paying attention to the environment the environment will become our biggest enemy. Can you respond? Do we have the resources?

Mr. TREADWELL. Ambassador Watson, a couple of things. Last year the Congress failed to pass a Coast Guard authorization bill. There was different language in the House and the Senate as to whether or not we would need icebreakers.

Scott gave us a B+ on the Arctic policy because we weren't very clear. There was actually a food fight within the Executive Branch on whether or not we would need icebreakers.

There has been a National Academy of Sciences study saying we need them. The Commission has come out. The chairs of the Joint Chiefs of Staff have said that we need this icebreaker capability. If we start building now, we may have them in the next decade when we will certainly need them.

I hope as this Congress considers the Coast Guard authorization bill we get those resources. We are moving the land-based resources up there. The science issues are going along fairly well.

But let me say this about shipping. Our Commission paid for the substantial part of the Arctic Marine Shipping Assessment done by the eight Arctic nations, which will be reported to the ministers in April. It will show that in 2004 in the Arctic or adjacent ice covered regions there have been close to 5,400 vessels greater than 100 tons traveling through this area.

To say no shipping is not really realistic. This is a major part of the Great Circle route between Los Angeles and Asia. It is a place we resupply villages in the north throughout the Arctic.

What is very important is that we do the risk assessment and that we work to make the shipping safer, as we do every other place. Signing onto Law of the Sea, going through the International Maritime Organization to get a mandatory polar code, setting up the vessel traffic systems and the identification systems are all resource investments we can make.

Right now there is no way you can tell a nation say not a member of the Arctic, a Korean ship, not to sail across this ocean, but we can get together through the IMO and set up good rules to do it, and that is what the policy saying that shipping should be safe, secure and reliable says we should do.

I will make sure that we get you a copy of the Arctic Marine Shipping Assessment when it comes out.

Mr. BORGERSON. Even if Congress appropriates money tomorrow it is going to take a decade to build these new ships and because of the Jones Act and the cost it imposes on the country at least $1 billion per ship. At current pace, that is 5 years after the Arctic is ice free, which we are already behind the eight ball.

Not only is shipping there now; next summer a German bolt company has applied and gotten Russian permission to begin using the Northern Sea route for interocean transit, so this is happening. This isn't science fiction 20 years from now. It is happening now.

I would finish my comment by saying that there is a broader challenge. Not only do we not fully appreciate the shipping and threats off our Alaskan coast and the Arctic; we don't fully understand still this far after 9/11 what is called maritime domain awareness, a security picture off of these coasts.

Are there bombs in a box, what ships are approaching the U.S. shore, et cetera. A huge security challenge has to be solved, and it is the same in the Arctic as it is in the Lower 48.

Chairman BERMAN. The time of the gentlelady has expired.

The ranking member, Ms. Ros-Lehtinen, is recognized for 5 minutes.

Ms. ROS-LEHTINEN. Thank you so much, Mr. Chairman. Thank you to our panelists this morning.

The United States has had a long and active military presence in the Arctic, including defense against missile and bomber attacks, regular visits by submarines and surface vessels. I had some questions about this issue.

How might U.S. defenses be impacted by the extension of sovereignty by other countries; also by Canada's claim of sovereignty on the Northwest Passage? Any new threats emerging, and how can we ensure that our national security will not be undermined by current and future developments in that region?

Thank you, gentlemen.

Mr. BORGERSON. Do you want me to start?

Mr. TREADWELL. Yes. Why don't you start?

Mr. BORGERSON. Very quickly, most of that presence has been subsurface submarines, not surface, and so we still have a very capable submarine capability in the Arctic. We have a not-so-capable surface capability.

The Arctic is also divided amongst three combatant commanders, which doesn't make very good sense from a security perspective. There is not one combatant commander with sole responsibility for that area of operations.

And to the point of Canada and the Northwest Passage, the 1988 agreement to disagree that President Reagan signed I think works and that we should deepen and widen that to be able to respond to these new security challenges in creating a common North American block and a classic balance of power perspective so as to hedge against Russia.

