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NATIONAL SECURITY IMPLICATIONS OF CLIMATE CHANGE

Wednesday, June 5, 2019

U.S. House of Representatives,

Permanent Select Committee on Intelligence,

Washington, D.C.

The committee met, pursuant to call, at 8:31 a.m., in Room HVC-304, Capitol Visitor Center, the Honorable Adam Schiff (chairman of the committee) presiding.

Present: Representatives Schiff, Himes, Sewell, Carson, Speier, Quigley, Castro, Heck, Welch, Maloney, Krishnamoorthi, Nunes, Conaway, Wenstrup, Stewart, Crawford, Stefanik, Hurd, and Ratcliffe.

The Chairman. The committee will come to order. Before we begin, I want to remind all members that we are in open session, and as such, we will discuss unclassified only.

Without objection, the chair may declare a recess at any time.

Good morning. Today's open hearing is the fourth in a series that the committee is conducting to examine the intersection of key national security challenges and intelligence. In our prior hearings, we have explored the rise of authoritarianism, Russian intelligence tradecraft, and China's use of technology as a tool of repression.

This morning, we will take a look at climate change, which is the greatest long-term national security threat to the U.S. and which will affect every dimension of our national life for decades and possibly centuries.

In the unclassified 2019 Worldwide Threat Assessment, Director of National Intelligence Coats submitted this finding to our Senate counterparts on behalf of the community, quote: Global environmental and ecological degradation, as well as climate change, are likely to fuel competition for resources, economic distress, and social discontent through 2019 and beyond. Climate hazards, such as extreme weather, high temperatures, droughts, floods, wildfires, storms, sea level rise, soil degradation, and acidifying oceans are intensifying, threatening infrastructure, health, and water, and food security.

In the past, the IC has partnered with climate scientists themselves to the mutual benefit of both. In the 1990s, the CIA managed a publicly acknowledged environmental intelligence program called MEDEA, which granted clearances to climate scientists so they could take advantage of technical collection capabilities to inform their research.

In public remarks about the initiative, former CIA Director Deutch said in 1996 that

MEDEA gave these cleared scientists an ongoing record of changes in the Earth that will improve their understanding of environmental processes. More importantly, it will greatly enhance their ability to provide strategic warning of potentially catastrophic threats to the health and welfare of citizens.

MEDEA, which was halted under the George W. Bush administration and then restarted for a time under President Obama, exemplified the IC's commitment ensuring that its assessments about the impacts of a changing climate are based on the most rigorous scientific observations and peer-reviewed data possible. The National Intelligence Council as the DNI's lead for strategic analysis has been at the forefront to publishing analytical findings about the national security implications of climate change projected against a long-term horizon. And its findings demonstrate why we must take immediate sweeping action to avert the direst climate crisis scenarios.

In 2008, the NIC released a National Intelligence Assessment that judged climate change effects as likely to exacerbate poverty, societal tensions, and shortcomings in governance while potentially spurring domestic strife in some countries or interstate conflict among competition for resources. Eight years later, in 2016, the NIC published a subsequent community coordinated memorandum devoted to climate change's manifold impacts on national security interests. Unsurprisingly, its top line finding skewed to those from 2008, further underscoring the inextricable linkages between more frequent and more intense extreme weather events and political or humanitarian upheavals.

The community has also warned that climate change will put additional stress on the U.S. military, whether through increased deployments to address more frequent humanitarian crises in hard hit parts of the world or because extreme weather events physically threaten our bases or other capabilities.

Meanwhile, thawing in the Arctic and anticipated new maritime access lanes could

spur both China and Russia to project combinations in military power and economic influence in a region of emerging geostrategic significance. Newly reachable mineral resources and oil reserves in tandem with easier accessibility for commercial naval vessels could create friction among Arctic claimants and undercut the efficacy of the multilateral Arctic Council to peaceably resolve disputes. And the Middle East and sub-Saharan Africa regions of ongoing U.S. interest are likely to suffer from extreme temperatures and scarcity of water. They may face growing levels of instability, poverty, violence, hunger, and migration as desperate people seek a better life. One sorrowful place where many of these conditions are apparent is war-ravaged Yemen, which has even reportedly witnessed competing actors on the ground weaponizing water shortages to gain an upper hand.

Other areas of concern include further radicalization of populations against weaker failed governments that cannot address climate insecurities, increased new migration patterns, future instability or unwillingness of international organizations to muster the requisite responses to climate change, and the role and consequences of unregulated and emerging technologies, such as geoengineering techniques designed to manipulate weather, that could carry harmful spillover effects without properly established frameworks in place.

Before turning to the ranking member, I want to close with a sentiment expressed by President Theodore Roosevelt more than a century ago: Of all the questions which can come before this Nation, sort of the actual preservation of its existence in a great war, there's none which compares in importance with the central task of leaving this land even a better land for our descendants than it is for us.

And, with that, I recognize Ranking Member Nunes for his opening remarks.

[The statement of The Chairman follows:]

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Mr. Nunes. Thank you, Mr. Chairman.

I would like to thank the witnesses for being here today. And I will just submit my statement for the record so that we can begin the hearing from the witnesses today because I know we are going have votes in a little while.

I yield back.

[The statement of Mr. Nunes follows:]

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The Chairman. I thank the gentleman.

And, without objection, these opening statements will be made part of the record.

It is a pleasure to welcome today's panel of analysts from the Intelligence Community. First, Mr. Peter Kiemel, Counselor to the National Intelligence Council at the Office of the Director of National Intelligence; next, Rod Schoonover, a senior analyst with the Office of Geographer and Global Issues at the Bureau of Intelligence and Research at the Department of State; and, finally, Mr. Jeffrey Ringhausen, Senior Naval Intelligence Manager for Russia and Eurasia at the Office of Naval Intelligence. Thank you all for being here. I understand that you have consolidated your opening statements into a single opening statement, and, Mr. Kiemel, you are delivering the opening statement?

Mr. Kiemel. That is correct. I will deliver the open statements. And if the committee would like, Jeffrey can also add some comments on the Arctic in particular as part of the opening statement.

The Chairman. Okay, great. Why don't you begin? Thank you.

STATEMENTS OF PETER KIEMEL, COUNSELOR, NATIONAL SECURITY COUNCIL, OFFICE OF THE DIRECTOR OF NATIONAL INTELLIGENCE; ROD SCHOONOVER, SENIOR ANALYST, OFFICE OF THE GEOGRAPHER AND GLOBAL ISSUES, STATE DEPARTMENT BUREAU OF INTELLIGENCE AND RESEARCH; AND JEFF RINGHAUSEN, SENIOR NAVAL INTELLIGENCE MANAGER RUSSIA AND EURASIA, OFFICE OF NAVAL INTELLIGENCE.

STATEMENT OF PETER KIEMEL

Mr. Kiemel. All right. Well, thank you, Mr. Chairman, and thank you, Ranking Member Nunes, and distinguished members of the committee for the opportunity to discuss the Intelligence Community's assessment of the national security implications of climate change.

In my opening remarks, I will speak briefly about how the IC approaches this topic, and then I will highlight several of the key implications for national security. It is the role of the IC to provide timely, objective, and relevant insights to advanced national security. Our job is to consider all the factors that could affect the global threat, landscape, and that includes climate change.

We examine how climate trends affect U.S. national security across a range of issues and dimensions. And to inform our judgments, we really on reports that are produced by U.S. Federal science agencies, peer-reviewed science journals, and reports from scientific organizations and panels.

The IC uses this reporting stream in conjunction with all-source intelligence reporting. Our analysts produce intelligence assessments focusing on the implications for national security, and their work is reflected in my testimony today.

As we discuss these assessments, I would like to underscore a couple of points about what we do and do not know. First, it is difficult to discern the national security implications of climate change in isolation. Climate change interacts with other environmental conditions and human factors. In many cases, climate change exacerbates existing stressors, such as natural resource constraints; it contributes to water and food shortages.

