

**Ensuring Resiliency of Military Installations and Operations in Response to  
Climate Changes  
U.S. House of Representatives  
Armed Services Committee  
Subcommittee on Readiness  
March 13, 2019**

**Statement of Sharon E. Burke  
Senior Advisor and Director of the Resource Security Program  
New America**

Thank you, Chairman Garamendi, Ranking Member Lamborn, and Members of the Committee, for the opportunity to appear before you today.

My name is Sharon Burke, and I direct the Resource Security program at New America, a nationally networked civic organization headquartered in Washington, DC. One of my research efforts, the Phase Zero Project, examines how to shape the strategic landscape, to prevent conflict or to give the United States an advantage. We are looking to bring to this task some of the analytical tools the Department of Defense uses to forecast threats and the private sector uses to anticipate opportunities, such as modeling, big data, machine learning, and scenario analysis, as well as the narrative approach New America is known for. Climate change is one of the shaping trends we consider in our work. Previously, as the Assistant Secretary of Defense for Operational Energy, I was responsible for improving the energy security of military operations. In that capacity, I focused on a range of efforts, from improving forward operating bases to incorporating energy considerations in the requirements process to conducting geopolitical wargames. My office also helped draft Directive 4715.21, which focuses on climate change adaptation and resilience. I first joined the Pentagon in 1994 as a civil servant through the Presidential Management Fellows program, and my service has included a stint as the Country Director for South Asia.

Today, I am here to discuss climate change as a security issue, the challenges it presents for readiness, and the opportunities we have today to enhance the resilience of missions and capabilities to such changes. This is not a new topic for the Department of Defense. In October 2007, the Department of Defense (DoD) released “A Cooperative Strategy for 21<sup>st</sup> Century Seapower,” the first ever collective maritime strategy for the Navy, Marine Corps, and the Coast Guard. It was also the first U.S. military strategy document to explicitly refer to climate change as a national security concern. In the years since, a number of documents from the Defense Department and Intelligence Community have followed that basic template, defining climate change as a national security issue and citing civilian scientific judgments. Most recently, in January 2019, the Department of Defense released “Report on the Effects of a Changing Climate to the Department of Defense” and the Director of National Intelligence acknowledged the threat of climate change in the Worldwide Threat Assessment.

The scientific judgment the Department now relies on includes the Trump Administration’s National Climate Assessment, released in November 2018. The Assessment, the concerted judgment of 13 Federal agencies, painted a grim picture of projected climate change effects by the middle of the century, such as increases in high heat days, heavy precipitation, droughts, and sea level rise, as well as more volatile weather patterns. According to an October 2018 Intergovernmental Panel on Climate Change report, the potential impacts of these changes worldwide include species extinctions, loss of ecosystems and habitat, decline or destruction of fisheries and coral reefs, and drops in agricultural productivity and availability of freshwater.

These climate-accelerated natural phenomena will interact with human societies in ways that are not yet clear but are increasingly under examination.

Climate change will affect U.S. national interests and the safety and wellbeing of all Americans where they live, from impacts as relatively benign as shifting growing zones and as serious as the sorts of more destructive coastal storms we saw in Puerto Rico, Texas, and Florida in 2017 and 2018. It will shape our trade and strategic partners and allies, as well, and our adversaries, too. In 2016, the Department of Defense issued Directive 4715.21, which assigned roles for implementing climate change adaptation and resilience at bases and in operations. While the Department has not made much progress in implementing the Directive, incorporating climate change into strategy and military force development is prudent and will cost relatively little, in dollar terms. A small investment now, however, may pay significant dividends in better resilience and readiness for great power competition, military missions, and defense infrastructure in the future

### **Great Power Competition**

The 2018 National Defense Strategy realigned the national security priorities of the United States, proclaiming great power competition to be the defining context and singling out China and Russia. While the strategy did not explicitly acknowledge climate change as a shaping factor in great power competition, no country is immune to its effects and impacts, and that includes China and Russia.

