



The National Security Implications of Global Climate Change
A TISS/AWC Conference
March 30th and 31st, 2007, Chapel Hill, North Carolina

Climate change has become virtually synonymous with global warming. But climate change in its larger sense has been a security problem for states since the time of “the Catastrophe” around 1200 BC. Climate change offers the most plausible explanation for the waves of migration and invasion that swept over Western civilization late in the second millennium BCE. Chronic drought or environmental crisis sent waves of people flooding into the Aegean and spreading out through the Levant, destroying ancient Troy and dozens of other cities in their path. Global warming is only the latest of the climate changes to pose security challenges for the world. It behooves us to examine this latest manifestation in the broadest possible context.

While few now deny that global warming and perhaps other forms of climate change are taking place, lively debate surrounds how rapidly it is occurring, how irreversible it is, and what impact it will have. While there is broad agreement that rapid climate change could significantly alter the world security environment, efforts to deal with the problem have been sluggish at best. It has proven difficult to get the security community to focus on this issue when political attention has been so concentrated on short-term goals. Dealing with the problem will require political will and commitment at all levels of government.

Much remains unclear. How robust are theories linking global climate change to conflict? Who would be the losers and winners in a changed environment? How might U.S. national security be affected? How should we approach the problem of global warming? And what measures should we take to be ready to prepare for/ deal with the kinds of instability that many think will ensue? What institutions and at what level (global, national, local) are most likely to produce useful results? What kinds of responses are appropriate? Should we focus more on adaptation or mitigation? What solutions have been suggested to date? Are these likely to be beneficial or to create a new set of security dilemmas?

The role of the military is of particular interest. If even some of the direst predictions come true, and rapid climate change leads to massive migration, failed states, flooding, resource scarcity, and other problems, the military will inevitably find itself involved. The military can take measures to mitigate climate change, assist in efforts to adapt to climate change, and prepare for the security challenges climate change may bring.

This conference will evaluate the nature and extent of the threat posed by climate change, and consider potential solutions. It will promote discussion between military officers and scholars and inform policy makers about the salient problems and possibilities that face us. It will establish and nurture relationships among the diverse organizations represented by symposium participants. It will focus in part on answering key questions posed by members of the interagency and international community who have identified climate change as a serious threat. It will also explore the significance of this issue for the U.S. military in general, and the Army in particular. It is obvious that, as the military prepares for the future, it should take into consideration the predictions of serious scholars of global climate change. But dealing with this problem could also bring positive benefits for the organization, contributing to improved public relations, helping build regional cooperation, and bolstering international confidence. In sum, this is an important and timely topic, deserving of serious analysis and discussion.

General Information

Dates: March 30 and 31st 2007.

Format: 7 panels, each 1 hr. 45 minutes featuring 3 speakers plus 1 (local) discussant

- Panelists to speak for 15-20 minutes, Discussant to comment for 10 minutes.
- 45 minutes question and answer with audience to follow presentations.
- Wrap up.
- Two keynote talks – one after lunch, the other during evening banquet.

Place: Friday Center, Chapel Hill (sessions - Sunflower Room, lunch - Trillium)
Banquet and Second Keynote Talk, Courtyard Marriott, Chapel Hill.

Sponsors: The US Army Environmental Policy Institute; Creative Associates, The Center for Global Change, The Nicholas Institute for Environmental Policy Solutions (Duke University), The Environmental Change and Security Program (The Woodrow Wilson International Center for Scholars), and the Department of Environmental Sciences at UNC-Chapel Hill.

Schedule

FRIDAY

AM 7:30 – 8:10	Registration and Continental Breakfast
AM 8:10 – 8:15	Welcome (Sunflower)
AM 8:15 – 10:00	Panel 1: Defining the Problem (Sunflower) <i>Break</i>
AM 10:15 – 12:00	Panel 2: Climate Change and Human Security (Sunflower) <i>Lunch (Trillium)</i>
PM 12:50 – 1:30	Keynote Address I (Sunflower) <i>Break</i>
PM 1:45 – 3:30	Panel 3: Climate Change and US Strategy (Sunflower) <i>Break</i>
PM 3:45 – 5:30	Panel 4: Meeting the Challenge (Sunflower)
PM 5:30 – 6:30	<i>Reception (Atrium)</i>
PM 7:00 – 9:00	BANQUET (Courtyard Marriott) Keynote Address II (Courtyard Marriott)