And the second point is it is difficult to project when and where specific disruptive events and other climatological effects will have the most significant national security impact. That is because the complexities of the Earth's systems are so great, there are uncertainties in modeling, and human choices are unpredictable.

We do however make judgments about general risk factors. In the next several years, we assess the security risk for the United States linked to climate change will arise primarily from distinct extreme weather events and from worsening preexisting problems, such as water and food insecurity around the world, as the chairman has already alluded to.

The various studies I mentioned generally agree that during the next 20 years and beyond, climate change will increasingly compound extreme weather events. Many scientists warn that the risk of abrupt climate change, which would have the most severe national security implications, will increase over the next year -- next several decades and beyond, although currently it is assumed to be low.

I would also like to remind everyone that the Intelligence Community does not assess the direct impact of climate change on U.S. homelands. We are going to focus on the national security implications of this before the United States.

I have submitted a statement of record that provides our assessment on the effects of climate trends on various facets of national security, including the ones that the

committee submitted to us in writing. And in my time this morning, I am going to highlight three areas of particular concern: food and water security; the Arctic; and U.S. military basing and operations.

Over the next 20 years, climate change is likely to exacerbate food and water insecurity in an increasing number of countries. This has the potential to contribute to political turmoil as governments struggle to cope with food or water crises. We already have seen water crises exacerbate social unrest in fragile states in the Middle East and North Africa, such as Syria and Libya. And these crises also contribute to increased migration flows.

And it has the potential to increase disputes over resources. Disputes over land and water resources increasingly trigger social violence and internal conflict, particularly when they build on existing social and political grievances. As the climate changes, disputes over water and land are likely to grow in regions, such as the Sahel in Sudan prompting more local conflicts.

Second, we assess the changing conditions in the Arctic will have significant security, economic, and social implications for both Arctic and non-Arctic states. Scientists tell us that the Arctic is warming at rates more than twice as fast as the rest of the Earth. This makes for an increasingly navigable Arctic that could be free of ice cover coming in the summer sometime between 2030 and 2040. These conditions would drastically shorten maritime routes between Asia, Europe, and North America. The region will also attract increased commercial interests, such as mining, energy exploitation, shipping, and fishing. As a result, the Arctic is emerging as a new domain of strategic competition. Russia, China and others are dramatically increasing their activities and investments in the region.

Finally, climate-related phenomena will affect some US. Military capabilities and

facilities, including military bases and training ranges globally. One example of this is the Marshall Islands where both U.S. bases are expected to be flooded annually by 2040 if the global sea level continues to rise at its current rate.

In the interest of time, I will conclude my remarks here and turn it over to my colleagues. I want to thank again the committee for convening this hearing. We appreciate the opportunity to discuss our analysis and to share our work with Congress and the American people. And I look forward to your questions. Thank you.

[The statement of Mr. Kiemel follows:]

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The Chairman. Mr. Kiemel, you said one of your colleagues also wanted to make some comments in terms of the Arctic?

Mr. Kiemel. That is correct. And I think I&R also is prepared to make an opening statement as well if the committee would like.

The Chairman. That would be great, thank you.

STATEMENT OF ROD SCHOONOVER

Mr. Schoonover. Thank you very much, Chairman Schiff, Ranking Member Nunes, everyone here today.

Thank you for inviting me to speak today. As an intelligence officer, my job is to provide clear, objective, independent analysis to policymakers to advance U.S. national security. As a scientist in the IC, I work to blend insights from peer-reviewed science for daily intelligence to provide science informed analysis. My work has benefited greatly from the cadre of talented, dedicated officers in the IC who quietly serve U.S. interests. A large part of this work has been to better understand the national security implications of a wide range of environmental and ecological stress. From the national security perspective, I fret most about two environmental concerns, risks from instabilities to the biosphere. For example, ongoing species extinction and climate change, which is the topic of today's hearing. The Earth climate is unequivocally undergoing a long-term warming trend as established by decades of scientific measurements and multiple independent lines of evidence. Global temperatures are set to continue to increase over the next few decades due largely to past emissions of long-lived greenhouse gases. Higher temperatures produce not only hot days and melting ice caps, however. Rather,

temperature is one of the fundamental control variables of the planet and affects more than just the weather and the climate. Rising temperatures drive changes in a wide array of Earth's processes in the atmosphere and the ocean, freshwater, soil, ice, permafrost and organisms comprising biosphere, including humans. Some are familiar, like sea level rise and declining Arctic ice. Others are under appreciated, like depleting oceanic oxygen, redistribution of animal and plants on the land and in the ocean. We are a long way from totally understanding how these factors will intertwine and affect people societies and governments. We expect however that many climate-linked stresses to human and societal systems to intensify or emerge, many with outcomes important for national security. And a critical factor determining the degree of harm is how people in societies act to decrease their vulnerability or exposure to ongoing and anticipated climate-linked hazards.

We expect that climate change will affect U.S. national security interests through multiple concurrent and compounded ways, global, often diffuse porto basins are almost certain to ripple across political, social, economic, and human security domains worldwide. These include economic damage, threats to human health, energy security, and food security. We expect no country to be immune to the effects of climate change for 20 years, but some populations will be able to cope, adapt, or respond more effectively than others.

Fragile states in sub-Africa, the Middle East, Central and Southeast Asia are especially vulnerable, as are small island nations. Climate change effects could undermine important international systems on which the U.S. is critically dependent, such as trade routes, food and energy supplies, the global economy, and domestic stability abroad.

Most countries, if not all, are already unable to fully respond to the risks posed by

climate-linked hazards. Under present conditions, countries with weak institutions, low governmental legitimacy, or potential for conflict or strife is already present will have increased risk of instability. We can expect heightened tensions in some places over natural resources, such as water, arable land, or fisheries.

Complications are many with respect to human movement, but the net effects on patterns of migration and statelessness could be dramatic. Extreme events amplified by climate change may impose newfound humanitarian challenges, particularly when they occur with greater frequency or severity in the same region.

Now two words that get the attention of most national security professionals are uncertainty and surprise. And climate change will bring significant amounts of both. We note that many Earth systems are now being driven by natural and manmade forces at very high rates of change. We expect that these stresses will produce a number of climate-linked surprises going forward.

Now the IC's role is not to predict the future but rather to assess risk and strategic warning. Absent extensive mitigating factors or events, we see few plausible future scenarios where significant harm does not arise from the compounded effects of climate change. People's choice in the present and future however dictate the magnitude of many factors.

Thank you. I look forward to your questions.

[The statement of Mr. Schoonover follows:]

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The Chairman. Thank you, Mr. Ringhausen.

STATEMENT OF JEFF RINGHAUSEN

Mr. Ringhausen. Chairman Schiff, Ranking Member Nunes, and distinguished committee members, I appreciate the opportunity to speak with you today about Russia's maritime adaptations to climate change.

The Russian Government's maritime efforts with respect to climate change are primarily in the Arctic and focused on two goals. The first is securing Russia's economic interests in the Arctic zone. The second is its military modernization, primarily of the forces of the Northern Fleet Joint Strategic Command. Nearly all of Russia's Armed Forces in the Arctic are subordinated to this command. To further its maritime economic interests, the Russian Government within the maritime realm is undertaking to modernize infrastructure along its northern coast and on some of its Arctic islands.

The goal is to be able to monitor, protect, and defend its exclusive economic zone in the Arctic and to enforce a regulatory regime across the Northern Sea Route. As climate change has made portions of the Arctic navigable for a longer period of the year, the Russian Government has promoted the Northern Sea Route and its Arctic region as a possibility for increased shipping and investment.

Moscow believes that there is substantial economic potential in the Arctic. Naval Intelligence assesses that this economic potential exists, but that the Russian Government appears overly optimistic regarding its development in the near and medium term. This applies both to the Northern Sea Route becoming a major shipping lane and to expanded resource extraction. Climate change will not make those resources easier

to extract either ashore or offshore, nor is it likely to change the basic geography or economics of shipping that make the Northern Sea Route unlikely to become a major highly trafficked thoroughfare.