Mr. TREADWELL. Thank you very much. I would only add this: We and Canada are very important allies. You can go a mile from my house and in a joint command at the Alaska Command you have Canadian officers and American officers working on the air defense of the United States today.

It is very much in both national interests to protect our environment. It is very much in both of our national interests to do. Article 234 of Law of the Sea was actually I believe proposed by the Canadians to grant nations the extra ability in ice covered waters to ensure environmental protection. So we get on Law of the Sea, and

I think we sit down with the Canadians and see how we can build this partnership.

Freedom of navigation, something that is supposedly a big argument between our two countries, is something that our nation depends on all over, all over the oceans of the world, and I think ultimately we can work out how we protect the Arctic environment and maintain freedom of navigation other places.

Ms. ROS-LEHTINEN. Mr. Chairman, thank you so much, and well timed because I see the bells have gone off to a vote. Thank you, sir.

Chairman BERMAN. Yes. We do have votes announced. I am going to take just a couple of minutes to go back and touch on a few issues that haven't yet been covered, but this has been very helpful to me and I think to a lot of the members who have been following this.

I made reference to this in my opening statement in that in the Ilulissat Declaration the coastal Arctic countries, including the United States, concluded that a comprehensive international Arctic agreement was not needed. Experts, to the contrary, have said the region's complexity requires a comprehensive framework.

What do you think of that conclusion? How should the United States and other Arctic countries govern the Arctic? Is a comprehensive governing structure needed, and what would be its components? I would be interested in hearing from all of you on that.

Mr. BORGERSON. I will start quickly since I have three New York Times op eds on the subject, and I have actually changed my mind over time.

I used to think that it was ripe for something modeled on the Antarctic Treaty, but I think that is not the case because, frankly, they are just too dissimilar and the geopolitics too complicated.

So I think the Law of the Sea provides the legal granite bedrock on which to build the governing approach to the Arctic, but that you can build on top of that elegant institutional structures on top of that like empowering the Arctic Council, like a marine preserve at the North Pole, et cetera.

While the Ilulissat Declaration was beautiful in its commitment to the rule of law and international peace and harmony, at the same time Russia resumed strategic bomber flights over the Arctic for the first time since the Cold War, dispatched naval combatants to the disputed waters off the Svalbard and so forth.

And so I think while that diplomacy is terrific first we have to sign the Law of the Sea and then we have to conduct energized diplomacy on which to build governing structures in which to respond to these emerging challenges.

Mr. TREADWELL. Mr. Chairman, in my testimony I talked about this. I also used to write in favor of the idea of an Arctic treaty. I realize as we go through the homework list of comprehensive things we have to do, whether it is fisheries and so forth, that there are mechanisms already in place.

I would urge this committee to work to see how we strengthen the Arctic Council. Part of it is who gets to the table and who is in the room. The Arctic Council is very unique in that it brings a set of permanent participants and indigenous representatives to the table, which would be very difficult on a global Arctic treaty.

You also have the eight nations there, and it is a small enough group that most of us know each other and have worked very well now together for close to 20 years.

Chairman BERMAN. What can we as a Congress do? I mean, we certainly can talk with parliamentarians and leaders of——

Mr. TREADWELL. Sure.

Chairman BERMAN [continuing]. The other members of the Council, but in terms of actually strengthening it? Are there steps we can take unilaterally?

Mr. TREADWELL. Yes, there are. I mean, one is the Scandinavians have proposed a secretariat.

The United States has not gone forward on funding of this issue because the Congress has not said—well, there is no authority. If the Congress would say we would make that our vehicle for Arctic cooperation and fund it that could be a very important thing.

The second thing is who votes. I mean, within that group we now have a large number of observer countries. China is coming in as an observer to begin with.

I like to think of those observers as Arctic partners. Lots of things happen in China that affect the Arctic and vice versa and so if we have a core group and then a partnership group that may be a better way to go about it.

Mr. BORGERSON. Just quickly, I think you can model it on the U.N. Security Council. There you have the P–5, although it needs to be reformed to reflect reality today. In the Arctic you have the A–5, the five coastal states who all have veto power.