SATURDAY

AM 8:30 – 10:15	Panel 5: Preparing for a Changed Environment (Sunflower)
AM 10:30 – 12:15	Panel 6: Dealing with Climate Change: Obstacles or Opportunities for the US Armed Forces? (Sunflower) <i>Lunch (Trillium)</i>
PM 12:15 – 1:15	
PM 1:15 – 3:00	Panel 7: Military Planning (Sunflower)
PM 3:15 – 3:45	Panel 8: Lessons Learned – Wrap up (Sunflower)
PM 3:45 – 3:55	Farewell (Sunflower)

Agenda

Welcome – Alex Roland¹ (TISS and Duke) and Douglas Johnson² (USAWC)

Panel 1: Defining the Problem

The opening panel will lay out the evidence for climate change in general and global warming in particular and discuss the areas of uncertainty that remain: how rapid is climate change; how irreversible is it; what different scenarios have been worked out by scholars; and finally, as a security threat, how pressing a problem is it? Is environmental security likely to be *the* problem of the twenty-first century? To what extent is the threat compounded by a failure of organizations and communities to perceive global climate change as a significant problem? The panel will make clear that the key issue is no longer whether or not rapid climate change is a problem, but how to make decisions in an environment of uncertainty.

- *How We Came to See Global Climate Change as a Threat -- Spencer R. Weart*³ (American Institute of Physics)
- *The Science of Climate Change – Robert Corell*⁴ (The Heinz Center)
- *A Threat Assessment – Richard Matthew*⁵ (University of California –Irvine)

Chair: Ryan Boyles⁶ (NC State Climate Office)

Discussant: James Rotenberg⁷ (UNC-Wilmington)

¹ **Alex Roland** is Acting Director of the Triangle Institute for Security Studies and is a Professor of History at Duke University and Acting Director of the Triangle Institute for Security Studies. He served in the United States Marine Corps (1966 – 1970). Between 1973 and 1981 he was the Historian at the National Aeronautics and Space Administration and from 1988-1989 he was a Professor of Military History at the Military History Institute, U.S. Army War College. He holds a doctorate from Duke University. Professor Roland's research and writing focus on military history and the history of technology. His doctorate is from Duke.

² **Douglas V. Johnson II** has been with the Strategic Studies Institute since 1985, first as Strategic Research Analyst and then as Research Professor of National Security Affairs. His 30 years of service in the U.S. Army included two combat tours, a variety of troop and staff assignments, and instructor duty at the U.S. Military Academy and the School of Advanced Military Studies at Fort Leavenworth. Dr. Johnson's current research addresses Army transformation. He holds a B.S. from the U.S. Military Academy, a M.A. in History from the University of Michigan, and a Ph.D. in History from Temple University. He is also a graduate of the U.S. Army Command and General Staff College and holds a diploma from the U.S. Army War College.

³ **Spencer R. Weart** is Director, Center for History of Physics, American Institute of Physics (AIP), College Park Maryland, USA. Originally trained as a physicist, he is now a noted historian specializing in the history of modern physics and geophysics. His publications include *The Discovery of Global Warming* (2003). He holds a Ph.D. in Physics and Astrophysics from the University of Colorado, Boulder.

⁴ **Robert W. Corell** joined The Heinz Center as the new Global Change Director on December 1, 2006. Dr. Corell is actively engaged in research concerned with the sciences of global change and the interface between science and public policy, particularly research activities that are focused on global and regional climate change, related environmental issues, and science to facilitate understanding of vulnerability and sustainable development. Dr. Corell is an oceanographer and engineer by background and training, having received Ph.D., M.S., and B.S. degrees at Case Western Reserve University and MIT.

⁵ **Richard A. Matthew** is Associate Professor of International and Environmental Politics, Schools of Social Ecology and Social Science at the University of California at Irvine. He is also a member of the Homeland Security Advisory Council (Region 1), has taught at the National Foreign Affairs Training Center, and has worked closely with the Departments of State and Defense as well as numerous non-governmental organizations. His research interests include international relations in the developing world, especially South Asia; transnational security threats including environmental change, terrorism and landmines. He holds a doctorate from Princeton University.

⁶ **Ryan Boyles** is a Director and State Climatologist at North Carolina State University. He holds a Ph.D. in Meteorology from NC State University. His research involved development of a radar-based mesoscale precipitation climatology and study of summer rainfall patterns across our state. As State Climatologist, Ryan is the chief scientist with responsibilities to promote the Office's climate services for extension, research, and education of applied meteorology and climatology.