While Arctic shipping is likely to increase, it will remain a miniscule portion of global shipping. From a military perspective, Russia's primary military power in the Arctic is resident in the Russian Navy's Northern Fleet, based in the ice-free harbors near Murmansk in the Barents Sea, the Northern Fleet's primary mission is to operate a submarine force, providing a sea-based strategic deterrent as part of Moscow's nuclear triad. Much of the Northern Fleet is focused on supporting this submarine sea-based deterrent force.

Climate change is unlikely to have much, if any, impact on the Northern Fleet and its primary missions and operations. Greater variability and sea ice coverage is the most relevant climate change impact. However, since the Northern Fleet largely operates in the Barents Sea, which is ice-free year round, there is virtually no impact on naval operations in this region. Because Russia's strategic submarines are built to operate in ice zones, climate change is unlikely to have a large systemic impact on them either. Other than strategic deterrence, the Northern Fleet's missions include the overall defense of the Arctic approaches to Russia. To this end, work is underway to refurbish and reestablish military infrastructure required to monitor, protect, and defend Russia's northern regions. Russia is modernizing maritime frontier outposts, area surveillance sensors, and airfields. It is also developing a chain of search and rescue stations to enable response to maritime traffic along the Northern Sea Route required.

I would like to thank you for the opportunity to appear and speak before you today. And I look forward to engaging in any of your questions.

[The statement of Mr. Ringhausen follows:]

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The Chairman. I thank you very much.

Mr. Ringhausen, if I could just ask you, I know that the rising sea levels are potentially affecting our naval bases in places like the Marshall Islands. What other of our U.S. naval facilities might be most severely impacted and what about that of our adversaries or what effect they are facing as well?

Mr. Ringhausen. From an adversary perspective, if you look at graphic in front of you, all of those Russian naval stations there are at least 20 meters above sea level. They have also built them back along the rivers, primarily so that they could place them on bedrock as opposed to the more erodible dirt at the entrance of those rivers. So they are unlikely to be affected by sea level rise. The shipping yards, the ship construction yards in -- near Arkhangelsk in the White Sea may be affected. The Russians haven't made any attempts to mitigate that that I know of.

From a U.S. Navy perspective on our own basing, I would defer that question to the Secretary of the Navy's Office or the CNO's office, sir.

The Chairman. And, Mr. Schoonover, where do you think the water may be weaponized by ISIS or al-Qa'ida? How can it be used as a weapon? And where are the areas where that is most likely to occur as conditions get hotter and drier?

Mr. Schoonover. Yeah. That is an excellent question. And I don't want to get too far out of the unclassified sphere. I would say that water being used or access to water being used to -- either as leverage against other populations or as a physical weapon, we would see this in large parts of water-stressed countries in Asia -- Middle East, rather. We have seen some of this from open press reporting in Iraq for example.

I think we could probably get a more exhaustive list, but we do see examples of this here and there through already stressed parts of the world.

The Chairman. Mr. Kiemel, I was fascinated to read, because it sounded like the stuff of science fiction, in preparation for the hearing today that there is work to I guess engineer climate, engineer rainfall that could be disruptive or could be weaponized. Can you tell us what the state of that technology is? Is this something that is still in the distant horizon, or is this already ongoing?

Mr. Kiemel. I am sorry who are you addressing?

The Chairman. Really any of you.

Mr. Kiemel. Sure. Well, there are unilateral efforts by countries and by some groups to test or deploy geoengineering. This is a largely theoretical field still, whether exploring how to moderate or impact climate change through such things as injecting aerosols in the stratosphere or chemically altering the reflectivity of clouds.

The authority of the actors to conduct such activities is probably going to be in dispute. What one country or one group does that is intended to affect itself can have a broader effect across national boundaries. So it is expected that this is the kind of thing that is going to lead to some disputes at some point in the future.

And it may be impossible to fully attribute outcomes to geoengineering activities, so rather than from natural variability or other emissions of greenhouse gasses, for example. So it will be in area where science is going to have a lot of disputes as well. And to the extent that this has national security implications -- because countries are disputing over which approaches work well; they are experimenting without some sort of international agreements in place or something -- you know, we are looking at this as a potential issue that has U.S. national security implications.

The Chairman. It seems like the weather-related version of the diversion of rivers that could affect relations between various countries.

Mr. Schoonover. Can I add to this?

The Chairman. Yes, of course.

Mr. Schoonover. I just want to make the point that there is a difference between conventional means that we might think of as weather modifications, such as cloud seeding, and climate geoengineering, which would effect long-term, large scale changes in the climate. So those two should be differentiated. The climate geoengineering techniques are roughly in two categories. Carbon dioxide removal, which would remove carbon dioxide and other greenhouse gases from the atmosphere, that is probably not very controversial from a national security perspective, but the other one, which would -- it is called solar radiation management, and it is intended or those techniques are intended to disrupt the absorption of solar radiation. And those could have significant transboundary effects. It may raise some interesting ethical questions. I think there is some amount of skepticism whether a single actor or a government or an individual would be able to implement these methods at a scale, in a long -- in a sustained scale to affect the global climate. And, you know, as I said the costs of this are still being figured out. It is probably much larger than we think to do long-time, long-term geoengineering. And one of the problems is, once you do that, it is very hard to quit doing geoengineering if you become reliant on it. And so that is one of the ethical questions that I was speaking about.

The Chairman. Thank you very much. I have just been informed that today is World Environment Day, so our timing for the hearing is good.

The ranking member, Mr. Nunes.

Mr. Conaway.

Mr. Conaway. Well, thank you, gentlemen. I appreciate you being here.

Mr. Ringhausen, I am trying to read your placemat. Can you walk us through the significance of the either on the sea ice mix, max versus minimum, two different dates?

What is the significance of that data to us?

Mr. Ringhausen. Yes, sir so the dark blue line is the sea ice minimum for September of 2018, the most recent minimum. And sea ice is really variable year to year. So I wanted to provide you just the last year. What you are seeing in this picture is solid sea ice so what you would need is you would definitely need an ice breaker to navigate that piece of geography.

What you don't see on this map because it would clutter it is, beyond that 100 percent coverage inside of that blue line, there are areas where you get 60 percent sea ice coverage, 30, 40, which you would probably also want an ice breaker or definitely need an ice-hardened-class ship to navigate.

Looking at the purple line, which is sort of at the edges of the map because the Arctic is entirely ice covered in the winter -- and the maximum ice is in March; the minimum is in September -- so what you see there is that you would need an ice breaker to navigate any of that in the March timeframe. So it provides sort of a rough seasonality in geography for current navigability in the Arctic.

Mr. Conaway. All right. So how has that changed over the last 50 years or 40 years, 30 years, whatever it is? Is it bigger, smaller, the same? What are we looking at?

Mr. Ringhausen. The Navy uses a figure of a per decade loss of 3 percent of maximum ice per year. And 13 percent of minimum ice per year. So what --

Mr. Conaway. Is that measurable, though? From the 1970 to 1980, could you not measure that? You said you are using an estimate of the loss?

Mr. Ringhausen. Yes, sir. It is measurable, and quantifiable, and it goes back to about those timeframes.

Mr. Conaway. All right. So, at least historically, you have relatively precise

measurements. But then looking forward, you are thinking 3 percent loss in max and 13 percent loss at a minimum? Is that what you are telling me?

Mr. Ringhausen. Yes, sir.

Mr. Conaway. And that tracks what has happened up to this point?

Mr. Ringhausen. Yes, sir.

Mr. Conaway. Okay. So Mr. Kiemel, you mentioned the difficulty in measuring impact of climate change on all other issues and all aspects of national security, social issues, migrations, all those things. You mentioned it was a relatively complicated model, with a variety of variables. Any chance how much more complicated that is than the underlying climate science modeling that goes on? Which is more difficult to model, the impact or whether it is going to happen or not, the climate change model?

Mr. Kiemel. From the IC's perspective, we are not doing the scientific modeling.

Mr. Conaway. Which one?

Mr. Kiemel. Sorry?