There should be a permanent secretary, and then you add other seats at the table that reflect these various interests, including the Chinese and Japanese, but especially international indigenous communities as well that participate in mapping out the government's framework for the future Arctic.

Chairman BERMAN. Dr. Corell?

Mr. CORELL. Yes. Towards the end of my statement I noted this project called Arctic Governance, and one of the commitments that we have made is that as this project proceeds to try to get that landscape well, well structured.

We have people like it turns out my cousin, Hans Corell, on that committee. He was the top legal advisor to the U.N. for 10 years, and he brings a lot of international law to the table, as well as Russians and others.

We have made a commitment to you in this committee and others, as well as the other Arctic countries, to share with you what we are learning in that process. It is an 18-month study, and out of it we expect to paint a policy picture in ways that maybe gives a little more underpinning than we now have at our disposal, so we will commit to come and talk to your staff about that over time.

Chairman BERMAN. Great. Okay. Well, thank you all very much for coming; you especially who had quite a turnaround. It was very helpful, very enlightening.

The hearing is now adjourned.

[Whereupon, at 11:52 a.m. the committee was adjourned.]

APPENDIX

Material Submitted for the Hearing Record

FULL COMMITTEE MARKUP AND MEETING NOTICE

Committee on Foreign Affairs
U.S. House of Representatives
Washington, D.C. 20515-0128

Howard L. Berman (D-CA), Chairman

March 20, 2009

TO: MEMBERS OF THE COMMITTEE ON FOREIGN AFFAIRS

You are respectfully requested to attend an OPEN markup and meeting of the Committee on Foreign Affairs, to be held in **Room 2172 of the Rayburn House Office Building,** for the purpose of mark up of the following legislation**:**

DATE: Wednesday, March 25, 2009

TIME: 9:30 a.m.

SUBJECT: Climate Change and the Arctic: New Frontiers of National Security

WITNESSES: Scott Borgerson, Ph.D.
Visiting Fellow
Council on Foreign Relations

Robert Corell, Ph.D.
Vice-President of Programs
The Heinz Center

Mr. Mead Treadwell
Senior Fellow
Institute of the North

By Direction of the Chairman

The Committee on Foreign Affairs seeks to make its facilities accessible to persons with disabilities. If you are in need of special accommodations, please call 202/225-5021 at least four business days in advance of the event, whenever practicable. Questions with regard to special accommodations in general (including availability of Committee materials in alternative formats and assistive listening devices) may be directed to the Committee.

COMMITTEE ON FOREIGN AFFAIRS

MINUTES OF FULL COMMITTEE HEARING

Day *Wednesday* **Date** *3/25/09* **Room** *2172RHOB*

Starting Time *10:10 A.M.* **Ending Time** *11:53 A.M.*

Recesses [ ] (_____ to _____)

Presiding Member(s) *Howard L. Berman (CA), Chairman*

CHECK ALL OF THE FOLLOWING THAT APPLY:

Open Session [✓]
Executive (closed) Session [ ]
Televised [✓]
Electronically Recorded (taped) [✓]
Stenographic Record [✓]

TITLE OF HEARING or BILLS FOR MARKUP: *(Include bill number(s) and title(s) of legislation.)*
Climate Change and the Arctic: New Frontiers of National Security

COMMITTEE MEMBERS PRESENT:
see attached

NON-COMMITTEE MEMBERS PRESENT:
n/a

HEARING WITNESSES: Same as meeting notice attached? Yes [✓] **No** [ ]
(If "no", please list below and include title, agency, department, or organization.)

