

**U.S. COAST GUARD CAPABILITIES FOR
SAFEGUARDING NATIONAL INTERESTS AND
PROMOTING ECONOMIC SECURITY IN THE ARCTIC**

HEARING

BEFORE THE

SUBCOMMITTEE ON SECURITY

OF THE

COMMITTEE ON COMMERCE,
SCIENCE, AND TRANSPORTATION
UNITED STATES SENATE

ONE HUNDRED SIXTEENTH CONGRESS

SECOND SESSION

DECEMBER 8, 2020

Printed for the use of the Committee on Commerce, Science, and Transportation



Available online: <http://www.govinfo.gov>

U.S. GOVERNMENT PUBLISHING OFFICE

WASHINGTON : 2023

SENATE COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

ONE HUNDRED SIXTEENTH CONGRESS

SECOND SESSION

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TUESDAY, DECEMBER 8, 2020

U.S. SENATE,
SUBCOMMITTEE ON SECURITY,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
Washington, DC.

The Committee met, pursuant to notice, at 2:30 p.m., in room SR-253, Russell Senate Office Building, Hon. Dan Sullivan, Chairman of the Subcommittee, presiding.

Present: Senators Sullivan [presiding], Wicker, Cruz, Lee, Young, Scott, Markey, Cantwell, and Blumenthal.

**OPENING STATEMENT OF HON. DAN SULLIVAN,
U.S. SENATOR FROM ALASKA**

Senator SULLIVAN. This hearing will now come to order. I am pleased to welcome our distinguished witnesses today as our subcommittee focuses on the capabilities of the United States Coast Guard for safeguarding our national interests in the Arctic region. We will be having two panels today. First, we are pleased to have the Vice Commandant of the United States Coast Guard, Admiral Charles Ray. He has been doing an outstanding job in his position.

And then our second panel will be of experts. Major General Randy Kee who will be remote, as well as Stephanie Madsen, Executive Director, At-Sea Processors Association from Juneau, Alaska. And Dr. Jennifer Francis, also coming via remote means, is a Senior Scientist at the Woodwell Climate Research Center in Falmouth, Massachusetts. Last year, this subcommittee held a hearing that focused on the Arctic strategy released by the Coast Guard in April 2019. That strategy prioritizes three lines of effort, one of them being the need to enhance our capabilities for operating in the Arctic through persistent investments in infrastructure, assets, and personnel needed to close gaps in presence, particularly given our rivals in the Arctic—China and Russia—communications and domain awareness in this region of growing global focus.

Today's hearing will focus on those needed investments in our Arctic capabilities, progress that has been made in obtaining them, and the vital work that still needs to be done. The Arctic has shifted from an area of cooperation to the next region of great power competition with our near, peer competitors, China and Russia, outpacing the United States in the development of ice capable ves-

sels and investments into Arctic infrastructure. The U.S. only has two polar icebreakers and a fire aboard the HEALY this summer has put half of America's polar ice breaking fleet temporarily out of commission.

As a result, the POLAR STAR is now America's only operational icebreaker, while Russia has approximately 54. This gap in capability creates space for Russia and China, which now has more icebreakers than we do, to exert maritime influence in the Arctic, which they are trying to do, and amplifies our existing vulnerabilities for vessel traffic, safety and security, maritime law enforcement, fisheries, resources management, search and rescue, and environmental response.

We have seen Russia push all-in on controlling the Arctic. Russia has opened 16 deep water ports, 14 airfields, built Arctic military bases, and even formed a new Northern Arctic Command. In fact, Vladimir Putin has referred to the Northern Sea route as the new Suez Canal, which he says Russia intends to fully control. He has made major military investments to secure this route for Russia, and his Government has even threatened to sink foreign vessels that do not have a Russian pilot on board or a Russian escort vessel.

In recent months, Russian provocation has only increased. The Russian navy conducted its largest war game exercise since the Cold War near Alaska. This exercise extended into the U.S. exclusive economic zone. Our commercial fishing fleet encountered a frightening situation in close proximity to a number of fishing vessels and directed them to immediately depart their legal fishing grounds. These were Russian warships, pictured here, and this graphic provided by the Coast Guard shows the locations clearly within the U.S. exclusive economic zone where our fleet was legally fishing when the Russian warships and aircraft, including submarines, pictured here above, ordered our fleet to leave the area.

Without persistence—persistent U.S. presence in the Arctic, we risk leaving an opening for these types of aggressive actions to continue. Recognizing the importance of these critical gaps, Congress has already made steady progress toward authorizing needed investments. Currently, the closest U.S. deep water port to the Arctic is Dutch Harbor on Unalaska Island, which is 1,000 miles from the Arctic Circle, not very close. In May, the Senate committee on the Environment and Public Works, on which I sit, passed the America's Water and Infrastructure Act, advancing the long needed Arctic deep draft port at Nome, Nome, Alaska as the first in what we believe needs to be a series of strategic Arctic ports. That is a major step forward for our Nation and protecting America's interests in the Arctic. The port Nome will not only be a critical component for Arctic maritime transportation, it will serve as a staging area for search and rescue, pollution response, and security operations with the Coast Guard and the Navy.

In June, the President weighed in on the importance of acquiring a polar security ice breaking fleet that can project persistent presence in the Arctic with the release of the President's memorandum on safeguarding U.S. national interests in the Arctic and Antarctic regions. This Presidential memo adds weight to the efforts in Congress to authorize and fund new polar security cutters. Two years

ago, I was able to authorize—get authorization in the NDAA for the construction of six polar class security cutters to start building our icebreaking fleet. We have followed up with the funds to build the first, and we are working on appropriations to secure the second, appropriation funding for the second polar class icebreaker.

I am disappointed, however, in what I believe is the Coast Guard's lack of strategic vision for where to homeport these new icebreakers. While making sure there are budget imperatives and plans for grouping similar assets together in fewer locations for cost savings, I believe this is not something that should override the operational imperative to base Coast Guard resources and cutters close to where their mission is. That is what the President's memorandum asked for, particularly as the Arctic has emerged as a critical area for great power competition, and the ice breaking vessels we are building and will likely be—we will be leasing, need to be able to operate and be stationed near the Arctic or in the Arctic where the action is.

I have just spoken to the National Security Adviser, Ambassador O'Brien, and I believe he shares similar views on these issues. These investments in our Arctic capabilities will help ensure that the United States does not cede any more ground in this strategic location. Without further investment in our polar capabilities, our adversaries influence will grow. And if that happens, we risk our ability to protect U.S. vessels, conducting commerce, to enforce international law, and to defeat threats to our National Security. With that, I want to thank our witnesses for participating in our hearing today to discuss this very important topic. I now want to recognize the Chairman of the Committee, to see if he has any opening statements, and then I will turn to Ranking Member Senator Markey. Chairman Wicker.

**STATEMENT OF HON. ROGER WICKER,
U.S. SENATOR FROM MISSISSIPPI**

The CHAIRMAN. Well, thank you, Chairman Sullivan. And I think it is noteworthy that we are having a hearing on the Arctic, and it is about 62 degrees in this hearing room. I don't know how our capable leadership managed that, but I think it is very appropriate and maybe we need to have a hearing about the tropics next time, but in all seriousness, great to have Admiral Ray back with us and the other distinguished panel.

And thank you, Chairman Sullivan, for your leadership on this important issue. Access to the Arctic's vast energy, mineral, fisheries, and other commercial resources is expanding and international competition for these assets is intensifying, as the Chair has just so ably stated. America's two nearest peer competitors, Russia and China, have both declared the region a national priority and have made corresponding investments. By contrast, U.S. investment in the Arctic infrastructure and capabilities has not kept up with our economic and National Security interests, and I want to be a teammate of our subcommittee Chair in rectifying that discrepancy.

The U.S. Coast Guard is on the front lines of strategic security competition in the Arctic. The Coast Guard has operated the Arctic since 1867 when, through the foresight of Secretary of State Wil-

liam Seward, America purchased Alaska from Russia. The Coast Guard's diverse set of Arctic missions includes search and rescue, enforcing laws and treaties, environmental protection, facilitating commercial trade, and protecting National Security. The Coast Guard's icebreaker fleet acts as the Nation's principal tool to conduct many of these critical missions. And I have to stretch to call it a fleet. The current icebreaker fleet is well past its service life and in dire need of replacement.

Long standing concerns with the icebreaking fleet size and age were underscored on August 18, 2020, when the Coast Guard cutter HEALY, a medium polar icebreaker, suffered an engine fire forcing the ship to return to her home port in Seattle. That fire has left the Coast Guard operating with a single icebreaker, the POLAR STAR, until the HEALY can be repaired. During a visit to Alaska hosted by the distinguished Subcommittee Chairman in August of last year, just before the fire, Admiral Ray and I flew out and landed on the HEALY in the Arctic. So I have witnessed firsthand the critical capabilities of this vessel and of its dedicated crew.

The HEALY fire, combined with recent aggressive Russian naval exercises in the Arctic, demonstrates the need for more U.S. icebreakers. The Coast Guard will now have to stretch the service life of the POLAR STAR, the Nation's only heavy icebreaker until 2023, extending its lifetime to nearly 50 years, well beyond the intended 30 years. In stark contrast to the American fleet, Russia currently has 4 heavy nuclear powered icebreakers and 11 medium icebreakers, with 3 more under construction and 11 additional icebreakers planned in the next decade. The Coast Guard has stated repeatedly that it requires at least three heavy and three medium polar icebreakers to fulfill its ice breaking mission.

The Coast Guard has awarded a contract for the first three heavy polar security cutters, and we hope there will be more to come. And if I have anything to do with it, I want to be a teammate with our distinguished subcommittee Chairman in that regard. But in addition to new vessels, we need shoreside facilities, piers, and support personnel to sustain a fleet of polar security cutters. So we have our work cut out for us. I hope our witnesses will underscore the need to prioritize and accelerate the polar security cutter acquisition program. Icebreaking capacity and supporting infrastructure are just two of the many challenges facing the Coast Guard in the Arctic.

On that visit to Alaska with Senator Sullivan, I spoke to the Coast Guard service members at Air Station Kodiak and aboard the Coast Guard cutter DOUGLAS MONROE about their role in protecting our ocean environment and marine life. The Commerce Committee is working to help the Coast Guard promote fisheries development and force our fisheries laws in respond to fisheries disasters. Alaska and my State of Mississippi may be thousands of miles apart, but we share a major interest in fisheries and the Coast Guard is protecting them every day.

We hope to address these and other challenges in the Coast Guard Authorization Act, legislation co-sponsored again by our distinguished Subcommittee Chair Senator Sullivan, which we are op-

timistic will pass in the next few days. I look forward to this discussion. Thank you, sir.

Senator SULLIVAN. Well, thank you, Mr. Chairman. And I believe Senator Markey is having a bit of an issue getting on the video here. So we are going to—

The CHAIRMAN. I think the equipment is frozen up.

Senator SULLIVAN. We are going to go directly—we are going to go directly to Admiral Ray for his opening statement. And I do want to mention, Mr. Chairman, with you and the Admiral's help, right now, it is looking like the NDAA is going to have the Coast Guard Authorization Act. This has been a goal of mine since I got here to pair those up. I think it is a good precedent that hopefully won't be a one-time occurrence this year, but something that we can look at doing every year. And I know the Coast Guard has been supportive of that as well. So that is good news. Admiral Ray, you have been doing a fantastic job in your role, and I look forward to your testimony in 5 minutes, oral testimony, and if you have a longer written statement, we would be glad to put that in for the record. Floor is yours, sir.

**STATEMENT OF ADMIRAL CHARLES W. RAY,
VICE COMMANDANT, U.S. COAST GUARD**

Admiral RAY. Good afternoon, Chairman Sullivan, Chairman Wicker. Thank you for having me here. And before I get started, Mr. Chairman, on behalf of the Commandant and on behalf of all the men and women of the United States Coast Guard, we pass our sincere condolences as you mourn the passing of your dad.

Senator SULLIVAN. Thank you very much.

Admiral RAY. Yes, sir. I want to thank you all for your unwavering support to our service and for this opportunity to update you on the Coast Guard's efforts to protect American sovereignty, promote economic prosperity, and expand American leadership across the Arctic. The rapidly changing physical, operational, and geostategic Arctic environment is driving increased activity in the region and with it increased risk across the maritime sector.

While our mission in the high latitudes have evolved since 1867, our commitment to the region has not. We are leaning forward to address the safety and security of our Arctic residents and the Mariners who make their living there, home porting—by home porting new offshore patrol cutters, fast response cutters, investing in Alaska real estate infrastructure, and prioritizing our operations in the region. The Coast Guard is also deeply concerned about the rising strategic risk to our Nation as China and Russia compete for diplomatic, economic, and strategic advantage in the Arctic. Both nations have publicly declared the Arctic a strategic priority and they continue to make significant investments to advance her own interests. Russia continues to invest heavily in icebreakers and Arctic infrastructure, better positioning themselves to shape the security and geopolitical environment in the region. They are focusing on developing the national resources, expanding their icebreaker fleet, and imposing strict governance on the Northern sea route.

I am especially troubled by Russia's recent military exercises in the Bering Sea that the Senator referred to. In late August, they

conducted a live fire exercise in an area that extended into the United States' exclusive economic zone, as is shown on the chart. Their irresponsible execution of this phase of their exercise created confusion and potentially unsafe interactions with American vessels legally fishing in our EEZ. Our long standing operational relationship with the Russians enabled us to, kind of through a red phone type scenario, cut through the red tape, and let them know of our concerns and what was going on that day.

As you know, Senator, we sailed ALEX HALEY up there to investigate and provide awareness. However, I am disappointed that Russia chose to push the boundaries of responsible behavior in the Arctic and in doing so, put Americans at risk. China also aspires to assert influence across the Arctic, leveraging economic investments, and natural resources, and infrastructure, and expanding their icebreaking fleet. This summer, they launched the Xue Long 2, which operated in the high Arctic. China has announced plans for two additional icebreakers, threatening to outpace our icebreaker building program.

The casualty, as Senator Wicker mentioned, a Coast Guard cutter HEALY this summer demonstrates our Nation's lack of capacity for icebreaking and emphasizes the critical importance of the Coast Guard's posed security cutter fleet. As was stated, we will begin construction of the post's security cutter in 2021 and it would be the first time we have done this in over 40 years. We have contracted with Halter Marine in Mississippi to design and buildup to three polar security cutters, and we appreciate the continued support from Congress and this committee, in particular, to build the next generation of assets.

Our Coast Guard's Operation Arctic Shield continues to be the primary operational means of protecting and executing our sovereign rights and responsibilities in the U.S. Arctic. Our flexible expeditionary approach has never been more important. As Alaska cruises were canceled this summer due to the pandemic, we redirected resources to conduct additional patrols to monitor foreign research vessels, and to enhance policing of our maritime border with Russia. For the first time since 1984, as you know, the Coast Guard will conduct operations North of the Arctic Circle during this winter. When the National Science Foundation, as a result of a caution for the pandemic, decided they did not want to send POLAR STAR to McMurdo in Antarctica, we immediately came up with a different sale plan for her, and she is underway as we speak today, straight to Juan de Fuca, heading North toward Dutch Harbor and then further up into the Arctic.

I think this demonstrates the Coast Guard's agility and the importance of the polar security cutters, the need for a larger icebreaker fleet to persistently safeguard our Nation's economic and national security interests in the high latitudes. While we are focused on protecting sovereignty in our U.S. Arctic, the Coast Guard is also working to build partnerships across the Arctic. This summer, we deployed—this past summer, we deployed two medium endurance cutters to participate in search and rescue and military exercises off of Greenland, operating with our allies Denmark, France, and Canada.

We worked to establish the things that you do when you exercise together. Never has Coast Guard leadership been more important in the Arctic than it is right now, as we shape the region as a safe, cooperative, and prospective domain for all. You have my commitment, the commitment of our Commandant, and that the Coast Guard will continue to exert all efforts to meet this challenge.

Thank you again, Senator, for this opportunity. I look forward to your questions.

[The prepared statement of Admiral Ray follows:]

PREPARED STATEMENT OF ADMIRAL CHARLES W. RAY, VICE COMMANDANT,
U.S. COAST GUARD

Introduction

Good afternoon Mr. Chairman, Ranking Member, and distinguished Members of the Subcommittee. It is my pleasure to be here today to discuss the Coast Guard's role and activities to advance national security priorities across the Arctic Region. This effort includes safeguarding U.S. sovereignty and executing our national responsibilities while effecting safe, secure, and environmentally responsible maritime activity.

The U.S. Arctic remains particularly dynamic, evolving environmentally, operationally, and strategically. Environmental changes, combined with the tyranny of distance and limited infrastructure, exacerbate the harshness of the operating environment. The types and levels of commercial activity are also transforming, from a surge in oil and gas exploration a few years ago to increases in vessel transits and expansion of environmental tourism. These alterations in types and location of activity, along with the changes in the physical environment, coincide with the re-emergence of great power competition across the globe which are exemplified in the Arctic. The importance of, and demand signal for, Coast Guard's services and leadership have never been greater as these dynamic challenges magnify U.S. national security interests across the Arctic.

National Security Drivers Across the Arctic

The actions and intentions of Arctic and non-Arctic nation states continue to shape the security environment and stability of the region. The geopolitical environment is evolving as state and non-state actors seek to advance their own interests in the Arctic. Allies, partners, and competitors increasingly contend for diplomatic, economic, and strategic advantage and influence. Russia and China exemplify that competition. Both have declared the Arctic a strategic priority; both have made significant investments in new or refurbished capabilities; and both are exerting direct or indirect influence across the region.

Russia's expansive Arctic has the potential to support naval fleets readily deployable between the Atlantic and Pacific Oceans. This region also represents significant economic opportunities, such as oil and gas extraction and development and attempted control of the Northern Sea Route for trans-Arctic shipping. As such, Russia continues to plan and expand its capabilities and capacity to influence and surge throughout the Arctic. This year, Russia launched the first in a new class of nuclear-powered icebreakers, which they sailed to the North Pole. In addition to continuing the expansion of its extensive icebreaker fleet, its renewed capabilities include air bases, ports, weapons systems, domain awareness tools, and search-and-rescue stations. Furthermore, Russia recently established an inter-agency commission of the Russian Security Council focused on ensuring Russian national security interests in the Arctic. Finally, Russia recently completed Exercise Ocean Shield 2020, a multi-theater exercise involving participation by both its Pacific and Northern Fleets and including maneuvers in the Northern Bering Sea and Arctic approaches. Through this exercise, Russia extended its operations into the U.S. exclusive economic zone and interfered with the safety and sovereignty of the U.S. fishing fleet, indicating a willingness to push the boundaries of acceptable, responsible behavior and governance.

China continues to aspire to assert influence across the Arctic including pursuit of economic investments in key strategic areas such as rare-earth elements, oil and gas development, air and sea ports, railways, and infrastructure to further its strategic objectives. Last year, China launched its first domestically-built icebreaking vessel, the Motor Vessel XUE LONG 2, which operated in the Arctic this year, including taking a sediment core sample while operating on the waters over the

United States' extended continental shelf. China is also designing an even more powerful polar icebreaker expected to have twice the icebreaking capability of XUE LONG 2. With three icebreakers, China could outpace U.S. icebreaker capacity and polar access by 2024. The primary concern with Chinese activities in the Arctic is the potential to disrupt the cooperation, stability, and governance in the region for both Arctic and non-Arctic states.

Coast Guard Leadership in the Arctic

The Coast Guard has shaped and influenced national security in the Arctic for over 150 years. This effort includes asserting the Nation's sovereign rights, upholding our sovereign responsibilities from the strategic to the tactical level, and countering malign influence that is contrary to U.S. values and international rules and norms. The Service's missions have evolved along with the evolution of the physical, operational, and strategic environments.

As the only U.S. Armed Force with both military and law enforcement authorities, combined with membership in the Intelligence Community, the Coast Guard seamlessly shifts between mission sets utilizing multi-mission personnel and assets. Specifically, the Coast Guard's constabulary functions and broad authorities serve as a critical bridge between the hard-power lethality of the Department of Defense (DoD) and soft-power diplomacy of the State Department. These characteristics enable the Service to cultivate strong international relationships and build coalitions among Arctic partners based on mutual interests and values that strengthen national security and regional stability while enhancing safety, maritime governance, and prosperity across the region.

Where strategic goals align, the Coast Guard works closely with the DoD to ensure efficient operations. The Coast Guard is a member of the Arctic Security Forces Roundtable, a EUCOM-sponsored multi-national group concerned with Arctic security issues, including maritime domain awareness. We work closely with NORTHCOM through the Arctic Capabilities Assessment Working Group, which was created to identify potential collaborative efforts to enhance Arctic capabilities in communications, maritime domain awareness, and presence. The Service's role as a member of the Intelligence Community offers a natural nexus for broad intelligence and information sharing, as appropriate, to counter nefarious actions in the Arctic and throughout the world. These efforts are only a few examples of partnerships between the Coast Guard and DoD.

This year, Arctic operations and engagements have faced unique challenges and interruptions, mostly due to the global pandemic of COVID-19. However, because of these challenges and the growing strategic imperatives across the Arctic, the Service has adapted operations to meet the Nation's mission demands. The following highlights some of these initiatives that have particular impacts on the Nation's readiness as well as national and international security.

Advancing Safety and Security in the U.S. Arctic

Operation ARCTIC SHIELD is the Coast Guard's year-round planning and operations effort that incorporates an expeditionary approach for deploying resources and conducting integrated operations to meet statutory mission demands, buy-down maritime risk, and advances national security objectives through maritime operations in the United States Arctic. ARCTIC SHIELD 2020 objectives included advancing national and Coast Guard strategic goals; enhancing capabilities to operate effectively in a dynamic Arctic; strengthening the rules-based order; and innovating and adapting to promote safety, resilience, and prosperity. An emergent priority was to protect Arctic residents by not transmitting or contracting COVID-19 while conducting missions. The pandemic imposed challenges on engagements and presence, both in communities and across the maritime domain, but has also presented other opportunities to broaden Arctic experience, training, and operational readiness to safeguard the U.S. Arctic.