Mr. Conaway. You are not doing the scientific modeling on climate --

Mr. Kiemel. We are not doing scientific modeling of climate change. We are using the scientific modeling that has been done by U.S. Government agencies and other scientists to inform our judgment. So I really can't speak to that.

Mr. Conaway. Mr. Schoonover.

Mr. Kiemel. -- perhaps has a better sense of that. But it is not the IC's --

Mr. Conaway. I am just trying to get a sense of how complicated it is. I believe that modeling for climate change is relatively complicated.

Mr. Kiemel. It is extremely complicated.

Mr. Conaway. And it is still science, which means that that some of our colleagues from time to time say this science is settled, which to me makes a bit of an odd

statement because I don't think any science is ever settled in that regard. And so just trying to figure out a lot of conversation about the climatology scientific modeling, not a lot of conversation about the modeling you are doing. So I am just trying to get a sense of which would be more complicated and more speculation than the other.

Mr. Kiemel. And I would definitely agree with you, your previous point too that the other factors are very complicated and very difficult to model as well. To define precisely what percent of an impact climate change has had on one national security problem or another is difficult.

Mr. Conaway. Yeah. No, I got you.

Mr. Kiemel. So we look at overall trends --

Mr. Conaway. I am just trying to compare the two major modeling projects: climate change and the effect it has on everything else. Which model would be more reliable?

Mr. Schoonover. If I can jump in?

Mr. Conaway. Sure.

Mr. Schoonover. There are different types of models. One is a set of computer models that are used on some scientific assumptions, and one is largely an analytic model in which --

Mr. Conaway. Scientific assumptions would be on the climate change model?

Mr. Schoonover. It is scientific, but we wouldn't know how to code much of it into a computer, which is talking about societal variables and other biophysical conditions, and political conditions. They are all in a Gordian knot of conditions. So it is really difficult to model those things beyond general analytic framework.

Mr. Conaway. Thank you, Mr. Chairman.

I yield back.

The Chairman. Ms. Sewell.

Ms. Sewell. Thank you, Mr. Chairman.

So can we talk a little bit about how the IC assesses the approaching increased disease incidences that we see and whether or not we are prepared for the effect of diseases being weaponized in a way that would affect our national security? That is for anyone who would like to --

Mr. Schoonover. I will take a swing at it. The Intelligence Community has many highly qualified experts to talk about infectious diseases and global health. But I think this topic is a good illustration of how what constitutes national security has broadened over the years I think few would dispute that infectious diseases and pandemic potential, our national security concerns, and I actual see the topic of climate change going that same direction. And, really, we could spend an entire hearing on this topic. It is a giant topic. And so a very single simple direct answer to your question will be really tough, but let me answer your very first question about whether we are ready. I mean, arguably we are not ready for a lot of these factors, even without climate change effects, just due to the element of surprise of infectious diseases and the rapid onset of potential pandemics. But just looking at climate hazards and climate change hazards, some groups of people are especially susceptible to climate-sensitive health hazards, periods of extreme heat for example, young children, elderly, populations already experiencing social marginalization, and we could talk about a number of direct risks from flooding.

Ms. Sewell. In terms of global organizations like the World Health Organization, our participation or nonparticipation in the Paris accords, how are those types of things helping, affecting our ability to be prepared for these global risks that exist because of climate change?

Mr. Schoonover. I am not certain I have an answer to that since that strays into

policy descriptive language, but maybe, Peter, you can --

Mr. Kiemel. One of the broader points about dealing with these macro issues like climate change is it is not all about the potential threats to national security. It is also about opportunities to find solutions to them as well. And I think the chairman mentioned earlier rivers and disputes over the flow of rivers. Water disputes have historically been major bones of contention between states like India and Pakistan.

Ms. Sewell. Exactly. I guess what I am trying to figure out is that we can't solve this alone, that this is a global issue and a global threat. And to the extent that we as international actors play a part of that, I would think that it is about, you know, us working with our allies as well in getting prepared for these threats.

Mr. Kiemel. Yes. States working together to find solutions has been one of the reasons why water conflicts haven't really caused wars. They have actually led to actual engagement between countries that wouldn't actually engage with each other. So there are possibilities for that as well.

Ms. Sewell. And the other question I had, I wanted to just dig a little deeper on this geo -- what did you call it -- geoengineering. If you could tell us a little bit about that more. How does one engineer weather and the effects that that could have as a global threat?

Mr. Schoonover. So, just to make certain, we are really not talking about changing the weather; we are talking about changing the climate, the long-term average of the weather over a long period of time. So one technique that has been discussed is taking jumbo jets that are filled with something like sulfur dioxide, which is a known coolant of radiation, and to inject that into the stratosphere, which is the layer of the atmosphere that is above the troposphere in which we live with the intended effect of reducing the incident solar radiation that comes to Earth. That is the theory. There

are some computer models that are trying to assess.

Ms. Sewell. So are there some sovereign states that are -- that have -- do we -- I know it is theoretical, but it also could be practical. How are we in the IC trying to prepare ourselves against uses of advanced technologies like this?

Mr. Schoonover. So the Intelligence Community is trying to understand the global developments in geoengineering and trying to determine the risk factors. And so the IC itself isn't doing anything in the geoengineering space, but in terms of malice, yes, we are.

Ms. Sewell. It is pretty frightening that you could actually change climate that way. And one could see the possibilities of weaponizing something like that. It seems to me that we should be concerned about how we are mitigating advanced technologies in the area of --

Mr. Schoonover. I think it would be hard to think of ways to weaponize a geoengineering method because of its global reach. And its diffuse impacts would be -- I mean, you know, if you are talking about changing the weather in a more regional system, you know, that is a different set of topics, and I have high doubts about that from a scientific standpoint.

Ms. Sewell. Thank you, Mr. Chairman.

I know my time is over. But it is very interesting and thank you so much for having this public hearing.

The Chairman. Thank you so much.

My son just told me that sulfur dioxide was a part of his standardized test. So they are teaching about this in our high school, which is good.

Mr. Stewart.

Mr. Stewart. Thank you, Mr. Chairman, and to all of you for your presentation

today. And I am going to try to be brief because we are coming up on votes, and I want to give everyone a chance.

I commend you for -- and sincerely appreciate your comments in discussing something that is really a very emotional issue. I was talking with one of our staff earlier and said it is a little bit like talking religion, hard to make converts. It is a little bit like talking politics; there is a lot of emotion to it. And people seem to stake out their position and I think are fairly defensive of that generally.

I think you all, on the other hand, in a very reasonable way and a very unemotional way, I think presented a fair evaluation of the risks while also noting some of the uncertainties. Mr. Kiemel, in your opening comments and others as well, you talked about weaknesses and variables in the modeling, a very, very difficult thing to model, at least very difficult. I think maybe even a more aggressive description may be possible. You recognize that climate is extremely complicated globally, just in and of itself. And that human behavior in the future, you know, just trying to predict 40, 50, 100 years in the future is very difficult to do. And yet you at the same time have said these are the things that are worrying us and things that we are dealing with now and that we have to consider. And I agree with you on that.

I am curious, I am going to sidebar for just a minute before I get to my question, and that is, do you think that some of the predictions of the warnings, of some of the real dire emotional claims that we have heard over the last half generation or so -- for example, we have been told that we have got 12 years to fix this, or it is the end of mankind -- do you think that helps the conversation, or does it make it more complicated and emotional than perhaps it should be in this? Just a quick response to that, if you would, any of you.

Mr. Kiemel. I am trying to think about, from the national security implications of

climate change, what the -- how the conversation about climate change itself impacts us. And I think we try to separate ourselves from the politics on any given issue. Believe me, any issue related to national security has multiple sides to it. You know, we see that with policy debates, even within an administration, that go on, let alone cross across parties. So every national security issue has a debate associated with it.

Mr. Stewart. Well, let me simplify this. When you hearing warnings or emotional claims that turn out not to be true, does that help the conversation or not help it when we are trying it be unemotional and analytical about this?