STATEMENTS FOR THE RECORD: *(List any statements submitted for the record.)*

- ***Global Warming Quotes on CO2, on Natural cycles and oceans, submitted by Dana Rohrabacher***
- ***The Cooling World, Newsweek, April 28, 1975, submitted by Ted Poe***

ACTIONS TAKEN DURING THE MARKUP: *(Attach copies of legislation and amendments.)*
n/a

RECORDED VOTES TAKEN (FOR MARKUP): *(Attach final vote tally sheet listing each member.)*

Subject	Yeas	Nays	Present	Not Voting
n/a				

TIME SCHEDULED TO RECONVENE _____
or
TIME ADJOURNED *11:53am*

Doug Campbell

Doug Campbell, Deputy Staff Director

Attendance - HCFA Full Committee
Climate Change and the Arctic: New Frontiers of National Security
March 25, 2009 @ 9:30 a.m. , 2172 RHOB

Howard L. Berman (CA)
Eni F.H. Faleomavaega (AS)
Donald Payne (NJ)
Brad Sherman (CA)
Robert Wexler (FL)
Diane E. Watson (CA)
Russ Carnahan (MO)
Albio Sires (NJ)
Gerald E. Connolly (VA)
Michael E. McMahon (NY)
John S. Tanner (TN)
Gene Green (TX)
Lynn C. Woolsey (CA)
Sheila Jackson-Lee (TX)
Barbara Lee (CA)
Shelley Berkley (NV)
Joseph Crowley (NY)
Brad Miller (NC)
David Scott (GA)
Jim Costa (CA)
Ron Klein (FL)

Ileana Ros-Lehtinen, (FL)
Christopher H. Smith (NJ)
Dan Burton (IN)
Elton Gallegly (CA)
Dana Rohrabacher (CA)
Joe Wilson (SC)
John Boozman (AR)
J. Gresham Barrett (SC)
Jeff Fortenberry (NE)
Michael T. McCaul (TX)
Ted Poe (TX)
Bob Inglis (SC)
Gus Bilirakis (FL)

Chairman Berman's opening statement at hearing, "Climate Change and the Arctic: New Frontiers of National Security"

March 25, 2009

There is no place in the world where global warming is having a more profound effect than the Arctic.

In recent years, we have witnessed the rapid disappearance of Arctic ice. Over the past two decades, the region has lost an area of thick ice roughly one and a half times the size of Alaska.

These changes have had serious impacts on the environment; they also have significant implications for U.S. foreign policy, and for national security as well as the economy.

Yet, despite the growing importance of the region, the Arctic has been a comparatively low priority on Capitol Hill. That should change.

A top national priority should be to address the root cause of global warming by reducing U.S. greenhouse gas emissions. We should also work cooperatively with other nations in the UN climate change framework.

As the scientific community has repeatedly warned us, our failure to act quickly and decisively on global warming could have catastrophic consequences.

For example, receding ice could release massive quantities of methane gas trapped in the permafrost. Methane is a greenhouse gas 20 times more effective in trapping heat than carbon dioxide.

The more the ice recedes, the more methane is released, thus causing more ice to melt. Once we get trapped in this vicious cycle, it will be very difficult to get out.

Strangely enough, disappearing ice in the Arctic may also create commercial opportunities. It could transform the Arctic into a major transit route for global shipping. Trips from Japan to Europe could be cut by days. Shipping costs could be reduced up to 20 percent.

How will the U.S. protect these new sea lanes and the surrounding environment? The changes expand the responsibilities of the Coast Guard and the U.S. Navy.

The disappearance of ice could also unlock the region's abundant natural resources. By some estimates, the Arctic could hold as much as 22 percent of the undiscovered, recoverable energy resources in the world, including 90 billion barrels of oil.

American and foreign companies are lining up to develop these resources. For example, in 2007 a Norwegian company launched the first commercial energy operations in the Arctic, and now shipping liquefied natural gas from Norway to American consumers.

Due in large part to commercial interests, the Arctic coastal nations of Canada, Russia, Norway, Demark, and the United States are attempting to claim precious territory. But there are several areas of dispute.

Canada, Norway, and Russia have disagreements over the extent of the Eurasian continental shelf. And the United States has differences with our close ally, Canada, on the Northwest Passage, the Beaufort Sea, and a number of other unresolved territorial disputes. How will we work with these countries to settle overlapping claims?

Climate change in the Arctic is also having a profound effect on animal and human life.

Polar bears have experienced weight loss and birth rate declines due to the loss of ice floes. Fish that normally inhabit warmer waters in the south are moving north. And fish that already live in the Arctic waters are moving even further north.

Indigenous people who have relied on sea ice for travel and hunting for generations have been forced to change their age-old traditions.