⁷ **James A. Rotenberg** is Assistant Professor: Tropical Ecology at the University of North Carolina at Wilmington. In 1998, he was awarded the J. William Fulbright Scholar to Guatemala. His primary research interest is tropical avian ecology, using birds as environmental indicators of habitat changes and conditions. Dr. Rotenberg has worked on several research projects in Mexico, Belize, Costa Rica, Guatemala, California, and North Carolina. Among the courses he teaches is one on global climate change.

Panel 2: Climate Change and Human Security

The second panel will focus more closely on the cause-effect correlations between climate change and conflict. Scholars disagree as to how far resource shortages (specifically water), the spread of disease, human migration on a massive scale, and other factors of this sort might exacerbate existing conflicts. The purpose of this session would be to consider how robust the theories are which link climate change to human security problems.

- *Water Conflict – Erika Weinthal*⁸ (Duke University)
- *Disease – Andrew Price-Smith*⁹ (Colorado College)
- *Demographics and Conflict – Nazli Choucri*¹⁰ (MIT) (In Absentia)

Chair: Robert Jackson¹¹ (Center on Global Change, Duke University)

Discussant: David Gilmartin¹² (North Carolina State University)

Luncheon

Keynote Address I

- *An Archaeologist looks at Ancient Climate Change: Cooling, Warming, Drought, and the Flail of God - Brian Fagan (University of California, Santa Barbara)*¹³ (accepted) - introduced by Alex Roland.

8 **Erika Weinthal** is Associate Professor of Environmental Policy at Duke's Nicholas School of the Environment, Environment and Policy Division. Her expertise lies in environment policy, international environmental institutions, the political-economy of the resource curse, water cooperation and conflict, and environmental security. She holds a doctorate in Political Science from Columbia University.

9 **Andrew Price-Smith** is Assistant Professor of Political Science at Colorado College. He holds a doctorate from the University of Toronto. He is currently completing a third book entitled *Contagion and Chaos*, forthcoming 2008). He has served as a consultant to the United States Institute of Peace, the United Nations Development Program, the World Bank, the US Department of Energy, and for the private sector. He is CEO of APS Consulting of Wyoming, which specializes in the use of open-source intelligence (including health, demographic and psychological data). He specializes in analyses of the effects of public health and medicine on the prosperity, governance and security of nations.

10 **Nazli Choucri** is Associate Director of the Technology and Development Program, and Director of the Middle East Program at MIT and has served as advisor to numerous international organizations --including the United Nations Development Program, the United Nations Environment Program, and the United Nations Fund for Population, among others -- as well as to a large number of national agencies. Her research interests include the interconnections among population, politics, and environment -- topics explored in a number of books, namely *Population Dynamics in International Violence*; *International Energy Interdependence*; and *International Energy Futures*, and her edited volume on *Multidisciplinary Perspectives of Population and Conflict*. Her doctorate is from Stanford University.

11 **Robert B. Jackson** is Professor of Professor of Biology and Environmental Sciences, Earth and Ocean Sciences Division, Nicholas School of the Environment at Duke University. He is Faculty Director for the Center on Global Climate Change. He holds a doctorate in plant ecology from Utah State University. He is an expert in ecosystem functioning and feedbacks between global change and the biosphere, with a strong interest in air quality, atmospheric science and global climate change.

12 **David Gilmartin** is a Professor of History at North Carolina State University, with expertise in Modern South Asia. His area of research specialization include the history of water control in the Indus River Basin and he has taught a course on the comparative history of the politics of water control in different regions of the world. His doctorate is from the University of California at Berkeley.

13 **Brian M. Fagan** is a Professor of Anthropology at the University of California, Santa Barbara. Born in Britain, he attended Cambridge University, where he concentrated on the study of Iron Age Archaeology and Anthropology. He is a member of the editorial board of the Cambridge Archaeological Journal. A former Guggenheim Fellow, Dr. Fagan received the Distinguished Service Award from the Society of Professional Archaeologists in 1996, and a Presidential Recognition Award from the Society for American Archaeology in the same year. He was the first recipient of the Society's Public Education Award in the following year. Dr. Fagan is the author of over 30 books covering a wide range of archaeological topics including, *Little Ice Age.: How Climate Made History: 1300-1850*.