The Coast Guard conducted additional, unscheduled patrols in Arctic waters this season with CGC HEALY, CGC ALEX HALEY, and CGC MUNRO. With these patrols, the Service monitored foreign maritime activity, including the Arctic deployment of the XUE LONG 2; enhanced monitoring and enforcement of maritime activities including commercial fishing in the United States exclusive economic zone and along the maritime boundary line with Russia; supported other U.S. marine scientific research; and protected U.S. sovereign interests. This activity included a joint patrol with a Russian Border Guard vessel along the U.S./Russian maritime border that highlighted the Coast Guard's continued focus on regional cooperation to combat trans-Arctic threats such as illegal fisheries. Additionally, aircrews trained with CGC HEALY and CGC MUNRO as they patrolled in the Chukchi Sea and Bering

Strait region, recertifying aircrews in shipboard landings in order to extend the operational reach of the Coast Guard into the higher latitudes.

As in the past few seasons, the Coast Guard deployed two MH-60 helicopters to Kotzebue, Alaska for four months to enhance response capabilities and provide direct support to communities in the U.S. Arctic region.

These helicopters have flown over 390 flight hours, and executed eight long range search and rescue missions. Additionally, they provided critical support to the National Oceanic and Atmospheric Administration, U.S. Fish and Wildlife Service, the Office of Naval Research, the Alaska Department of Fish and Game, and the University of Washington in multiple missions to include assisting scientific research studying marine mammals plus Arctic ice and environmental conditions. Coast Guard HC-130 and MH-60 aircrews also conducted regular Maritime Domain Awareness flights, establishing a U.S. Government presence over U.S. Arctic waters, protecting U.S. sovereign interests, and executing U.S. responsibilities.

Because of pandemic concerns in Antarctica, the National Science Foundation informed the Service that it will not use CGC POLAR STAR to support the McMurdo Station resupply mission this year. This change affords the Coast Guard the unique opportunity to conduct maritime operations in the U.S. Arctic during the winter. From December 2020 to February 2021, POLAR STAR will project power throughout the Arctic and defend American sovereignty along the U.S. and Russia maritime boundary line. This opportunity enhances Coast Guard readiness by increasing Arctic ice navigation proficiency and informs operations of the future Polar Security Cutters.

Building Arctic Capacity

The ability for the U.S. to lead in the Arctic, both strategically and operationally, hinges on physical presence to protect U.S. national sovereignty and safeguard our homeland security interests. The foundation of the Coast Guard's operational presence and influence is U.S. icebreakers, whose purpose is to provide assured, year-round access to the polar regions for executing not only Coast Guard missions but also national missions in the high latitudes.

I'd like to take this opportunity to thank Congress for its continued support of the Coast Guard's Polar Security Cutter program, which awarded a contract for the detail design and construction of the first ship in 2019. This program is efficiently managed through the joint Navy-Coast Guard Integrated Program Office, which was established to accelerate the project and leverage best practices from each Services' shipbuilding programs. Because of Congress's support and this partnership, the Nation is as close as we have been in over 40 years to recapitalizing our icebreaking fleet. Continued investment is key to meeting our Nation's growing needs in the rapidly evolving and dynamic polar regions.

Until the delivery of Polar Security Cutters, the Coast Guard must maintain cutters POLAR STAR and HEALY, the Nation's only operational icebreakers. Robust planning efforts for a service life extension on POLAR STAR are already underway, and initial work for this project will begin in 2021, with phased industrial work occurring annually through 2023. The end goal of this process will be to extend the vessel's service life until delivery of at least the second new Polar Security Cutter. The recent casualty to CGC HEALY, our only medium icebreaker, underscores the importance of this effort. It also highlights the Nation's limited bench strength for this particular mission set, and the importance of devoting sufficient resources for maintenance and repair activities to aging assets.

On June 9th of this year, the Administration released a Presidential Memorandum on Safeguarding U.S. National Interests in the Arctic and Antarctic Regions that directed a review of requirements for a polar security icebreaking fleet acquisition program that supports our national interests in the Arctic and Antarctic regions. This memorandum highlights the Administration's priority for securing national interests in the Arctic and for recapitalizing the Nation's icebreaker fleet. The Coast Guard will continue to work within the Department of Homeland Security, with the Department of Defense, and with other Departments in responding to the Nation's need in the Arctic.

The Coast Guard must continue to evaluate options to advance U.S. interests in the region, which extend beyond the provision of icebreakers. As outlined in the Coast Guard's 2019 Arctic Strategic Outlook, in order to respond to crises in the Arctic, our Nation must also muster adequate personnel, aviation, and logistics resources in the region. To meet the challenges of the Arctic as a strategically competitive space, the Coast Guard must also expand its means to shape the security environment and respond to, intercept, and collect information on activities and intentions of those operating in the Arctic region.

Advancing Strategic Leadership and National Security Across the Arctic

As many nations and other stakeholders across the world aspire to expand their roles and activities in the Arctic, the Coast Guard continues to be a leader across the region, expanding collaboration, cooperation, and interoperability.

The Service exercises leadership through engagement in Arctic Council activities including representation on a variety of working groups. As Chair of the Marine Environmental Response Experts Group, the Coast Guard engaged with Russia during the response to the June 2020 Arctic oil spill in Siberia, the worst ever in the region, and continues to work with partners to identify and apply lessons-learned from the spill to reduce risks in the United States. As a member of the Shipping Experts Group, the Coast Guard supports projects such as mitigation of risks associated with the use and carriage of heavy fuel oil by vessels in the Arctic. The Coast Guard also chairs the Council's Search and Rescue Experts Group, served on the Council's Task Force on Arctic Marine Cooperation, and has been active in other task forces that established the 2011 Arctic Search and Rescue Agreement, the 2013 Oil Spill Prevention and Response Agreement, and the 2015 Framework for Oil Pollution Prevention.

Additionally, the Arctic Coast Guard Forum (ACGF) continues to be a bridge between diplomacy and operations. Formally established in October 2015, the ACGF operationalizes all of the elements of the Service's Arctic strategy, as well as the objectives of the Arctic Council. It is a unique, action-oriented maritime governance forum where the Coast Guard and peer agencies from the other seven Arctic nations¹ strengthen relationships, identify lessons learned, share best practices, carry out exercises, conduct combined operations, and coordinate emergency response missions. In April 2019, the ACGF conducted its second live exercise², POLARIS, which incorporated six ships and five aircraft from ACGF member nations to respond to a simulated cruise ship in distress near Finland.

The exercise was a successful demonstration of combined operations, and highlights the criticality of coordination preparedness for maritime environmental response and search and rescue. In April 2021, the ACGF will hold its third live exercise off the coast of Iceland.

When Russia assumes chairmanship of the Arctic Council and the ACGF in Summer 2021, the Coast Guard will continue to encourage advancement of shared ACGF objectives, including more collaboration with operational Arctic entities and increasing joint response capability for both search and rescue and marine environmental response cases.

The Coast Guard has also supported Arctic safety through other international bodies such as the International Maritime Organization (IMO). The Coast Guard was instrumental in the IMO's development and adoption of the International Code for Ships Operating in Polar Waters (Polar Code), which is mandatory under both the International Convention for the Safety of Life at Sea (SOLAS) and the International Convention for the Prevention of Pollution of Ships (MARPOL).

The Polar Code covers the full range of design, construction, equipment, operational, training, search and rescue, and environmental protection matters relevant to ships operating in the inhospitable waters surrounding the two polar regions. Additionally, in November 2017, the Coast Guard collaborated with the Russian Federation to jointly develop and submit a proposal to the IMO to establish a system of two-way routes in the Bering Strait and Bering Sea, with the objective of advancing the maritime transportation system in the region; promoting the safe, responsible flow of commerce; and de-conflicting commercial uses of the waterways with subsistence activities.

The Coast Guard continues to work to expand the Service's influence across the Arctic. From July through September of this year, the Coast Guard deployed CGC CAMPBELL and CGC TAHOMA in the North Atlantic region to participate in joint military and Search and Rescue exercises. This included engagements with the Danish Joint Arctic Command, Canada, and France. These operations demonstrate the Service's strong relationships with international partners across the globe.

Improving Critical Communications in the U.S. Arctic

Perhaps one of the biggest challenges in the Arctic is simply communicating. Out of necessity, the Coast Guard uses a variety of solutions to communicate in the Arctic, which minimally satisfies current operational requirements. The Service is undertaking multiple connectivity and communications efforts to support and improve operations in the Region and will partner with the Department of Defense and other partners when possible. These efforts include recapitalizing our military satellite

¹ Canada, Denmark, Finland, Iceland, Norway, Russia and Sweden

² The first live exercise, Arctic Guardina, was held in September 2017

communications terminals, upgrading high-speed data “Cutter Connectivity” solutions with emerging polar satellite services, replacing all Coast Guard cutter High Frequency (HF) radios, and reengineering the terrestrial HF network. These efforts will dramatically improve the Service’s Arctic communications and operations in the Arctic.

Additionally, the Coast Guard is working with the Department of Homeland Security Science and Technology (S&T) Directorate to execute a comprehensive review of mariner communications and connectivity needs with the broader Federal, State, local, and industry communities of interest in the Arctic. We have also engaged the DHS S&T Arctic Domain Awareness Center of Excellence (ADAC) at the University of Alaska, Anchorage, to conduct relevant research. The intent is to identify areas of possible collaboration in a whole of government approach and potential public-private partnerships to address shared communication and connectivity gaps and needs.

Conclusion

The Coast Guard’s value proposition in the Arctic includes upholding freedom of navigation and the rules-based order by setting and enforcing standards of behavior in the maritime domain. The Coast Guard’s role in our whole-of-government approach to securing our national interests in the polar regions is using our experience, leadership, and ability to both influence and compete below the level of armed conflict. Leveraging the Service to set the example for maritime governance in the Arctic positions the United States to be the preferred partner of other Arctic allies and stakeholders to positively shape the security environment across the region. The Coast Guard, and the Nation, must remain committed and agile in the rapidly evolving geopolitical and operational Arctic environments.

The Administration’s and Congress’ continued support for a modernized and capable polar fleet and Arctic infrastructure will posture not only the Coast Guard, but the Nation, to lead across the national and international landscape to build a coalition of like-minded partners in order to shape the Arctic domain as a continued area of low tension and great cooperation while preserving our national interests and rights. We understand the significant investment required to secure the Arctic, and we appreciate the trust the Nation has placed in the Service. Thank you for the opportunity to testify before you today and for all you do for the men and women of the Coast Guard. I look forward to answering your questions.

Senator SULLIVAN. Well, thank you, Admiral, and I think we are going to just start right in, as we—when Senator Markey is available, we will make sure he has an opportunity to provide his opening statement. I want to begin by commanding the Coast Guard on its decision of the POLAR STAR do the Arctic patrol this winter.

And can you provide an update on the status of the HEALY, and how extensive was the damage, and when do you think the HEALY will be operational again? I had the opportunity to meet with the captain and the ship’s leadership crew, boy, just a couple of months ago when they were in Seward, Alaska, and it is a great crew, so I am glad everybody is safe, but an update would be appreciated.

Admiral RAY. Yes, sir. I am proud to report to you, she is in the yard in the Mare Island, the upper reaches of San Francisco Bay, and they have done work on her before, so they are no strangers to her. We—the motor that we had to replace was 115 tons of motor. We had one spare. Somebody had the foresight years ago. When we commissioned HEALY, we had a spare. We actually built a building around it in Curtis Shipyard. So we had to ship it. It was too big to ship by rail or truck. We had to put on a barge and ship it through the Panama Canal. And so there is—we got her. The motor is replaced inside HEALY. We expect her to finish her dry dock availability toward the end of this month. For that, she will enter a dockside availability at home port and she will be ready to sail next summer so it would go back up North.

Senator SULLIVAN. Right. Thank you, Admiral. I am sure you are familiar with the memorandum from the President on June 9th of this year regarding the Arctic and ice breakers and where to look at home porting them. Are you familiar with that? And one of the things that I have been pressing, literally everybody listed on that memo: the Secretary of Defense, Homeland Security Secretary, Secretary of the Navy, Secretary of State, OMB Director, National Security Adviser, is the importance of when we look at icebreakers, and I think everybody recognizes the need to build a fleet because we really don't even have a fleet, but to make sure they are home ported in an area in which they are in the region.

Can you talk about that because right now, when I talk to the Senior Officials listed on that memorandum from the President on America's National Security interests in the Arctic, to a person they recognize that home porting icebreakers in Alaska makes long-term strategic sense and is in the long-term strategic interest of the United States of America. And as I mentioned in my opening statement, you know, I love the Coast Guard, but sometimes I get a sense of, kind of, a strategic thinking deficit on these kind of issues where too much of the home porting decisions seem to be based solely on where the current crew is, not where the action and the presence is needed. So can you talk to me about that?

Admiral RAY. Yes. Senator Sullivan, so with regards to the President's memo, as you know, that was a joint effort between the Coast Guard and Department of Defense, NOAA, Department of State. And so we got together and created a document in response and turned it in on time to DHS and that was submitted to the NSA. So when they would choose to release that, I am not certain to say at this point.

As you asked, during the course of this time, we did in our response say that, you know, Alaska home port should be considered in the analysis. And as I think you are aware, right now, we are—we have an ongoing homeport analysis for border security cutters that is ongoing. We expect that to complete in August and then a report out by the end of this Fiscal Year. So and that will definitely include analysis of home porting options in Alaska.

Senator SULLIVAN. And so your timeline for completion of that is August?

Admiral RAY. The they report—the homework will be done in August, and I will double check this but this is what I recall from the memo. The homework will be done in August, and then we will have the analysis of it and, you know, running it, working it through our review process by the end of the calendar year.

Senator SULLIVAN. Let me ask with regard to leasing. I just talked to the National Security Adviser. I know that there are icebreakers that are being looked at in Finland. Last week, I chaired the readiness subcommittee hearing on the Armed Services Committee with the Secretary of the Navy, CNO, Commandant of the Marine Corps. He had talked about this issue. There is another icebreaker that is in Florida, I guess. Not sure what it is really doing in Florida.

But the look in terms of the potential to lease those soon, these are medium icebreakers that would essentially bridge the gap that we all recognize we have, my understanding is the White House,

National Security Adviser, possibly the Navy, with regard to some of their funding, are looking at moving forward on leases soon. Like hopefully as early as the end of this month. Do you have any comment on that? And do you support it?

Admiral RAY. Well, sir, Senator, with regards to leasing, we—that was obviously a part of the Presidential Directive to investigate that, and we went about that with the joint Navy and Coast Guard team. We have gone about investigating the feasibility of using those vessels for our purposes along the way, as we have said consistently, and it was accepted by those that, you know, at the NSA and others, was that any leasing arrangement would not be in lieu of building our own icebreakers, this would be in addition to.

Senator SULLIVAN. As—I fully agree with that. In addition to, as a bridge.

Admiral RAY. Yes, sir.

Senator SULLIVAN. I couldn't agree more.

Admiral RAY. Yes, sir. And I think it is—there is a potential that one of those vessels could be of benefit as a bridge, as you say.

Senator SULLIVAN. Good. OK. Admiral, sorry, I am just trying to get a sense of—sometimes these remote hearings, you have got to get a sense of who is on the line and who isn't. And so for now, we don't have anyone on the line. So I am going to continue my line of questioning. With regard to the leased icebreakers that we are looking at—again, just speaking to the National Security Adviser about an hour ago, and I would fully support it as Chairman of this committee.

There is also an interest in possibly if we do lease medium term icebreakers in the near future to at least have, again, those home ported or have one or two of those home ported in America's Arctic, which is Alaska. Give me a sense of what goes into the cost benefit analysis, because to me, and again, to so many that I have spoken to, it seems to be a strategic no brainer that if the entire point of having an icebreaker is particularly to protect the interest in the Arctic, to have it in the Arctic. Right now, the home porting in Seattle is a couple thousands of miles away, as you know, from the Bering Strait, where a lot of the action is and, of course, the Arctic Circle. So give me your thoughts on, again, what we could do with medium icebreakers right now?

Again, I think the White House is looking at something that could be home ported hopefully soon in the America's Arctic, which is in Alaska. But what are the different things that the Coast Guard is looking at? Because as I mentioned my opening statement, sometimes it just seems very frustrating that—pretty obvious choice, long term strategic thinking would be you would want these home ported, at least some of the fleet, in America's Arctic.

Admiral RAY. Senator, with regards to the potentially leased icebreakers short term bridging strategy, we have, you know, there is—we have not invested significant effort in analyzing where we would sail those from. I think, you know, obviously the closeness, the geography of the mission set that they would be engaged in. Your point is well made. For a longer term basing of our icebreakers, as you and I have talked and the Commandant have talked, there are multiple factors that we consider when we talk

about the ability to maintain, not—we realize that through your work on the Committee that, you know, you will provide the resources we need.

Senator SULLIVAN. We will.

Admiral RAY. Yes, sir. We appreciate and understand that. What we look at as the mission effectiveness, our ability to bring those to bear in a reasonable amount of time so that we can have a high probability success when we do sell that cutter. That is part of the calculus. There are other parts of the calculus with regards to the ability for the Coastees assigned to the cutters, for their families to, you know, to live and prosper in that vicinity. So as we talk about longer term home porting of cutters, as you and I have discussed said, those things are still—those are elements that we consider alongside the geographic considerations for getting to the OP area as soon as you would described.

Senator SULLIVAN. Let me ask another related questions. I know that, as you mentioned, there are feasibility studies with regard to home porting of the polar security cutters in Alaska, possibly Australia for the Antarctica mission. And also the FRCs, the feasibility study with regard to the ability to protect America's interests as it relates to China. So I know that there was look at Guam and maybe even American Samoa. How are those feasibility studies going? Now I am talking Alaska, Australia, and then for the FRCs, Guam and American Samoa.

Admiral RAY. Well, as I—Senator, as I said earlier, the feasibility study for the home ports, the polar security cutters, that is ongoing right now. So we—I don't have any specific response with regards to some of the home ports that were mentioned in the President's memo.

Senator SULLIVAN. OK, and just to be clear, sorry to interrupt, but those are for the six authorize polar security cutters that were authorized in the NDAA. So the longer term ones that we are building, not necessarily the short term bridging ones that have the potential to be leased in a much shorter amount of time, correct?

Admiral RAY. Yes, sir.

Senator SULLIVAN. OK.

Admiral RAY. So no, I mean, we are still working on the analysis of the home ports of those, as we have discussed. With regards to the fast response cutters, I want to thank you, in particular, for your support for our ability to homeport those where they need to be in Alaska. So, as you know, we are building—thanks to the support of this committee, we have funds already designated in Kodiak to start building out the piers there. We have funds on the unfunded priority list for Sitka. And then—so we are tracking with regards basing those in Alaska where they need to be.

Senator SULLIVAN. Well, we appreciate that.

Admiral RAY. Yes, sir. With regards to fast response cutters in the South Pacific, those—the discussion about potentially home porting one in American Samoa, we have already got two in Guam right now that are there, but the one in American Samoa, that has been a discussion. And we are analyzing that, but we don't have—that cutter is not on budget yet. So we will continue to analyze that and see what we come up with.

Senator SULLIVAN. OK, good. I believe Senator Markey is on the line, so I am going to recognize him next. And then I will turn to Senator Scott. Senator Markey.

**STATEMENT OF HON. EDWARD MARKEY,
U.S. SENATOR FROM MASSACHUSETTS**

Senator MARKEY. Thank you, Mr. Chairman. Thank you for the great work in putting together this very important hearing. First, I want to thank our distinguished witnesses as well, including Dr. Jennifer Francis, who is a senior scientist at the world's leading Woodwell Climate Research Center, in Falmouth, Massachusetts. What is often thought of as the frozen Arctic is actually not so frozen anymore, making it a complex and fast changing environment that has caused a host of new and evolving national and economic security issues for us to confront. And we know that many of these changes are driven by the human-caused climate crisis. If we don't talk about the effects of climate change on the Arctic, we can't fully understand the truth that threatens to our security. A novel Arctic climate is emerging in its new state, according to recent research, "extremes become routine."

Rising temperatures are causing the region's climate to shift from sea ice to open water and from snow to rain. These changes in the North are sadly mirrored in the Antarctic, where the Pine Islands and Dewitts Glaciers are breaking free. The collapse of these ice sheets will have immense implications for rising seas, with Massachusetts and other coastal states facing up to 10 feet of sea level rise. Together, these climactic changes in polar regions are of incredible concern to our country. And as I mentioned before, the Arctic in particular is warming twice as fast as the global average. Between 1992 and 2019, Arctic sea ice shrank by nearly a million square miles, an area larger than the State of Alaska.

Current Arctic sea ice extent is the second lowest on record, with new trade routes opening and towns being flooded, the changes are drastic and unfolding at an unprecedented rate. The effects of fire field from the Arctic as well, with impacts in lower latitudes on weather patterns, extreme events and, of course, sea level. But we have also seen wildfires in places that few would have expected decades ago. In 2019, areas within the Arctic Circle experienced a massive fire season. That was supposed to be a freak occurrence. These fires weren't projected by scientists to start until mid-century. As the climate crisis continued to worsen, but now researchers say that the 2020 Arctic wildfire season, a previously unthinkable concept, is likely even worse than the one before. When I consider the changes in the Arctic, it is with great sadness and appreciation that I remember a climate scientist and climate change pioneer, Dr. Conrad Steffen. He was a leading researcher on the consequences of climate change in the Arctic and died in a tragic accident in Greenland this past summer.