All of these issues and questions are complicated. That's why it's important for the United States to address them comprehensively, and in cooperation with other countries.

Shortly before he left office, President Bush issued a directive on U.S. Arctic policy -- the first update since 1994. It covers a wide range of policies, from protecting national security to involving indigenous people in decision-making to ensuring the environmental sustainability of natural resources.

Does this directive reflect the right policy? How should Congress prioritize issues related to the Arctic?

I believe Arctic conservation should be at the top of the agenda. I recently joined over 60 of my colleagues in sending a letter to President Obama recommending that he employ a science-based approach to safeguard this fragile region and manage U.S. activities.

That letter also calls for the suspension of new industrial activity in the Arctic until a comprehensive Arctic conservation and energy plan has been completed.

It's clear that we still have much to learn about the changes occurring in the region. And it will be difficult to gather the data we need unless we increase our capabilities.

The U.S. faces a drastic shortage of personnel and equipment in the region. The Coast Guard has only two temporary Arctic stations to cover an area one and a half times that of the United States. It could take hours just to reach a ship in distress.

We have only two polar ice breakers deployed and a third in mothballs. By comparison, Russia has 20 ice breakers, including seven that are nuclear powered.

Other Arctic countries are rapidly increasing their capabilities in the region. Canada is building an Arctic Training Center, expanding its northern armed forces, and plans to upgrade a deepwater port in Nunavut.

And Russia intends to spend billions of dollars to double the capacity of its port in Murmansk by 2015. The U.S. is far behind in this new race to the North Pole.

But good Arctic stewardship requires more than enhancing capabilities. It requires cooperation.

Last May, the United States and the other four coastal Arctic states met in Ilulissat, Greenland and agreed to work cooperatively to settle any overlapping regional claims. They also concluded there is no compelling need for a comprehensive, international regime to govern the Arctic.

The U.S. has also been working through the Arctic Council – a group of eight Arctic nations and representatives of various indigenous groups -- to address environmental and developmental issues. But the Council's decisions are not binding.

Experts, such as Dr. Borgerson whom we have here today, argue that a new governance structure is needed.

Other experts believe the United States should first ratify the Law of the Sea Convention. In practice, the U.S. government abides by the convention, but is not a party to it. As a result, we are missing an opportunity to work cooperatively with Arctic nations in determining territorial boundaries.

The United States faces many challenges and opportunities in the Arctic. We can try to engage other Arctic countries to address these issues through peaceful cooperation, or sit on the sidelines and risk a Hobbesian free-for-all that could further damage the environment and place the U.S. at a commercial disadvantage. I think the choice is clear.

During her confirmation hearing, Secretary Clinton said the Arctic "offers a chance for cooperation that might lead not only to positive actions with respect to the Arctic, but deepen our partnerships with Russia and others across the board."

I agree with Secretary Clinton and hope our conversation today will help highlight areas of common purpose with our Arctic neighbors while providing guidance for U.S. Arctic policy.

COMMITTEE ON FOREIGN AFFAIRS
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

Donald A. Manzullo (IL-16)
Opening Statement

May 15, 2009

Mr. Chairman, thank you for holding this important hearing regarding the affects of global climate change on the Arctic and its impact on the national security of the United States. This is a fascinating topic that deserves more attention, and I commend the Chairman for calling this hearing. The truth is the Arctic is changing rapidly, and regardless of whether this change is man made or natural, the United States must do more to adapt to it.

The Arctic region is critical to America's national, energy, and economic security. The delicate balance that previously governed the Arctic is now being challenged by a resurgent Russia focused on weakening our sovereignty in the region. If the Arctic ice melts further, the North Pole will become one of the most sought after and vital shipping lanes for all nations seeking a shorter passage between the hemispheres. It is critically important in such instances to ensure that no single country or entity can deny navigation and movement. We need to improve our sea assets to meet this challenge – it cannot be handled just by one modern Coast Guard icebreaker.

