Testimony before the
Subcommittee on Investigations and Oversight,
House Committee on Science and Technology

"THE FOREIGN POLICY AND NATIONAL SECURITY IMPLICATIONS OF GLOBAL CLIMATE CHANGE"

September 27, 2007

A Statement by

Alexander T. J. Lennon, Ph.D.

Fellow, International Security Policy &
Editor in Chief, *The Washington Quarterly*

CENTER FOR STRATEGIC AND INTERNATIONAL STUDIES, 1800 K STREET, NW, WASHINGTON, DC 20006
TELEPHONE: (202) 887-0200 FACSIMILE: (202) 775-3199 WWW.CSIS.ORG

The Center for Strategic and International Studies (CSIS), in collaboration with the Center for a New American Security (CNAS), has been conducting a project over the past year to identify and analyze a wide range of potential foreign policy and national security effects of major disruptions in the world's climate patterns. I have codirected this project with Julianne Smith, deputy director of the international security program when the project started and now director of the Europe program at CSIS, with the guidance of executive director, Kurt Campbell, who was senior vice president and director of the international security program at CSIS when the project started and is now the cofounder and chief executive officer of CNAS.

The project has not collectively delved into questions about whether climate change is occurring or who might be responsible. Nor has the group sought to make recommendations about what to do about the issue. That is not our area of expertise. It has exclusively sought to better understand the potential foreign policy and national security implications if climate change occurs.

Within this national security framework, the project has proceeded from two premises. First, the national security community is not traditionally accustomed to planning for contingencies more than thirty years into the future, or about the time frame for developing new military capabilities. Therefore, most of the work in this project focused on national security implications over the next three decades. Project members have concluded that it is not necessary for doomsday predictions of glaciers melting, ice sheets breaking off, or catastrophic sea level rise to come to fruition for U.S. foreign policy and national security interests to be harmed. Instead, the analysis focuses on consequences associated with effects such as more severe and frequent storms as well as changes in rainfall patterns over the next thirty years. Second, national security planning is based on being aware of, and contingency planning for, the worst consequences that may be encountered in the foreseeable future.

Through a series of working groups, this effort has sought to combine the best insight of two traditionally separate expert communities—specialists in the science and policy of climate change with analysts of foreign policy and national security. In consultation with scientific experts through these working groups, Jay Gulledge of the Pew Center for Global Climate Change took the lead in outlining scenarios for three posited worlds, two over the next thirty years (expected and more dramatic climatic changes, respectively), as well as more cataclysmic global climate change over the next 100 years.

Based on these scenarios, foreign policy and national security experts John Podesta, former chief of staff for President Bill Clinton; Leon Fuerth, former Vice President Gore's national security adviser; and R. James Woolsey, former director of Central Intelligence, then respectively assessed a wide range of possible foreign policy and national security consequences—political, economic, social, military, and religious—of each world. The highlights are expected to be published as a monograph later this fall and in greater detail as a book in 2008.

Unless otherwise noted, the testimony presented today is principally based on the *mildest* of these three scenarios, or the expected climate change over the next thirty years, based primarily on a scenario presented by the Intergovernmental Panel on Climate Change (IPCC) and analyzed by John Podesta and Peter Ogden with feedback from the working group. The frame for presenting these issues in this testimony is my own, highlighting what most struck me as codirector of the project, but my role here is to convey the findings as a codirector and group member, not to present my original analysis. The credit for the analysis goes principally to the authors as well as working group members.

Overall, project authors have emphasized that two general remarks about climate change should be highlighted. First, while rising average global temperatures tend to be discussed when analyzing climate change, the reality is that such changing temperatures usually vary widely both in different parts of the globe and across time, with impacts not evolving linearly but often suddenly. Changes in ocean currents, atmospheric conditions, and cumulative rainfall will vary dramatically across different regions and geographies. It is unfortunately also true that current modeling capacity focuses on continent-sized areas. We currently lack the models for smaller regions, countries, or areas.