I met with Dr. Steffen in 2007 in Greenland and heard about his research, which found that climate change is causing the ice sheet in Greenland to melt at unprecedented speed. And sadly, because of our failure to heed the canary in the coal mine and take the drastic action on climate change, the ice sheet is now melting twice as fast as it was during that visit 13 years ago. As the Chairman

knows so well, the Arctic region is not some far off remote expanse. It provides livelihoods. To many, it is a global fishing center. It is a cultural and sacred place for Arctic indigenous peoples. It is the home of rare and endangered species. It is security. It is now at immediate risk as a result of the human caused climate crisis. The Arctic is a keystone of our climate system, which means that Arctic security is a National Security issue affecting all Americans. I want to thank our witnesses for being here today. I want to thank you all for the work you do. And would like to ask you, Admiral Ray, last year we spoke about the Coast Guard's oil spill preparedness.

The Coast Guard had previously acknowledged shortfalls in its abilities to respond to any oil spills that might take place in the Arctic. In July 2020, a Russian power plant experienced a massive failure that dumped tens of thousands of tons of diesel into the Polar Arctic, showing how immediate this threat is to the fragile Arctic ecosystem. Admiral Ray, since we spoke last December, what specifically has the Coast Guard done to improve its oil spill response capabilities?

Admiral RAY. Thank you, Mr. Ranking Member. Several things to kind of, if you will, work to the left of an incident. We have worked on—this summer during Operation Arctic Shield, we made a concerted effort to get out and we visited. At the end of this summer, when you put it with the work we did last summer, we had visited 92 percent of the facilities that store petroleum products in the Alaskan Arctic. And as a result of that, we were able to inspect and we were able to work with the operators, owner operators, of these facilities, and work to ensure that those don't become, because as you know, the Russians spill that you referred to was caused by thawing permafrost and then the failure of containment tank that they had that has let several thousand gallons loose. So we have worked to address that. And we have actually inspected and visited 92 percent of those. We continue to work with Federal, state, and local stakeholders to perform exercises this summer with regards to our preparation for spills. And we also worked with—

Senator MARKEY [continuing]. Are there additional resources which you would like Congress to provide to you to better protect the Arctic from any spills, either foreign or domestic?

Admiral RAY. Well, the work that we are doing with the Department of Defense, we are leveraging some of their resources. And Senator, there are no specific, other than the capability to move this equipment which you are providing, the C-130Js and with additional H60 helicopters, those would be helpful in responding to any sort of incident or spill in the Arctic. So we can provide—we have—I am sorry, sir, go ahead.

Senator MARKEY. You mentioned the permafrost is melting. Half of the world's permafrost is expected to vanish by the end of this century. But I noticed in your written testimony, Admiral, that it does not include the words climate change. Do you believe the Coast Guard should be planning for human caused climate change?

Admiral RAY. Mr. Ranking Member, the Coast Guard has been consistent in that we are really agnostic as to the cause, but we are planning and paying attention to science all over our country. Up North in particular with regards to, as you would already discussed, that there is water where there used to be ice, the multi-

year ice has receded. If you look at the planet from the North Pole aspect, you can clearly see greater expanses of water that remain over the course of time. We have seen it this year in our hurricane season. Down the Gulf Coast, we have had more named storms than we would ever had since we have been naming storms. So we pay very close attention to the forecast and the scientific analysis. But as I said, that is what we look at and what we build to what as we are planning our operations.

Senator MARKEY. Now, I know what you are saying, but you can't be an agnostic when it comes to climate change. That is what's causing the hurricanes. That is what is causing the melting of the permafrost. It is what is driving all of these changes that we are seeing. And if I may Admiral Ray, do you think the Coast Guard needs to integrate climate resiliency into the construction of any new facilities in the Arctic?

Admiral RAY. Absolutely, Senator.

Senator MARKEY. And so, I just want to make sure, though, I make it clear that I thank you for your service, Admiral. I think you are really doing an excellent job, and I look forward to working with you.

Senator SULLIVAN. Senator Scott.

**STATEMENT OF HON. RICK SCOTT,
U.S. SENATOR FROM FLORIDA**

Senator SCOTT. First, I want to thank Chairman Sullivan for his commitment to the Coast Guard, his commitment to security in the Arctic, and all the things he has taught me about icebreakers in the last 2 years. I want to thank Admiral Ray for being here. I had no idea the importance of icebreakers until I got this job 2 years ago.

Senator SULLIVAN. Well, being the Senator from Florida, we are OK with that.

Senator SCOTT. But I have a great help with Chelsea, who is a great—I think she will be a great Coast Guard Admiral. So while the United States icebreaking capabilities have remained stagnant for decades, as we all know, Russia and communist China continue to advance policies and dedicate more resources to capitalizing on the issues of the Arctic. China's growing influence around the world presents a clear and present danger to the stability of world markets, the security of the United States and our allies in the quest for freedom and democracy around the globe. As we all know, we must do everything we can to make sure our men and women in uniform have every resource available to defend against the growing threat and keep our family safe. I want to thank again Chairman Sullivan.

When I came up here and we were shut down, he was a big advocate of making sure the Coast Guard got—started getting paid. So, Admiral Ray, the Coast Guard plays a crucial role in defending our Nation and protecting our security in domestic and international waterways. Can you talk about the resources you think you need to remain competitive or the U.S. to remain competitive in commercial and defense activities in the Arctic? And how we can improve the coordination between the Coast Guard and the Department of

Defense as we work to combat what Russia and China is trying to do in the Arctic?

Admiral RAY. Thank you, Senator Scott, for the question. With regards to the resources we need to improve our readiness, the Arctic is, as you know, we use the same resources. There are a lot of the same ones. And so the readiness piece that the Coast Guard, that our Commandant has repeatedly talked about under testimony and in various other fora, it is pretty straightforward. We have had really good success with getting the funds to purchase new assets. Where we have fallen behind is in the asset, the funds to maintain those assets and operate them. And so where is the Department of Defense when they went to address their readiness kind of deficit a couple of years ago under this Administration, they realized about a 12 percent increase in their ONS funding and we are about flat lined. And so that is a challenge. That is one thing that we need. As I have said before, some of the assets that we are using up there, the polar security cutter is going to be really important as we continue to build our Arctic capability.

We are also, Senator Sullivan, the Chairman asked me last time I testified about our communications capability. We made progress there, but it is going to require investments in satellite capability to communicate and operate up North. I could go through a list of assets, and sir, I would be glad to provide a more fulsome briefing for that. But it is primarily, I would say, our readiness has to do with operations and maintenance funding for our current assets. With regard to answer your part of the question about our engagement with DOD, I think we are about as tight now as we have been, on Arctic issues in particular, with DOD that we would been in my lifetime.

As you know, we would got an integrated program office with the Navy to help construct the polar security cutters. And we have got equal roles of leadership with them on that committee. And it has been a tremendous help. I am convinced that our ability to award that contract in April of 2019 was really aided by our cooperation with the Navy and their experience with that.

Senator SCOTT. Is the budget issue thing just tied to the fact that your budget is separate and—your budget comes up through Commerce, right? And so you are not part of the DOD budget. Do you think that is the reason why it is happening?

Admiral RAY. Well, sir, we are part of Department of Homeland Security, and so we fall under that regime of budget distribution, if you will. And I am—we think the Coast Guard is well positioned in the Department of Homeland Security. We have got many missions that work for that. As you know, we are a military force, armed service at all times. But we also have Title 14 authority, which gives us law enforcement authority. We are a member of the intelligence community. So the Department of Homeland Security is a great place for the Coast Guard and we think we prosper there. But when it comes to the readiness funds that are that are provided to the Coast Guard via the Department, that is where I think we could use some support of.

Senator SCOTT. Thank you.

Senator SULLIVAN. Thank you, Senator Scott. And just, I want to ask this very quickly and get to Senator Blumenthal, but in my

opening remarks I did mention that this is the first time, it looks like successfully, sometimes I talk to Senator Blumenthal a lot about it as well, that we are pairing up the Coast Guard Reauthorization Act with the NDAA. That brings a lot of synergies to the DOD and—or I shouldn't say DOD, I should say Coast Guard and other services operations. I am assuming, Admiral, you support that?

Admiral RAY. Absolutely, sir, and we appreciate your tireless efforts to make that happen.

Senator SCOTT. Well, we are going to—we are making it, I think we are making it a precedent this year and hopefully in a bipartisan way, we can make that happen every year. I think it helps the Coast Guard and the other services. Senator Blumenthal.

**STATEMENT OF HON. RICHARD BLUMENTHAL,
U.S. SENATOR FROM CONNECTICUT**

Senator BLUMENTHAL. Thanks, Senator Sullivan. And I would just second with a great big exclamation point the fact that this pairing is not only profoundly significant and historic, but it is also bipartisan and I hope we continue the work together that we have started because the Coast Guard deserves that reliable and well merited treatment in terms of authorization and appropriation. We are very proud in Connecticut to be the home of the Coast Guard Academy. The Coast Guard has a long and storied history in Connecticut. We regard it as kind of one of our own, and very, very grateful for the role that the Coast Guard is playing in advancing our economic interests in the Arctic. I thank the Chairman for making that topic the focal point of today's hearing.

I want to raise an issue probably somewhat painful to both of us, and I know that it is not within the direct purview of this hearing. So if you want to respond in writing as well as orally now, I certainly would welcome it, but as recently as this morning, I have been contacted my office by whistleblowers from the Academy complaining about some of the racial tension, potential slurs, other kinds of abuses that are deeply troubling. These instances have been disturbing to us. In Connecticut for a long time, in fact, to our delegation, Representative Joe Courtney and I have heard them for a while, and I know you are familiar with them. The June report from the Department of Homeland Security, Office of Inspector General on racism at the Academy found that the Coast Guard has failed to thoroughly investigate racial harassment.

Allegations including the use of racial slurs and failed to discipline cadets who were found guilty of that behavior. The specific incidents included in the report, I think you will agree, have no place in society, much less in the military or the training institutions like the great Coast Guard Academy that we are proud to host in Connecticut. Hate speech and race-based harassment by cadets at the Academy have gone largely underreported because of the stigma and shame attached to providing information, and sometimes they have been ignored.

These experiences don't stay in New London, they affect the entire Coast Guard, as you well know, a little bit like a virus. Racial hatred and tension spreads. It is a contagion that I know the Coast Guard leadership is committed to stop. And so I just want to ask

you, what you can tell me to update us as to what the Coast Guard is doing about this very important topic, what you are doing to monitor, counter it?

I raise this topic certainly not cheerfully, but I think necessarily because I know, Ray, you are certainly committed to stop this kind of racial slurs or any other kind of abuse and just want to give you the opportunity to respond.

Admiral RAY. Thanks for the question, Senator. And we do absolutely take this to heart, the report of the Inspector General from the Department of Homeland Security, as well as the righting the ship report that were from 2019 or excuse me, from 2019. We leaned into those and in the course of the last year we addressed every single recommendation, direction that was provided in those two reports and we have addressed them and reconciled them in policy and procedure. More importantly, I think what we would done with those is go from not just fixing our manuals and our policy, we have created tools to put in the hands of our commanders.

And I am not just talking about the Coast Guard Academy. I am talking about Commanders writ large across the service so that they know how to conduct an investigation. They know what they have to report up. They know we are able to track harassment so that it—because many times these things start with harassment and they turn into something bigger.

And so we put tools in our hands, to our Commanders, that we will use those and spread across the service so they can actually take action against these incidents. Taking it very seriously, sir, and thank you for bringing it up.

Senator BLUMENTHAL. Have you heard recent reports of these kinds of racial incidents or slurs continuing?

Admiral RAY. I have not heard of recent reports from the Coast Guard Academy. No, sir.

Senator BLUMENTHAL. Since the June report, have you heard any and what steps have you taken?

Admiral RAY. Negative, sir. I have not heard any from—since the June report of the Coast Guard Academy. And I will double check with my team, but we—if there is something that happens of this nature, I get a report from our Civil Rights Directorate every month on things that happen of this nature. And so I am pretty sure I would have heard if it happened—maybe, you know, have not been informed. But I will double check and get back with you, sir.

Senator BLUMENTHAL. If you could double check, I would appreciate it. And I would also be interested to know, because my time has expired, maybe you can respond in writing, what kind of comprehensive steps have been taken to change the culture and to instill in the cadets the idea that there is zero tolerance for this kind of abuse?

Admiral RAY. We will respond in writing to your question, sir.

Senator BLUMENTHAL. Thank you, Admiral Ray. Thanks to Chairman.

Senator SULLIVAN. Thank you, Senator Blumenthal. Senator Cantwell.

**STATEMENT OF HON. MARIA CANTWELL,
U.S. SENATOR FROM WASHINGTON**

Senator CANTWELL. Thank you, Mr. Chairman, and thank you and to my colleague as well. These—so appreciative of you being here today. And, I have a historic day in the sense that the House is taking up the NDAA and passing legislation, including the Coast Guard with authorization for six icebreakers, so we definitely believe in that mission. It is a very bipartisan effort, a very bipartisan effort to also fund those icebreakers, as we have in the past. And so I want to ask you specifically about the mission moving forward. Admiral Ray, will the Coast Guard continue to build icebreakers beyond the three and recapitalize on these purposes of both the climate science aspect of the Arctic mission?

Admiral RAY. So with regards your first question, ma'am, Senator, is I know you are aware, we have talked about three heavies and three medium icebreakers, and so—and we are in the precursor stages for the requirements for the medium icebreakers at this point. So by the plans we have now, that would be the next evolution of building out our icebreaker fleet. However, we are always reevaluating the fleet mix that we need with regards to icebreakers. So given the support of the Congress, I mean, we will continue to look at that and evaluate that.

And so our real focus at this point—in fact, I was just down in Mississippi early last month at the Halter Shipyard with our Mission Support Commander and with our Deputy Commandant for Operations, meeting face to face with the leadership of the shipyard that is constructing the first polar security cutter, just to let them know how important it was to us and to our Nation. And they get it and they are going—they are moving out on that. Regards to the second part of your question, Senator, I am not sure I caught that—

Senator CANTWELL. Well, we want to make sure that—I mean, obviously, it is an evolving mission. And there is the work that the HEALY does, you know, science capabilities that we don't want to get lost in all of this. We want to continue those science capabilities. I want to make sure we are also getting a work force. Currently you are short 400 prevention personnel, and we certainly think that the Arctic is an important prevention mission. And so we want to make sure that we are discussing here what kind of resources that you need and what we need to do to keep the science mission and to have a work force.

Admiral RAY. Senator, thank you for recognizing that prevention workforce. That is a part of regulatory role of the Coast Guard which often goes unheralded by it is so important. As we were talking with the Senator, the Chairman earlier, our folks and Secretary in Anchorage travelled all over the State of Alaska this summer to finish out, and they ended up completing about 92 percent of the inspection of the petroleum storage facilities in Alaska. That is the kind of work those folks do so bad things don't happen. So, thank you for your support of that workforce, Senator.

Senator CANTWELL. So, what do we need to do to train and skill more people?

Admiral RAY. We are—we are completing, Senator, a study right now on—because the way we were turning our prevention officers

was kind of—it is something we have been doing the same ways for years and we need to do something with greater effect where we have Centers of Excellence where we take people and just in time train them to do the missions we need. And it is much more complex now, whether it is deep water offshore drilling in the Gulf of Mexico, or whether it is up in the Arctic oceans.

And so the support for us—and once again this comes to the readiness funding that we have been talking about because if this is human capital—so to develop that human capital, it is operations and support funding where that is how we train people, that is how we send them to these industry Centers of Excellence, so that our people are on the right footing to do the regulatory role they need to protect our natural resources.

Senator CANTWELL. Well, whatever we can do to be helpful on that front. We want a Center of Excellence. People trained and skilled in the Arctic—there is no difference here between Senator Sullivan and I, and many of our colleagues on these issues. So thank you, and I am just taking by, you do agree that the science mission of the icebreaker fleet should continue?

Admiral RAY. Absolutely ma'am. It is an important part of our mission. It has been for many years.

Senator CANTWELL. Thank you.

Senator SULLIVAN. Thank you, Senator Cantwell. Admiral, I am going to ask a few follow-up questions and then I am going to see if Senator Markey has any, and I believe there might be one or two additional Senators who are wanting to participate and coming down to the hearing room. So, let me ask you, I highlighted it briefly in my opening statement, but the August 26th incident that we had with this massive Russian military exercise that went into the United States' EEZ. I know that you, the Coast Guard, District 17 in Juno, the headquarters are often made aware of these kind of exercises to coordinate with Northern command, coordinate with the U.S. Navy.

I have raised this with the Secretary of the Navy, with the North Comm Commander, what do you think happened that we can improve on to make sure that something like that doesn't happen again? First of all, our fishermen, in my view, should never be essentially forced out of the American EEZ, when they are legally fishing. And yet, that did happen because the Russians were being quite forceful. Second, there seemed to be somewhat of a lack of information flow and I am sure—and I know because I have requested if, an after-action to make sure that we improve upon that, particularly as it relates to our fishermen, whether they are based in Seattle or based in Alaska.

You know, this is a huge part of the U.S. economy—a huge part of my state's economy. These are great, hardworking, patriotic Americans. And can you just comment on that and how we avoid that from happening again, and what steps we need to take? And if you are looking at, I know you are, but coordinating with North Comm and U.S. Navy on this?

Admiral RAY. Senator, it is a multi-part question so I will try to answer it in the same way. The—first of all, as I described the activity of the Russians in planning and executing that section exercise, I think there was a degree of irresponsibility there that needs

to be addressed and talked to, and we have done that. We have sent a written correspondence. We have got a Coast Guard attaché in Russia who does the leg work with the Russians. And we have a relationship with the Russians' border guard that serves as a really kind of a red phone type of relationship, so we are working that.

With that said, this was not our best day with regards to doing our role to look after American fishermen, the U.S. Coast Guard, so we—I will just be quite frank, we own some of this in that there is—although there is about 4,000, over 4,000 of those hydro packs that come out, the hydro pack is the form of a message that would describe the area that is on your chart there. About 4,000 of them a year. When the ones that are in our exclusive economic zone, we have a duty to pay attention to that. And we have looked at the ways that we can communicate that with the fishing fleet. And we did not do that that day. You know, there are ways they could receive it, on satellite phones and satellite receivers and other types. However, there are also ways we can transmit it to make a pointed effort.

What we are doing to hopefully prevent this from ever happening again, we are having biweekly meetings with the industry groups, in particular the At-Sea Fish Processing group that will be represented in your next panel, to understand how we can communicate that to the fleet so that the fleet knows in advance when these things that could cause a challenge to their fisheries operations. And we are dedicated to doing a better job with that. This is not a once and done thing. This is going to be a persistent effort on the part of the U.S. Coast Guard to keep that fleet informed.

Senator SULLIVAN. Great. Let me turn next to—we were talking about the different things the Coast Guard needs in terms of its presence, its ability to do its job in the Arctic, one of which is infrastructure. As I mentioned, at the Port of Anchorage, Dutch Harbor, these are about a good 1,000 miles, 1,200 miles away from the Arctic Circle. So Alaska, as you know, is a big state. Just because you are up in Alaska doesn't mean you are near at all to the action.

As I like to say, that would be, you know, the functional equivalent of having a Coast Guard base in Florida protecting the interests of Boston or Rhode Island or Maine. So infrastructure is critical. We have made significant progress here on the deep water draft port for the Port of Nome, which is much more, in terms of a geographic sense, able to protect the interest of the Arctic. Last time you testified before this committee, you emphatically stated the need for those kind of ports and infrastructure. Can you just comment on that again?

As I mentioned, in the Environment and Public Works Committee, the Ports and Harbor Bill has a very significant authorization for deep water draft port that can handle icebreakers, can handle fast response cutters, National Security cutters, even destroyers from the U.S. Navy. What is your sense of that? I believe we need a vision for a series of strategic Arctic ports the way Russia does. Can you comment on that a little bit and how important that is to the Coast Guard?

Admiral RAY. Senator, I will. First, I want to thank you for the infrastructure that you have provided us already. As you know,

about 10 percent of the Coast Guard's infrastructure is in Alaska—

Senator SULLIVAN. We will continue to provide that as you need it.

Admiral RAY. Yes, sir. And I really—specifically with regards to Kodiak, because that is our stepping off point at present with regards to all of our operations in the Gulf of Alaska or heading further out West, the Aleutians are up North in the Bering and further North. As we have repeatedly said, sir, if there was a deep water port North of Dutch, as you would discussed, we would certainly take advantage of it. It would be a benefit to the Coast Guard.

Senator SULLIVAN. Yes, OK. Let me ask one final, actually, I am going to just make one more point again on the leasing and if we were to do kind of a leasing with regard to medium icebreakers, again, I think as a bridge for some of the polar class icebreakers, I think home porting those in Alaska would make immediate sense. We look at, I know the Coast Guard has already talked about Seattle for some of the polar class ones which are building on what is already there, makes sense. But as you know, there is going to be a lot more than just two or three from what we are working on.

So I want to just make that statement from the Chairman's position here on the importance of that. What else do you need, the Coast Guard needs from this committee? As I mentioned, we are already working on that alignment between the NDAA and the Reauthorization Act. My goal would be to do the Reauthorization Act every year, just like we do the NDAA. It makes total sense.

We should pair them, but the Coast Guard needs a Reauthorization Act every year just the way the rest of the military does. Is there anything else you need from this committee, whether it is Arctic related or any other broad based Coast Guard issues that are at the top of your list right now?

Admiral RAY. Senator, I thank you for your support. I think as we have discussed two or three times here, that realization that the Coast Guard needs, in addition to the capital assets that Congress has been so good at providing us, we need those operations to maintenance funds moving forward, because that is what makes us go and will make us be the Coast Guard we need to be.

And then I would be remiss and I would be—my Coastees would be disappointed in me. You know, our Coastees, when I travel around the Coast Guard, they still remember that shutdown, that partial shutdown of 2019 and how that affected them, viscerally affected them and their families. And so I would just ask for your continued support, direct finance so that the Coastees never have to—you know, if any military member is getting paid, they need to be getting paid.

