Findings from Select Federal Reports:

THE NATIONAL SECURITY IMPLICATIONS OF A CHANGING CLIMATE

May 2015

THE WHITE HOUSE
WASHINGTON

"Climate change is an urgent and growing threat to our national security, contributing to increased natural disasters, refugee flows, and conflicts over basic resources like food and water. The present day effects of climate change are being felt from the Arctic to the Midwest. Increased sea levels and storm surges threaten coastal regions, infrastructure, and property. In turn, the global economy suffers, compounding the growing costs of preparing and restoring infrastructure."

- *White House, National Security Strategy, February 2015*

"The impacts of climate change could directly affect the Nation's critical infrastructure. In U.S. coastal regions, rising sea levels, higher storm surge, and increased erosion could damage or destroy critical infrastructure. In Western States, higher temperatures and more frequent or severe heat waves could buckle railways, damage roads, and strain power systems."

- *Department of Homeland Security, Climate Change Adaptation Roadmap, June 2012*

"We judge global climate change will have wide-ranging implications for U.S. national security interests over the next 20 years . . . The United States depends on a smooth-functioning international system ensuring the flow of trade and market access to critical raw materials such as oil and gas, and security for its allies and partners. Climate change and climate change policies could affect all of these—domestic stability in a number of key states, the opening of new sea lanes and access to raw materials, and the global economy more broadly—with significant geopolitical consequences."

- *National Intelligence Committee, National Intelligence Assessment on the National Security Implications of Global Climate Change to 2030, June 25, 2008.*

"A changing climate will have real impacts on our military and the way it executes its missions. The military could be called upon more often to support civil authorities, and provide humanitarian assistance and disaster relief in the face of more frequent and more intense natural disasters. Our coastal installations are vulnerable to rising sea levels and increased flooding, while droughts, wildfires, and more extreme temperatures could threaten many of our training activities. Our supply chains could be impacted, and we will need to ensure our critical equipment works under more extreme weather conditions. Weather has always affected military operations, and as the climate changes, the way we execute operations may be altered or constrained . . . Climate change will affect the Department of Defense's ability to defend the Nation and poses immediate risks to U.S. national security."

- *Department of Defense, Climate Change Adaptation Roadmap, 2014.*

Overview

The effects of climate change are already being felt across many parts of the world, increasingly posing new risks to America's national security – both domestically and internationally.

This document draws from some of the reports published by the Federal government addressing the national security implications of climate change. These analytical and strategic documents, including the Third National Climate Assessment, the White House's 2015 National Security Strategy, the Department of Defense's 2014 Quadrennial Defense Review, and the Department of Homeland Security's 2014 Quadrennial Homeland Security Review, provide critical insight both in terms of the nature of the threat – and the way the Federal government is rising to the challenge.

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With climate change, certain types of extreme weather events and their impacts, including extreme heat, heavy downpours, floods, and droughts, have become more frequent and/or intense. In addition, warming is causing sea level to rise and glaciers and Arctic sea ice to melt. These and other aspects of climate change are disrupting people's lives and damaging certain sectors of the economy. The national security implications of climate change impacts are far-reaching, as they may exacerbate existing stressors, contributing to poverty, environmental degradation, and political instability, providing enabling environments for terrorist activity abroad. For example, the impacts of climate change on key economic sectors, such as agriculture and water, can have profound effects on food security, posing threats to overall stability.

The implications of climate change on national security are not all beyond U.S. borders – they pose risks here at home. According to the Third National Climate Assessment, sea level rise, coupled with storm surge, will continue to increase the risk of major coastal impacts on transportation infrastructure, including both temporary and permanent flooding of airports, ports and harbors, roads, rail lines, tunnels, and bridges. Extreme weather events are also affecting energy production and delivery facilities, causing supply disruptions of varying lengths and magnitudes and affecting other infrastructure that depends on energy supply. Increasing risk of flooding affects human safety and health, property, infrastructure, economies, and ecology in many basins across the United States.

These impacts increase the frequency, scale, and complexity of future defense missions, requiring higher costs of military base maintenance and impacting the effectiveness of troops and equipment in conflict. Assessments are currently underway by the Department of Defense (DOD) to determine the national resources necessary to respond to these growing threats to U.S. national security.