Protecting the Arctic's natural resources is also a priority that must be explored. With the development of cleaner and better technology to extract natural resources, the United States can devise environmentally sound ways to tap into the natural resources that lie in the Arctic region. However, not all nations seeking access to the Arctic share America's commitment to environmental protection. Furthermore, even the prospect of increased shipping activity poses a real threat to the Arctic's fragile environment if not managed properly.

The Arctic region is important to the United States for so many reasons that it is warrants greater emphasis in Congress. I look forward to hearing the testimonies.

Opening statement of Congressman Gerald E. Connolly
March 25, 2009
HFAC Full Committee Hearing
Climate Change and the Arctic: New Frontiers of National Security

Mr. Chairman, thank you for holding this important hearing on the visible, tangible results of climate change in the Arctic region.

When it comes to global warming, most people instantly think of the ice caps and the shrinking habitat of polar bears. While that is certainly a serious ramification, today's hearing highlights a series of geopolitical and economic challenges posed in just the Arctic region. Due to the continued thawing of terrain that was once covered by ice, we are now faced with questions about new international shipping routes, competing claims on land rights and natural resources, and uncertain disruption to indigenous communities.

To effectively address these and the countless other challenges created by climate change that are manifesting around the globe, the United States must take a leadership role in first addressing the underlying issue. While I agree with the importance of charting a course to address the Arctic situation, I think my colleagues would join me in acknowledging that we also must to tackle that which has created this situation in the first place. A key component of President Obama pledged to renew America's standing on the global stage must include the U.S. setting an example for other world leaders to follow with respect to climate change. How refreshing it is for us to have a President who not only acknowledges the science of global warming but also is motivated to do something about it.

In my tenure in local government, I led an effort with the Sierra Club known as Cool Counties to recruit all 3,066 counties across the nation to commit to reducing their own greenhouse gas emissions 80 percent by 2050. I also led visiting delegations to Europe, where our counterparts are more engaged in combating climate change. Germany, for example, has become a leader on solar and wind power, installing solar panels on many of its government buildings.

Under the leadership of our colleagues on the House Energy and Commerce Committee, I hope we have a comprehensive proposal for consideration by this Congress as early as Memorial Day, and I urge members of this committee to be actively involved given the global implications of any action we take.

CONGRESSWOMAN SHEILA JACKSON LEE OF TEXAS

STATEMENT BEFORE THE
FOREIGN AFFAIRS FULL COMMITTEE HEARING
"CLIMATE CHANGE AND THE ARCTIC: NEW FRONTIERS OF NATIONAL SECURITY"
MARCH 25, 2009

Thank you, Mr. Chairman, for convening today's hearing. May I also take this opportunity to thank the Ranking Member, and to welcome our distinguished witnesses Scott Borgerson, Ph.D., Visiting Fellow, Council on Foreign Relations; Robert Corell, Ph.D., Vice-President of Programs, The Heinz Center; and Mr. Mead Treadwell, Senior Fellow, Institute of the North. I look forward to your informative testimony.

I represent a city that has been called the Energy Capitol of the World. The energy business is the cornerstone of the State of Texas and the City of Houston. Houston is one of the world's largest manufacturing centers for petrochemicals – the basic building blocks for producing thousands of consumer goods such as clothes, telephones, carpet, televisions and many other items that are part of daily life.

In fact, the $15 billion petrochemical complex that lines the Houston Ship Channel is the largest in the nation. Petrochemicals are organic compounds derived from petroleum or natural gas. This group comprises almost 200 chemicals, including simple hydrocarbons such as methane and ethane; aromatic hydrocarbons such as benzene and toluene; olefins such as ethylene and propylene; naphthenes; and a variety of other derivatives.

Chemical facilities in the Houston region provide an abundant supply of materials to other manufacturers – locally, statewide, nationally and internationally. Transporting those chemicals is no small task. Houston is home to the "Spaghetti Bowl," an ever expanding complex of several thousand miles of product pipeline connecting some 200 chemical plants, refineries, salt domes and fractionation plants along the Texas Gulf Coast. The region's four ports, including Houston, Freeport, Galveston and Texas City make the area's petrochemical products accessible to the world and allows manufacturer's access to feedstock's from global markets. Houston is home to more than 400 chemical plants, which employ in excess of 35,000 people.