Senator SULLIVAN. I agree 100 percent with that last comment, and as you know, some of us worked day and night to make sure that wouldn't happen, didn't happen, got cured quickly when it did happen. And it is my goal as Chairman of this committee to make sure something like that never, ever, ever happens again. It was an outrage. The Coast Guard members, the family members and trust me, I did a few town halls in Alaska with them, they were appropriately really pissed and they should have been. And we

need to make sure that doesn't happen again. I see we have one additional Senator who joined us. Senator Cruz, the floor is yours.

**STATEMENT OF HON. TED CRUZ,
U.S. SENATOR FROM TEXAS**

Senator CRUZ. Well, thank you, Mr. Chairman, and let me thank you also for convening this hearing and for your leadership on this issue. Chairman Sullivan is the leading champion for the Coast Guard in the U.S. Senate and also the leading champion for America leading in the Arctic. And I am grateful for your leadership in both regards.

Senator SULLIVAN. I appreciate that. Thank you.

Senator CRUZ. I will also note, Admiral, and the question you raised about the shutdown. That shutdown in 2019 was unfortunate. And Senator Sullivan and I together teamed up on legislation to pay the men and women of the Coast Guard and took to the Senate floor trying to get the Senate to adopt it. Unfortunately, a Democratic Senator raised an objection and held the men and women of the Coast Guard hostage to that. And so I am hopeful we don't see a reprise of that in the days and weeks to come.

The Arctic Circle has strategic, economic, and military significance for the United States, and I want to thank the Coast Guard for your continued presence in the region, your leadership working to protect America's interests. I've said for a long time that China is an adversary who would benefit from an American retreat all across the globe. President Xi and the Chinese Communist Party are investing heavily in the military, as is Russia. In your assessment today, who is the dominant power in the Arctic Circle?

Admiral RAY. Senator, thanks for the question. From the analysis that we have done, I mean, obviously, if you look at the planet from the North down, down, looking down at the North Pole, you can see the extensive shoreline that Russia has. You know that they are—they are a force to be reckoned with there just because of geography. They have got the geography and they have got the natural resources there. So in the near term, I think Russia is certainly the Nation that we should really be paying close attention to. But we cannot ever take our eyes off the ball on China.

I think that the behavior they are displaying in the polar regions, not just the Arctic, but the Antarctic and not just the Alaska Arctic, but over by Greenland as well, they are they are displaying similar activity, following, in my opinion and the analysis I've done, this is all unclassified, with regards to, you know, they are following the same playbook they followed in the South China Sea and following the places they do everywhere else. They will get a toehold, start working in the name of science, in the name of other things, and the next thing you know, they are moving forward with their agenda there. Does that answers your question, Senator?

Senator CRUZ. In your assessment, what would be the effect to the United States if we were to cede control of the Arctic to the Russians and the Chinese?

Admiral RAY. Well, it would be no different than ceding the Gulf of Mexico to somebody else. It is a shore of the United States. It is the approach United States, although it is not as accessible as the Gulf of Mexico or the Pacific Coast or name your coast, but it

is the same sovereignty rules and the same—we have the duty, we in the Coast Guard, and this is what we—we have the duty to protect it now. 30 years ago, when I was a young officer in the service, nobody talked about it because the multi-year ice had not receded. But now there is access out there that didn't exist. Traffic through the Bering Strait, increased, you know, 200 percent in the last four or 5 years.

It is not going to replace the Suez Canal anytime soon, but it is growing and the access is up there. So I would say we should be planning to be able to exert our sovereignty, protect our resources, provide support for those who need access, and these are eco-tourists, these are Americans, a lot of them, or also the folks who are Alaska Natives who live and make their living up there. We need to be the same Coast Guard, I am speaking from a Coast Guard perspective, for them as I am for any other state in our country.

Senator CRUZ. You said in your opening statement that State actors, as well as non-State actors, are seeking to advance their own interests in the Arctic. What did you mean by non-State actors?

Admiral RAY. Well, the potential for IUU fishing will exist up there. That is coming. I mean, when the Senator, now here in Nome, summer before last, we had a NOAA—

Senator CRUZ. And pretend hypothetically there were a Senator in the room that didn't know that particular acronym.

Admiral RAY. OK, I am sorry, that is illegal, unregulated and unreported fishing. That is a scourge—it literally is one of the scourges of the planet. I would say, from a maritime perspective, IUU fishing, whether it is happening in the South Pacific, whether it is happening in the Bahamas or pick a place, off the coast of Africa, off the coast of Somalia, that is one of the most widespread degradation of resources that the planet knows. And it has effects.

And so what the Senator and I saw last year when we were in Nome, there was a NOAA scientist there, really bright scientist, and she explained, she drew out a map for us in the gravel of the parking lot of the harbor at Nome, and she explained to us because Pollock is the most substantive American fishery. We could probably get arguments on that from other parts of the country, but it is the greatest in capacity what happens. And that is caught in the Bering Sea, and those Pollocks are moving North, up toward the Arctic.

Now, there is a 16 year moratorium on fishing in the Arctic that pretty much everyone agrees who has the capability to fish up there. But they will be up there. They will be up there and they would deplete those resources just like they will anywhere else if we let them.

Senator CRUZ. And what resources does a Coast Guard need to combat both State and non-State actors in the Arctic?

Admiral RAY. The capital assets that we are being provided right now, whether it is polar security cutters and continue to be able to build out that fleet, because what happens is—and that is why we call it polar security cutters and not icebreakers per say moving forward, because breaking ice is just a means to an end. The end is to get Coast Guard cutters with Coast Guardsmen on scene to a place where either people need a rescue or they need arresting. And we do both of those. And so that is the resources we need. And

then the aircraft, the communications capability to go with them. But in the short term, as I was telling the Committee earlier, I think the operations and sustainment funds are really the long pole in the tent for our service right now.

Senator CRUZ. Thank you, Admiral. And as a closing observation, I will say I was up this summer in Alaska with Senator Sullivan. And my advice to you is for the Coast Guard to stay utterly agnostic on the malicious lie that Senator Sullivan persists in repeating, which is that Alaska is larger than Texas. And I can tell you, we Texans don't believe the lying maps that are put out. And my advice is for you to stay out of that particular squabble.

Senator SULLIVAN. Just for your information, not only is it larger, but if you split Alaska in half, Texas would be the third largest state in the country. So we are—and I don't think the map makers are lying. But I am glad you were up there. And, Admiral, you are very popular. There is another Senator who was actually recently in Alaska as well, Senator Lee, who is joining us. And I am sure he has some questions as well.

**STATEMENT OF HON. MIKE LEE,
U.S. SENATOR FROM UTAH**

Senator LEE. Utah is bigger than most states, but I feel quite intimidated, not going to get into this dispute. I never realized it was up for debate, whether Texas was bigger than Alaska.

Senator SULLIVAN. It is not up for debate, just for the record.

Senator LEE. Admiral, thanks so much for being here. Thanks for all you do. The mission of the Coast Guard is absolutely essential to who we are and our ability to live our lives as we do. In your testimony, you note that the ability of the United States to lead in the Arctic hinges on physical presence in the region so that we can defend our homeland and safeguard our own security interests. You note that this is really important for us and we ought to stick to that. This means that we need assured year round access to the polar regions. The Coast Guard has also noted that it needs six polar security cutters, these PSCs, for their missions.

Now, my understanding is that the Coast Guard and Navy's first contract award for a PSC anticipates construction beginning sometime next year, sometime in 2021. Is that right? And then delivery of a vessel by 2024, meaning that we may not have vessels to fully replace our aging icebreakers for 5 years, give or take, possibly a little bit more. Is that right?

Admiral RAY. That is accurate, Senator.

Senator LEE. Now, how does this timeline harm the Coast Guard's readiness and its ability to carry out its core missions?

Admiral RAY. Well, this timeline is—it is, really at this point, it is unavoidable. We've got cutters that are over 40 years old, where the oldest one, POLAR STAR, the one that we talk about the most, and it is an interesting—and so urgency, a sense of urgency has been on the Coast Guard for several years now. And I am just thankful that the result of the leadership here in this subcommittee and the support of the Administration. We are moving forward with recapitalizing. There is no time. The longest journey starts with the first step and we are on the step.

Senator LEE. You know, Federal law generally prohibits the use of foreign contractors, foreign shipyards, for the construction of Coast Guard vessels or major components of Coast Guard vessels. It is no secret that Finland has boasted, apparently with some ability to back it up, that they could build an icebreaker within 2 years and they could do it for less than \$300 million. Undoubtedly, we need, for the reasons that you have stated quite persuasively, we need to be able to compete with China and with Russia in this region in particular.

In order to accelerate our acquisition, based on our needs for the acquisition, do you think Congress ought to consider, in a limited manner, sort of revisiting the general prohibition on foreign shipbuilding? In other words, would or could granting some limited flexibility to our NATO partners and friendly Arctic nations, is that something that could help the Coast Guard acquire the flexibility that it needs to get these vessels up and running so that we can establish this presence that we need in the Arctic?

Admiral RAY. Senator, first of all, as I am sure it is no surprise, we are huge fans and supporters of the American industrial base in the shipyards along the Gulf Coast in that and I know you are, too. With that said, I think the bridging strategy that makes the most sense to the Coast Guard at this point is this potential to lease one of these icebreakers. Because it would need to be, and you know, it would have to be U.S.-flagged to be able to have the authority that we use it for. So that—from the perspective we have done is trying to bridge the closest gap that we found ourselves in. That makes more sense to me.

Senator LEE. OK, it makes more sense. But just to be clear, it would be no security threats associated with, security issues, that would attend if we were to lift this restriction such that we could acquire a vessel in a different way than current law allows. Are there any security issues that would preclude us from contracting with someone operating within a NATO power or within another friendly nation, friendly Arctic Nation perhaps, to help us meet our shipbuilding needs? Would that present any security threat?

Admiral RAY. Certainly, it depends on which one you are talking about. Not all are created equal, but of the Arctic nations that I am familiar with, that I have dealt with, security of the ones that are our allies would not be the first concern I would have.

Senator LEE. They would not be the first concern that you would have. And would they be a concern at all? Is that a concern to have purchased that from Finland, for example?

Admiral RAY. Is security a concern for—not to my knowledge, sir.

Senator LEE. OK. Thank you very much. I see my time has expired. Thank you, Mr. Chairman.

Senator SULLIVAN. Thank you, Senator Lee. And just one final question relates to what Senator Lee was asking about. He raises a really good point about this huge gap in capability for coverage of protecting American sovereignty. Isn't that one of the reasons the President put the memo out on the issue of if you are not going to build, which creates some legal challenges, at least right now in the current law to lease? And that is what we are looking at doing right now. Leasing potential medium icebreakers from Finland is one option, is that correct?

Admiral RAY. There have been several different vessels alluded to, some of them are of Finnish origin, sir.

Senator SULLIVAN. But to lease, to close that gap and protect that, to at least bridge that gap until we can build our own.

Admiral RAY. That is the general strategy that we have been exploring and as a result of the President's memo.

Senator SULLIVAN. And do you think that makes sense?

Admiral RAY. I think you would agree it does. One thing I do want to state, these vessels, I have been around them and various commercial icebreakers, if you will. And they are not—they are not to military design with regards to communications, with regards to damage control, with regards to compartmentalization. So if we get, you know, in some sort of—we have some sort of accident because the nature of the work that we do, so there is a different gap.

We would have to do some work to them. It is not just take one off the shelf. If it was, we would have probably done that a long time ago. So there will be some work required to make these for the Coast Guard. But with that said, it is the Commandant's position and our position that we will certainly consider this and work to see what makes sense to bridge this gap.

Senator SULLIVAN. Right. Thank you. Sure, yes, Senator Lee.

Senator LEE. I just have to ask the question, so if I understand the point that is being made, and I think Senator Sullivan raises an excellent point, if in order to bridge the gap, perhaps we could lease something. If we could lease, for example, a vessel that has been built in Finland, that would suggest that our security needs are met by that vessel or certainly not compromised by that.

And if the only reason why we are not securing that vessel from Finland is because U.S. law prevents it, even though we could potentially do it for a fraction of the cost and get it in less than half of the time. I would suggest that is a question for us to consider as a Congress, why is it that for the sake of hewing to the status quo of what current U.S. law requires, if there is no security implication from doing so, why would we need to limit ourselves to leasing rather than buying with regard to a Finnish-built icebreaker? That is a question I have for you.

Admiral RAY. Sir, I think it is in the national interest to preserve our industrial base, shipbuilding base. And I think I mean, history has proven that. That is what won us World War II largely. And so I think to outsource the building of new ships for the use of our military, that would be something we would have to consider long and hard. And so my starting position is that when you protect this industrial base, which is declining, shipbuilding base is declining along the Gulf Coast in other places, and so that is—and that's where I stand on that.

Senator LEE. And I completely agree that is a legitimate interest to maintain our industrial base so that we can have access to those things. When our own industrial base can't do things in the same way that others could do, especially with an ally, a friendly Arctic nation, I think that is a good reason for us to ask ourselves the question of whether we ought to revisit some aspects of existing law. Thank you, Mr. Chairman.

Senator SULLIVAN. Thank you, Senator Lee. And Admiral, I want to thank you again, not just for this hearing, but the outstanding

work that you would be doing for the Coast Guard. So many issues beyond just the Arctic. I appreciate very much your testimony for this panel. The record will remain open for 2 weeks. And if there is additional questions from Senators, for the record, we respectfully ask you and your team to try to get back to those as soon as you can.

But for now, sir, we are going to move on to our next panel. And I want to thank you again for your outstanding testimony today and your exceptional service to our Nation. And please pass on to the men and women of the Coast Guard that we got their back, and we are working to try and make sure we take care of them and give them the assets and training that they need to protect our nation, and do it in a way that makes all of us proud.

Admiral RAY. Thank you very much for the opportunity, Mr. Chairman. And we really do appreciate your support.

Senator SULLIVAN. Absolutely. We are now going to turn to our next panel. We have three witnesses that I mentioned earlier. They are all testifying remotely, so hopefully this is going to work easily. We have Major General Randy Kee, and Stephanie Madsen, and Dr. Jennifer Francis. General Kee, we will begin with you, sir.

**STATEMENT OF MAJOR GENERAL RANDY A. "CHURCH" KEE,
USAF (RETIRED), EXECUTIVE DIRECTOR, ARCTIC DOMAIN
AWARENESS CENTER, UNIVERSITY OF ALASKA,
COMMISSIONER, U.S. ARCTIC RESEARCH COMMISSION**

General KEE. Good afternoon, Mr. Chairman, Ranking Member and distinguished members of the Subcommittee in Washington, D.C.. It is an honor to discuss U.S. Coast Guard Arctic capabilities for safeguarding national interests and promoting economic security. I respectfully commend the Subcommittee's interest and support of the Coast Guard's Arctic endeavors. I have the privilege to serve as the Director of the Arctic Domain Awareness Center at the DHS Center of Excellence in Maritime Research hosted by the University of Alaska. I am also a U.S. Arctic Research Commissioner. The following reflections are mine alone and do not necessarily represent the views of the organizations to which I am assigned or affiliated.

Among my experiences in the Arctic, please note I spent time listening and learning from Alaska's indigenous communities, getting insights from people who have been a part of the Arctic since time began. The Arctic is exceptional. Arctic exceptionalism in size, breadth, and depth of ongoing collaboration of our science and economic endeavors, indigenous peoples concerns, military cooperation and governance related activities are really the envy of many across the globe. Continuing Arctic exceptionalism is by no means assured, and U.S. investment of Arctic initiatives in science, economics, and measures to ensure American security and sovereignty should really top U.S. priorities.

The opportunities of an opening Arctic are incentive for Arctic and Antarctic nations alike to pursue easier access to extract minerals, harvest marine life, conduct maritime transport, advance tourism and project sovereign influence. Diminishing Arctic environment is enabling rising competition between national powers. The Russian Federation has refurbished Soviet—former Soviet Arc-

tic bases, built additional, and is capable of projecting power to and through the Arctic. With a dominant number of icebreakers, Russia can project surface forces in multiple directions simultaneously.

Russian national decisionmaking and defense planning are opaque at best, and Russia's Arctic military advantage should be met with resolve and strength as America cannot afford to be perceived as weak in our Arctic commitment to the Kremlin. From my vantage, the Russian Navy's actions against Alaskan fishermen in the Bering Sea in late August are frankly unacceptable. Harassing Alaska vessels within the U.S. EEZ should not go unanswered and should not happen again. It is important to note Russia is an Arctic Nation who shares a critical Arctic waterway with the United States. It is in both Nation's interest to prevent conflict in the Bering and Chukchi Seas.

Conversely, the People's Republic of China advances influence through the use of its economic power to gain access across the Arctic. China is normalizing an Arctic presence via national and icebreakers, gaining port access and advancing mining interests. It is not inconceivable China may conduct extractive measures closer to the U.S. Arctic maritime EEZ than any we would likely prefer, particularly based on China's track record of environmental stewardship elsewhere. It is in our interests to find a way to decouple joint approaches between Moscow and Beijing in the Arctic region. This is possible through a diplomatic reproachment that does not condone or reward malign Russian actions, but guided by realizing there are a number of common Arctic interests between Moscow and Washington, D.C. I do believe that great power competition need not become great power confrontation.

Against the backdrop of the most difficult operational and geostrategically challenging theaters in the planet, the selfless service of the U.S. Coast Guard makes the challenging look easy and conducting search and rescue, disaster response, law enforcement, and support to civil authorities. As a career military pilot with 30 years of service that includes operating the Arctic, please let me assure you, what America's Coast Guard does in the Arctic is demanding, requires daunting courage, expert skills and a matchless fidelity to duty. U.S. Coast Guard needs to project persistent power in the United States regions of the Arctic as well as other international Arctic waters. The authorization of six and appropriation of one polar security cutter was a critical gain. Hopefully new funding for more icebreaking cutters will be coming soon as capacity is well below what is needed. New icebreaking cutters need the ability to defend, communicate, and ascertain the operating domain.

This summer's recent mishap aboard the Coast Guard's cutter HEALY highlights the challenge of the long lines of communications from home port in Seattle to the U.S. Arctic region. There should be consideration either developing or enhancing infrastructure in Alaska to serve an expeditionary function, providing a logistical and affordable levels of repair. Locating one or more such facilities in places such as Seward, Kodiak, Dutch Harbor or Nome can possibly provide ice going vessels an important third option between repair at sea or return to home port in Seattle.

Coast Guard homeporting should be located at a robust multimodal transportation node, co-located with heavy marine industry, housing, schools, communications and logistics. I truly wish such facilities already existed in Alaska's Arctic, and advocate for smart and long term commitment to establish joint civil Government development of Alaskan ports. As a former military programmer, I am guided by the principle of efforts to create capabilities via ramps through multi-year incremental increments. One point to emphasize is the focus on increasing capabilities at or near the Bering Strait as this maritime choke point becomes—could become as strategically important as the Straits of Malacca or the Panama Canal to global maritime commerce.

The State of Alaska's official motto, North to the Future, is as relevant as ever. I believe the importance of the Arctic will certainly continue to rise. Thank you for the opportunity to provide these reflections and please know how appreciative I am of your service to our Nation providing political leadership in these difficult times. I respectfully look forward to addressing your questions.

[The prepared statement of General Kee follows:]

PREPARED STATEMENT OF MAJOR GENERAL RANDY A. "CHURCH" KEE,
USAF (RETIRED), EXECUTIVE DIRECTOR, ARCTIC DOMAIN AWARENESS CENTER,
UNIVERSITY OF ALASKA, COMMISSIONER, U.S. ARCTIC RESEARCH COMMISSION

Introduction and overview of the specific needs.

Good afternoon to you Mr. Chairman, ranking member and distinguished Members of the Subcommittee in Washington D.C. It is a genuine privilege and a pleasure to discuss U.S. Coast Guard Capabilities for Safeguarding National Interests and Promoting Economic Security in the Arctic.

I have the honor to serve as the Director of the Arctic Domain Awareness Center, (ADAC) a Department of Homeland Security Center of Excellence in Maritime Research in support of the United States Coast Guard's Arctic mission, hosted by the University of Alaska at the University of Alaska Anchorage. Please know that ADAC and the Center's associated research and education network are truly committed to being the best possible support to the U.S. Coast Guard (USCG) as we can individually and collectively muster. Accordingly, we in ADAC seek to be supportive of the U.S. Coast Guard's 2019 Arctic Strategic Outlook, (ArcSO) as well as the U.S. Coast Guard's 2018 Maritime Commerce Strategic Outlook (MCSO). I respectfully commend the Subcommittee's interest and support of the implementation of the U.S. Coast's Arctic Strategic Outlook and the Maritime Commerce Strategic Outlook in an Arctic context, as important and believe is greatly appreciated by many who are concerned about these topics in Alaska, across our Nation and with America's closest Arctic partners and allies, in particular, our allies in Canada.

In addition to serving and supporting the U.S. Coast Guard in leading ADAC, I respectfully relay that I was recently appointed as a Commissioner to the U.S. Arctic Research Commission by the President of the United States. In the coming months and years, I look forward to supporting and serving with the Commission in meeting statutory requirements as directed in the Arctic Research Policy Act of 1984. As is the case with many in the research community, I have the privilege to serve in other committees and volunteer endeavors, and list the following as the more significant of these collateral activities: U.S. Delegation lead for Situational Awareness, International Cooperative Engagement for Polar Research, U.S. Office of Naval Research, Global Fellow, Polar Institute, Woodrow Wilson Center for International Scholars, Co-Chair, Alaska Civil Armed Services Team (ACAST), State of Alaska.

I respectfully submit the reflections contained in this document are mine alone, and do not necessarily represent the views of the U.S. Coast Guard, the Department of Homeland Security, the State of Alaska, the University of Alaska, the Office of Naval Research, the Wilson Center or the U.S. Arctic Research Commission. These reflections do represent however, many years of Arctic focused endeavors ranging from military operations to military and national strategy development, multi-national military engagement focused on Defense Support to Civil Authorities, pol-

icy and planning for defense and security formulation, and directing a multidiscipline center of Arctic maritime research.