Mr. Kiemel. That is where we try to put on our clear lenses and look at -- and then separate it from the emotional warnings. Look at just sort of, okay, how do we separate out what might be a national security implication from what might be an emotional argument or an argument about the science itself?

Mr. Stewart. And, again, I think that is what you all have done a fine job of doing today.

I am going to ask this question, and I have no idea how you are going to answer it. I am assuming that all of you have at least a TS security clearance. Is that right? You deal in a wide range of national security issues. Is that fair? I mean, you are experts on certain things, but you also have exposure and, in the course of your work, see other threats as well. Is that true?

Mr. Ringhausen. Yes.

Mr. Stewart. Peter, is that true for you as well?

Mr. Kiemel. Yes.

Mr. Stewart. If you tried to prioritize this, would you put this issue that we are dealing with today somewhere in the top two or three of the most urgent problems that we have to deal with over the next, say, 5 years?

Mr. Kiemel. I would be hesitant to talk about in an unclassified setting how we rank the competing threats. I will say that when we did the unclassified version of the Annual Threat Assessment this year, we intentionally say we don't put these threats in here in rank order. You know, we include the full range of threats. And we included in that threat assessment a discussion of this particular issue. So we do include it among the top issues.

Mr. Stewart. Okay.

Jeff or Rod, do you guys have a response to that?

Mr. Schoonover. Yeah, I think one of difficulties is the time scale of potential danger that, every year or every week, it would be hard to say how climate change effects globally are -- is as important as a whole range of other national security events. But if you integrate over time, you know, 20, 30, 40 years. I would be hard pressed to say that it is not in the top.

Mr. Stewart. Okay.

Jeff?

Mr. Ringhausen. I would say that it is not in the top of the Russians' national security priorities. In fact, they in some respects welcome climate change.

Mr. Stewart. As do some other nations as well, I suppose. I said I would be brief; turns out I wasn't. I apologize, and I yield back.

The Chairman. Mr. Quigley.

Mr. Quigley. Thank you, Mr. Chairman.

Mr. Kiemel, I think you said something akin to nations don't enter conflicts over waters or something like that.

Mr. Kiemel. Yeah, historically that has been a part of the solution to bilateral problems between rather states than a course of -- a cause of conflicts.

Mr. Quigley. Maybe the Six-Day War is an exception?

Mr. Kiemel. That was certainly a factor in that war of many.

Mr. Quigley. But don't you see many examples like that where desperate countries do things in an effort to secure their own situation and create conflicts because, if they are that desperate or there are age-old conflicts, as you discussed earlier, this exacerbates the situation and becomes the spark to dry kindling.

Mr. Kiemel. Yeah, I think this is why we are looking at this as a national security issue, as an intelligence topic, because while this has been largely the case heretofore, I think our concern is that, as droughts become more common, we are going to see rising disputes over water, driven by water. As natural disasters, you know, by flooding become more common, we are going to -- we are seeing this. And it is particularly evidence as water is a driver of internal conflict within countries. If you look at, I think I mentioned in my statement for the record, Mali as an example, just last month in Nigeria --

Mr. Quigley. In northern and southern California.

Mr. Kiemel. Precisely. There is a lot of internal conflict over water. And these places, like in West Africa in eastern Nigeria, for example, where you have water and draught as an issue intermixed with historic Tribal rivalries, historic religious rivalries, and ethnic rivalries, you have is water as a contributor to -- and an intensifying factor in those kinds of conflicts. And that provides opportunities for extremist groups, for terrorist organizations to take advantage of those conflicts to try and advance their interests as well.

Mr. Quigley. Thank you. If we have just for a few moments, sir, you were talking about the changes in the Russians' Northern Fleet. And you seem to minimize the abilities and changes that that will do, the changing ice patterns. Mr. Pompeo

warned in just this last month of the dangers of Russian and Chinese activities in the Arctic due to these changes. So could you spout as quickly as you can, if there are threats, military, what does it do for them besides make them more navigable? Is it easier for them to defend and not just get through things, but from a defense issue, not just protecting ourselves, but a threat to the U.S. and its allies, why does this change the ball game, if it does?

Mr. Ringhausen. I think, in most respects, the Arctic has been a closed off arena from a defense perspective for years. And now it appears that the ice there, the ice there is melting, and that is going to open up, from a Russian perspective, a threat vector to them. So they are going to -- but they have been fairly modest in their modernization. They are going to develop additional systems and capabilities across the islands, primarily for monitoring their --

Mr. Quigley. Is it simply that it makes it easier for them to defend their interests there, or how is it a greater threat to the U.S. and its allies, in more layman's terms?

Mr. Ringhausen. It is less a threat to the United States directly than it would be to our allies. Of the eight Arctic states, they are mostly NATO, Sweden and Finland being the exceptions, but also close allies. So conflicts that involve Russia and our allies in the region involve us. So I think that would be the threat.

Mr. Quigley. Again, is the main threat that they can move their shipping easier and it is easier for them to be aggressive?

Mr. Ringhausen. I don't think that is the threat. The shipping is very small and minuscule. I don't think it eases their ability to be aggressive. The fact that norms in the Arctic are now a question of governance and sort of establishing that governance opens the potentiality for conflict. But to date, Arctic nations have shown a good bit of restraint in being able to resolve these issues bilaterally.

Mr. Quigley. Thank you.

The Chairman. Dr. Wenstrup.

Dr. Wenstrup. Thank you, Mr. Chairman.

Thank you all for being here.

You know, on one side of the issue, we recognize that, in handling all of this, the U.S. can't do it alone. If the U.S. is acting alone to try and make change and to do things right, technology, et cetera, et cetera, in some ways, it is kind of like being in a nonsmoking section on a plane if we are the only ones who are doing it.

So we are going to go have to deal with this in a lot of ways and deal with the changes. I appreciated Mr. Quigley's question about what are other nations doing to their advantage? Are they taking opportunity or protecting themselves in some ways? But, you know, we also look at situations -- for some, farming becomes more difficult in this situation; for others, it may become more viable in other parts of the world. I think you mentioned something about new markets of fishing lanes and things like that that may open up as a result. And these are things to keep an eye on too. The point I am trying to make is, for some, there may be some good things and others, not good things.

But let's go to infectious diseases and things like that for just a second and epidemics that may be due to climate change because I certainly understand the change in water status and temperature and migration of certain animals may lead to diseases, animal or insects may lead to diseases that need to be dealt with. And I wonder if you could give me some examples that we should be concerned about, not necessarily just in the U.S. but around the world. And I will get to why I want to be concerned about how it is affecting other parts of the world.

Mr. Kiemel. Well, I had two points that I would make on this particular issue. I mean, there are -- one of these issues is warming trends, a combination with more

rainfall and flooding and its potential to increase the frequency of waterborne diseases.

Dr. Wenstrup. I mentioned that, but I just didn't know if there were any in particular that you were seeing or need to be predicting or to be ready for. I understand that. I said I understand waterborne, temperature, malaria, things like that depending upon the situation. I guess here is where I am going. Without going into examples, there is always an opportunity -- you know, part of intelligence is also being part of nation-building in a lot of ways. And I think the Continent of Africa was very grateful to the efforts made by President George W. Bush in bringing treatments for AIDS to Africa. So, if we see these things that we can't stop from happening necessarily, can we be on top of it and use it to our advantage to do some nation-building to be able to help from the medical side. You see a doctor in front of my name. You see where I am going her. So are there opportunities there for some things that we maybe can't stop to be the ones to be there to be of assistance to people as we try to nation-build?

Mr. Kiemel. Absolutely. And we are not alone as a nation I think in seeing opportunities to do that. The Chinese are also seizing opportunities to bring medical personnel into, for example, Africa and say, "We are from the Chinese Government; we are here to help."

Dr. Wenstrup. They also want their minerals at the same time, but that is another story. I would rather be on the right side of this.