China is about the size of the United States, with a long coastline, the two largest megacities in the world, and a landscape that varies from desert to rainforest. Climate change is likely to have a range of effects on the country, including shifts in precipitation, the number of high heat days, and more volatile weather patterns, especially along the coasts. The impacts on China will be diverse, affecting everything from agricultural productivity to the availability of fresh water. New America has forthcoming research on these impacts, based on analysis from the Pacific Northwest National Laboratory's Global Change Assessment Model (GCAM). Our early findings suggest that taken together with the country's growing import dependency for energy, China's resource security will help shape its strategic choices. China already is investing extensively in key resource relationships, in ways that are not always separable from regional and global strategic priorities. This has been the case with many of the countries in China's Belt and Road Initiative, but New America's analysis across 25 indicators, including China's bilateral trade, investments, and mineral dependencies, suggests that some of its most important resource relationships are with key U.S. allies, including Australia and Canada.

Another top Chinese resource partner is Russia, where the trade in energy, minerals, and agriculture undergird a growing strategic partnership. Needless to say, an enhanced Russia-China relationship is unlikely to benefit the United States. According to our forthcoming analysis from GCAM, Russia may also have a comparative advantage when it comes to climate change, at least toward the middle of the century. This may unlock more productive land and milder temperatures for the country, making Russia a more attractive agricultural trade partner. On the other hand, there are always uncertainties when it comes to climate change: parts of Russia where permafrost is already thawing, for example, have experienced releases of deadly bacteria and methane gas, as well as the emergence of giant sinkholes.

Indeed, the Arctic has the potential to be another front in the global competitive space. Satellite imagery of the Arctic – which is tracked by the Naval Ice Center, as well as civilian agencies – shows dramatic evidence of the formation of an entirely new ocean, where there was only solid ice before. This means new oil, gas, and other mineral resources are becoming recoverable and new global trade routes are opening for the first time in recorded human history.

To date, international interests in the region have focused on scientific research and enjoyed good cooperation. Indeed, most Arctic littoral nations are partners or treated allies for the United States, but Russia enjoys a relative advantage in the region and has been increasingly aggressive about its military and commercial presence in “the Far North.” The country has a very long Arctic coastline with relatively warmer waters, making the Northern Sea Route off their coast more navigable than alternate routes through the thawing ice. Russia also currently has around 40 icebreakers, including seven that are nuclear-powered. China, which has no Arctic coastline but a keen interest in a polar sea route, has two heavy icebreakers and a third in construction, as well as land acquisitions in the area.

The United States has increased regional surveillance and likely dusted off our missile defense sites in the region, but has not significantly changed our presence, given the difficulty and expense of operating in the harsh Arctic climate and the view that most area missions belong to the Coast Guard. The United States currently has only one functioning heavy icebreaker and one medium icebreaker, though U.S. forces can and do transit the region in submarines and aircraft, including for Freedom of Navigation operations. The United States also relies on cooperation with Canada for Arctic missions, despite the fact that the United States does not recognize Canada’s claim to the Northwest Passage as an internal Canadian waterway.

### **Military Missions**

Climate change is highly likely to affect military missions, both directly and indirectly. The most direct effect is on disaster relief missions, at home and abroad, and the indirect effects concern the way that changing conditions may destabilize countries with poor or corrupt governance, weak economies, and a history of civil unrest and conflict.

The risk of devastating violence in this era of mobility is the potential energy gathering behind every internal or interstate friction, ragged political change and corrupt governance, and the human misery and migration that follow disasters and shortages of food, water, energy, and other basic necessities. A recent World Bank report found, for example, that by 2050, the impacts of climate change in S-Saharan Africa, South Asia, and Latin America could force 143 million people to move. That is why the 2010 Quadrennial Defense Review labeled climate change an “accelerant of instability or conflict,” a factor that can push that potential energy into a perfect storm of instability and conflict.

The Sahel region of Africa is illustrative. A semi-arid region with a history of political instability and weak governance, violence, and poverty, the Sahel is nonetheless seeing significant population growth. The region is home to 135 million people today, which is forecasted to rise to 330 million by 2050 and around 670 million by the century’s end. This region is already experiencing a rise in droughts and a fall in agricultural productivity and access to freshwater, and is expected to be one of the most climate-change affected regions of the world in the coming decades. There is already internal displacement and out migration, given these conditions. While the remedies to the looming regional crisis are largely civilian in nature -- such as the empowerment of women and improvement in governance -- there are clear military implications, including a correlating increase in regional violent extremist organizations, such as the Islamic State in the Greater Sahara, Al Qaeda in the Islamic Maghreb, and Boko Haram.