While many of these experiences are oriented at the Federal or multinational level, they also include time spent listening, learning and working with Alaska's indigenous communities of leaders, gaining understanding and insights of the Bering, Chukchi and Beaufort Sea areas from these leaders in local and place-based knowledge. No meaningful work can happen in this region without the insight, involvement and collaboration with these communities.

Due to the close collaboration we have at ADAC with DHS and the multiple echelons of Arctic-oriented service within the USCG, we identify our Center as an extended member of the DHS and Coast Guard family and celebrate their successes, while trying to lessen the burden of their operational challenges. The Center achieves this effort in a cost-effective manner by harnessing the power of the University of Alaska and our network of partners and collaborators, which contain research nodes across the United States, extensive research collaboration across Canada and some additional collaborations with America's Nordic Allies and partners as well. Strategically, ADAC's research, educational programs and convening activities continue to seek solutions that support the USCG's statutory missions associated with Coast Guard's Title 10 and Title 14 Authorities.

At the outset, I very much hope the committee recognizes my reflections are oriented to be supportive of the challenges our Nation's Coast Guard faces in securing and protecting the U.S. Arctic maritime region. Against the backdrop of one of the most difficult operational theaters on the planet, the selfless service of the U.S. Coast Guard makes the challenging look easy in conducting search and rescue, disaster response, law enforcement and support to civil authorities. As a career military pilot with three decades of service that includes operating in the Arctic and across many other operational demanding areas, please let me assure you . . . what America's Coast Guard does every day in the Arctic is supremely demanding, requiring daunting courage, expert skills and a matchless fidelity to duty.

The USCG has long made the case of needing to revitalize their ability to project persistent sovereign power into the ice-laden regions of the U.S. Arctic as well as the international waters of the Central Arctic. This persistent power is best advanced via Polar Security Cutters. The authorization of six and the appropriation of one Polar Security Cutter (PSC) was critically needed and hopefully additional appropriations for more Polar Security Cutters will be coming sooner than later, as the current capability of the U.S. Coast Guard in this capacity is greatly diminished and well below what is needed for the mission.

While the platforms matter, as persistent presence is not achieved without them, it is useful to consider a comprehensive systems approach to projecting such persistence. USCG PSC's without connectivity or communications may be unable to respond when and where most needed in a timely manner for crisis response. PSC's that have lagging or incomplete operational domain awareness may not be able to ascertain risk or have sufficient tactical knowledge and understanding to conduct an assigned mission. For safety and mission assurance PSCs must be manned by crews and leadership that have been trained and educated to fully comprehend a complex operating environment. PSC's that do not have minimal logistics and support located within the theater they operate, may have to forfeit their operational tasking and retrograde thousands of miles back to home port to effect repairs when mechanical issues arise that are beyond the ability to repair at sea.

As such, creating a systems approach in support of projecting persistence, that include PSCs, and complementary capabilities in communications & connectivity, domain awareness, institutionalized training and in-theater logistics support can result in PSCs providing a presence that signals to friend and foe alike. . . the U.S. Coast Guard is on the watch and vigilantly ready to protect and secure the U.S. maritime Arctic.

Further, ensuring the U.S. Coast Guard is supported with the best understanding science and technology can deliver in characterizing the ever-changing Arctic at fine scale for U.S. Coast Guard operational and tactical decision makers, is a persistent and enduring need.

The following paragraphs are presented to describe the challenge, present the key drivers of concern, offering solutions to consider and reflecting on opportunities to advance an improved chance of success for the U.S. Coast Guard and the Homeland Security Enterprise in better securing our Arctic maritime national interests.

A discussion on the geostrategic challenges facing the Coast Guard and our national interests in the Arctic.

Alaska and Alaska's maritime region make the U.S. an Arctic nation. While it may not be evident to many, and likely, most Americans, the Arctic region is vital

to U.S. national interests and Alaska's maritime regions of the Bering, Chukchi and Beaufort Seas are the Arctic approaches to U.S. sovereign territory. It is a region that is experiencing great change due to rising temperatures, now rising at more than twice the rate as lower latitudes and as forecasts indicate, this trend is posed to continue, and bring unique challenges that will strain all the inhabitants' ability to resiliently adapt . . . flora, fauna and people alike.

When the United States became an Arctic nation in 1867, the Nation became responsible for facilitating domestic security and defending national sovereignty across a significant frontier, known to the generations of Alaska Native residents and a handful of explorers, miners, trappers and settlers from the continental U.S., Canada, Russia or other places. In the more than a century and half since the Alaska purchase, the national security challenges within America's Arctic have fundamentally changed. As seasonal Arctic ocean sea ice levels continues to diminish, the barriers of access are opening the Arctic region to natural resource development, maritime trade, and tourism, all of which is substantially transforming the security landscape of the high latitude north. New international actors now look to the Arctic for opportunity, while existing Arctic nations are now advancing efforts to better realize the region's economic potential.

As the changing Arctic presents new economic and geopolitical opportunities, environmental change poses a significant threat to current economic systems and traditional lifestyles in the Arctic. Thawing (and sometimes melting) permafrost is compromising the land that serves as the foundation for coastal Arctic communities and the small number of connecting roads and ports. With less sea ice cover, weather systems are becoming more volatile, allowing for stronger storm systems that further exacerbate coastal erosion through storm surges, high winds and coastal flooding. Environmental changes in the Bering Sea is now having an impact to traditional commercial and subsistence fisheries as fish stocks are starting to move north, risking and in some instances, already dislocating traditional food sources for marine mammals and Alaskan Arctic residents alike. Collectively, these environmentally focused changes pose a significant threat to existing coastal communities, local economies and associated infrastructure within the region.

The opportunities of an opening Arctic are an incentive for Arctic and non-Arctic nations alike to pursue easier to access and extract mineral and petrochemical resources, pursue fish proteins (at present, outside of the Central Arctic Ocean), conduct maritime transport, advance tourism and project sovereign influence through national flagged vessels.

Reductions in sea ice have reduced the access barrier to maritime operations and as a result, increasing activity is gaining in the Bering, Chukchi and Beaufort Sea regions, as well of course the overall pan-Arctic, which includes the Northern Sea Route along Russia's northern shore and the Northwest Passage across Northern Canada. The Arctic's diminishing sea ice environment is increasing accessibility to the vast hydrocarbon deposits within the region, which allows for Arctic nation-states like the Russian Federation to expand resource extraction efforts. The diminishing ice Arctic is enabling sea lanes of the Arctic to open sooner and stay open longer through the summer months and increasingly into the fall. This past May as an example, saw the earliest recorded transit of the Northern Sea Route, a record that will likely be routinely broken repeatedly in the seasons to come. The emerging economic potential of the Northern Sea Route, and the possibility of a viable Transpolar route within this century have incentivized nations and industry to consider leveraging these new and shorter routes for transporting maritime commerce as an economic advantage.

The diminishing Arctic ice environment that is enabling rising competition is manifesting itself in a multifaceted manner. It is well understood the Russian Federation has restored and refurbished former Soviet bases along Russia's Arctic region, while creating new facilities and establishing forces at those stations capable of projecting power in and through the Arctic region, well beyond national borders. If this was simply establishing a safe and secure Russian Arctic in creating sound defense by having a more than capable offense, then such activities may be reasonable and possibly even acceptable. However, Russian national decisions and associated defense planning, are opaque at best, and the asymmetric Arctic military advantage created in the Russian Federation should be met with resolve and strength by the U.S. and America's Allies . . . as resolve and strength has historically been successful to stabilize relations between Moscow and Washington D.C.

Russia's approach to managing the Northern Sea Route (NSR) bears monitoring. Their practices obliquely, if not directly, potentially restrict freedom of navigation and counter the aspect the NSR is an international waterway.

Russia is no doubt, a considerable Arctic maritime power. With a dominant number of ice breakers, that range from vessels suitable for riverine operations to nu-

clear-powered ocean-going vessels, the Russian military can project sovereign influence throughout the pan Arctic in multiple directions simultaneously.

Russian abilities to muster and project military forces into the Arctic are remarkable. The range and complexity of these activities have continued to grow substantially following their restart of Long-Range Aviation back in January 2007.

Russian military exercises in the Bering Sea in late August are a deeply worrying example where lack of understanding, communication and a willingness for provocation, places not only military forces and response measures at risk, but these actions also place U.S. citizens at risk, such as the U.S. fishing fleet that were interrupted and alarmed in their commercial activities by poorly understood and reportedly aggressive Russian military maneuvers.

Since the routine establishment of Extended Economic Zones (EEZ), normally 200 nautical miles from shore, as codified in the United Nations International Convention on the Law of the Sea (UNCLOS) in 1982, foreign vessels are granted the right of innocent passage, permitting transit and freedom of navigation as long as these vessels are not conducting items exclusively prohibited such as weapons testing, polluting, fishing or conducting scientific research. According to UNCLOS, it was allowable for the Russian navy to exercise in the U.S. EEZ, as long as the vessels stayed outside of U.S. territorial waters (12 nautical miles from shore).

However, the Russian navy aggressive actions against U.S. flagged Alaskan fishermen in late August this year, are unacceptable. The Alaskan fishermen were rightly operating in a region well known and well established as a profitable fishing ground. For U.S. vessels to be harassed and ultimately forced to depart the area and losing the associated economic opportunity should not be permitted, particularly, as these fishermen were operating within the U.S. EEZ and adhering to the usual and customary practices of UNCLOS and of course U.S. fishing regulations.

In past experiences while serving in uniform, I have been confronted by military members of the Russian Federation. While my reflections are anecdotal and not a full analysis, these experiences have created a personal reflection that Russian military rewards those who act aggressively, and restraint can often be seen as a sign of weakness.

As the Russian Federation is an Arctic nation who shares a critical waterways management challenge with the United States, it is in both nations' interests to resolve conflicts, effectively communicate and find solutions to prevent escalation of tension and a rise in military actions along our shared and the economically increasingly important waterways in the Chukchi and Bering Seas.

From personal experience, it is my belief that Russia respects strength and resolve, and towards that end the U.S. National Security Strategy provides the antidote and guiding perspective . . . peace through strength, sustained in a competent, professional manner earns the respect of the Kremlin and Russian forces. This requires investment, training, proficiency and most importantly . . . persistent presence, oriented on a timetable and tempo of our choosing.

In sum, the U.S. cannot afford to be perceived as weak in our Arctic resolve to the Kremlin. Certainly, America should avoid over-reacting in a manner that may be seen as unrestrained escalation, but should reserve the right to escalate if needed to retain the initiative and in every case, ensure Russia understands, the United States of America will defend our citizens, our territory, our treaty Allies and our National Interests.

The Peoples Republic of China's efforts in the Arctic is manifesting itself differently than Russian actions. China continues to maximize its influence through use of its economic power to create potential for access to policy governance in forums such as the Arctic Council, and uses its economic strength to potentially position China to gain access to Arctic regional mineral wealth, fish proteins and more. China's economic partnership with Russia for Arctic region liquified natural gas (LNG) is one example of China's advancement on their declared Belt and Road initiative. China continues to project sovereign presence into and across the Arctic via Xue Long I and Xue Long II icebreaker cruises, with a third Xue Long to join future efforts. There are media reports that China is seeking to replicate Russian examples of developing nuclear powered ice breakers. In addition to investments in LNG on Russia's Arctic Yamal Peninsula, China's influence in gaining Iceland commercial port access and efforts to advance commercial mining interests in Greenland, signal China's strategic aims contain a comprehensive pan-Arctic approach. Based on their actions in other regions, it is a reasonable conclusion to state Chinese national need for raw resources such as mineral and fish proteins will continue to drive their aspirations and activities across the Arctic.

The People's Republic of China see the Arctic as integral to its global ambitions. It is fairly clear that China will continue efforts to gain access to resources and deliver products to market for economic benefit, while also establishing influence

among the Arctic community who may be tempted by promises of infrastructure investment and economic development through Chinese investment. Chinese icebreakers continue to project presence in the Arctic region, to include operations in the Arctic basin outside of the U.S. Arctic EEZ in the Chukchi and Beaufort Seas. It is not inconceivable that such a presence could lead to mineral and other extractive measures in the future—closer to the U.S. Arctic maritime EEZ than we would likely prefer, particularly when considering the insufficient measures Chinese industry has made towards environmental stewardship in other regions across the globe.

China's willingness to support infrastructure in developing regions, provides many reasons for caution and close examination of any promise or offer made by the Chinese government or government supported industry. Regrettably, there are a number of instances elsewhere on the planet where such promises have yet to substantially deliver, where more is the case where profound disappointment in these arrangements has been the result. One needs to simply review the many instances in Africa, South and Southeast Asia to get a full picture of the corresponding risks that await in the Arctic. China is not an Arctic nation, yet is acting as it has sovereign interests in the Arctic, and had its advocates continue to make remarks that China seeks and should be granted a role in Arctic Governance at a number of multinational forums such as the 2019 U.S. Arctic Research Commission and Woodrow Wilson Center hosted conference on the *Impacts of a Diminishing Ice Arctic on Naval and Maritime Operations*. In sum, China's effective use in leveraging its national economic strength as a means to gain political influence across the Arctic is competing and conflicting with corresponding U.S. National Interests.

To be sure, the Arctic is but one area in the growing array of geo-strategic challenges between the United States and China, but the pace of Chinese advancement in and across the pan Arctic region, to include their presence near U.S. Arctic waters is outpacing American countering efforts to deter and dissuade Chinese actions in the Arctic, which are counter to American national interest.

A similar intent may be implied about Russia. However, while Russian military strength and considerable reach of their forces across the Arctic, arrayed against Europe and deployed in the Middle East, are dispatched by a nation that has an insufficient economic engine to long-term sustain such force. Russian investments in military capability are to be taken seriously, however, Russian economic shortfalls compromise Russian military strength, particularly when compared to the economic muscle of China as the world's second largest economy. Accordingly, finding ways to manage tensions with the Russian Federation in the Arctic as fellow Arctic nations, should be sought, particularly from a position of U.S. strength. Such measures should seek to first, find a way to decouple joint approaches between Moscow and Beijing. This is possible through diplomatic rapprochement that does not condone or reward past and current malign Russian actions, but guided by realizing there are a number of common interests in the Arctic between Moscow and Washington D.C. This approach may be well aligned to American interests and serve to better manage escalation of military tensions in the Arctic.

The above discussions are a representative sample of the geostrategic challenges that face U.S. national interests in the Arctic. What is important to emphasize, Great Power Competition need not become Great Power Confrontation, and measures to manage and as useful, deescalate are important, if not critical. To be sure, escalation management requires the means and capabilities to back words with commensurate force. This is not only a Department of Defense matter. . .this includes ensuring needed capability within the national security enterprise, including the Department of Homeland Security and the United States Coast Guard.

Against this backdrop, it is important for the Nation to continue to invest in real capabilities and invest in efforts that continue to innovate DHS and U.S. Coast Guard presence and ability to project and sustain activities in the Arctic region, particularly, U.S. Arctic maritime regions. Real capabilities such as PSCs, but also the means to make these platforms more versatile, more connected and more interoperable with the rest of the U.S. joint force and with our Allies and partners.

A discussion on civil safety and security challenges facing the U.S. Coast Guard in the Arctic.

While rising competition among the Great Powers is a pacing interest on Arctic matters, the spectrum of challenges that impact the U.S. maritime Arctic are considerable, and yet often times overshadowed by the higher profile provided to Great Power Competition.

In order to prepare for these existing and increasingly complex security challenges, the U.S. Coast Guard released the USCG Arctic Strategic Outlook in 2019, significantly updating the prior 2013 Strategy to focus three "complementary lines of effort" to the USCG will endeavor in order protect national interests: 1. Enhance

Capability to Operate Effectively in the Dynamic Arctic. 2. Strengthen Rules-Based Order. 3. Innovate and Adapt to Promote Resilience and Prosperity. In order to prepare for the challenges facing the USCG in supporting the changes of American Maritime Commerce the USCG released the Maritime Commerce Strategic Outlook in 2019. Along the Aleutians (the U.S. Congressional Southern Boundary of the Arctic), through the Bering, Chukchi and Beaufort Seas provides the USCG an opportunity to view both the ArcSO and the MCSO in an integrated manner, providing opportunities to advance safety, security, waterways management and protection to maritime commerce for the benefit of the nation, industry and communities in the region.

The Arctic region continues to experience unprecedented change in terms of environment, weather patterns, and human activity. Over the past year, rapidly warming trends have contributed to decreasing extent of Arctic Ocean sea ice and spurred seasonal increases in storm severity, via significantly stronger winds and coastal storm surges buffeting shores across the North American Arctic. As the Arctic continues to warm, the foundations of coastal regions securely frozen for centuries are now thawing and becoming increasingly vulnerable to intensifying severe weather patterns. Across the U.S. Arctic, this thawing terrain has an unusually high susceptibility to erosion, which is of great concern to associated infrastructure and communities. Characterizing these changes at fine scale, remains a research challenge that has yet to be fully addressed.

Enabled by a changing environment, human activity across the Arctic is rising and includes increased commercial marine traffic, bolstered adventure tourism, (albeit temporarily dampened due to the Coronavirus pandemic) and expanded efforts to develop and conduct resource exploration and extraction methodologies. Newly opened pathways from the diminishing ice environment is a draw for nefarious influences in the region and can possibly contribute to unconventional marine safety and security threats including increased illicit trafficking and criminal activity. While modest global crude oil prices continue to dampen off-shore Arctic oil exploration activities in the Chukchi and Beaufort Seas, current favorable U.S. government exploration policies and historically fluctuating crude oil prices are likely to ensure that long-range oil and gas exploration activities will likely increase across the North American Arctic in the coming years.

Transportation networks across the North American Arctic are principally limited to air and seasonal marine conveyance. Economic development remains limited due to remoteness, lack of infrastructure, high cost, and difficulty establishing new roads, ports, and facilities. In context of the U.S. National Security Strategy and the USCG Arctic Strategic Outlook, there is a need to consider how DHS and USCG will safeguard and secure new economic developments within the U.S. Arctic coastal and maritime regions in order to meet broad strategic goals for regional security.

An increasingly dynamic Arctic continues to affect populations whose ancestors have inhabited the region for generations. Subsistence lifestyles continue but are increasingly threatened by retreating ice and increased regional industrial activity (such as marine shipping and resource extraction), which affect marine mammal activities and populations. Sincere consideration and active participation of local populations' lifestyles, practices, and customs should guide new U.S. Federal initiatives and inform DHS and USCG regional activities.

As trends indicate, human activity across the Arctic continues to increase in scope and magnitude. As new Arctic expansion and operations bring a more diverse and less experienced population and the rapidly changing Arctic environment confounds traditional understanding, the percentage of those truly prepared for the Arctic environment is in decline. This leads to risk-prone behaviors that stress resources and challenge the U.S. Coast Guard's ability to conduct search and rescue, humanitarian assistance missions, protect fisheries and marine life and lead disaster response operations. Additionally, as more outsiders enter the Arctic, the reasons for their arrival become more diverse resulting in increased need for vigilance in enforcing national laws and regulations.

The preceding paragraphs outline a series of concerns and a series of needs to consider in realizing a future U.S. maritime Arctic region better matched to national interests and the U.S. citizens who call the region home. Addressing these challenges are not only limited to the U.S. Arctic maritime region but should be conducted in a manner that better allows the U.S. Arctic maritime region to serve as the point of departure for increased efforts in the National Interest across the Arctic basin. To be sure, the investment costs to realize a substantial gain of economic prosperity for the region is sizeable, but so too is the potential opportunity.

The Arctic is an exceptional region. Arctic "exceptionalism" in the size, breadth and depth of ongoing collaboration in facets such as Arctic science, economic endeavors, recognition of indigenous peoples and governance-related activities such as the

mechanisms associated with the Arctic Council are the envy of many other regions across the globe. However, continuation of these aspects of Arctic exceptionalism is by no means assured and U.S. investment of Arctic initiatives of science, economics, and measures to ensure U.S. security and sovereignty, are well within U.S. national interests.

A discussion on solutions and supporting concepts.

Responding to the drivers of concern . . . it is important, if not critical to provide sustained support to the U.S. Coast Guard with improvements and capability to smartly project presence and enforcement to preserve and protect U.S. interests within our sovereign spaces, which ranges in providing the clenched fist of resolve to security missions to the hand of help to respond to civil crisis and to advance science and research in a pan-Arctic context to support the public good.

What this means, is the real and critical value to field the Polar Security platforms validated to support the U.S. Coast Guard polar requirements. This also means providing these platforms the ability to serve as fully capable instruments of national sovereignty, capable to deter, dissuade and defend in like manner to USCG National Security Cutters. Advancing U.S. Coast Guard Arctic and Antarctic capabilities requires working with science and technology research and providers to gain smart abilities to receive and conduct command and control and to establish situational awareness and overall domain understanding, across remote and austere regions that have well understood limitations in communications and logistics infrastructure.

This summer's recent mishap aboard the U.S. Coast Guard Cutter Healy, highlights the challenges of the long lines of communications from the Healy's homeport in Seattle to the U.S. Arctic region. Establishing a home port closer to the Arctic with full depot level repair capability is a considerable, and in fact, a quite massive investment in heavy infrastructure, base development, family quarters and more, particularly since no corresponding commercial infrastructure fully exists in Alaska.

Homeporting of capital U.S. Coast Guard assets should be located at a robust multimodal transportation (air, road/rail, and seaport) node, with co-located heavy marine industry, piers, housing, schools, communications and logistics capability already exists. While I truly wish such facilities did exist in Alaska, and in particular, in the Arctic, and I would heartily advocate for smart and long-term commitment to establish joint civil-government development of Alaskan ports. As a former Headquarters U.S. Air Force programmer, I am guided by the principal of programmatic road maps that create capability via "ramps" . . . guided by a joint vision and sustained incremental advances that over a multi-year period to realize the vision. In sum—until a comprehensive Alaskan Arctic/near Arctic commercial port facility is realized, it may be wise to consider maintaining PSC home ports in Seattle, leveraging the existing commercial investments, that reduce the cost to the U.S. taxpayer.