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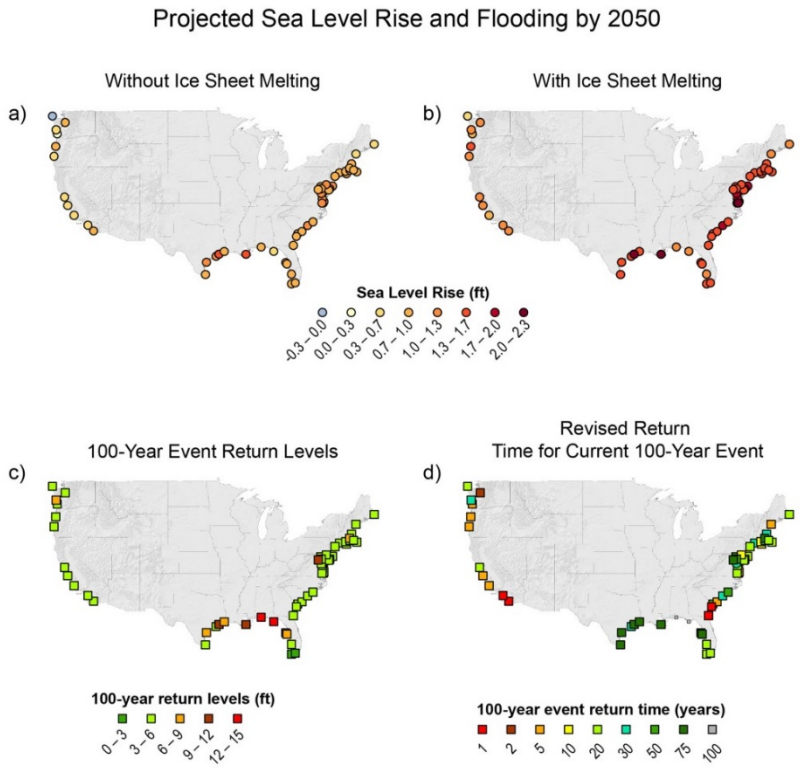
Security Implications – Domestic

Federal literature outlining the domestic security implications of climate change ranges from treatment of specific regional impacts – such as along coastal areas or in the Arctic – to a broader look at domestic risks. The national security implications of climate change are not isolated to any one region, and the impacts will be felt in different ways.

Coastal Areas at Risk

For a fuller discussion on coastal areas at risk due to climate change, see the Department of Homeland Security's Climate Action Plan from 2013.

U.S. coastal areas are on the frontlines of the threat posed by changing climate. Critical infrastructure, major military installations, and hurricane evacuation routes are increasingly vulnerable to impacts, such as higher sea levels, storm surges, and flooding exacerbated by



Projected sea level rise and flooding in the coastal United States by 2050. Melillo, Jerry, Terese Richmond, and Gary W. Yohe, "Climate Change Impacts in the United States: The Third National Climate Assessment," U.S. Global Change Research Program, 2014.

climate change. Sea level rise, coupled with storm surge, will continue to increase the risk of major coastal impacts on transportation infrastructure, including both temporary and permanent flooding of airports, ports and harbors, roads, rail lines, tunnels, and bridges.

Superstorm Sandy provides a powerful example, as the storm's effects were exacerbated by the sea level in the New York Harbor, which had risen one foot since 1900. The storm had devastating impacts on the northeastern seaboard, impacting critical infrastructure. Hospitals were evacuated and train and roadway tunnels and waste water treatment facilities were flooded. All told, the storm left 8.5 million people without power and caused tens of billions of dollars in damages.

Marines and sailors assigned to the 26th Marine Expeditionary Unit step off a landing craft utility vehicle onto the shore of Breezy Point, New York, on Nov. 9, 2012. They and troops from other units partnered with the Federal Emergency Management Agency, the U.S. Army Corps of Engineers and the National Guard after Hurricane Sandy. U.S. Marine Corps photo.

The Federal response to Hurricane Sandy illustrated the breadth and depth of response necessary from U.S. security personnel in the wake of extreme events. From first-responders and the Federal Emergency Management Agency to the National Guard and Coast Guard, the response came from all quarters. This included DOD, which increased the capacity of the Joint Logistics Operations Center by instituting around-the-clock shifts, helping to coordinate the delivery of 6.2 million meals, 7.8 million gallons of fuel, and other medical and staple necessities. DOD also delivered generators and high-capacity pumps to ease the burden of power outages and dry out water-damaged buildings and key structures.