This instability effect is the most important climate security concern, but unfortunately, it is also one of the least well understood. There is no comprehensive, credible risk portfolio, for example, delineating which regions and countries are most likely to be destabilized, with what consequences. The deficit in available climate risk projections reflects, in part, a gap between the scientific study of climate change and practical applications of that information. So, for example, the kind of information and data a military strategist or planner needs in order to incorporate climate change into an operational or campaign plan, global force management

decisions, or a Theater Cooperation Plan is not yet available. One way to help close this gap is to incorporate climate change into military threat assessments, strategies, and plans, calling on civilian agencies or nongovernmental institutions to provide the relevant data or even to develop a climate risk portfolio. A military demand signal for the kinds of actionable information they need would greatly help in building not only relevant future defense capabilities and plans, but also broader national security priorities for development, trade, and diplomacy.

There are also more direct impacts to military missions. According to the National Climate Assessment and the United Nations, climate change increases the frequency and/or severity of extreme weather events, which in turn connotes a rising demand for humanitarian and disaster relief. Active duty forces generally are not the lead for such missions, but rather support civilian authorities, such as the State Department, the Federal Emergency Management Agency (FEMA), or in the case of the National Guard, governors and other state authorities.

Military forces, however, have unique capabilities for such incidents, particularly when it comes to logistics, and have been frequently called on in recent years to support disaster relief missions. More than 10,000 active duty and National Guard personnel responded to Sandy in 2012, for example, and around 9,000 to Typhoon Haiyan in the Philippines the following year. Around 14,000 defense personnel joined 27,000 FEMA employees in Houston to deal with Hurricane Harvey in 2017, as well as 17,000 active duty, reserve, and National Guard personnel, aircraft, and combat support hospitals to Puerto Rico in the aftermath of Hurricane Maria. In 2018, the National Guard, Army engineers, and Air Force assets assisted with response to the California wildfires. Across these disasters, defense personnel engaged in everything from search and rescue to emergency food distribution to electricity restoration.

Indeed, most military strategy documents identify humanitarian and disaster relief (HADR) or Defense Support to Civil Authorities (DSCA), as it is generally called in the domestic context, as part of the defense mission, though often as a limited or associated concern. This reflects internal DoD ambivalence about these responsibilities, which are relatively lower priority than combat missions in training, organizing, equipping, and posturing of armed forces. Civilian disaster relief capacity largely consists of the Office of Foreign Disaster Assistance at the State Department, with only about 500 staff worldwide, FEMA for domestic relief only, state and local assets, and non-governmental organizations. In addition, no other nation has the capacity the United States does to conduct such missions, particularly the logistics support. HADR operations, in addition to their humanitarian importance, generate good will in partner and allied nations, which has reputational and material advantages for the United States. At the same time, China is improving rapidly in this area; indeed, HADR operations could well become another driver for either cooperation or competition between the two nations.

### **Military Installations and Readiness**

As this Subcommittee knows very well, militaries need bases of operations for administrative activities, training, and to support a range of missions. For the United States, that translates to 28 million acres under Pentagon management worldwide, with nearly 600,000 structures. The replacement value for this infrastructure has been estimated at more than a trillion dollars. Many of these bases are more than housing or training sites; in the digital age, they are increasingly “platforms” that directly support military operations. Although the Department has taken some action to protect these bases from climate change, such as updating building codes and conducting some vulnerability assessments, bases are a relatively low priority policy concern. In 2012, the Government Accountability Office observed that DoD lacked sufficient official scientific information and coordination to effectively and consistently anticipate and adapt to the effects of climate change at bases. Based on DoD’s January 2019 “Report on the Effects of a Changing Climate to the Department of Defense,” which this subcommittee and others in Congress requested, that situation does not appear to have changed.