However, there should be consideration and deliberation in either developing or enhancing existing infrastructure in Alaska to serve an expeditionary/intermediary function providing logistical and affordable level of repair function for PSC Arctic operations. Locating one or more Polar Security Cutter expeditionary support/logistics facilities at locations near existing USCG facilities at Seward, Kodiak or a refurbished location at Dutch Harbor in the Aleutians or alongside future developments at a deep-water port in Nome, can possibly provide the USCG PSC's (and other USCG plus U.S. Navy vessels) an important third option between repair at sea or return to home port in Seattle. The idea advanced by others in a port complex between the Port of Nome and the natural deep water port region known as Port Clarence is likely a highly useful future port construct.

Quite frankly, advancing expeditionary support/logistics activities in or near the Alaskan Arctic region could prove the most helpful start in creating the programmatic ramp that could result in a multiyear approach to smart civil/military solutions to enable PSC homeporting, particularly, as industry sees opportunity to also invest in Arctic maritime transportation, tourism and extraction activities. From a geostrategic vantage, I do respectfully recommend that planners and programmers focus on increasing capabilities at/near the Bering Strait, as this maritime chokepoint could become as important as the Straits of Malacca or the Panama Canal to global maritime commerce.

While USCG Search and Rescue in Alaska and the U.S. Arctic is well known and highly regarded, providing pollution and other environmental response across Alaska's coastal and maritime region is a thankless and exacting mission for the USCG. Spill response is costly, and proactive prevention is difficult and logistically straining. Scientific research and oil spill response communities provide important support to the efforts, but to be sure, advancing science of spill response and improving

inspections using science and autonomous systems to better monitor across storage facilities across vast and remote regions will grow more important as facilities age and are more compromised by thawing permafrost and other environmental changes underway across the Arctic.

Advancing the U.S. Coast Guard's Arctic and overall polar capabilities also means advancing trusted relationships, with other Arctic Coast Guards as conducted via the Arctic Coast Guard Forum, but importantly with Russian counterparts (for Bering & Chukchi Sea waterways management), Canadian Allies and with the Kingdom of Denmark as well as representative government on Greenland. Sustaining trusted relationships are a domestic matter as well. U.S. Coast Guard Arctic relations across Federal Departments and Agencies, State of Alaska, Alaska Native Communities and Academic partners take time to develop and once established, should be nurtured and sustained. In particular, it remains critical to consult and understand the challenges faced by the U.S. citizens of the Arctic who see firsthand, the changing Arctic maritime and can provide uniquely important insights beneficial to safety and security responders. The adage that you can't surge trust or a trusted relationship . . . applies in full measure to the Arctic.

While the Arctic region is increasingly impacted by the changing physical terrain and a rise in a variety of human activities, the Arctic also provides some of the best examples of international cooperation on the planet. Highlights include the Arctic Council, led by 8 nations and 6 internationally recognized Arctic Indigenous groups, and supported by outstanding scientific research and focused working groups; the International Maritime Organization (and the IMO's supporting Polar Code); the International Arctic Science Committee; the University of the Arctic; the Arctic Coast Guard Forum; and the Arctic Security Forces Roundtable.

While I am certain the Committee is familiar with the United Nations Convention on the Law of the Sea, as a former military operator and someone familiar with international maritime operations, in an Arctic context, the United States could realize a stronger advantage by ratifying the treaty. In understanding there are both pros and cons towards ratification, failure to ratify reduces the influence in advancing U.S. interests in rules-based order across the international maritime region. The United States is fortunate to have Canada as our closest Arctic defense and security partner and ally. This includes a shared defense commitment through the North Atlantic Treaty Organization, shared protection via protecting respective aerospace domains and the maritime approaches to Canadian and American sovereign territory via the North American Aerospace Defense Command (NORAD) and a complementary defense arrangement through United States Northern Command and Canada's Joint Operations Command. This bi-national defense cooperation is supported by the Canada-U.S. Permanent Joint Board of Defense (PJBD), established in 1940 by joint declaration between the U.S. President and the Canadian Prime Minister. PJBD today has 4 CANUS departments represented: DoD, DHS and Canada's Department of National Defense and Department of Public Safety. As useful as the forum is towards advancing bi-national defense and security cooperation, it remains perhaps, a bit underleveraged in both Washington and Ottawa.

While fortunate to have Canada as a close and enduring ally in securing and defending the North American Arctic, there are key drivers of concern that warrant increased support to our national security efforts in the Arctic region, and in particular, support to the USCG.

While the Department of Defense has rightly benefitted in gaining increased readiness and capability through national reinvestments, the USCG has lagged in gaining the needed appropriations to renew and improve operational capability and supporting infrastructure to support this sea service to conduct its statutory assigned missions in both defense and security in the U.S. Arctic EEZ in the Bering, Chukchi and Beaufort regions and providing the ability to project sovereign U.S. maritime surface presence into the international ice laden waters east of North America. For a nation with Global interests and an implied intent to operate across the global commons of the Polar regions, the Nation's Coast Guard does not have the numbers of PSCs or the supporting capabilities to operate, command and control and sustain presence to match interests.

What may not be clear to the Committee, is the role the Arctic Domain Awareness Center (ADAC) at the University of Alaska provides to supporting the U.S. Coast Guard or other Department of Homeland Security Arctic missions. ADAC is a Center of Excellence in Maritime Research that is part of the DHS Science and Technology Office of University Programs (DHS S&T OUP). ADAC was founded in the Summer of 2014, received its first funding in January 2015 and is now in its seventh year of providing science and technology research, professional workforce research assistance-ships (at both the undergraduate and graduate levels) and planning an array of conferences and workshops, convening Arctic minded professionals

in security, defense and supporting disciplines, virtually all inclusive of Canadian participation, with many also including Nordic Allies and partners. It is important to note, that ADAC works comprehensively to characterizing the dynamics of change (as previously discussed), in platforms, models, decision support and knowledge products to assess the associated impact to crisis response at granular levels, to enable smarter decisions and smarter decision making.

ADAC and its associated research network have developed an important new capability in oil spill response via autonomous underwater vehicles and communications systems suited to the Arctic region. ADAC has created and greatly advanced a construct called the “Arctic Incidents of National Significance” method which creates new research by convening operators, scientists and industry to address specific concerns oriented to “what keeps the commander up at night” to create solutions for gaps and shortfalls in Arctic capabilities. This approach has generated new awareness tools, decision support science and advances in Arctic search and rescue and marine pollution response.

ADAC has recently commenced a new research project using unmanned aerial systems from the University of Alaska Fairbanks to train and equip local operators Unalakleet for monitoring of fuel storage facilities to support U.S. Coast Guard marine inspection requirements. ADAC is just about ready to commence a new comprehensive Arctic and Alaskan communications and connectivity assessment, oriented to a whole of mariner community approach.

In sum, this center of maritime research led by the University of Alaska is creating domain awareness across a region that is woefully lacking in such knowledge.

If/as desired, I would be pleased and honored to provide more information about the Center as meets the desires of the Committee. If/as desired, the following website provides a substantial insight to the Center’s people, programs and activities: <https://arcticdomainawarenesscenter.org/> In sum, ADAC has built trusted relationships across DHS and USCG, across the U.S. Federal and State of Alaska governments, Alaska Arctic communities, Arctic science professionals across the United States and with Canadian counterparts in each corresponding facet. To be sure, our team serves everyday focused to advance science and technology and other programs to benefit the DHS and USCG in their Arctic mission.

Conclusion.

I respectfully submit, it is not my place to recommend to the Coast Guard or the Department of Homeland Security in how to present the requirements for Congressional funding or which of the myriad of competing demands for funding in the department or the service should receive the highest priority. In equal measure, it is not my place to recommend to this Committee, what funding priority that is presented to the Committee should receive highest consideration. I would recommend however, the U.S. Coast Guard is the nations’ vanguard to secure the U.S. Arctic maritime region, protecting fisheries and other marine life, rescuing people, responding and recovering from marine pollution events, supporting the science community to the benefit of many and projecting American sovereign power across the ice laden waters of the Arctic. Supporting USCG Arctic and Polar capability, is in the national interest. Providing this selflessly serving community of USCG mariners the capability to meet the full spectrum of statutory missions to respond at strength in and across the Arctic, will preserve our resources, advance national power to meet the rising challenge from other competing nations, support civil safety and security and will provide America’s Arctic allies and partners, needed assurance of U.S. commitment towards the peaceful opening of the Arctic.

The State of Alaska’s official motto “North to the Future” is a relevant now as ever. Accordingly, I believe the importance of the Arctic will continue to rise. As the community of science projects Arctic warming will continue, associated environmental changes will continue accelerate, and accordingly, measures to address, adapt and increase resilience will need critical continued investment.

The economic opportunity of the Arctic and in particular, the U.S. Arctic seem quite profound, but should be viewed at more than just another opportunity access natural wealth. Economically developing the Arctic in a sustained and responsible manner is a critical national interest and a flourishing economy that integrates existing culture, respectful to Alaskan Natives and other long-standing Arctic residents holds needed promise to lift a region to the benefits of these regions, the State of Alaska and the Nation.

Waterways in the Bering and Chukchi could one day prove as one of the globe’s most important to maritime commerce. Managing the incredibly important fisheries and marine life in the U.S. Arctic maritime, providing safety at sea, securing U.S. EEZs and being vigilant and prepared to respond to crisis and disaster in one of the most pristine areas on the planet provides a remarkable task list for the U.S.

Coast Guard. I do believe that prioritizing the needs of the Coast Guard to address this task list is critical for the Committee to consider and to address in a substantial way.

Thank you for the opportunity to provide these reflections, and please know how appreciative I am of your service to our Nation in providing political leadership in these difficult times. I genuinely appreciate your support and enabling efforts to ensure the U.S. Coast Guard can safely and properly meet the challenges and secure the opportunities of the developing Arctic region. I respectfully look forward to addressing your questions.

Senator SULLIVAN. Thank you, General. Ms. Madsen.

**STATEMENT OF STEPHANIE MADSEN, EXECUTIVE DIRECTOR,
AT-SEA PROCESSORS ASSOCIATION**

Ms. MADSEN. Thank you, Mr. Chairman. Chairman Sullivan, Ranking Member Markey, members of the Subcommittee, thank you for the opportunity to testify. My name is Stephanie Madsen. I am the Executive Director of the At-Sea Processors Association. I have spent my entire career living and working in the Bering Sea, Aleutian Islands region. This part of the Arctic includes some of the most productive fishing grounds on Earth. It is a truly remarkable place with its rich native culture, stunningly productive marine ecosystem, and vital geopolitical positioning adjacent to the Russian maritime boundary.

For decades, the U.S. fishing industry has been able to operate in the eastern Bering Sea safely and with legal certainty. That sense of security was shattered during the last week of August, when Russian military warships and warplanes initiated a series of outrageous confrontations with U.S. fishing vessels operating lawfully within the U.S. EEZ. These confrontations, unprecedented in my almost 40 years working with this industry, gave rise to genuine fears for the physical safety of fishing captains and their crews, and cost the affected companies millions of dollars in lost fishing opportunities.

In the first such incident, the Northern Jaeger was harassed by members of the Russian military over the course of 5 hours, a Russian war plane flew overhead for 2 hours, issuing warnings and threats via radio through broken English. Those threats later escalated via transmissions from a nearby Russian warship. Until they reached such a fever pitch, the Northern Jaeger Captain Tim Thomas felt he had no choice but to protect the safety of this crew by complying with Russian military orders that he sailed 5 hours south and not return until September 4. In the second such incident, Russian warplanes repeatedly buzzed two vessels, Blue North and Bristol Leader, warning via radio that they were on live missile fire zone and in imminent danger.

They ultimately felt compelled to follow Russian military orders to chart a specific course at maximum speed with Blue North Captain David Anderson cutting his fishing gear loose in order to evacuate the area quickly. In the third such incident, three Russian warships rapidly approached a cluster of fishing vessels, ordering that they changed course immediately. When one of those vessels, the Vesteraalen, replied that it had fishing gear in the water so it had limited ability to change course, a Russian warship came directly toward it, maneuvering as if to signal hostile intent. The warship came within a half nautical mile of Vesteraalen before

changing its course. As a representative of the U.S. fishing industry and indeed a proud American citizen, I am outraged that the U.S. vessels would—could ever be subjected to this kind of treatment by a foreign military power.

Today, I want to share two main messages with the Committee. First, in any future incident such as this, U.S. authorities must be far more active in safeguarding our sovereign fishing rights. We would later learn that these confrontations were related to a major Russian military exercise of which the Government received notice, yet nothing about the exercise was commuted to our industry. Furthermore, when captains contacted the Coast Guard to convey what was occurring, frontline Coast Guard personnel seemed unaware and were largely unable to provide our captains with guidance. In the event of any future exercise, news of what is planned must be shared widely in advance with our fleets, as well as smaller vessels operating out of the Northern Bering Sea communities.

The Coast Guard must be on alert and Coast Guard assets must be deployed to the area to provide any assistance necessary to U.S. vessels. Alarmingly, none of those things happened here. Second, this kind of harassment simply cannot be allowed to become a new normal. In the rapidly changing Arctic, we fear being caught in the crossfire of Russia's effort to establish a more assertive military and economic presence, our sovereign right to legally fish within the U.S. EEZ must be protected. From our vantage point, a remote U.S. military presence to protect U.S. interests in the region is simply non-negotiable.

I would defer to my fellow witnesses with such impressive military credentials and expertise to opine on precisely what form that should take. But I thank the members of the Subcommittee for their focus on this region and for considering the enormous economic and national security stakes that are at play. Thank you, Mr. Chairman.

[The prepared statement of Ms. Madsen follows:]

PREPARED STATEMENT OF STEPHANIE MADSEN, EXECUTIVE DIRECTOR,
AT-SEA PROCESSORS ASSOCIATION

Chairman Sullivan, Ranking Member Markey, and Members of the Subcommittee, thank you for the opportunity to testify. My name is Stephanie Madsen, and for the last 12 years I have served as Executive Director of the At-sea Processors Association—a trade association representing six member companies that operate catcher-processor vessels in North Pacific and U.S. West Coast fisheries. The most important fishery in which we participate is the Bering Sea/Aleutian Islands Wild Alaska Pollock fishery—the largest seafood fishery in the world. My members are proud to have been at the forefront of management innovations that have made our regions' fisheries a global model for sustainability. We are also a very proud contributor to Alaska's seafood economy, which supports 101,000 U.S. jobs and earns an estimated \$5.6 billion in annual labor income.

I have spent my entire career working in and around the Bering Sea/Aleutian Islands region. This part of the Arctic is truly remarkable, with its rich Native culture, stunningly productive marine ecosystem, and vital geopolitical positioning. Pollock fishing transcends the maritime boundary with Russia; our vessels operating in the U.S. Exclusive Economic Zone are sometimes within literal shouting distance of Russian vessels fishing for pollock in their waters. Yet in spite of this close proximity to a geopolitical adversary, our industry has for decades been able to operate safely and with legal certainty, relying on the USA/USSR Maritime Boundary Agreement concluded between James Baker and Eduard Shevardnadze on June 1, 1990.

That feeling of certainty and safety has been shattered by recent confrontations initiated by Russian military warships and warplanes with U.S.-flagged fishing vessels operating lawfully within the U.S. EEZ. These incidents were alarming in and of themselves; they gave rise to genuine fear for the physical safety of fishing captains and their crews, and they disrupted the business operations of fishing companies at a critical point in a very important fishing season. They also give rise to an urgent question: do we risk these kinds of confrontations becoming something of a “new normal” in the changing Arctic? And if so, what are U.S. policymakers and military planners doing to safeguard U.S. economic and security interests in this vital region?

Military Confrontations

The last week of August started as a typical one in the summer fishing season. U.S.-flagged fishing vessels were operating throughout the Eastern Bering Sea. As always, different segments of the fleet were targeting a variety of species using traditional fishing methods. APA catcher-processor vessels work in parallel with smaller catcher vessels that deliver pollock and other groundfish to motherships for processing. Another fleet of catcher-processor vessels targets non-pollock groundfish such as Atka mackerel and flatfish, while freezer-longline vessels target Pacific cod. These Bering Sea fishing grounds are among the most productive anywhere in the world—although this year fishing conditions have been particularly challenging due to shifts in the stock dynamics and distribution.

Tuesday, August 25 provided the first indication that it would not be a typical week for our fleets. The *Island Enterprise*, a catcher-processor vessel operated by Trident Seafoods, was fishing in the vicinity of Pervenets Canyon when suddenly, without warning, a large submarine—what we learned later to be an Oscar-class Russian nuclear submarine—surfaced in the vicinity. Shortly thereafter a warship appeared, traveling at 17.5 knots on direct course towards the submarine. The warship made no contact with the *Island Enterprise*, but came within 2.5 nautical miles. Other vessels also observed the submarine and warship that day. These were our first clues that a major Russian military operation was underway smack-dab in the middle of our fishing grounds.

The close and unexplained proximity of a foreign warship and submarine were, as you can imagine, immediately troubling. However, it is the events that unfolded the following day, August 26, that have given rise to deep concern throughout our industry. On that day the Russian military initiated a series of confrontations with U.S.-flagged fishing vessels that were, from our perspective, dangerous and completely unacceptable. These confrontations gave rise to genuine fears for the safety of captains and their crews, and in some cases led to operational decisions that collectively cost companies millions of dollars in lost fishing opportunities.

- In the first such incident, the *Northern Jaeger*—a catcher-processor vessel operated by American Seafoods—was harassed by members of the Russian military over the course of approximately five hours. *Northern Jaeger* Captain Tim Thomas was positioned 21 nautical miles inside the U.S. EEZ when what he recognized to be a Russian military warplane started flying over his vessel. The warplane initiated radio contact, and through broken English started to deliver an alarming drumbeat of messages warning of “danger” and insisting that he “leave” as it continued to fly over the vessel at an increasingly low altitude. Despite his best efforts—which included enlisting the assistance of a Russian-speaking member of his crew—he was unable to ascertain from the warplane a clear sense of what was happening or to learn of any specific course of action that was being requested of him. During this period Captain Thomas repeatedly stated that he was operating lawfully within the U.S. EEZ and couldn’t be ordered to “leave”. He also initiated multiple conversations with United States Coast Guard personnel, none of whom appeared to be aware that a major Russian military exercise was underway in the U.S. EEZ. After approximately two hours the warplane departed, and radio contact was initiated by a Russian warship that was positioned approximately 40 nautical miles away. Communications from the warship became increasingly urgent, warning of imminent danger and demanding that the *Northern Jaeger* leave, without providing specific coordinates. Captain Thomas sought to chart a new course on several occasions, but each time communications came back from the Russian warship making clear that they were not satisfied. Eventually, the Russian warship ordered that Captain Thomas sail due South “for five hours” and not return to the area until September 4. Ultimately, with the level of intensity of the Russian military communications continuing to increase—and no satisfactory explanation or support provided by the U.S. Coast Guard—Captain Thomas complied. He estimates that approximately five days of productive fishing time were lost by the

encounter and his resulting relocation, an economic harm estimated to total approximately \$1.5M.

- Positioned some distance to the north of Northern Jaeger were the Blue North and the Bristol Leader. These two freezer longliners were harassed by a Russian military warplane, which warned that they were in a live missile fire zone and in imminent danger. Bristol Leader Captain Brad Hall and Blue North Captain David Anderson recount similar experiences, with repeated fly-overs at low altitude—in some instances as low as an estimated 200 feet. After initiating radio contact, the warplane issued orders that they leave the area on a specific course at maximum speed. Both captains sought advice from the U.S. Coast Guard but were unable to learn any additional details about what was occurring. Coast Guard personnel told Captain Anderson to comply with the orders he was being given by the Russian military. Ultimately, both captains felt that they had no choice but to abandon their fishing activities and exit the area. The Blue North cut its fishing gear and left it behind in order to be able evacuate the area quickly. It was only when the vessels fully complied with the Russian warplane's orders that the harassment ceased. The economic losses relating to disabling fishing gear and relocating from productive fishing grounds were significant.
- In another area, more than 50 nautical miles inside the U.S. EEZ, six U.S. catcher boats and two motherships were operating along the shelf break. Three Russian warships and two support vessels appeared, and initiated radio communication with two of the catcher boats—the Vesteraalen and the Mark 1. As the warships rapidly approached the catcher boats, they issued orders that they change course immediately, warning of imminent danger. The Vesteraalen responded that it had fishing gear in the water so had limited ability to change course. In response a Russian warship came directly towards the Vesteraalen, maneuvering as if to signal hostile intent. The warship came within half a nautical mile of the Vesteraalen before finally changing course.

As a representative of the U.S. fishing industry—and indeed as a proud American citizen—I find it completely unacceptable that U.S.-flagged vessels operating lawfully within the U.S. EEZ could ever be subjected to this kind of treatment. The fact that U.S. fishing companies, captains and crew had not been directly advised that a major Russian military exercise was planned in their sphere of regular operation is deeply concerning. The idea that U.S. vessels could be subjected to this kind of harassment by a foreign military power is alarming. And the notion that U.S. captains should be complying with orders issued by members of the Russian military is offensive. We need to ensure that the events of August 26 never happen again.

Specific Observations

In the immediate term, we believe there are steps the U.S. government must take to ensure that any future Russian military exercise potentially impacting U.S.-flagged vessels is handled differently and that U.S. fishermen maintain their sovereign right to legally operate in the U.S. EEZ.