Second, at least as important as the way that the climate reacts to rising temperatures is the way that societies around the world react to temperate and climate changes. While the greatest changes in temperature will be seen toward the poles, the greatest vulnerabilities lie near the equator where fragile societies in Africa, south Asia, and central and South America will experience the greatest impact from climate change.

While authors raise a variety of concerns throughout the three scenarios, four consequences stand out to me as the greatest concerns to U.S. foreign policy and national security interests.

- First, climate change would exacerbate water, food, and energy shortages and increase the risk of at least political stress if not resource conflicts, possibly over water in the Middle East and even sources of protein, such as fish, in East Asia.

- Second, while many countries will face stress from climate change, potential consequences in China present unique challenges because of its geopolitical significance.

- Third, migration within and from south Asia and sub-Saharan Africa, including to Europe, threatens our foreign policy and national security interests.

- Finally, and potentially of greatest concern to me, the effects of global climate change will increase the risk of state weakness and failure, exacerbating the threat of global terrorism over the next generation.

These crises are all the more dangerous because they are interconnected: water shortages can lead to food shortages, which can lead to resource conflicts, which can drive migration, which can create new food shortages in new regions, all of which can strain a

state's ability to govern, particularly when it is already weak or failing. Collectively, the greatest risks of global climate change in the next thirty years come from its impacts in the developing world—not just the demands for disaster relief, development assistance, and conflict prevention that will be placed on the developed world, particularly the United States, but also to U.S. security itself from state failure and terrorism.

Water and other resource shortages

An August 20 Washington Post article raised concerns that warming will exacerbate global water shortages. To put it simply, hotter temperatures mean that more water will evaporate into the air, increasing droughts, while at the same time potentially causing floods when it descends back to earth as more severe rain storms, only to evaporate again in an increasingly violent hydrological cycle. Increasing water scarcity due to climate change will contribute to instability throughout the world.

Although references to this threat may evoke images of armies amassing in deserts to go to war over water, Podesta and Ogden emphasize that the likelihood of such open conflict over the next 30 years is low. Nevertheless, while we are not likely to see "water wars," water scarcity can shape geopolitical order when states directly compete with neighbors over shrinking water supplies.

This is likely to be the case in the Middle East, where water shortages will coincide with a projected population boom. According to current projections, the Middle Eastern and North African population could double in the next 50 years. Meanwhile, seventy-five percent of all the water in the Middle East is located in Iran, Iraq, Syria and Turkey. Situated at the headwaters of the Tigris and Euphrates, Turkey is the only country in the Middle East that does not depend on water supplies that originate outside of its borders. Yet climate change will leave all of the other countries dependent on water from the Tigris and Euphrates Rivers more vulnerable to deliberate supply disruption.

Israel, for example, is extremely water poor and will only become more so. By 2025, Israel will have less than half the minimum amount of water per capita considered necessary for an industrialized nation. Moreover, Israel's water is in politically unstable territory with one-third in the Golan Heights, a source of strain in its relations with Syria, and another third in the mountain aquifer that underlies the West Bank.

Strains over water are not limited to the Middle East, particularly in more severe scenarios of climate change according to Leon Fuerth. The Indus River system is the largest contiguous irrigation system on earth with the headwater of its basin in India, making it the most powerful player in political disputes over water. Pakistan, Bangladesh, and Nepal are already engaged in water disputes with India and severe climate change would exacerbate those tensions.

The ongoing genocide in Darfur may have begun as a consequence of water scarcity. Water shortages have led to the desertification of large tracts of farmland and grassland. Arab nomads in North Darfur subsequently moved south for livestock to graze, thereby

coming into conflict with southern sedentary farmers and mixing with simmering ethnic and religious tensions. Government refusal to address the grievances of southern farmers led in stages to rebellion, counterinsurgency, and eventually ethnic cleansing.