In my district, the 18th Congressional District of Texas, and the surrounding coastal areas, last year provided an unusually high number of disasters; with the worst flooding in the central U.S. in 15 years, a record number of tornadoes, an early wildfire season and a very active hurricane and storm season including: Dolly, Fay, Gustav, Hanna and Ike.

Of course we cannot forget Hurricane Katrina, which was among the worst storms in American history. This year's hurricane season officially begins on June 1st, and scientific predictions do not bode well. Forecasters anticipate a "very active" year for storms along the Atlantic coastline, with researchers at Colorado State University anticipating 17 named storms, including 9 hurricanes. According to these predictions, there is a 74% chance that at least one major hurricane will strike the U.S. coastline. Similarly, Accuweather forecasts 13-17 total storms in the Atlantic Basin. Of those, 3 -5 are likely to be major hurricanes of Category 3 of Category 3 or greater.

What does this mean?

While I represent the energy industry in my district, it gives me great pause. What type of affect is this industry having on Houston? On Texas and the Gulf region? And ultimately to our Earth? Are we being responsible in our regulation of the energy industry? Are we doing enough as Members of Congress to ensure that proper laws and regulations are in place to ensure sustainability?

The fact that we discuss polar bears and salmon and even penguins as we examine the melting ice caps, increase in floods, fires, hurricanes and other natural disasters – tells me that we are not doing enough.

I look forward to hearing from each of our witnesses today, how we can stop guessing at what is happening to the environment, and with climate change and start implementing policies that allow business to move forward without damaging our earth further.

Questions for the Record Submitted to
Dr. Scott Borgerson, Dr. Robert Corell, Ph.D., and Mr. Mead Treadwell
by
Congresswoman Barbara Lee

House Committee on Foreign Affairs Hearing
Climate Change and the Arctic: New Frontiers of National Security
March 25, 2009

Q1: **In your testimonies you emphasize the far-reaching and profound consequences of fundamental changes to the Arctic ecosystem brought on by climate change including significant sea level rise. It is estimated that a 1 meter rise in sea-level would adversely impact 100 million people across the globe.**

How essential are United States efforts to not only mitigate the impacts of climate change by immediately acting to curb greenhouse gas emissions, but also support for the implementation of adaptation strategies to prepare at-risk populations for future climate warming?

- No response received.

Q2: **Congress has an opportunity to act now before the impacts of climate change are severe enough to provoke solely reactive policies which fail to account for long-term sustainability, thereby costing the United States and the entire global community not only resources, but lives.**

Based on your scientific expertise and experience, can you speak to what you would consider an ideal timeline for United States to act with regard to mitigation and adaptation in addressing the threat of climate change?

In other words, how quickly does the science say we must act?

Thank you. I agree that this requires immediate action, and I implore my colleagues on the Committee to take this into consideration as Congress moves forward in addressing this very important issue.

- No response received.

Q3: **On Tuesday, the Exxon Valdez Oil Spill Trustee Council stated in a report marking the 20th anniversary of the worst oil spill in U.S. waters,**

that lingering oil continues to be found more than 450 miles away, and is estimated to persist at an amount near 20,000 gallons.

This unfortunate black mark on our nation's efforts to act as stewards of the global environment continues to illustrate the importance of adequate, enforceable, and preventive environmental safeguards.

The treacherous and harsh conditions of Arctic waters severely increase the potential for serious environmental disasters such as the Valdez oil spill in 1989. However, United States lease sales have continued to occur in regions such as the Chukchi Sea, where there is an estimated 40 percent chance of a spill of at least 1,000 barrels or more, and adequate technologies or methods to clean up such a catastrophic disaster are unavailable.

Do you believe the technologies and capacity currently exist to safely extricate the vast natural resources in the arctic region, and that we can be confident in the absence of such an environmental disaster, or at a minimum, effective response capabilities?

What steps can we take to preserve and enhance environmental protections, as well as navigational and marine safety measures, as the Arctic Ocean and its abundant natural resources become more accessible?

- No response received.

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