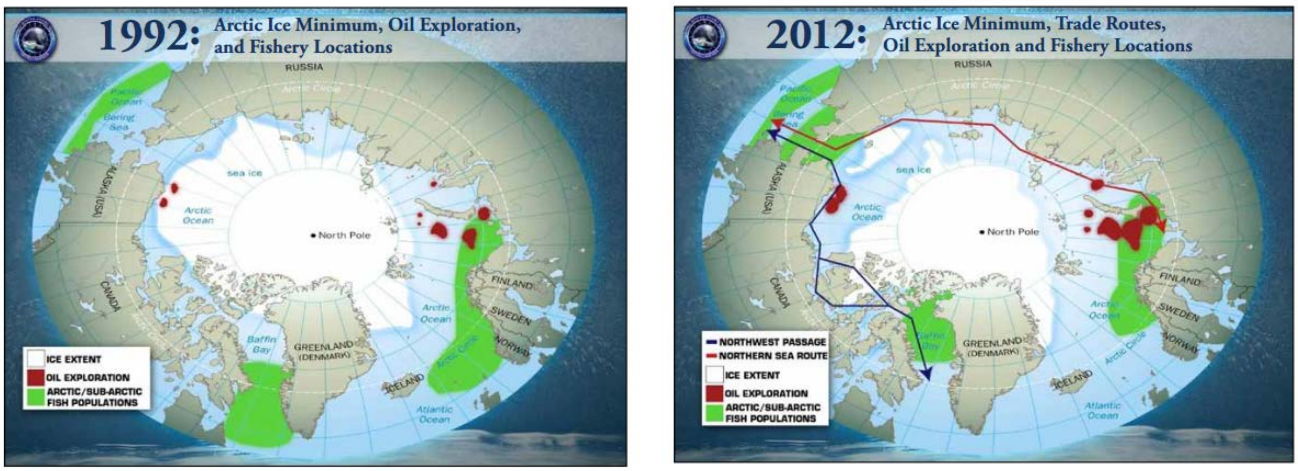
Strategic response extends beyond the immediate aftermath of a storm. Consistent with the recommendations of the Hurricane Sandy Rebuilding Task Force, the White House has emphasized the importance of rebuilding damaged infrastructure to a higher standard that can withstand the risks posed by higher sea levels, increased flooding, and other impacts. In November 2013, President Obama signed Executive Order 13653, directing Federal agencies to

modernize Federal programs to support climate-resilient investments; plan for climate change related risks to Federal facilities, operations, and programs; and provide the information, data, and tools that state, local, and private-sector leaders need to make smart decisions to improve preparedness and resilience. Additionally, the President signed Executive Order 13690 in January 2015 establishing a new flood risk management standard for new and rebuilt Federally-funded structures around floodplains. By requiring that Federally-funded buildings, roads, and other infrastructure be constructed to better withstand the impacts of flooding, this new standard will support the thousands of communities that have strengthened their local floodplain management codes and standards, and will help ensure Federal projects last as long as intended.

Readiness in a Changing Arctic

For a fuller discussion on climate change and the Arctic, see the President's National Strategy for the Arctic Region from May 2013.

The Arctic Region provides another vivid case study of the interconnection between national security and climate change – where the ability to advance U.S. national security interests, pursue responsible stewardship of the land, protect local communities, and strengthen international cooperation depends on the ability to meet the challenges of climate change.



Arctic Ice Minimum, Oil Exploration, and Fishery Locations – 1992 (left) and 2012 (right). United States Coast Guard, "Arctic Strategy," 2013.

Although the threats to this region may seem remote to most Americans, the changing Arctic climate has far-reaching impacts on other parts of the country. Temperatures in the Arctic are rising at twice the rate of the rest of the world on average, and melting glaciers and land-based ice sheets are contributing to rising sea levels. Rising ocean temperatures are causing northward range shifts of certain fish species, affecting ocean ecosystems and the communities and economies that depend on them. The changing Arctic could lead to global changes in ocean-based food security that will place additional burdens on economies, societies, and institutions around the world.

The White House's National Strategy for the Arctic Region prioritizes the advancement of U.S. security interests and highlights that the United States must improve its ability to respond in the Arctic. As ice coverage in the Arctic continues to recede and shorter shipping routes become more accessible and more profitable, increased ship traffic and human activity in the region will require that the United States be more prepared to respond to emergencies in this remote region.

The United States will have the opportunity to address Arctic challenges in its role as the chair of the Arctic Council from 2015 to 2017. Secretary Kerry has identified three priorities for this Chairmanship: Arctic Ocean safety, security, and stewardship; economic and living conditions of Arctic communities; and climate change mitigation and adaptation.

Risks to Infrastructure

For a fuller discussion on climate risks to infrastructure, see the Third National Climate Assessment, the 2015 Quadrennial Energy Review, and the 2014 Quadrennial Homeland Security Review.

The national security implications of climate change include risks to energy and other critical infrastructure.

- Extreme weather events are affecting energy production as well as energy transportation, transmission, and distribution infrastructure, causing supply disruptions of varying lengths and magnitudes and affecting other infrastructure that depends on electricity supply.

- Higher summer temperatures will increase electricity use, causing higher summer peak loads, while warmer winters will decrease energy demands for heating. Net electricity use is projected to increase.

- Changes in water availability, both episodic and long-lasting, can affect electricity production. In the longer term, sea level rise, extreme storm surge events, and high tides will affect coastal facilities and infrastructure on which many energy systems, markets, and consumers depend.