Other resources may be affected as well, according to Fuerth, particular under more severe predictions for climate change. For example, China could find itself in direct confrontation with Japan and even the United States over access to fish. Rising standards of living are already leading to increased demands for higher quality food and sources of protein, such as fish, in China. This increasing demand combined with severe climate change at a time when all major fisheries may have crashed as the result of unsustainable fishing practices, along with the ongoing, worldwide decimation of wetlands, would create at least political strains over sources of protein.

China's challenges

Depleted fisheries are not the only challenges that climate change will present to China or that China will present to the world. China's current energy production and consumption patterns alone threaten the long-term global environment. Unless its pattern of energy consumption is altered, China's carbon emissions will reinforce or accelerate several existing domestic environmental challenges—ranging from water and food shortages to desertification to unrest within China—and become the primary driver of global climate change itself.

Water shortages will pose a major challenge to China. Two-thirds of China's cities are currently experiencing water shortages, and will be exacerbated by shifts in precipitation patterns and increased water pollution. In 2004, the UN reported that most of China's major rivers had shrunk, and in December 2006 it found that the Yangtze River's water level dropped to an all-time low because of climate change. Northern China faces the greatest threat in this respect, as it will be subject to heat waves and droughts that will worsen existing water shortages.

According to the IPCC's Fourth Assessment Report in 2007, these regional water shortages will also lead to food shortages as "crops in the plains of north and northeast China could face water-related challenges in coming decades, due to increases in water demands and soil-moisture deficit associated with projected decline in precipitation." China's first national report on climate change, released in late 2006, estimates that national wheat, corn, and rice yields could decrease by as much as an astounding 37 percent in the next few decades.

China, moreover, is severely affected by desertification. More than a quarter of China is already desert, and the Gobi is steadily expanding, threatening roughly 400 million people according to the UN Convention to Combat Desertification. The United Nations Framework Convention on Climate Changes (UNFCCC) notes that desertification-prone countries are "particularly vulnerable to the adverse effects of climate change."

In spite of the colossal development projects that China has initiated, domestic social and political turmoil are expected to increase. One source of unrest will be increased human migration within China due to environmental factors. Much of this migration will reinforce current urbanization trends, putting added pressure on already overpopulated and dangerously polluted Chinese cities. Those regions of China that do benefit from some additional rainfall will also need to cope with an influx of migrants from water-scarce areas. In China's northwestern provinces, where rainfall may increase, the acceleration of the movement of Han Chinese into Muslim Uighur areas will aggravate tensions that have led to low-level conflict for many years.

In the last few years, concerns over environmental issues have provoked thousands of Chinese to demonstrate across the country. In April 2005, as many as 60,000 people rioted in Huaxi village in Zhejiang Province over the pollution from a chemical plant. Just three months later, 15,000 people rioted for three days in the eastern factory town of Xinchang, 180 miles south of Shanghai, over the pollution from a pharmaceutical factory.

More broadly, the findings of a poll conducted in China last year by the Chicago Council on Global Affairs and WorldPublicOpinion.org indicate that much of the Chinese public believes that climate change is a uniquely serious environmental problem. Some 80 percent of respondents concurred that within ten years, global warming could pose an important threat to their country's "vital interest."

On one hand, this may lead to internal political reform designed to address public concern. It is also possible, however, that the Chinese leadership will not make necessary adjustments, potentially leading to larger protests and violent clashes with police, as well as more restrictions on the press and public use of the internet. Relations with the West would rapidly deteriorate as a result. Whatever the political response, many experts including SAIS China director David Lampton, former Assistant Secretary of State Jim Kelly, and Secretary Rice have all argued that it is not in the U.S. interest to have a massive country like China be weak and unstable.

Migration

Challenges from migration are not limited to China. The United States itself, like most wealthy and technologically advanced countries, will not experience destabilizing levels of internal migration due to climate change, but will still be affected. According to the IPCC, tropical cyclones will become increasingly intense in the coming decades, and will force the resettlement of people from coastal areas in the United States.