Panel 3: US National Defense and Climate Change

Panel 3 will consider the impact of global climate change on U.S. national defense. Though we may well be spared catastrophic problems of the sort discussed in Panel 2, global climate change will, nonetheless, affect our strategic options. If the world at large experiences widespread human disasters, we may choose to intervene. If we do, we will find our resources strained and our soft-power options limited. If we do not, the kind of forces that feed off of resentment, inequalities and human suffering – including transnational threats of all sorts – are likely to grow and expand, to our detriment. Quite apart from this, the balance of power will shift if and when different geographic regions experience change. This panel will focus on trying to think through what global climate change might presage, what demands it might place on us, and how our relationships with the world at large might alter. It would consider not only threats but also opportunities.

- *Under What Conditions Climate Change could Pose a Threat To US National Security Interests – Joshua Busby*¹⁴ (University of Texas- Austin)
- *The Perfect Storm and U.S. Defense Strategy -- John T. Ackerman*¹⁵ (Air Command and Staff College)
- *Climate Change: Complicating the Struggle against Extremist Ideology – Kent Butts*¹⁶ (Center for Strategic Leadership, USAWC)

Chair: Timothy McKeown¹⁷ (University of North Carolina at Chapel Hill)

Discussant: Col. Gregory Douquet, USMC¹⁸ (Royal College of Defence Studies and King's College London)

¹⁴ **Joshua Busby** has just joined the faculty at University of Texas at Austin, Lyndon B. Johnson School of Public Affairs. Dr. Busby, who holds a doctorate from Georgetown University is interested in Climate Change and U.S. National Security, and specifically in the impact of environmental solutions on national security and grand strategic concerns of great powers. His position is that the physical effects of global climate change may not pose an existential threat to the United States but do pose challenges for the U.S. in terms of its effects on U.S. interests outside its borders, both physical and symbolic.

¹⁵ **John T. Ackerman** is an Assistant Professor of National Security Studies at the Air Command and Staff College (ACSC), Maxwell Air Force Base, Alabama. Dr. Ackerman is also a retired Lieutenant Colonel from the United States Air Force and held assignments in Intercontinental Ballistic Missile Operations and Training and taught both company grade and field grade officers' professional military education courses. His professional interests include national, international, and environmental security issues. His research efforts have included exploration into the relationships between sustainability and security, the international relations implications of global climate change, and the national security ramifications of global warming. He is currently researching the challenges posed by climate change to the National Defense Strategy of the United States.

¹⁶ **Kent Hughes Butts** is Director of National Security Issues Branch, Center for Strategic Leadership, USAWC. Dr. Butts has served as a strategic analyst in the Strategic Studies Institute, U.S. Army War College and taught at the U.S. Military Academy. In a 1998 work, *Environmental Security: A DoD Partnership for Peace*, he looked at how international environmental issues can lead to instability and conflict that threaten U.S. security interests and may result in the commitment of U.S. forces. More recently he has written on how to combat terrorism.

¹⁷ **Timothy McKeown** is Professor of Political Science at UNC-Chapel Hill. He holds a Ph.D. from Stanford, and has also taught at Carnegie-Mellon, Duke, Moscow State Institute of International Relations (Russian Federation), and the New School for Democratic Management. His current research investigates foreign aid programs and the practice of conditionality and soft influence strategies; government research and development subsidies as a trade-promoting strategy; industrial structure and foreign economic policy, and third party interventions in bilateral bargaining. Methodologically, he continues to work on developing the theory and methods of qualitative research, especially the systematic observation of archival material.

¹⁸ **Colonel Greg Douquet** (USMC) currently holds a Fellowship at the Royal College of Defence Studies in London where he is pursuing a dissertation on national security implications of climate change in the CENTCOM Area of Responsibility. Professionally, Colonel Douquet holds dual specializations in strategic planning and in aviation operations. Prior to his fellowship, he served as a planner for future operations in Iraq for the Marine Corps. He has served two tours of duty in Iraq, as an operational commander of an assault support helicopter squadron in 2005, and as a Marine Corps planner for operation ENDURING FREEDOM in Afghanistan and for IRAQI FREEDOM, the initial U.S. invasion of Iraq in 2003.

Panel 4: Meeting the Challenge

At this point discussion will shift to a consideration of solutions – or rather responses – to global climate change. Panelists will be asked to consider why, despite compelling scientific evidence, the problem has failed to get much traction. What could be done to change this? They will be invited to consider what kinds of methodologies are available for making decisions in the face of much uncertainty. They will also be asked to evaluate different approaches to dealing with climate change. Would we do better to focus on mitigation or adaptation? What organizations are currently engaged in these efforts? How well suited are they to the task? Are local, national, or international efforts most likely to succeed? Can the U.S. help create a global framework for environmental management?