First, it is imperative that our industry be notified immediately and directly by our own government of any such planned exercise. Our understanding is that Russia provided notice of their intent to conduct these exercises, including specific coordinates, via HYDROPAC. This is a communication system that is not regularly monitored by our industry, and I want to be clear that it does not constitute sufficient notice to mariners. Furthermore, as noted above, some U.S. vessels were harassed outside the coordinates provided via HYDROPAC. We understand that the HYDROPAC notice was received by at least one agency of the U.S. government. If any part of the U.S. government is notified of such a foreign military exercise in the future, there must be a clear and widely-understood mechanism by which that news is communicated to potentially impacted fishing fleets so we are aware of the exercises and can respond accordingly should there be a threat to the safety of our vessels and crew. This mechanism needs to account for the diversity of fishing vessels active near the U.S.-Russian maritime boundary, from large catcher-processors to small skiffs operated out of Northern Bering Sea communities. Communications issued on the exercises fell short of alternatives that were available to U.S. authorities, such as issuance of a Marine Information Bulletin.

Second, other parts of the U.S. government—most importantly the United States Coast Guard—must be alerted and have an opportunity to plan for the safety of U.S. mariners, including U.S.-flagged fishing vessels while they lawfully operate within the U.S. EEZ. It is unacceptable that Coast Guard officers on the front lines were unable to provide our captains with even the most basic information or, in most cases, guidance when contacted.

Third, in the event of future foreign military operations in or near the U.S. EEZ in the Bering Sea, plans should be in place for the U.S. Coast Guard to have an at-sea presence in the area to deter engagements by the foreign military with U.S.-flagged vessels lawfully operating in the U.S. EEZ and to better intervene in the event there is engagement or other immediate danger to our vessels. Communication to our vessels of potential threats to our safety should be coming from the U.S. Coast Guard, not the Russian military. Recognizing the need for a presence after the August 26 events, the Coast Guard ultimately deployed the CGC ALEX HALEY to the area for the remainder of the planned exercises. This was appreciated, but future plans should include the deployment of at least one cutter to an area for the entirety of an operation to help prevent a recurrence of what occurred to our fleets.

A New Normal?

Beyond requesting the Subcommittee's help in securing these Federal process improvements, I welcome your focus on the broader geopolitical challenges in the Arctic region of which these confrontations appear to be merely one symptom. If indeed these exercises are part of Russia's effort to establish a more assertive presence in the Arctic—especially in a world where receding sea ice extent provides a set of new economic and military opportunities for regional powers—that is a cause of genuine alarm for our industry.

Our sovereign right to legally fish within the U.S. EEZ must be protected. Our concerns are heightened by recent proclamations by members of the Russian Duma calling into question the legitimacy of the U.S./Russia boundary line—a cornerstone of the framework for our Federal fisheries. Russian naval exercises cannot be allowed to serve as a deterrent to the fully legitimate operations of a U.S. fishing fleet that competes directly with the Russian seafood industry in global markets for pollock, Pacific cod, and other groundfish.

Anxiety throughout the industry was also further heightened when a Russian warplane harassed our vessels in a separate incident the following month. On September 14, approximately 70 miles west of St. George, a Russian warplane made two direct passes over a U.S.-flagged catcher-processor vessel, the Starbound—the first starboard to port, the second stern to bow—and then performed a fly-over of a second one of our vessels, the Alaska Ocean. The captains estimate that the aircraft was at approximately 500 feet. No radio contact was made. This incident does not appear in any way related to an officially-noticed military exercise. Although it didn't come with the level of economic cost or genuine fears regarding crew safety that accompanied the August 26 incidents, it is extremely worrying if it is indicative of a broader trend.

From our vantage point—on the front lines of a changing Arctic—a robust U.S. military presence to protect U.S. interests in the region is simply non-negotiable. I will defer to my fellow witnesses, with such impressive military credentials and expertise, to opine on precisely what form that should take; but I thank Members of the Subcommittee for their focus on this region, and for considering the enormous economic and national security stakes that are at play.

Senator SULLIVAN. Thank you, Ms. Madsen. And I agree with your comments wholeheartedly and we will have a good discussion on some of the details of those. Hopefully you saw Admiral Ray's testimony in the Coast Guard's view on that as well. Dr. Francis, you have 5 minutes for your oral statement and if you would like a longer written statement, we can provide that for the record.

STATEMENT OF JENNIFER FRANCIS, SENIOR SCIENTIST, WOODWELL CLIMATE RESEARCH CENTER

Ms. FRANCIS. [Technical Issue.] Alright, everyone, I just have a few slides I want to share while I am speaking. Alright. Good afternoon—thank you to Chairman Sullivan and the Committee, and in particular to Senator—for inviting me to testify—today is because of the staggering decline in Arctic sea ice.—percent in this animation. Think of this ice as the Earth's mirror. It reflects most of the sun's energy that hits it right back to space without entering the climate system. And losing so much of this mirror is literally a threat multiplier to our National Security in several direct and in-

direct ways that are distinct from those you have already heard about today. The most direct impact of ice loss is the escalation of global warming.

The extra heat now being absorbed in the Arctic Ocean has intensified global warming by 25 to 40 percent. The implications of this are sobering. This year alone, we have all watched in horror as a record number of billion dollar disasters, including wildfires, heat waves, floods and rapidly intensifying hurricanes, devastated parts of the United States and elsewhere, threatening communities, straining agriculture and food security, and stretching relief resources. This, Senators, is the face of climate change. The ice loss is also causing the Arctic to warm two to three times faster than the Earth as a whole.

This is exacerbating the melt of glaciers and the Greenland ice sheet, which is accelerating sea level rise and threatening coastal cities and infrastructure worldwide. The rapid warming is in the—permafrost—grows in Arctic soils. Which could release—affects the frequency of extreme weather events as the North to South difference in air temperature is a major factor controlling weather patterns. Recent research, including my own, suggests that a reduction in that temperature difference will make weather systems more persistent, which can lead to prolonged droughts, heat waves, storminess and even cold spells. Disrupted weather patterns pose new challenges to farmers and food security, electric utilities, drinking water managers and even human survival.

The peoples of the North are also being directly affected by their transformed surroundings. Traditional hunting is their primary source of food, and the loss of ice as a hunting platform has thrown their way of life into chaos. The species that usually hunt have shifted migration patterns or disappeared altogether, and subarctic animals have appeared well North of their typical ranges. The ice serves as a means of transportation as well, but now it is often too thin to be trusted.

Moreover, their coastal villages are being washed into the sea by large storm waves as winds now blow over ocean, open ocean rather than over stable sea ice. Their roads and airstrips are buckling as the ground beneath them thaws and collapses. These impacts are undermining the security of Arctic communities in Alaska and around the hemisphere. The news is not all bad, however. Expanded areas of ice free Arctic waters enable normal cargo vessels to shortcut passages between major commercial ports in Eurasia and North America.

Natural resources that have been inaccessible under the ice to now be more easily and economically exploited. But this easier access also comes with heightened risks to those venturing into an Arctic Ocean with little in the way of our infrastructure, emergency facilities, accident mitigation resources, or even ports of call. Change has come quickly, and the region is woefully unprepared for these new activities. What can we do about these threats to National Security posed by Arctic ice loss and warming? The impacts I have discussed are symptoms of the underlying disease.

To treat the disease, we need to pull out all the stops to reduce emissions of heat trapping gases and to remove carbon from the atmosphere by both natural and technological means. The symptoms

must be addressed by proactively building resiliency, which depends on research that characterizes the physical threats, identifies the specific risks, and develop strategies to protect those in harm's way. This will not be easy or cheap, but the reactive approach will be much more expensive and threatening to National Security. Thank you very much.

[The prepared statement of Ms. Francis follows:]

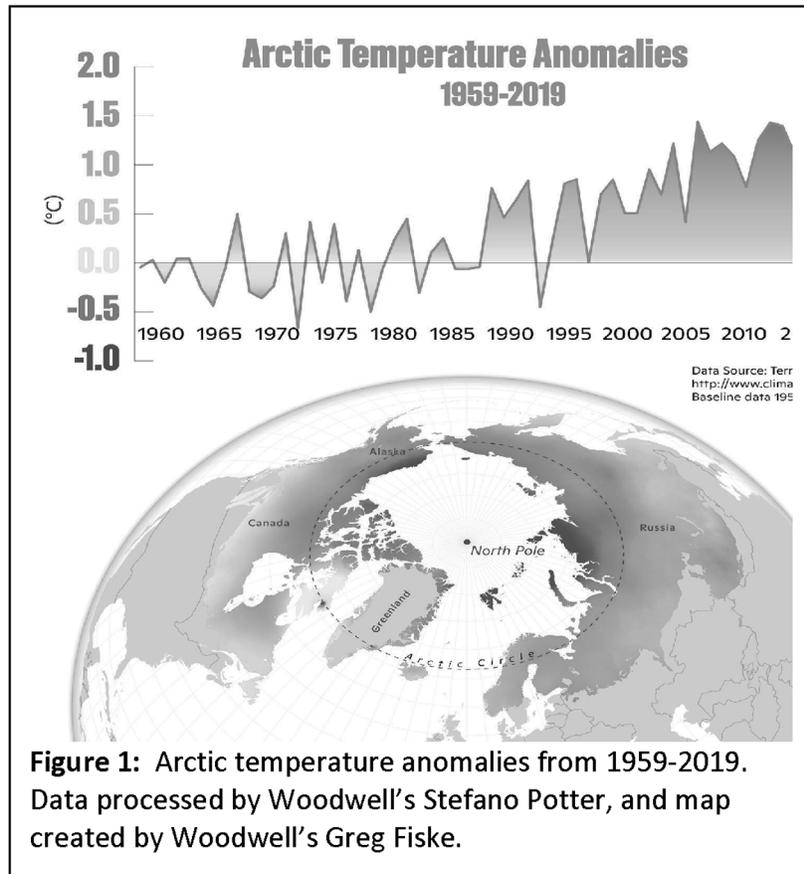
PREPARED STATEMENT OF DR. JENNIFER FRANCIS, SENIOR SCIENTIST,
WOODWELL CLIMATE RESEARCH CENTER

Thank you to the committee and in particular to Senator Markey for inviting me to provide testimony for this hearing.

The Woodwell Climate Research Center is a Massachusetts-based non-profit organization of researchers who work with a worldwide network of partners to understand and combat climate change.¹ Our scientists helped to launch the United Nations Framework Convention on Climate Change in 1992, and shared the Nobel Prize with the Intergovernmental Panel on Climate Change in 2007. Woodwell brings together cutting edge science, and 35 years of policy impact to find societal-scale solutions that can be put into immediate action. Our scientific expertise is on climate change impacts, natural climate solutions, and climate risk. This includes work with extensive research on the local, regional, and global impacts of the rapidly warming Arctic.

I am a senior scientist and a member of the Arctic Program at Woodwell. I received my PhD in Atmospheric Sciences from the University of Washington in 1994. After 24 years as a research professor in the Department of Marine and Coastal Sciences at Rutgers University, I joined Woodwell in 2018. My research focuses on connections between climate change and the rising frequency of extreme weather events, particularly the role of rapid warming and melting in the Arctic.

Fossil fuel combustion and deforestation release heat-trapping greenhouse gases, which in turn, have caused global average temperature to rise at unprecedented rates. From 1901–2019, the globe has already warmed by 1°C (1.8°F), with nine of the top ten warmest occurring since 2005.² The rate of warming is not attributable to natural causes; in fact, the globe would be in a cooling phase now if it were not for the effects of human activities. The responses of Earth's natural systems to the warming are already adversely affecting our quality of life, and these impacts will worsen for generations to come if emissions of heat-trapping gases are not curtailed severely and rapidly. Mitigating, understanding, and preparing for these impacts is critical, hence the vital importance of hearings like this one.



The effects of rapid Arctic change on the frequency and severity of physical hazards will affect society in all regions of the world, but none more so than in the Arctic.

The pace of change in the Arctic system has been nothing short of staggering; the Arctic is experiencing the greater increase in average surface temperature globally (*Fig. 1*). In just the past 40 years, half of the ice floating on the Arctic Ocean has vanished during summer.³ Ice volume has declined by a whopping 75 percent (*Fig. 2*). Indeed, the dramatic loss of Arctic sea ice is the primary reason for the recent intense focus on the Arctic region. You can think of this ice as the Earth's mirror: it reflects most of the sun's energy that hits it right back to space without entering the climate system. Losing so much of this mirror is literally a threat multiplier to our national security in several direct and indirect ways that are distinct from those related to military concerns.

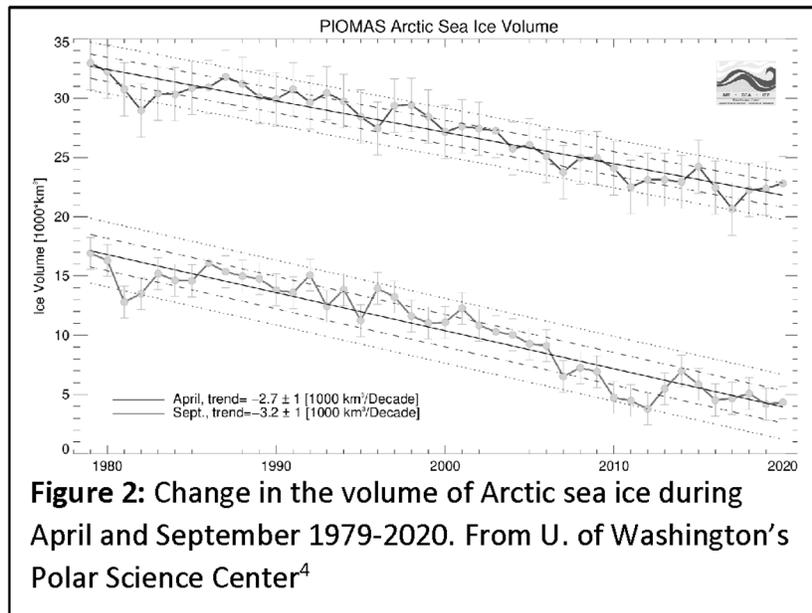


Figure 2: Change in the volume of Arctic sea ice during April and September 1979-2020. From U. of Washington's Polar Science Center⁴

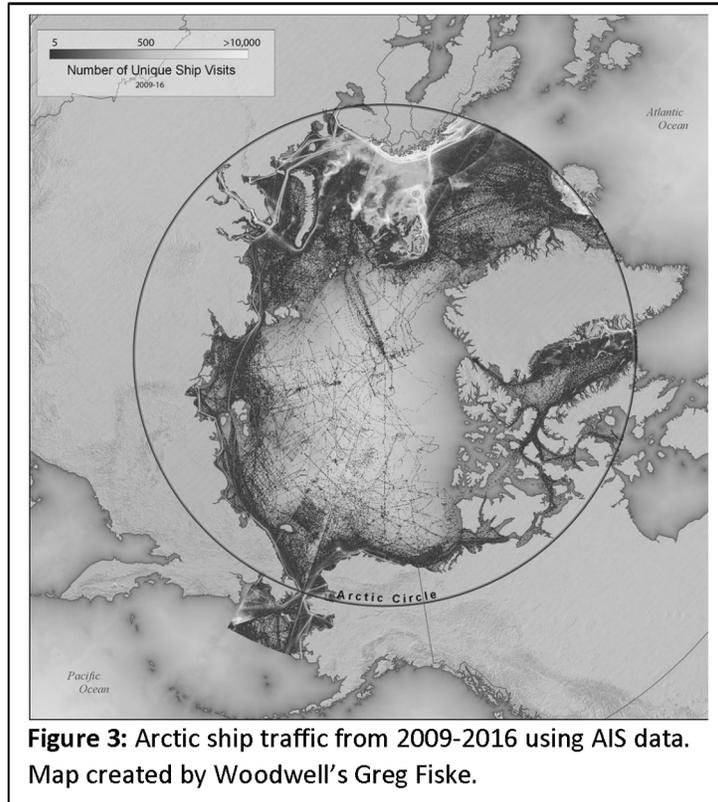
The most direct impact of ice loss is the escalation of global warming. The extra heat now being absorbed by the planet where ice used to exist has intensified global warming by 25–40 percent.⁵ The implications of this are sobering. This year alone, we've all watched in horror as a record number of \$1 billion disasters⁶—including wildfires, heatwaves, floods, and rapidly intensifying hurricanes—devastated parts of the U.S. and elsewhere, threatening the security of affected communities, straining agriculture and food security, and stretching relief resources. This, Senators, is the face of global warming.

The ice loss is also causing the Arctic to warm three times faster than the Earth as a whole. This is exacerbating the melt of glaciers and the Greenland ice sheet, which contributes directly to the recent acceleration of sea-level rise, threatening coastal cities and infrastructure world-wide.⁷ The rapid warming is also hastening the pace of permafrost thaw—frozen Arctic soils—which could release vast stores of additional fossil carbon into the atmosphere.⁸ Arctic warming also affects the frequency and intensity of extreme weather events, as the north-to-south difference in air temperature is a major factor controlling weather patterns. Recent research, including my own, suggests that a reduction in that temperature difference will make weather systems more persistent, which can lead to prolonged droughts, heatwaves, storminess, and even cold spells⁹. As we all have witnessed, these tendencies have emerged in spades. Disrupted weather patterns pose new challenges to farmers and food security, electric utilities, drinking water managers, and even human survival.

The Peoples of the North are also being directly affected by their transformed surroundings. Traditional hunting is their primary source of food, and the loss of ice as a hunting platform has thrown their way of life into chaos. The species they usually hunt have shifted migration patterns or disappeared altogether, and sub-Arctic animals have appeared well north of their typical ranges. Sea ice serves as a major transportation resource, as well, but now it is often too thin to be trusted. Moreover, their coastal villages are being washed into the sea by large storm waves, as winds now blow over open ocean rather than over stable sea ice. Their roads and airstrips are buckling as the ground beneath them thaws and collapses. These impacts are undermining the security of Arctic communities in Alaska and around the hemisphere.

The news is not all bad, however. Expanded areas of ice-free Arctic waters enable normal cargo vessels to short-cut passages between major commercial ports in Eurasia and North America. Natural resources that have been inaccessible under the ice can now be more easily and economically exploited. But with this easier access also come heightened risks to those venturing into an Arctic Ocean with little in

the way of infrastructure, emergency facilities, accident mitigation resources, or even ports of call. In collaboration with Tufts University, Woodwell scientists have charted more than 122 million messages from satellite Automatic Identification System (AIS) data, mapping Arctic ship traffic from 2009 to 2016 (*Fig 3*). The mean center of ship traffic has moved 300 km to the north and east, taking advantage of newly ice-free ocean. Change has come quickly, and the region is woefully unprepared for these new activities.



What can we do about these threats to national security posed by Arctic ice loss and warming? The impacts I've discussed are symptoms of the underlying disease. To treat the disease, we need to pull out all the stops to reduce emissions of heat-trapping gases and to remove carbon from the atmosphere via natural (such as reforestation) and technological (carbon capture) means.

The symptoms must be addressed by proactively building resiliency, which depends on research that characterizes the physical threats, identifies the specific risks, and develops strategies to protect those in harm's way. My colleagues at Woodwell are engaged in an assessment of risk owing to Arctic change, a collaboration with partners at The Center for Climate and Security (CSS). The CSS is a Washington DC-based non-partisan institute housed in the Council on Strategic Risks. That project is employing cutting-edge climate-risk modeling to understand how climate change impacts will play out in the region, and how those will affect the existing balance of security. The project will demonstrate the potential value of granular modeling of climate change impacts to anticipate and prepare for societal instability and security challenges.

Mitigating and adapting to climate change in the Arctic will not be easy or cheap, but the reactive approach will be much more expensive and threatening to national security^{10,11}.

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Senator SULLIVAN. Thank you, Dr. Francis, and I am going to ask some witnesses some of the similar questions that I asked Admiral Ray. General Kee and Ms. Madsen, I would like you to comment on the issue of Arctic—both Arctic infrastructure in the home porting of icebreakers in the Arctic region. As I mentioned, we have six that have been authorized in the National Defense Authorization Act years ago. One is being built now.

But as you know and you mentioned it General, the capacity of the United States relative to the great power competition rivals like China and Russia is significantly less, dramatically less. As we are building up the fleet and as we are looking at the issue of even short term bridge leasing, how much do you think it makes sense to make sure these assets are actually in the Arctic so they can respond to Arctic related National Security, economic security, environmental security, issues of ice being—somewhere else? General, we will start with you.

General KEE. Senator Sullivan, thank you very much for the question, sir, and I will offer a couple of brief reflections. Number one, I do respectfully believe that the ability to create home ports is a multi-year endeavor. It does require the ability to leverage a port that has multimodal transportation capabilities, whether it is road, rail, air, but some multimodal aspects of logistics that connect it—to connect that port to essentially transportation network.

And it does also, of course, really need housing, schools, and all, essentially the logistic support aspects of being able to handle the crews, the maintenance, logistics, support teams, etc., that the Coast Guard has that crews, essentially, this weapon system platform. So the idea to me and that is what I would respectfully offer to this conversation is, if you take the long-term approach that over time you build to a home port capacity, you take, maybe consider some ideas of building intermediate capacities, such as an expeditionary facility or expeditionary facilities that build essentially ports that the vessels can operate from essentially during a rotation of duty.

In between times they need, before—in between time they would need to go to conduct upper level repairs that would really require a kind of home port or a large scale facility. So to me, I look at

the idea that ultimately having home ports in the Arctic would make sense long term, is the idea that building this in concert with really from a civil, military or civil Government sort of joint venture makes perhaps much more sense based on the amount of actual cost it takes to building at heavy capacities of essentially depot repairs and the transportation networks.

So the idea is the answer is yes, it is just a matter of time. And then looking at solutions that are expeditionary or intermediate as you work through the stair steps to create an actual home port that has all that heavy capabilities that they are in. The idea of leasing as an interim measure to me, again, as an interim measure makes lots of good sense. It is going to be a while before we can field organic capability, but in addition to leasing platforms, we also need to think about is the whole logistics package, crews, main support, the logistics tail that goes with this to make sure that it is essentially a complete math equation that really encompasses all the cost variables in that leasing equation so that there is really no surprise to the Coast Guard or really, or to the Congress that would be authorizing and appropriating such expenditures.