Mr. Kiemel. But I think one of major papers just wrote something about the tsetse fly and any immunizations so that west -- so that eight nations in Africa can bring in higher producing European dairy cows that will have much higher rate of dairy production bring to them, so alleviating food shortages just because we were able to help them develop defenses against tsetse flies by changing the tsetse flies' threat to them. So that is a very good example of where the U.S. United States has opportunities to advance

its national security interests because of some of these issues.

Dr. Wenstrup. And I hope we continue down that lane. As these things occur that we may not be able to stop or control, let's be part of the solution for some of our friends and build good relationships in that way.

I yield back.

The Chairman. I thank the gentleman. I lost a friend last year to West Nile virus who contracted it in Los Angeles. Who would imagine you could contract West Nile virus in Los Angeles?

Mr. Heck.

Mr. Heck. Thank you, Mr. Chairman.

I want to thank the panel members for being here very much. I especially want to thank the chair for holding what I think is a very important hearing. It seems to me we are at the point where it is axiomatic that there are profound national security implications due to climate change. I am not sure there is a great purpose served by reiterating them, but the economic stresses, the impact, the arable land, water quality, food insecurity, the Arctic lanes, migration patterns, country destabilization, sea rise, et cetera, et cetera, et cetera. And it has been documented in frankly report after report. But here is my question. I think I want to start with you in the middle, sir. Within the Intelligence Community, whose job specifically is it to ask the questions, what are the implications to our intelligence gathering to the IC of climate change? And how is it that we should adapt to it? Whose job is it specifically to do that?

Mr. Kiemel. Across the Intelligence Community, there are various groups who have the responsibility for looking at this as one of the strategic issues that look at it. Within the National Intelligence Council, our Strategic Futures Group has done a lot of work on this, and so it is part of the annual program of analysis that the chair of the NIC

puts together to say, what are we going to be doing on this issue?

Mr. Heck. -- among a list of other things. There is no central point. It is within a broader framework, of which --

Mr. Kiemel. It is like some of the things like broader technological change and the way it is going to impact us. It affects us from a functional issue perspective, but it also affects each of the regional groups. So what the NIC has done and I think what other IC agencies have done is say, when we look at these crosscutting issues, how are we sure we are not creating gaps and seams in that? And the way that we do that is by ensuring that when we put together a program of analysis, that we are asking all of the right questions --

Mr. Heck. So, excuse me.

Mr. Kiemel. But --

Mr. Heck. That sounds like there is no place where the buck stops, frankly. What I didn't hear you say, for example, is if there is anybody specifically responsible for integrating climatological expertise with, for example, country-specific expertise so that we understand specifically what is happening in a region as a consequence of climate change that is of a national security implication that does then impinge upon our ability as an IC to operate effectively. I think this is a gap, frankly, in our ability to adapt. I think this is a gap in our ability to respond to this, frankly. And I think something needs to be done about it, and I am going to do something about it today, actually.

I am going to introduce the Climate Security Intelligence Act when we go offer on the floor in just about 1 hour. It is going to establish a climate security intelligence center at ODNI because I think the buck needs to stop somewhere. I think we need to be able to see, frankly, a sign on a door that says: This is where this activity has to be taken up. We believe it is enough of a priority that there is a focal point to it so that we

can in fact adequately respond to this challenge that we have, that is of major -- I am not going to rank order it in terms of all of other challenges, but there is no question that climate change is an existential issue for the global community. And so that is part of why I am so very glad that the chair called this meeting. And I want to not only express my appreciation to him for calling the hearing, but helping work with us in the development of this legislation and joining me as an original cosponsor. I want to invite any of the other members of the committee who believe that it is time to elevate this issue to join me in cosponsorship of this legislation because somebody needs to be responsible for asking these questions, integrating the answers so that, again, our national IC apparatus can be as effective as is possible in dealing with it.

I have got 19 seconds left to ask a longer question, but not unrelated is Nord Stream 2. If any of you have particular expertise, I would like you to respond to what kind of threat, if any, the successful completion of Nord Stream 2 posed to our national security.

RPTR FORADORI

EDTR SECKMAN

[9:30 a.m.]

Mr. Ringhausen. Nord Stream 2, the pipeline in the Baltics, sir?

Mr. Heck. Yes.

Mr. Ringhausen. I think largely it prevents -- it allows Russia to manipulate gas in Europe without affecting the Eastern European transit routes. So previously everyone was --

Mr. Heck. To weaponize fossil fuel?

Mr. Ringhausen. Essentially, sir. You could punish Poland, Ukraine, former Soviet, and former Warsaw Bloc countries without punishing Western Europe, Germany in particular in that --

Mr. Heck. I am way over time. Thank you very much.

The Chairman. Ms. Stefanik.

Ms. Stefanik. Thank you, Chairman Schiff.

Recently, the Defense Department released a report stating that there are vulnerabilities to 79 installations worldwide over the next 20 years due to climate change. Can you comment whether you feel that there are IC facilities at risk due to climate change?

Mr. Kiemel. I think we are better off talking about IC facilities in a classified setting. We can take that as a question for the record, if you would like.

Ms. Stefanik. Great. In terms of our partners, what are they doing to address potential challenges with our Intel capabilities when it comes to climate change?

Mr. Kiemel. Would you mind repeating the question, please? Sorry.

Ms. Stefanik. Other countries that we work with to gather intelligence, so our partners, our Five Eyes, for example, what are they doing to address the Intel capabilities, challenges stemming from climate change?

Mr. Kiemel. I am reluctant to say because that is not an area that I have looked at closely. So, again, I would appreciate the opportunity to take that as a question for the record as well.

Ms. Stefanik. Does anyone have an answer to that question? It seems like a fairly straightforward question as to what other nations are doing, particularly our Intel partners, when it comes to addressing climate change?

Mr. Kiemel. I am sorry. I just don't know.

Ms. Stefanik. Okay. So no answer to that question. I would look forward to getting that for the record because I think that is a pretty critical question to have an understanding of who our closest allies are, how they are addressing threats related to climate change.

Mr. Schoonover. Ma'am, are you -- just to clarify -- were you talking about our partners intelligence --

Ms. Stefanik. Yeah, our Five Eyes. Any best practices.

Mr. Schoonover. The intelligence agencies of the Five Eyes?

Ms. Stefanik. Correct. No answer? That is disappointing that we don't have an answer on that.

I yield back, Mr. Chairman.

The Chairman. Thank you. Mr. Castro.

Mr. Castro. Thank you, Chairman. You will -- one of you on the panel mentioned earlier the long-term effect of climate change and migration, and of course, around the world right now, there are 70 million people that are displaced from their

homes, much of that because of civil war, famine, and so forth. But I want to ask you about migration and climate change.

Can you explain for us how the IC assesses the intersection of migration and climate impacts, specifically with regard to Central and South America in the coming years?

Mr. Kiemel. Well, certainly climate-related hazards are contributing to global migration. And I think that is -- and in Central America, in particular, that is in combination with other factors like, you know, economic problems, bad -- low levels of governance and corruption and certainly high levels of violence and crime that are driving migration from Central America. And this is one of those areas where, you know, things like drought in Central America are worsening economic conditions, and whether that is a, you know, a global -- as a result of global warming or whether that is a result of just, you know, a series of weather -- changing weather patterns, drought has been a factor in some of these countries.

And that is -- it gets to the point that, you know, that what the solution to these problems is, you know, it is difficult to solve one problem without taking on sort of a holistic approach to solving all of them. So this is certainly a factor in Central America, but it is part of a range of factors.

Mr. Schoonover. And just to jump in. We have some amount of anxiety in the Intelligence Community to draw a really heavy causal link between environmental conditions in general to certain specific migration patterns. We look to the academic community to really suss out that from their standpoint. But oftentimes we will make general assessments, but I am not aware of an Intelligence Community assessment on that particular issue.

Mr. Castro. All right. I wanted to follow up with a question about the Arctic

Council. What types of climate disruptions or other factors might threaten the Arctic Council's efficacy to resolve disputes or other claims.