The United States will also experience border stress due to the severe effects of climate change in parts of Mexico and the Caribbean. Northern Mexico will be subject to severe water shortages, which will drive immigration into the United States in spite of the increasingly treacherous border terrain. Likewise, the damage caused by storms and rising sea levels in the coastal areas of the Caribbean Islands—where 60 percent of the Caribbean population lives—will increase the flow of immigrants from the region and generate political tension.

In the developing world, however, the impact of climate-induced migration will be most pronounced. Migration will widen the wealth gap between and within many of these countries. It will deprive developing countries of sorely need economic and intellectual capital as the business and educated elite who have the means to emigrate abroad do so in greater numbers than ever before. Podesta and Ogden focus on the effects on three regions in which climate-induced migration will present the greatest geopolitical challenges are South Asia, Africa, and Europe.

South Asia

No region is more directly threatened by human migration than South Asia. The IPCC warns that "coastal areas, especially heavily populated mega-delta regions in South, East and Southeast Asia, will be at greatest risk due to increased flooding from the sea and, in some mega-deltas, flooding from the rivers." Bangladesh, in particular, will be threatened by devastating floods and other damage from monsoons, melting glaciers, and tropical cyclones that originate in the Bay of Bengal, as well as water contamination and ecosystem destruction caused by rising sea levels.

The population of Bangladesh, which stands at 142 million today, is anticipated to increase by approximately 100 million people during the next few decades, even as the impact of climate change and other environmental factors steadily render the low-lying regions of the country uninhabitable. Many of the displaced will move inland, which will foment instability as the resettled population competes for already scarce resources with the established residents. Others will seek to migrate abroad, creating heightened political tension not only in South Asia, but in Europe and Southeast Asia as well.

Bangladeshi migrants will generate political tension as they traverse the region's many contested borders and territories, including between India, Pakistan, and China. The India-Bangladesh border is already a site of significant political friction, exemplified by the 2,100 mile, two-and-a-half meter high, iron border fence that India is in the process of building.

In Nepal, climate change is contributing to a phenomenon known as glacial lake outburst, in which violent flood waves reaching as high as 15 meters destroy downstream settlements, dams, bridges, and other infrastructure. Ultimately, this puts further stress on the already beleaguered country as it struggles to preserve a fragile peace and reintegrate tens of thousands of Maoist insurgents. Neighboring the entrenched conflict zone of Kashmir and the contested borders of China and India, an eruption of severe social or political turmoil in Nepal could have ramifications for the entire South Asian region.

Nigeria and East Africa

The impact of climate change-induced migration will be felt throughout Africa, but its effects on Nigeria and East Africa pose particularly acute geopolitical challenges. Migration will be both internal and international. The first domestic wave will likely be

from agricultural regions to urban centers where more social services are available, and the risk of state failure will increase as central governments lose control over stretches of their territory and their borders.

Nigeria will suffer from climate-induced drought, desertification, and sea-level rise. Already, approximately 1,350 square miles of Nigerian land turns to desert each year, forcing both farmers and herdsmen to abandon their homes. Lagos, the capital, is one of the West African coastal megacities that the IPCC identifies as at risk from sea level rise by 2015. This, coupled with high population growth (Nigeria is the most populous nation in Africa, and three-fourths of the population is under the age of 30), will force significant migration and contribute to political and economic turmoil. It will, for instance, exacerbate the existing internal conflict over oil production in the Niger Delta. Nigeria is the world's eighth-largest oil exporter, Africa's single-largest, and the fifth-largest oil exporter to the United States, larger than any Middle Eastern country other than Saudi Arabia. This instability has an impact on the price of oil, and will have global strategic implications in the coming decades.