The Department of Homeland Security's Quadrennial Homeland Security Review points out another key risk: climate change may overwhelm the capacities of critical infrastructure, causing widespread disruption of essential services across the country.

Security Implications – International

For a fuller discussion of international security implications, see USCENTCOM's Climate Change Assessment from 2014, the President's February 2015 National Security Strategy, the 2014 Quadrennial Defense Review, and the Department of State's 2014 Climate Change Adaptation Plan.

Climate change is an urgent and growing threat to U.S. national security, contributing to increased weather extremes which worsen refugee flows and conflicts over basic resources like food and water. The national security implications of climate change reach far beyond U.S. coastlines, further threatening already fragile regions of the world. Increased sea levels and storm surges threaten coastal regions, infrastructure, and property. A changing climate will act as an accelerant of instability around the world, exacerbating tensions related to water scarcity and food shortages, natural resource competition, underdevelopment, and overpopulation.

Thus, climate change impacts, coupled with other global dynamics, including growing and urbanizing populations, could devastate homes, land, and infrastructure. Climate change will exacerbate water scarcity and may lead to increases in food costs. The pressures caused by climate change will influence resource competition, while placing additional burdens on economies, societies, and governance institutions around the world. Many governments will face challenges to meet even the basic needs of their people as they confront demographic change, resource constraints, effects of climate change, and risks of global infectious disease outbreaks. These effects are threat multipliers that will aggravate stressors abroad such as poverty, environmental degradation, political instability, and social tensions – conditions that can enable terrorist activity and other forms of violence. The risk of conflict may increase.

The near-term impacts of climate change are likely to have a disproportionate effect on poor countries with weak governance structures, particularly in Africa and Asia. Because the United States is a global power with strategic interests around the world, climate change is strategically important to the United States through the impacts it has on the regional stability of U.S. allies.

Demands on Military Resources

For fuller discussion of military impacts and response, see the Department of Defense's Climate Change Adaptation Roadmap, their Strategic Sustainability Performance Plan, and their Quadrennial Defense Review, all from 2014.

In 2014, DOD published the "Climate Change Adaptation Roadmap," highlighting the Department's efforts to plan for the impacts of climate change. The roadmap identifies the ways in which climate change is anticipated to affect DOD's missions, including increased demand for disaster and humanitarian relief overseas, greater need for air, sea, and land capacity in the Arctic, limited environment for military operations, and instability within and between other nations.

Climate change will directly impact U.S. military readiness, impacting installations and operations in a number of ways that include the availability of quality land and ranges, reductions in water supply, greater flood and fire hazards, and weather risks to the electricity supply. Installations near the coastlines are threatened by coastal erosion and sea level rise, damaging infrastructure and reducing the land available for operations. Intensified heatwaves will present challenges to outdoor training and personnel efficiency. Climate change may also affect DOD military supplies, affecting where they are purchased and method of transport and storage. Strained access to staple resources, damaged infrastructure, and mass migration present challenges to ensuring the stability of regions abroad, creating environments ripe for terrorist activity.

Climate change will also impact the design of current and future weapons systems to account for extreme weather. Due to conditions such as prolonged temperature exposure, moisture, or sand, weapons planners need to plan for increased maintenance needs and more units in the field to maintain a ready force. In the future, planners must account for an increasingly hostile climate based on today's trends.

Flooding after Hurricane Gustav in 2010 at Keesler Air Force Base in Biloxi, MS. Credit to SSgt Kimberly Rae.

The impact of climate change can be felt at the installation level. For example, unusual torrential downpours and resultant flooding caused $64 million in damages to 160 facilities and other infrastructure components at an Army installation in the Southwest. On the Alaskan coast, several Air Force early warning and communication installations are facing challenges with the rising sea level, diminishing sea ice, and thawing permafrost. And coastal erosion has damaged essential infrastructure, including runways and seawalls that are estimated to cost $25 million to repair. In 2010, record-breaking rainfall and severe flash flooding overwhelmed the Department of Energy's Pantex Plant, which has a critical mission to assemble and disassemble nuclear weapons. The facility has upgraded its preparedness response system and procedures in preparation for more severe weather.

Conclusion

Climate change is predicted to strain economies and societies around the world, placing an additional burden on already-vulnerable nations abroad and putting pressure on capacity at home. Climate change will change the nature of U.S. military missions, demand more resources in the Arctic and other coastal regions vulnerable to rising sea levels and other impacts, and require a multilateral response to the growing humanitarian crises that climate change is predicted to bring. While the challenges are vast, the United States is preparing with strong resilience measures that will address these changing dynamics, making the Nation safer at home and strengthening missions abroad.

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