- *Transatlantic Climate and Energy Policy Making – Dennis Tänzler*¹⁹ (Adelphi Research, Germany)
- *Making Clean Power Happen: The Role of the Corporation – Simon Rich* (Formerly, Louis Dreyfus National Gas)²⁰
- *Communicating the Risks of Global Warming – Anthony Leiserowitz*²¹ (Yale University)

Chair: Randall Best²² (Center on Global Change, Duke University)

Discussant: Marvin Soroos²³ (North Carolina State University)

19 **Dennis Tänzler** is Research Fellow with Adelphi Research, Germany. He holds degrees in political science as well as in North American Studies/Cultural Sciences. His main areas of research are international environmental and development policies with a special focus on transatlantic climate and energy policy as well as crises and conflict prevention strategies. He is presently working on the BMBF funded project "Security Diagrams" that aims to improve the assessment of the impacts of extreme weather events on societies.

20 **Simon Rich** is the former Chairman and CEP of Louis Dreyfus Natural Gas and CEO of Louis Dreyfus Holding Corp; the Louis Dreyfus Group holds a global position in all areas of energy and agriculture including production, processing and merchandising. He is a thought leader at the nexus of agriculture and energy. Mr. Rich is former chairman and emeritus member of the board of visitors of the Nicholas School of the Environment and Earth Sciences at Duke University and teaches courses in Energy and Environment within the school. He also serves as a trustee of Warren Wilson College in Asheville, NC, is vice chair of Environmental Defense in North Carolina, a director of Sustainable North Carolina, the North Carolina Sustainable Energy Association, the Center for Environmental Farming Systems, and is a member of the Governor's Energy Policy Commission.

21 **Anthony Leiserowitz** has just assumed a position at Yale University. Prior to this, he was a research scientist at Decision Research, a principal investigator in the Center for Research on Environmental Decisions at Columbia University, and a courtesy professor of Environmental Studies at the University of Oregon. He is interested in how publics perceive risk and what this means for how we respond to the climate crisis. He earned a Ph.D. in Environmental Science, Studies and Policy (focal discipline: Geography) from the University of Oregon.

22 **Randy Best** is Associate Director at the Center on Global Change, Duke University. The Center on Global Change is one of three primary participants in the The Climate Change Policy Partnership (CCPP). The CCPP is intended to leverage the resources of Duke University to determine practical strategies to respond to the pressing challenges of global climate change.

23 **Marvin Soroos** is Professor Emeritus in the Department of Political Science in the School of Public Administration at North Carolina State University. His area of specialization included global atmospheric issues (climate change, ozone depletion, transboundary air pollution). He has written a number of articles on the subject of global climate change and the Kyoto accords and is the author of *The Endangered Atmosphere: Preserving a Global Common*. His Ph.D. is from Northwestern University.

Panel 5: Preparing for a Changed Environment

Speakers on Panel 5 will be invited to think about what has and should be done to prepare for a chaotic and uncertain international environment. Is our strategic planning adequate? What can be done to identify potentially vulnerable regions and manage risk? What steps can be taken to prevent instability? Speakers will also be invited to think about whether policies developed in response to worries about climate change would diminish or increase international stability.

- *Early Warning Systems – Michael Glantz*²⁴ (Center for Capacity Building)
- *Good governance and Stability -- Robin Dorff*²⁵ (Creative Associates)
- *Defense Planning – Henry Gaffney*²⁶ (Center for Naval Analyses)

Chair: Joseph W. Caddell²⁷ (North Carolina State University and UNC-Chapel Hill)

Discussant: William H. Schlesinger²⁸ (Nicholas School of the Environment, Duke)

Reception (Friday Center) / Banquet: (Courtyard Marriott)

Keynote Address II: General Paul Kern²⁹, USA (Retired) Introduced by Douglas Johnson.

²⁴ **Michael (Mickey) Glantz** is Director, Center for Capacity Building, Senior Scientist and former Director of the Environmental and Societal Impacts Group, a program at the National Center for Atmospheric Research (NCAR). He is interested in how climate affects society and how society affects climate, especially in how the interaction between climate anomalies and human activities affect quality of life issues. Among the issues which have been of great concern to him lately is how to warn vulnerable communities of pending danger.