Europe

Some migration from South Asia and Africa will likely increase the number of Muslim immigrants to the European Union (EU), potentially exacerbating existing tensions and increasing the likelihood of radicalization among members of Europe's growing and often poorly assimilated Islamic communities. The majority of immigrants to most Western European countries are already Muslim. Muslims constitute approximately five percent of the European population, with the largest communities located in France, the Netherlands, Germany, and Denmark. Europe's Muslim population is already expected to double by 2025, and it will be much larger if climate change spurs additional migration from South Asia and Africa.

The degree of instability generated will depend on how successfully these immigrant populations are integrated into European society. Unfortunately, this process has not always gone well as articles by State Department analyst Timothy Savage in *The Washington Quarterly* and Robert Leiken in *Foreign Affairs* have discussed. Although the influx of immigrants from Africa—Muslim and otherwise—will continue to be viewed by some as a potential catalyst for economic growth at a time when the EU has a very low fertility rate, the viability of the EU's loose border controls will be called into question, and the lack of a common immigration policy will invariably lead to internal political tension.

State failure

In addition to potentially exacerbating radicalization in Europe, climate change could contribute to terrorism by increasing weak and failing states. In poor economic and social conditions, a country's political direction can change quickly. For instance, the inability or perceived unwillingness of political leaders to stop the spread of disease or to provide adequate care for the afflicted would undermine support for the government. In countries

with functioning democracies, this could lead to the election of new leaders with political agendas radically different from their predecessors. It could also breed greater support for populist candidates whose politics resonate in a society that believes that its economic and social hardships are due to neglect or mismanagement by the government. In countries with weak or non-democratic political foundations, there is a heightened risk that this will lead to civil war or a toppling of the government altogether.

Water-borne and vector-borne diseases such as malaria and dengue fever will be particularly prevalent in countries that experience significant additional rainfall due to climate change. Conversely, some air-borne diseases will thrive in precisely those areas which become more arid due to drought and higher temperatures, such as in parts of Brazil. Shortages of food or fresh drinking water will also render human populations more susceptible to illness and less capable of rapidly recovering.

Restrictions on the movement of goods in response could become a source of economic and political turmoil. Countries that depend on tourism could be economically devastated by even relatively small outbreaks. For example, the fear of Severe Accurate Respiratory Syndrome (SARS) sharply curtailed international travel to Thailand in 2003. Even without trade restrictions, the economic burden that disease will place on developing countries will be severe from factors such as added healthcare costs combined with a loss of worker productivity from worker absences.

The outbreak of disease can also lead a government to adopt policies that may be seen as discriminatory or politically motivated by segments of its own population. Treatment may be provided first, or exclusively, to a particular ethnic group, religious faction, or political party. This can provide anti-governmental groups with the opportunity to increase their popularity and legitimacy by providing those health services that the government does not.

The threat of state failure and a base for global terrorism may be highest in East Africa because of the potential number of weak or failing states, the numerous unresolved political disputes, and the severe impacts of climate change. Climate change will likely create large fluctuations in the amount of rainfall in East Africa during the next 30 years—a 5 to 20 percent increase in rainfall during the winter months will cause flooding and soil erosion, while a 5 to 10 percent decrease in the summer months will cause severe droughts. This will jeopardize the livelihood of millions of people in a region where 80 percent of the population earns a living from agriculture and it constitutes about 40 percent of GDP. Meanwhile, the entire Horn of Africa continues to be threatened by a failed Somalia and other weak states. Al Qaeda cells are active in the region, and there is a danger that this area could become a central breeding ground and safe haven for jihadists as climate change pushes more states toward the brink of collapse.

The risk is also high in South Asia, particularly Bangladesh, where hundreds of Taliban and jihadists already found safe haven in the wake of the U.S. invasion of Afghanistan. In his May/June 2007 *Foreign Affairs* article, “Al Qaeda Strikes Back,” former National Security Council staffer and CIA analyst Bruce Riedel warns that Bangladesh is among

the places most likely to become a new base of operations for al Qaeda. The combination of deteriorating socioeconomic conditions, radical Islamic political groups, and dire environmental insecurity brought on by climate change could prove a volatile mix with severe regional and potentially global consequences.