Mr. Ringhausen. For dispute settlement in the Arctic Council, it is -- so the Arctic Council operates on a consensus-based approach, so everyone has to agree. It is also chartered to not be a security form, too, so that limits its writ, but it is also solved essentially bilaterally for actual problem-solving. So, for what they have reached -- what the Arctic Council has done in and of itself, it has been ecological response, search and rescues initiatives, almost solely. So things that everybody can agree on, that oil spills are bad, and that we want to help people in distress. Disputes are settled bilaterally primarily.

Mr. Castro. There is intensifying interest, obviously, in that region, I mean, does it become tougher based on what you have discussed here today?

Mr. Ringhausen. I would say the problem has been the sort of general decline in Russian relations with the West has caused Russia to withhold its consensus in the last 5 and 6 years.

Mr. Castro. All right. I yield back, Chairman.

The Chairman. Mr. Welch.

Mr. Welch. Thank you. Thank you very much. You know, the role you are playing by bringing to our attention the effects of climate change obviously is very important, particularly given the political debate about its existence. But it seems to me that the two major security issues have to do with population displacement and migration and the stress that places on the receiving countries. And then, secondly, the internal dislocation that occurs when there is not enough food and leads to acceleration in destabilizing lack of governance.

And we have seen with what happened with the migrations in Europe and we

even see it here in this country with pressure from the triangle countries with people coming up here to escape violence and also economic insecurity, that it creates enormous pressure even on countries that are very mature with governance systems.

I will ask you, Mr. Kiemel, to comment on just what happens and the dynamic that happens from -- that is of concern to the security intelligence folks where the increasing -- the increasing lack of food, particularly in African countries, what that does in those countries and what the effect is on more mature countries where there is a perception among people who are suffering there that there is a refuge.

Mr. Kiemel. Yeah, it is really -- it really is -- it really is, as I earlier said, difficult to separate out the climate dimensions from all the other dimensions. So really you have to look at it, it is sort of an intensifier of the many other conditions that -- many other problems that -- internal problems that countries are facing that prompt these violent outbreaks between people and groups and prompt the migration. But, you know, to the extent that we see extreme weather events, such as floods or heat waves or severe tropical storms that are becoming more frequent, you know, that is adding more stress, and that is leading to an increased number, potentially, of displaced people. And that effect then is felt disproportionately in certain regions and other countries and then adds to stress in those countries.

We have seen, for example, you know, the migration from Syria, not necessarily climate-related, obviously, but migration itself causes stress in neighboring countries, Turkey and Jordan, for example, and then even across into Europe.

Mr. Welch. Thank you. You know, the National Academy of Sciences report in 2011 said for every degrees Celsius that the global thermostat rises, there will be a 5 to 15 percent decrease in overall crop production, which is obviously significant, particularly with the population expected to be about 10 billion by 2050.

There was a question I think the chairman asked early on about ISIS and al-Qa'ida, and it seems to me, and I am looking for your response to this, that the big advantage for groups like that is instability and the inability of a local government to be able to provide stability to an economic opportunity for its citizens.

So can you just comment, Mr. Ringhausen, on how that dynamic is an accelerant for extremist groups?

Mr. Ringhausen. Sir, I would say just, briefly, in the maritime realm, as ocean water has increased in temperature, it has driven fisheries north, and that has created some instability in food security. It is going to change industry and potentially affect subsistence level fishing in some Native communities. But I am not qualified to speak on extremist groups, sir.

Mr. Kiemel. Sir, I can jump in on that. Terrorist groups -- and I will refer back to my statement for the record on this. Terrorist groups have exploited natural disasters and water and food shortages in countries, including Iraq, including Nigeria where ISIS West Africa has exploited problems in northeast Nigeria, Pakistan, Somalia. They use this to -- you know, these problems that intensify problems in governance, for example, or economic problems, they use those to boost recruitment and support -- and their support among local populations.

And to the extent that these food and water shortages spark local conflicts, that also creates potential for the terrorist groups to move in and gain recruits or safe haven.

Mr. Welch. So essentially stability is bad for terrorism; instability is good?

Mr. Kiemel. That is right.

Mr. Welch. Thank you. I yield back.

The Chairman. Ms. Speier.

Ms. Speier. Thank you, Mr. Chairman. And thank you all for your participation

today. Dr. Schoonover, as the globe heats up, scientist assess that long-frozen microbes in the permafrost will be exposed, potentially carrying diseases to which no living human has natural resistance.

In a recent example in Siberia in 2016, a 12-year-old boy died and 20 other people were sickened with anthrax after a 75-year-old reindeer carcass thawed during a heat wave and infected local water supplies. What kind of strain could prehistoric germs place on global health systems and how could that impact our military readiness?

Mr. Schoonover. Thank you. That is a really good question. It is actually a really good illustration of a class of national security problems that I think of in terms of climate-linked surprise. If you had assessed ahead of time what the risk from thawing caribou from the permafrost would be, no one would have an answer, but once it presents itself, it makes sense.

So I don't really know what the level of exposure is, and you know, I would look to the scientific assessment on the prevalence of that. One of the things that it is sometimes hard to do is to separate anecdote from trend. But emergent diseases or re-emergent diseases from previously -- from frozen permafrost, for example, provided I think if it were recent enough, if it goes back too far, it might not have the degree of infectability on human beings, I am just speculating there, but I do believe that there is probably some emergent risk for humans and animals that humans depend on.

Ms. Speier. Thank you. Any other comments? This is for any of you on the panel. It is conceivable that a war between Vietnam and China could erupt in the South China Sea if the location of fish moved due to climate change?

Mr. Ringhausen. I think it is -- we would expect there to be tension as a result of moving fisheries. Many countries globally, not just in the high north, depend on fish as an important part of their diet. And so, as water temperatures have warmed, stocks are

moving north. We have seen types of fish further north than they have ever been seen. Cod near Xiamen island, the biomass across -- and Nome, Alaska, has increased over 500 percent from one measurement to another over 5 years.

So the fish are going to move to where they are comfortable, and that is going to create industry problems and problems between nations. I would be hesitant to speculate on a specific conflict as a result.

Ms. Speier. But conflict certainly will be in the offing as the waters warm and the fish population moves and food becomes scarcer, correct?

Mr. Ringhausen. Certainly, I think in my mind what I would expect is a country whose fish stocks were in their exclusive economic zone, now those fish stocks have moved to someone else's; you could find conflict as their fishermen move to get those same species of fish that their populations prefer. And so that would create a conflict, not necessarily between in the example you provided between Vietnam and China, but Vietnam and some country further north, for example.

Mr. Schoonover. May I jump in?

Ms. Speier. Certainly.

Mr. Schoonover. This is an illustration of what I was referring to in my opening statement about redistribution of animals and plants in the oceans and land. Those effects are almost certain to create new tensions across maritime domains. But one of the other really important pressures is the over-exploitation of fisheries, there are just fewer fish and more fishery vessels out on the ocean. And so sometimes it is hard to remove the climate signal, and, you know, we kind of bundle a lot of these stressors together.

But in terms of like whether a hot conflict will emerge between two countries, it is hard to assess. But I would imagine that the risk of tensions would be there.

Ms. Speier. Thank you. I yield back.

The Chairman. Mr. Carter.

Mr. Carson. Thank you, Chairman.

With respect to weapons proliferation in the context of global climate change and any possible political stability that follows, which States should we have our eye on? I would imagine it would be those States that face both political stability and legitimacy challenges in the wake of climate change, in addition to possessing adequate levels of weapons that could in turn lead to a proliferation scenario. Who should we keep our eye on in this regard?

Mr. Kiemel. The proliferation of weapons of mass destruction, the proliferation of conventional arms is a very real near-term threat, and the drivers for that I think are more near term in nature. And when we get at the national security implications of climate change, we are talking more strategic threats over time. So I am hesitant to say that climate is going to be a major driver of that. But just as I mentioned earlier where climate change is driving internal conflict, and internal conflict leads to challenges to governance, I would say that, you know, you have to think about that then, you know, where are there potential -- where are there potential for groups who would like to do things that are bad, like terrorists or proliferators of weapons of mass destruction or other things, to do things, you know, to do bad things.