²⁵ **Robin Dorff** is Senior Advisor for Democracy, Governance and Civilian/Military Relations, Creative Associates. His teaching and research expertise is in the areas of national security and defense policy, failed and fragile states, building democracy and good governance, and post-conflict stabilization and reconstruction. He holds a doctorate in political science from UNC-Chapel Hill and before coming to Creative Associates was Chairman of the Department of National Security and Strategy at the US Army War College and later, the Executive Director of the Institute of Political Leadership in Raleigh, NC.

²⁶ **Hank Gaffney** is the Director of the Strategy and Concepts Team in the Center for Strategic Studies (CSS) at The Center for Naval Analyses (CNA). He has been at CNA since 1990, specializing in broad studies of the evolving world security environment (including a long study on Globalization and the U.S. Navy). Dr. Gaffney served for 28 years in the Office of the U.S. Secretary of Defense prior to joining The CNA Corporation (19 of those years at the SES level). Dr. Gaffney received his undergraduate degree from Harvard College in 1956 and his doctorate from Columbia University in 1967.

²⁷ **Joseph (Joe) W. Caddell** is Adjunct Assistant Professor of Peace, War, and Defense at the University of North Carolina at Chapel Hill and a Teaching Assistant Professor of History at North Carolina State University. He teaches the History of Air Power, the History of Sea Power, U.S. Military History, and the American Civil War and Reconstruction. Professor Caddell served in the U.S. Air Force and Air Force Reserve from 1973 through 1997, retiring as a Lieutenant Colonel. He has taught warning intelligence at a variety of Department of Defense Schools and edited and authored texts and monographs for the Air War College and the Army War College on subjects ranging from Nuclear Strategy to Military Deception. He holds a doctorate in History from Duke University and is a Fellow of the Triangle Institute for Security Studies.

²⁸ **William H. Schlesinger** is James B. Duke Professor of Biogeochemistry and Dean of the Nicholas School, Duke University, Earth and Ocean Sciences Division. Schlesinger's expertise lies in global environmental change, focusing on chemical changes in the environment, especially soils, that relate to changes in global climate and desertification. His doctorate is from Cornell University. He was elected a member of the American Academy of Arts and Sciences in 1995 and The National Academy of Sciences in 2003. He was President of the Ecological Society of America for 2003-2004. Currently, Schlesinger focuses his research on global change ecology. He is the co-principal investigator for the Free Air Carbon Dioxide Enrichment (FACE) Experiment in the Duke Forest—a project that aims to understand how an entire forest ecosystem (vegetation and soils) will respond to growth in elevated CO₂.

²⁹ **General Paul Kern** served for more than 40-year career in the United States Army, retiring as Commanding General, Army Materiel Command (AMC) in 2004. In that capacity, and earlier as Commander of the 4th Infantry Division (Mechanized), General Kern left his impact on the Army's future as he led a drive to digitize and transform its warfighting capabilities. Prior to his command at AMC, he served as the military deputy to the Assistant Secretary of the Army for Acquisition, Logistics and Technology and was the senior military advisor to the Army Acquisition Executive and the Army Chief of Staff on all research, development, and acquisition programs and related issues. He

Panel 6: Dealing with Climate Change: Opportunities or Obstacles for the Military?

Panel VI will consider how concerns over climate change have affected the U.S. military. It will also seek to generate discussion about the environmental role of the Army. What can the Army do to promote responsible stewardship of the environment, as mandated by FM 34-200.4, while ensuring combat readiness? How do environmental laws of war affect current military operations? As a large and complex institution, the Army can do (and in the past has done) much to speed the commercialization and implementation of efficient technologies world wide. What is it doing today? What are the potential costs and benefits of a more concerted engagement by the U.S. armed forces in environmental issues? Can it lead to improved military-to-military relations with regional partners?

- *Climate, Security, and Energy* – E. Thomas Morehouse, Jr.³⁰ (Institute for Defense Analyses)
- *Military Technology and Renewable Energy* – David Sheets (Army Environmental Policy Institute)³¹
- *The Law, the Environment, and Combat Operations* – Karen Hulme (University of Essex)³²

Chair: Douglas Crawford Brown³³ (University of North Carolina at Chapel Hill)

Discussant: Christopher Schroeder³⁴ (Duke Law)

Luncheon

supervised the Program Executive Officer system, and served as the director of the Army Acquisition Corps. He is serving on the Military Advisory Board for the Center for Naval Analyses (CNA) Corporation's current project on "National Security and Climate Change."