For that report, Congress asked the Department to identify bases most vulnerable to climate change, given that such vulnerability assessments can help prioritize and inform investments and protect the continuity of operations. Ideally, such assessments should look at changing hazards, vulnerabilities in military and civilian infrastructure, which most bases rely on, and the criticality of missions and capabilities on the bases, to get a comprehensive picture of risk. While the increasing hazards of severe weather should certainly be a chief concern, there is also a changing threat profile. Several nations -- Russia and Iran among them -- have shown both the capability and intent to attack U.S. electricity grids and other critical infrastructure using remote cyber means. A comprehensive vulnerability assessment can be a win-win tool, helping identify both natural and manmade vulnerabilities, hazards, threats, and risks for bases.

These assessments may well identify a need for expensive retrofits or relocations, but they may also just identify a need for updated codes, regulations, policies, and other low-cost changes. As the Department considers how to improve this process, it may want to give special consideration to fixed military infrastructure overseas, which often depends on host nation infrastructure. If the Department lacks sufficient scientific and technical capability to design an adequate assessment tool and carry out the examinations, there is considerable expertise in civilian agencies and at the local level around the country, including at universities.

Congress and the Department of Defense have been careful to make a distinction between fixed bases and contingency and other operational bases, platforms, equipment, and missions, when it comes to energy and climate change. There are several reasons for this distinction, including that there are entirely different requirements, budgeting, and procurement processes and personnel involved (the force development process vs. the facilities sustainment, restoration, and modernization process). The main reason to make a distinction, however, is that environmental limits, no matter how intrinsically good, are unlikely to serve the country well at forward deployed bases. At best, the armed forces would have to violate those limits when elected leaders deploy them for combat, rescue, or humanitarian missions. Indeed, it is the nature of war to consume and destroy resources; arguably, the best military environmental policy is not to go to war in the first place. As the saying goes, however, the enemy gets a vote -- nations don't always get to choose when a threat will emerge or conflict or disaster will strike.

There is, however, a role for energy and environmental considerations when it comes to operational equipment and activities; indeed, the gravity of military needs can provide a natural pull for environmental improvements and innovation. There are good reasons to go "green" for military operations, after all. A lower requirement for resources, particularly fuel and water, for example, means a more logistically sustainable operation with fewer soft, supply targets for adversaries to strike. The Taliban, armed chiefly with cheap improvised explosive devices, weaponized human bodies, small arms, and rudimentary rocket propelled grenades, has been able to successfully target U.S. supply convoys, which disproportionately carry fuel and water. This lesson is not lost on other potential U.S. adversaries. Those potential adversaries may be far better equipped than our current foes, including with GPS-guided maritime mines, precision strike, and hypersonic missiles. Moreover, the United States increasingly has an electrified force, which introduces an entirely new attack surface, one that the Department of Homeland Security and the FBI have publicly warned the Russians are seeking to exploit with remote cyber weapons. The Department of Defense should increasingly take energy resilience into account as a planning factor and a capability enabler. These considerations are not as explicitly incorporated into strategy, plans, and any modeling and simulations as they could be.

In this regard, the Pentagon itself is a barrier, given today's focus on "lethality." Climate change and other resource challenges are generally not seen as "real" security issues. In addition, the Department has its hands full with active combat operations, pressing modernization needs, unfolding cyber and high tech wars, and overall budget uncertainties. Moreover, our political

military may consider climate security a political fight best avoided. And to be fair, climate change is a security concern, but not necessarily one with a military solution.

It follows, then, that the lack of civilian operational capacity for climate security, at home and abroad, is also a barrier to stronger national security. With the exception of discrete offices, such as the Office of Foreign Disaster Assistance, the State Department lacks operational equipment, training, and organization, a situation exacerbated by the current depletion of staffing. This is not to say that diplomacy and development missions are unimportant; they are just not sufficient to build climate security and respond to contingencies in a tangible way. Moreover, in extreme circumstances, civilian agencies and NGOs will continue to require the assistance of National Guard, reserve, and active duty forces, especially for logistics support. The American people are historically generous in responding to crises ad hoc, but have shown little enthusiasm for increasing the standing resources for security building, such as foreign aid or disaster risk mitigation. This is problematic, given that climate change is a security issue, but it is not truly a military matter: no soldier, sailor, airman, or Marine can defeat climate change by shooting at it, blowing it up, or even by phishing it with a virus. Climate change is ultimately a governance and economic development challenge and fundamentally a civilian and civil society responsibility, but if the nation does not get ahead of the changes that are underway and coming, there may well be a growing need for military missions to deal with the consequences.