So thinking through the full math equation of getting a comprehensive package of what it costs to do the leasing, I think is important. I do believe it is a good interim measure and it is a short term measure to buy time and reduce risk to allow the Coast Guard to get caught up with organic capabilities, to be able to have a more robust capability of projecting U.S. persistent presence into the Arctic region, I would say both the U.S. Arctic region and international Arctic waters spaces. I respectfully give the floor back to you, sir.

Senator SULLIVAN. So I am going to step out for one minute here. There have been a couple of votes that have been called. Senator Markey, I am going to yield the remainder of my questioning time to you and then I am going to try and get back here as quickly as possible. And so you can go vote if you haven't already voted. And then I will continue to follow up on the questions. If that sounds good to my Ranking Member, I am going to—I am going to head down and vote right now. I will be back. Thank you.

Senator MARKEY. Thank you, Mr. Chairman, very much. Climate change is an intersectional issue, it affects our health, our economy, our environment and security. We are talking about the need for robust security planning in the Arctic region. But changes in the Arctic means less security for the rest of the country as well. Dr. Francis, is it true that changes in the Arctic climate affect sea levels and weather patterns throughout the United States from Feldman to Florida?

Ms. FRANCIS. It is absolutely true, Senator Markey. Thank you for that question, yes.

Senator MARKEY. Yes, and it has repercussions that go far beyond any one region. Within the Arctic, warming temperatures and disrupting weather patterns are washing coastal villages into the sea, changing animal migration patterns, and collapsing roads and airstrips. Outside of the Arctic, the broader climate crisis is endangering public health through droughts, extreme weather, heat stress and other developing disasters. Dr. Francis, do you think we are doing enough to consider Arctic security in a holistic way, in-

cluding taking into account its effects on permafrost, weather patterns, indigenous peoples and global sea level rise?

Ms. FRANCIS. [Technical Issue.] Thank you very much for the question. I think we are doing way—at this point to, as I mentioned, to treat the disease, the underlying disease that is causing the ice to melt, that is causing—and in turn is causing sea levels, sea level rise to it—seeing this happening before our very eyes. So the changes that are happening in the Arctic are already affecting not only the people who live in the Arctic, but also down to the islands through sea level rise and through changes in weather patterns.

My own research is acutely on this connection between the rapidly warming Arctic and the changes in weather—the main underlying effect is to cause weather patterns to become more persistent. And when they become more persistent, that leads to things like longer droughts, and longer, more prolonged heat waves, and even longer stormy periods. You might remember—years ago when we had six Northeasters—almost in a row. These types of weather regimes that are becoming more persistent to a whole variety of extreme weather events.

Senator MARKEY. So how can the U.S. Government, including the Coast Guard, better invest in understanding and guarding against the effects of climate change in order to better increase our National Security and our economic security?

Ms. FRANCIS. [Technical Issue.] Well, I think one of the main avenues that we should be going down right now is increasing the amount of information about the physical world up in the Arctic region, both the atmosphere, the ocean, the ice and the biology. So the atmosphere, this would help with forecasting weather—lack of data and information.

And in terms of ocean effect, we know relatively little about the way that ocean currents move from up there and those things that affect how we could respond to or how the Coast Guard would respond to any kind of event that might happen up there. So, say, an oil spill, which has been mentioned. What's oil once it goes into the water, which way is the wind going to blow it, which way are the currents going to push it?

If there were an accident and people were lost overboard, which direction with the drift? We are severely lacking some of that basic information about the Arctic system itself, which would play into not only research, but also any kind of environmental crisis and many of the operations that the Coast Guard undertakes on a regular basis.

Senator MARKEY. And again, I apologize. I am going to have to go make this roll call as well. Just one final question, Dr. Francis, what areas of research do you think are most critical to invest in in order to better protect the Arctic and Arctic based resources?

Ms. FRANCIS. [Technical Issue.] Well, it really goes back to what I was just saying—understanding of how this ice and the ocean—works, but it is a real moving target. The Arctic that we have now is very, very different from the one that was there only 20 or 30 years ago. Any of—research that needs to occur and information that needs to be provided that can help us update—these—system-wide—

Senator MARKEY. Dr. Francis, I apologize to you. You are having a little bit of an audio problem right now. I just—I want to thank you so much, again. And I apologize because I have to make the same roll call that Chairman Sullivan is making. And I thank you so much for all your great work. And Randy, thank you for yours as well. But I am just going to put the hearing into recess until Senator Sullivan returns. But thank you, Dr. Francis, so much.

[Recess.]

Senator SULLIVAN. The Subcommittee hearing will now reconvene. And again, I appreciate the witnesses' cooperation and flexibility here as we are voting in the Senate. Ms. Madsen, I wanted to get back to you with regard to not only your testimony, but with regard to what Admiral Ray had said with regard to the incident that you mentioned, that really was an outrage with regard to not just the Russian actions, but as Admiral Ray mentioned, there were some miscommunications, certainly by the Coast Guard.

I have been asking for an after-action both from Northern Command, Coast Guard and the U.S. Navy. But what would you—as we are looking at this, what do you think we, and I am talking about the Coast Guard, the Navy, others involved, to prevent future incidences from happening again as you mentioned, this can't be the new normal, but what specifically would you and your members want to make sure happens with regard to Coast Guard actions and other actions that we as the U.S. Government can be taking?

Ms. MADSEN. Thank you, Mr. Chairman. I think that in our written testimony, we lay out three actions. The first one is definitely we need to hear from our Government, not from the Russian military, about any activities. And so I think that what we discovered is that I don't really know how to describe it other than there was some kind of a gap in communication between the U.S. Government who knew about the exercises and the Coast Guard that we depend on and communicate with quite frequently. So I think that is one. Our U.S. Government needs to communicate amongst itself. The other more important one is, if we know that these exercises are legal and going to continue, then I think we need Coast Guard assets on the ground so that there is someone not 200 miles away at least, that can provide some kind of protection or guidance to the fishing fleet.

Senator Sullivan, you might know that as you go further North, the border gets very constrained between the US. So it is not just a large fishing vessels that were impacted. Well, we were the ones that got impacted this year. But I am also concerned about some of those smaller vessels operating out of the Northern Bering Sea communities that in the future could also be impacted. So I think we really have to look at a variety of communication systems. And then when they know what is going on, we need to have Coast Guard assets there.

Senator SULLIVAN. I think that is a great recommendation, and so not just being made aware, which, of course, that should have already been happening, but with regard to an exercise of that size and nature, to have our own assets in the region to protect with regard to what we are doing in our own fishing fleet. So I agree with that. And I think that that is something we will strongly en-

courage with regard to the Coast Guard's activities. Let me ask again, General and Ms. Madsen, the issue of infrastructure.

We do have a large fishing fleet. It is an issue that as sea stocks move North, that the need for more infrastructure in Alaska is not just a National Security requirement, but an economic and a safety requirement. As I mentioned in my opening testimony, we are making substantial progress for a deep water port in Nome, Alaska, but where else and what else would you like to comment on with regard to infrastructure as it relates to protecting America's economic, National Security, fishing opportunities and other issues with regard to Arctic infrastructure? I would like for both of you to be able to comment on that.

Ms. MADSEN. Senator Sullivan, if I might start, Stephanie Madsen. As you know, Senator, I lived out in Unalaska, Dutch Harbor for 19 years. So I guess I am a little bit passionate about the international port of Dutch Harbor as one of the main deep water ports that is already in existence. Certainly Nome is very viable and very important as the Arctic becomes more open and security becomes more of an issue. So I think those two have definitely been identified.

You know, the Coast Guard—we depend on the Coast Guard. Thank goodness for the Coast Guard, not only to help us enforce fishing regulations, but to provide safety and rescue. And it is difficult even now to have them based in Kodiak and would have to respond, you know, where we were fishing this summer. So I think that that would also encourage and enable the fishing fleet as the distribution of the fish changes to help us feel secure and have Coast Guard responsive, including the polar ice breakers.

Senator SULLIVAN. General.

General KEE. Chairman, thank you. And also, before we go further, Senator, I would like to offer condolences as well. I did not get a chance to say in the opening reflects, but please accept my condolences to you and your family for your loss.

Senator SULLIVAN. Thank you.

General KEE. I would like to offer a couple of thoughts. First, that is a great question and I appreciate the opportunity to reflect. I look at this strategically that the Arctic interests are continuing to rise. Our Arctic economic security interests are continuing to rise. When you look at the idea of creating ports and deep water ports are enablers, not only, of course, the National Security interests that are places where Coast Guard vessels and really Navy vessels can operate from, but also an opportunity to provide the economic engine that is so needed in Western Alaska in particular, and to advance, essentially providing economic opportunity to advance the livelihood of those people who live there to give them options to be able to stay in this region and have a viable future and viable careers, as opposed to where there really is not the economic engine there yet.

And so strategically, the idea of building ports and increasing joint ventures with the commerce industry, the idea of an Arctic and really a bearing in Chukchi, Beaufort to Blue economy where mariculture and aquaculture activities could be pursued and a way to help begin the process of economically developing Western Alas-

ka. And it is in our national interest. We are also looking at, of course, that communications are critical.

The communications shortfalls, certainly what happened in August, are certainly a very evident. We as a Center that I have the privilege of shepherding are focused on commencing hopefully very, very soon a new study, it is called the Alaskan Antarctic Maritime Communications Connectivity Analysis, to really take a look across the mariner community of Alaska, breaking in five sectors to Southeast, Southcentral, the Bering, Chukchi and Beaufort, to really kind of break down what are the communications shortfalls that the mariners are facing, including, of course, the fishing fleet are facing in these regions, to be able to have that communication and connectivity ability so they can be notified in a timely manner and have the means to communicate when things such as what happened in August manifest.

The idea, of course, when you think about ports is an idea of looking at Dutch Harbor, of course, is well known and well suited for not only the bearing, but also projecting power into the North Pacific. When you look at Port of Nome, it is a shallow port at this point, getting into deep water capacity. But you also have the idea that, and I know several have talked about and I mentioned this in my relatively lengthy written statement, the idea of a port complex. I know I have ventured that idea forward, where you look at the port complex between the existing port structure in Nome and what is being built out there to include, of course, looking at port Clarins as a natural deep water area and the idea of a port complex that is conducted in places like this and the Gulf Coast.

The idea of building this over time and identifying opportunity there to not only, of course, serve commercial industry, for example, the graphite mine up there near Teller as a port, a place to—port Clarins, for example, could help service that. And ultimately the idea of building port infrastructure that connects with transportation nodes, idea looking toward the long term future of creating transportation nets and networks that include potentially road rail that connects Fairbanks, for example, out to Nome.

Again long term ideas, but the end of the day, if we are going to really realize our Arctic interests, in particular the Bering region, Bering, and Chukchi, we do need to think about how partnerships in the commercial sector could be of interest and viability to reduce the taxpayer burden, of course, but also to create the idea of joint ventures that can really provide prosperity to both the commercial sector, the residents who live there, and a place to operate safely for National Security assets. So those are some thoughts. I would respectfully reflect to you, sir.

Senator SULLIVAN. Alright. Thank you. Those are great. Ms. Madsen, I want to go back to Admiral Ray's comment at the end of his testimony on the issue of the Coast Guard's focus on IUU issues. And he talked about it from the perspective of the Coast Guard and the sustainability of our oceans and our fisheries throughout the world. I would like your perspective from that of the fishing fleet, can you share how critical it is to combating IUU fishing?

I was proud as your Senator, one of the first bills that I was able to get through this committee was actually the implementation of

the IUU fishing, treating the domestic legislation that did this. But how important is that, how equipped do you believe the Coast Guard is to combat IUU fishing issues, particularly as Admiral Ray talked about the fisheries migrating North, and what would you like, the Coast Guard or NOAA or other Federal agencies, to do more in this regard?

Ms. MADSEN. Thank you, Senator, for that question. As you well know, you know, our fisheries compete on the global market. And so if IUU fishing is not enforced, and that means that our markets are being impacted as well globally. And we are already—as you are well aware, because you are one of our heroes, that is a big impact to all of our fisheries, especially up in the North Pacific. So I believe that support of the Coast Guard, certainly funding, but I think it is a little bit bigger than just a Coast Guard.

I think internationally we are going to have to pool our resources together. But it is critical. It is important. You know, one of our direct competitors for pollock is Russia right now. So, you know, you have hit on it. You have been our champion. And I think it is just going to come down to persistence, continued funding, and some very strong actions that indicate to the globe that we are not going to stand for it.

Senator SULLIVAN. But so many of these issues, whether it is IUU fishing, whether it is protecting our economic interests, Dr. Francis, our environmental issue interests, they all in many ways converge on this issue of presence, infrastructure, Coast Guard vessels, icebreaking capabilities so the United States can actually be in the region, protect the region, and as Admiral Ray said, focus on what the Coast Guard does throughout the rest of the nation, which is protect the coasts and the sovereign interests of the country. Shouldn't be any different in the Arctic off the coast of Alaska than it is in the Gulf of Mexico. And I was glad to hear the Admiral say that.

General, let me ask a more specific question. Prior to this hearing, I was on the phone with the National Security Adviser, Ambassador O'Brien. He is the lead on the Presidential memo that came out in June. I thought it was very positive. It was something we had been pressing the Trump Administration to do exactly how to protect our economic and security interests in the region. And there is an interest in quite soon looking at bridging the gap with regard to icebreaker coverage that we currently have, which has been exacerbated by the HEALY fire for two medium-sized icebreakers to be leased.

There is a strong interest, I can tell you, at the White House to do this and to have these homeported in America's Arctic, in Alaska. If you had a recommendation for the National Security Adviser on this issue, where would you look to homeport? And it would have to be relatively soon, like within this year, two additional medium class icebreakers that could start to protect America's interests. It would be leased, obviously, from other sources and just being built. What do you think the best place is, given what you talked about earlier in your testimony, would be to homeport these two vessels in Alaska? Where would you recommend that?

General KEE. Well, first of all, thank you for that question, Senator. And let me offer a reflection before I address the question, be-

cause I think at this point it is really important to know the details of the lease package. So, for example, would there be an intent to have depot level repairs provided on scene where the vessel was, "home ported"? Because if you brought—you need to have that kind of capabilities. What would the leasing enterprise provide?

For example, would they provide vending logistics to conduct not only the medium level, if you will, through flight or through—oh, my goodness to talk like I start a pilot for a moment, but the through vessel missions that when they come and go and then back to station at home port, those essentially—that means is conducted between depot level repair. If that is going to be conducted by the vendor providing the vessel that we are leasing from, then its ability—it is really on to their ability to bring that capability forward. And so that, therein lies the challenge. If you had the company that we are leasing from, and would be anticipating this to be a finished effort, and as a NATO partner, not a NATO ally, certainly they have interoperability aspects in the commercial sector that will be well familiar to people. They are not military vessels, that is what Admiral Ray described, but they are certainly capable. And certainly helps bridging the gap.

So I would look to the fact of, you know, if they had a robust capability to bring forward, to do the kind of maintenance work needed, then I would get as far forward with that as I could, simply because they would be incumbent upon the vendor to provide that capability. If they are limited on this, for example, in the port of Nome, could be the place to operate from as an example, and especially if the draft was deep enough, interior space was available, and using air logistics to the airport there for time, sense delivery of materials and logistics would be, of course, a critical aspect to this. So the idea is, again, go as far forward—

Senator SULLIVAN. Let me—let me, sorry to interrupt you, but let me, if you had to—if this was a leasing decision soon, a home porting decision soon. I get the, and it is important as you highlight the details of the leasing package, but from what exists currently in Alaska in terms of Coast Guard capabilities, Coast Guard stations, pier space, what would be one or two locations that you would think would be top on the list?

General KEE. Well, then again—very close, Senator. I would look to obviously where the existing Coast Guard capabilities, for example, Kodiak and refurbishing aspects of Dutch Harbor. Both of those are known ports with existing pier space. Refurbishment costs are relatively minor at this point.

There is some housing there in Dutch Harbor. There is perhaps more housing available in Kodiak. So near term would probably be Kodiak, Dutch Harbor, and then looking further North to Nome as soon as you could get there, even if you operated from Nome part of the time and then retrograded back to either Dutch or Kodiak. Respectfully submitted.

Senator SULLIVAN. Let me ask, I am going to close a hearing with one final question for all three of the witnesses. You know, we have covered a lot of ground here. We know that the Arctic is challenged by remoteness, extreme environmental issues, severe weather issues, receding sea ice, but it is also a strategic area of major shipping locations, increase of great power competition, resources.

What we haven't talked too much about is emerging technology to cope, to overcome some of these challenges or play a greater role. I will just throw this out for the final question. Is there any technological approach to some of the challenges that we are not thinking about, that we might be able to take advantage of in the future, and that relates to domain awareness, that relates to observer capabilities, any of those issues that given the expertise of the three witnesses on this panel, you would like to just highlight for the Committee as a final topic before we close?

General KEE. Senator Sullivan, I would like to take a run to that question if it is OK with you.

Senator SULLIVAN. Sure.

General KEE. Strategically advancing science, technology and domain awareness really is about platforms, autonomous platforms, whether underwater, surface, or aerial, to be able to conduct the kinds of remote monitoring. This includes some of the infrastructure challenges the Coast Guard highlighted in really monitoring at-risk petroleum tanks and tank farms where environmental change and really degrading permafrost is causing many of these older structures to bear very close monitoring. Using unmanned aerial systems to monitor these is an important aspect.

Being able to not only have platforms that can respond to oil spill response or characterize the Arctic from a bathymetric standpoint are things that technology has, again, solutions that can be of support. This is an area that is rich for onward discussions. But communications, satellite based and terrestrial based built to have communication and connectivity to mariners, Coast Guard mission sets, and of course, that interoperable Defense community, I think is critically important.

And again, I would love to dive on this one deeper, but I know the time is short. So let me just offer those as a brief set of reflections. Last, for me, though, characterizing the Arctic at fine scale is important. I really appreciate the previous discussions with witnesses regarding the characterizing the Arctic at grand scale.

To me, what matters for the Coast Guard vantage point and those of mariner operators is the weather outside in the wind-screen. And so to me, how we can better characterize ocean currents, moving in ridging at fine scale, I think is going to matter tremendously as we look to advancing more mariner commercial activities and really projecting sovereign influences into the coming years and beyond. Thank you, sir.

Senator SULLIVAN. Thank you. Dr. Francis, do you have a view on this?

Ms. FRANCIS. Yes, thank you very much for this question, and it goes back to what I said earlier hopefully my Internet connection is a little better now and I won't be broken up quite so badly. But I agree with what was just said. And I would just reiterate that so many of the Coast Guards operating, you know, their mission is it really depends on having good information about the weather, about ocean currents, about what the ice is doing. And all of those really depend on getting good information from the environment so that our forecast models, which also need further development, can provide them with the best information about not just what is

going on in their neighborhood at the moment, but also the forecast for the next day or week or longer.

And they can then deploy their resources more effectively to take advantage of that, because if they were, as I mentioned, on an oil spill or man overboard or some kind of search and rescue, we know that cruise ships are now heading up there, it is still very likely, even though the ice is diminishing, it is still very possible that a cruise ship could be going along in the open water. The wind shifts, the pack ice moves down on that cruise ship and pins it in a location, runs it aground into rocks or whatever. And I think the Coast Guard would be very hard pressed to be able to respond to that kind of an emergency.

So I really think we need to do a better job getting the information so that we can do a better job at the forecasting of both weather and also the ocean behavior and the sea ice.

Senator SULLIVAN. Great. Thank you. And Ms. Madsen, I will leave it up to you to close with that question.

Ms. MADSEN. Well, thank you very much, Senator. As you know, we are pretty proud up in Alaska about the science that we have. We have a pretty extensive climate model. We are you know, I am focused on fish, but the climate model extends far beyond that with its projections. The Alaska Fisheries Science Center has some of the lead scientist in this regard. We have had Marines that have been taking different measures of different things for many, many, many years.

So we need to continue those time series. Because I am focused on fishing, I think we need to use and work a little bit better on cooperative research using the platforms that we have out in the Bering Sea. I know, Senator, that this year we were unable, as you know, to get our fishery surveys done. But with the help of the Science Center, many of the vessels took data loggers to collect temperature so that we could try to identify the cold pull and inform as much as we could without the surveys. So I think there is opportunities here. I guess maybe not technology based, but we do have the models up in the North Pacific.

We need the surveys to continue to inform those models, which means money. But it is kind of a dual focus, a dual purpose. You not only get the data that would inform those models, but you would also get the data to inform the changes and the total allowable catches up in the North Pacific. So we have great science up here. I think we just need to double up on it and make sure the funding is there to encourage the continuation of some of these long time series.

And Senator, we do appreciate all the work that you have done for the North Pacific and the fisheries for sure. So I can't let the hearing close without thanking you once again.

Senator SULLIVAN. Well, let me thank you as well, Stephanie. You have done a great job and a real leader in our state on so many of these issues. And General, you too as well. And Dr. Francis, I know that Senator Markey holds you in very high regard as well. So I want to thank the three witnesses for a really, really productive hearing. We saw a lot of good bipartisan participation in this hearing, which I thought was great and important.

The record for the hearing will remain open for an additional 2 weeks. If Senators have additional questions, they will please submit them for the record and for our witnesses. If you can respectfully try to get those answers back as soon as you can, we would greatly appreciate that.

With that, I want to thank the witnesses again, both Admiral Ray and the current panelists, and a lot of good information and a lot of important issues that we need to work together on. And I think we have a lot of important information to digest and move forward on as we continue to look at the challenges and opportunities in America's Arctic. With that, this hearing is adjourned.

[Whereupon, at 5 p.m., the hearing was adjourned.]