30 **Edward T. Morehouse, Jr.** is with the Institute for Defense Analyses / Science & Technology Policy Institute (1994 - Present). His work for the last decade has focused on the confluence of climate, security and energy issues. He is especially interested in how to meet the challenge of finding remedies that contribute positively to all three. As Military Assistant to (1993-1994) Secretary of Defense (1993 - 1994) he assisted in the organization and management of new Pentagon Environmental Security office and advised the Deputy Under Secretary of Defense on formulation and integration of environmental and energy programs and policies. He is currently working with the CNA Corporation to assess the national security implications of predicted global climate changes caused by elevated atmospheric concentrations of greenhouse gases.

31 **David Sheets** is a Senior Fellow with the Army Environmental Policy Institute, assisting the Army Secretariat in developing proactive policies and strategies to address emerging environmental, safety, and occupational health issues (ESOH) that may have significant future impact on Army operational readiness. Mr. Sheets is responsible for sustainable energy initiatives and identifying future contaminants and munitions constituents of importance to the Army, to include nanoparticles and heavy metals. He is also responsible for several other initiatives, such as green chemistry and for improving the management of environmental cleanup. Mr. Sheets served as a US Army Sanitary Engineering officer in the Medical Service Corps for twenty years, retiring in February 2003. Mr. Sheets holds a Masters of Science Degree from the University of Texas at Austin in Environmental Health Engineering.

32 **Karen Hulme** is a faculty member in the Department of law, University of Essex. Dr. Hulme studied law at the University of Nottingham and decided to specialise in the area of public international law. She achieved her Masters in Public International law also at Nottingham. She has particular interests in environmental laws and the laws of war. Karen was awarded a doctorate in 2002 from the University of Essex for her work on the protection of the environment in times of armed conflict. She currently teaches on the public international law, international law of armed conflict, law of evidence and tort law courses. She is the author of *War Torn Environment: Interpreting the Legal Threshold*.

33 **Douglas J. Crawford Brown** is Professor in Environmental Sciences and Engineering and in Public Policy at UNC-Chapel Hill. Through the Carolina Environmental program (CEP) he coordinates environmental research, education and outreach on campus. He received his degrees in physics (BS, 1975; MS, 1977) and nuclear science (PhD, 1980) from the Georgia Institute of Technology. Dr. Crawford-Brown's interest focus on risk assessment and uncertainty analyses. He is the author of 130 academic articles and five books on these topics. In November 2006, the EPA Administrator appointed Dr. Crawford-Brown as a member of the Clean Air Scientific Advisory Committee (CASAC). In addition, he has served on a wide variety of state, national and international commissions addressing environmental issues.

34 **Christopher H. Schroeder** is Charles S. Murphy Professor of Law and Professor of Public Policy Studies, and Director of the Program in Public Law at Duke university. His areas of research and scholarship include environmental law. He has written on the philosophical foundations of risk regulation and liability, the regulation of toxic substances, the performance of American environmental policy, and on a variety of topics in public law and theory. His publications include a leading environmental law casebook, *Environmental Regulation: Law, Science and Policy* (5th Edition, 2006), published by Aspen Publishing, and *A New Progressive Agenda for Public Health and the Environment* (2005). He received his J.D. degree from University of California, Berkeley.

Panel 7: The US Military: Planning for the Future

This last panel will focus on what the U.S. Armed Forces might be called upon to do in the event that rapid-climate change does indeed take place. How should they plan for such a future? Among the scenarios envisaged are large-scale humanitarian disasters in Third World areas, increased instability in Central and Latin America, and, within the United States, repetitions of Katrina. It seems likely that still further demands will be placed upon the military to get involved in peacekeeping and nation-building activities (defined as part of the Army's core mission by DOD Directive 300.5). What have the Armed Forces learned from their experiences in Afghanistan/Iraq about how to stabilize conflict-torn regions? What can they do to promote cooperative security within the Western Hemisphere? What role will the American army be called upon to play in domestic emergency management and response? How can it manage finite resources and prepare for multiple missions to best effect?