The U.S. response and the risk of desensitization

Although some of the emergencies created or exacerbated by climate change may ultimately be managed by the United Nations, the United States will often be sought as a global "first responder" in the immediate aftermath of a major natural disaster or humanitarian emergency. The larger and more logistically difficult the operation, the more urgent the appeal will be.

The U.S. military has already played a vital role in international relief efforts undertaken after the December 2004 Indian Ocean tsunami. Podesta and Ogden emphasize that there was simply no substitute for the more than 15,000 U.S. troops, two dozen U.S. ships, and one hundred U.S. aircraft that were dedicated to the operation. The performance of the U.S. military was resoundingly applauded by the international community. In Indonesia itself, the U.S. public image improved dramatically. A Pew Research Center poll conducted in the spring of 2005 found that 79 percent of Indonesians had a more favorable impression of the United States because of its disaster relief efforts. As a result, the overall U.S. favorability rating in Indonesia rose to 38 percent after having bottomed out at 15 percent in May 2003. U.S. Admiral Michael Mullen, chairman of the Joint Chiefs of Staff, was right to describe the military's response to the tsunami and the subsequent improvement of the U.S. image in the region as "one of the most defining moments of this new century." The question now is whether the tsunami response will be remembered in 30 years time as a defining case or an exception to the rule.

If and how to respond will be a recurring question for the United States, each time raising a difficult set of issues with important national security and foreign policy implications. How much financial assistance should the United States pledge and how quickly? With which other countries should the United States seek to coordinate its response, either operationally or diplomatically? Should the U.S. military participate directly, and, if so, in what capacity and on what scale?

Over time, it is possible that the United States will become reluctant to expend ever greater resources on overseas disaster relief, not to mention longer-term humanitarian and stabilization operations, as the impacts of climate change begin to be seen more frequently and felt more acutely at home. Natural disasters already cost the United States billions of dollars annually, and the IPCC projects that climate change will create an "extended period of high fire risk and large increases in area burned" in North America and particularly in the western United States. The United States will also have to meet rising health costs associated with more frequent heat waves, a deterioration of air quality, and an increase in water-borne disease.

We might have glimpsed a model of this future in the response to the 2005 Pakistani earthquake, which occurred within a year of the Indian Ocean tsunami and just two months after Hurricane Katrina. With time and resources devoted to the Gulf Coast, the United States may not have responded as quickly and effectively at it otherwise would have, and as a result, missed a rare opportunity to recast its image in a strategically critical country.

Over the next three decades, the spread and advancement of information and communication technologies will enable the public to follow these crises more closely, making it difficult to ignore the widening chasm between how the world's "haves" and "have-nots" are affected by climate change. Ironically, as noted in a recent report by the UK Ministry of Defense's Development, Concepts, and Doctrine Center, the very words and images that at first will catalyze action might eventually lose their impact: "Societies in the developed and developing worlds *may* become increasingly inured to stories of conflict, famine, and death in these areas and, to an extent, desensitized."

Ultimately, the threat of desensitization could prove one of the gravest threats of all, for it is clear that the national security and foreign policy challenges posed by climate change are tightly interwoven with the global leadership challenge of helping those least responsible to cope with its effects.

Climate change will present challenges to U.S. foreign policy and national security interests all over the globe over the next generation. While the greatest temperature changes will be observed toward the poles, the greatest threats are likely to be seen closer to the equator, where societies and governments are more fragile and less able to cope with the strains of climate change. These threats include water shortages in the Middle East, environmental damage and domestic instability in China, migration within South Asia and Africa as well as from those regions to Europe, and state weakness and failure particularly in Africa and South Asia. Ultimately, these threats are not simply environmental but would exacerbate the threat to U.S. national security from terrorism itself, both by exacerbating radicalization of Muslim communities in Europe, which may then seek harm to Western societies, and by providing a home for terrorist operational planning and training in increasingly strained countries in the generation ahead.