And the list of places that have both real high climate challenges and real high levels of things that we have to worry about, like North Korea or Iran, are -- the overlap between those isn't really great. So I would try and separate out the climate change from the broader challenge that we face.

Mr. Carson. Would India and Pakistan be a part of that conversation as well?

Mr. Kiemel. I am sorry. Say that again, please.

Mr. Carson. Would India and Pakistan, would those two be a part of that conversation?

Mr. Kiemel. Yes, I would say.

Mr. Schoonover. Again, just trying to avoid some kind of causal link that climate change will produce instability and, therefore, some kind of concern in terms of weapons of mass destruction, but I would say that India and Pakistan are nuclear capable countries that are also, in the views of some, highly fragile states with large populations in high climate exposure areas.

What the outcome of that exposure, you know, there is a lot of randomness, and there is a lot of human choice, but I think the committee should be aware that there is a known source of tension between India and Pakistan over water. The degree to which climate change affects that tension through the Indus River system, I think is a point of concern, and it is something that the Intelligence Community has often cited in our annual threat assessments as a place to watch.

Mr. Carson. Any additional statements? All right. Thank you, Chairman.

I yield back. Thank you, gentlemen.

The Chairman. Mr. Himes. I know we have another of our committee members on the way, but we are going to be -- should be able to wrap up before votes.

Yeah, Mr. Himes.

Mr. Himes. Good morning, and thank you for being here. I wanted to follow up on something that has not come out perhaps as much as it could this morning, which is takeaways this committee might have, particularly as we think about budget and structure and architecture within the IC. This is obviously a threat over a very long period of time, across a lot of geography. I suspect that 10, 20 years ago, the IC was not thinking much about it, so this is sort of an expansive freeform question. But what

should we as overseers, as authorizers, be thinking in terms of both opportunities we might take within the budget, but also perhaps under-addressed threats, other things we should be thinking about as we think about structure and funding for the IC?

Mr. Kiemel. As we discussed with Representative Heck, this is -- you know, this is an issue where there is broad coverage in the IC, but, you know, a centralized focus for it is difficult to point to, and you know --

Mr. Himes. I am sorry to interrupt, but have you by chance had a chance to review Mr. Heck's bill?

Mr. Kiemel. I am sorry. If we are going to talk anything related to the budget, I think we should probably take it as a question for the record. But I do want to point out that our -- the IC's assessment of these issues does go back a couple of decades at least. As the Chairman pointed out at the beginning, we were doing things on this issue already. We were doing assessments on this issue already in the early 1990s, and we produced a National Intelligence Estimate, our first one on this, already in 2008.

Mr. Schoonover. If I can join in. So one of my prior positions at the National Intelligence Council was the Director of Environment and Natural Resources where I oversaw the long-range analytic work on environmental and natural resources, including climate change. And just speaking from a nonbudgetary analytic standpoint, I think one of the things that would help the Intelligence Community in its analysis is assistance in breaking down some of the silos in the U.S. Government.

We would love, from a scientific standpoint, to be able to better access the data and findings and analysis from our partner U.S. Government agencies like the Department of Energy, and NASA, and NOAA, and the U.S. Global Change Research Program. I think we -- to the extent that the authority of the Intelligence Community can inform the research direction of both academic work and also work that is sponsored by the U.S.

Government, there is a lot of scientific and other questions that we need quite a bit of help with. There are a lot of unknowns.

There are unknowns in the climate part of the equation to some degree. Really, in terms -- and it was a prior question that was asked before. Really in terms of the impacts and especially how different climate-linked hazards intertwine, I think -- and multiple and maybe compound. I think there are large standing -- longstanding analytic questions that we have difficulties in assessing.

Mr. Himes. So, Doctor, let me push on you that. I like Mr. Heck's idea, but my guess is it is not an organization that is going to be stood up tomorrow. So, in my last 30 seconds or so, I am interested to hear that there are barriers -- you have said barriers between the IC, NASA, NOAA, Commerce, et cetera, are those barriers informal, or are there bureaucratic barriers that prevent you from getting the data you need?

Mr. Schoonover. They are not formalized barriers. They are largely ad hoc. You know, if I happen to know some folks in the water team or in the long-term weather prediction team at NOAA or NASA, that is how those relationships often work. You know, I wouldn't claim that there are barriers, but there are a few enablers.

Mr. Himes. So some form of congressionally nudge would be helpful to focusing attention and making --

Mr. Schoonover. Well, I will be agnostic on that. That is up to you. But I would say that just from that --

Mr. Himes. But just so I can be clear on this, the issue is not that there are rigid barriers. It is just this is sort of a new concept, and so the communication is informal. Is that correct? So if we were to --

Mr. Schoonover. That is correct, for much of the Intelligence Community. The Intelligence Community has 16 components, so I don't want to speak for every single

component, but generally, yes, the relationship is fairly informal and really depending on person to person.

Mr. Himes. Thank you. I yield back, Mr. Chairman.

The Chairman. One of the things I mentioned in the opening statement was the MEDEA program that had existed at one time and then got out of existence and came back into existence. Mr. Schoonover or Dr. Schoonover, did you participate in that MEDEA program or any of you go back to those days, and how did that work, and should that be resurrected?

Mr. Schoonover. That is a great question. And my service to the government started in 2009, well after MEDEA was in place. But I was quite familiar with the MEDEA program and the scientists. And whether that program should be reinitiated, you know, that may be a question for other people in the Intelligence Community. But what I would say is that ideally we could, to some degree, have those capabilities within the U.S. Government without necessarily having to go outside to the academic community, which is who the MEDEA program was largely built from. And that is kind of what I was talking about before with the silos. Ideally, our preferred sources are U.S. Government sources. We would prefer not to wait until some compendium of findings are published, and we would prefer to go right to what we consider the most trusted scientists in the world, and they are sitting in our own government.

Again, there is nothing -- there is nothing really preventing this, but it is not highly enabled.

The Chairman. You know, one of the benefits, as I understood it of MEDEA, was that, you know, we might have classified imagery of the Earth from NGA or elsewhere that could help inform climate scientists about changes that are very graphic. So that would be one benefit, I assume, of not doing it all inhouse, sharing of information, but it

sounds like there is also a need to have better sharing within the government and cultivate the experience that is already there.

Mr. Schoonover. Yeah. And I can let my cowitnesses jump in here. But one of the things that, just from the Intelligence Community analytic standpoint, the questions that we get from policymakers, we don't usually get to wait for more information to come in. Our assessment is due in 3 days or 3 hours, and so -- and increasingly the questions that are posed to the Intelligence Community, particularly on climate change, often require some technical capacity. We can't -- we often don't have that capacity internally to the Intelligence Community on evolving concerns.

So it would be beneficial to turn to the proper experts in the government who have the timely information that may not actually have been produced in an academic paper or in some other kind of consensus reporting that may come out a year later or 2 years later. The academic -- you know, the assessment, you know, the packaging of information is on a different timeline than the Intelligence Community's analytic framework.

The Chairman. Thank you. Any other witnesses that want to comment? Any of my colleagues want to ask any last questions?

Mr. Ringhausen. I would say, sir, from a Navy intelligence perspective, the National Ice Center, which is part of NOAA, under the Department of Commerce, is literally right across the street from where Navy Intelligence is essentially -- most of its manpower is. And it is an interagency organization led by the Navy in partnership with NOAA and the Coast Guard, so that is where we go for our ice and our and maritime information and we work with them.

And for the question of -- I haven't -- the question of -- earlier about -- Mr. Himes' question about authorization and those things, in respect to Mr. Heck's bill, the drivers of

maritime climate change to national security are going to be economic. So having economic analysis and thought baked into that would be important because that is going to be the preceding indicator of military issues.

The Chairman. Thank you.

Any further questions from my colleagues? All right.

Well, I want to thank the witnesses for the testimony today, and we are adjourned.

[Whereupon, at 10:00 a.m., the committee was adjourned.]