- *Disaster Preparedness* – Lieutenant Colonel Bert B. Tussing (USMC, Retired)³⁵ (Homeland Defense and Security Issues, Center for Strategic Leadership, USAWC)
- *Peacekeeping* – Major General William L. Nash (US Army, Retired)³⁶ (Council on Foreign Relations)
- *Strategic Challenges U.S. Army* – Douglas Johnson³⁷ (Strategic Studies, USAWC)

Chair: David Schanzer³⁸ (Center on Terrorism and Homeland Security)

Discussant: Richard Kilroy³⁹ (East Carolina University)

35 Lieutenant Colonel **Bert B. Tussing** is Director, Homeland Defense and Security Issues, Center for Strategic Leadership, U.S. Army War College. Before joining the AWC, Col. Tussing served in the United States Marine Corps for 24 years. He was involved in a number of humanitarian operations in the Caribbean ; in Operation URGENT FURY in Grenada; operations as a part of the Multinational Force in Beirut; Operations PROVIDE PROMISE and DENY FLIGHT in Bosnia; and the final withdrawal of U.S. forces from Somalia. Professor Tussing also served as Marine Corps analyst to the Secretary of the Navy; as a Brookings Legislative Fellow; and as Legislative Assistant to the Chairman of the Joint Chiefs of Staff. Professor Tussing's is the author of many works, including recently (with Antulio Echevarria) *From "Defending Forward" to a "Global Defense-In-Depth": Globalization and Homeland Security*.

36 **Major General William L. Nash**, USA (Ret.), is the General John W. Vessey senior fellow for conflict prevention and director of the Center for Preventive Action at the Council on Foreign Relations. His areas of expertise include conflict prevention, national security, civil-military relations and coordination, and post-conflict reconstruction. General Nash leads the Council's efforts to work with governments, international organizations, the business community, and nongovernmental organizations to anticipate international crises and to provide analysis and specific recommendations for preventive action. In addition, General Nash is a professorial lecturer at Georgetown University, a visiting lecturer at Princeton University, and a military consultant to ABC News. He has not only written widely on the subject of peacekeeping but has extensive first hand experience in peacekeeping operations, both as a military commander in Bosnia-Herzegovina and as a civilian administrator for the United Nations in Kosovo.

37 **Douglas V. Johnson II** has been with the Strategic Studies Institute since 1985, first as Strategic Research Analyst and then as Research Professor of National Security Affairs. His 30 years of service in the U.S. Army included two combat tours, a variety of troop and staff assignments, and instructor duty at the U.S. Military Academy and the School of Advanced Military Studies at Fort Leavenworth. Dr. Johnson's current research addresses Army transformation. He holds a B.S. from the U.S. Military Academy, a M.A. in History from the University of Michigan, and a Ph.D. in History from Temple University. He is also a graduate of the U.S. Army Command and General Staff College and holds a diploma from the U.S. Army War College.

38 **David Schanzer** is David H. Schanzer is Director of The Triangle Center of Terrorism and Homeland Security and Visiting Associate Professor of the Practice for Public Policy Studies at Duke University. His areas of research interest are in terrorism, national security policy and law, and homeland security. Before assuming this position, he served as Democratic Staff Director in the House Select Committee on Homeland Security. There he developed ideas for comprehensive strategy documents and reports on homeland security topics.

39 **Richard J. Kilroy, Jr.** is Visiting Assistant Professor Political Science and Assistant Director Military Programs at East Carolina University. He is also Director of East Carolina's Security Studies Program which aims to develop new thinking toward National Security by understanding emerging threats and coordinated responses between different agencies and levels of government. He is an expert in national security affairs and has edited and authored a number of books including, forthcoming Spring 2007, *Threats to Homeland Security: An All-Hazards Approach*. Spring 2007 His doctorate is from the University of Virginia

VI. Wrap Up

The purpose of this final panel will be to consider what, if any, lessons can be drawn from the conference as whole. Two speakers will be invited to sum up what they consider to be the main areas of consensus/controversy and suggest useful avenues for future research, recommend policy measures, and consider the implications of global warming for the future of the U.S. Armed Forces.

Richard Weitz⁴⁰ (The Hudson Institute)

⁴⁰ Richard Weitz is a Senior Fellow and Director of Program Management at Hudson Institute. He analyzes mid- and long-term national and international political-military issues, including by employing scenario-based planning. He is collaborating on a project on climate change and security with scholars at CSIS. From 2003 to 2005, Dr. Weitz was a Senior Staff Member at the Institute for Foreign Policy Analysis (IFPA). From 2002 to 2004, Dr. Weitz was a consultant for the Center for Strategic and International Studies, the Defense Science Board, and DFI International, Inc. He also has held positions with the Center for Strategic Studies, the Belfer Center for Science and International Affairs (BCSIA) at Harvard University's Kennedy School of Government, and the U.S. Department of Defense. He holds a doctorate from Harvard and degrees from The London School of Economics and Oxford University.