WRITTEN TESTIMONY OF
KARL KIM, PH.D.
PROFESSOR & CHAIR OF URBAN AND REGIONAL PLANNING
UNIVERSITY OF HAWAII

HEARING ON
CLIMATE CHANGE IMPACTS AND RESPONSES IN ISLAND COMMUNITIES

BEFORE THE
UNITED STATES SENATE
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

MARCH 19, 2008

INTRODUCTION

Good Morning Senator Inouye and members of the Committee. I am Karl Kim, Professor and Chair of the Department of Urban and Regional Planning at the University of Hawaii. I am honored to have this opportunity to speak to you about the impacts of climate change and responses in island communities. I have just come from Tokyo and the United Nations University where I have been participating in meetings related to climate change, sustainability, disaster management, and renewable energy. I am also engaged in research related to modeling of efforts to reduce carbon emissions through urban and transportation planning with the National Institute for Environmental Studies in Japan. I also serve as an Advisor to the Korea office of the International Council of Environmental Initiatives, which is focused on sustainable development in the Asia-Pacific region. I would also note that I am a member of the Transportation Research Board, National Research Council which will also be addressing the impacts of climate change on transportation at its Annual Meeting in 2009. I am currently working on a study estimating the impacts of climate change and sea level rise on coastal roadways and business activities in Hawaii. My current research also involves modeling evacuation decision-making in coastal communities. Much of my research over the past two decades has involved sustainable development and urban and transportation planning.

CLIMATE CHANGE AND URBAN PLANNING

Cities are both a cause of and a solution to the problem of climate change. They consume tremendous amounts of land, resources and energy and generate vast amounts of greenhouse gases. Cities store heat and are constructed of impervious surfaces, contributing to urban runoff, flash flooding, and other ecological problems. Urban expansion has also meant the destruction and loss of forests, agricultural lands, and other sinks for carbon sequestration. Cities also provide opportunities for increased density of development, reduction of travel distances for work, shopping, and education, and opportunities to utilize new technologies for energy, communications, commerce, and economic development. Adoption of sustainable, renewable, green design, planning, and building techniques will help to not only reduce the ecological footprint of cities, but also provide a pathway for continued economic growth and prosperity. It is critical that the planning regime, including comprehensive and general plans, development plans, zoning

and building codes and various community and project plans, is realigned to address the conditions and needs created by climate change. Turner, et. al. (2007) have recently examined the costs and benefits of hardening the shoreline versus managed realignment of development further inland. There are technological issues with obvious political and economic consequences to these policy changes. The University of Hawaii plays a critical role in not just developing but also applying new technologies to the planning and design of human settlements. Islands provide a unique opportunity for studying the impacts of climate change, and, more importantly, for designing and implementing appropriate responses.

CLIMATE CHANGE GREATLY IMPACTS ISLAND COMMUNITIES

Island communities are disproportionately affected by climate change. See Huang (1998) for a summary of the vulnerabilities of small islands to the impacts of climate change and State of Hawaii (1998) for a comprehensive discussion of the impacts of climate change in Hawaii. Like all coastal communities, the effects of sea level rise in terms of erosion and inundation of roadways, urban infrastructure, and coastal assets have become a matter of national concern. In addition to the potential loss of beaches and other areas important to our island economy, sea level rise also threatens our water system and increases the risk of sewage spills and toxic releases into our environment (Schiedek, et. al., 2007). Climate change means increased variability in weather conditions with an increase in extreme events such as both heavy rainstorms and also periods of drought. See New Scientist (2007) for a discussion on how climate change will lead to more wild weather. Heavy rainfall increases the probability of urban floods while drought increases the risk of wildfire. Native trees, especially in rainforest areas are not as resistant to either drought or wildfire, so climate change can also affect the make-up of forests and in turn affect wildlife habitat. Drought also increases municipal and agricultural ground water use which increases the chance of salt water intrusion into the aquifer. Increased temperatures as well as prolonged rainfall can also contribute to the increase in vector-borne diseases such as dengue fever which is also spread by both urbanization and the increased movements of human hosts between remote locations across the planet. See Haines, et. al. (2006) for more discussion of the impacts of climate change on public health.

In the Pacific region, climate change, global warming, sea level rise, and extreme weather events have increased the risk of natural events becoming disasters. Because more people and activities have located in coastal and other hazard prone areas, the risks of weather and natural events (hurricanes, storms, tsunamis, earthquakes, floods, droughts, wildfires, and others) turning into disasters where people are killed, injured, or lose their homes, property, businesses, jobs, and other assets are increased. Worldwide, there is increasing concern about the impacts of climate change on visitor destinations (Phillips and Jones, 2006). More people living and working in hazard prone areas means more exposure to disaster. The International Red Cross/Red Crescent describes a disaster as "an exceptional event which suddenly kills or injures large numbers of people." The Center for Research on the Epidemiology of Disasters (CRED) defines a disaster as a "situation or event which overwhelms local capacity, necessitating a request to a national or international level for external assistance." Because of the increased risks of natural

disaster, there is need for further efforts focused on preparedness, response, relief, recovery, and mitigation in the region.

RESPONSE TO CLIMATE CHANGE

In order to lessen the probability of natural events turning into disasters, there is a need to develop effective plans, training programs, and integrated systems of disaster preparedness, response, and recovery. An integrated system includes federal, state, and local governments as well as international agencies, non-governmental organizations, and the private and volunteer sectors. A comprehensive approach involves consideration of all phases of the disaster cycle including: 1) preparedness; 2) response; 3) recovery; 4) mitigation; 5) development; and, 6) adaptation to environmental change. While there has been research and training on various aspects of response and preparedness, there is need for more research on adaptation and vulnerability (Smit and Wandel, 2006). Each of these phases require different tools, methods, technologies, resources, and commitments. It should be noted that an "all-hazards" approach is one in which many of the same concepts, methods, and resources are transferable across different natural, technological, and human caused disasters.

There is a particular need to address natural hazards in the Pacific region and in many areas throughout the nation. With the creation of the Department of Homeland Security (DHS), significant effort has gone toward the prevention of and response to acts of terrorism. The National Domestic Preparedness Consortium was established by Congressional Mandate in September 1998 (House Conference Report [H.R.2267]) and reconfirmed in Public Law 107-273 in 2001. The original members (Center for Domestic Preparedness, Louisiana State University, Nevada Test Site, New Mexico Institute of Mining and Technology, and Texas A&M University) of the Consortium addressed counterterrorism preparedness needs of our nation's emergency responders within the context of chemical, biological, radiological, and explosive (Weapons of Mass Destruction [WMD]) hazards. Re-authorized in Homeland Security legislation (H.R.1) in 2007 through FY 2011, the Consortium's mission was expanded to include all hazards, including technological and natural hazards. Two new members were added to the Consortium (Transportation Technology Center, Inc. and the National Disaster Preparedness Training Center at the University of Hawaii). Within DHS, the Consortium is located within the Federal Emergency Management Agency (FEMA) under the National Preparedness Directorate.

NATIONAL DISASTER PREPAREDNESS TRAINING CENTER

On August 3, 2007, President Bush signed H.R. 1 "Implementing Recommendations of the 9/11 Commission Act of 2007"which authorized the establishment of the National Disaster Preparedness Training Center (NDPTC) at the University of Hawaii. Housed at the University of Hawaii, a premier research university, the NDPTC is uniquely positioned to develop and deliver natural disaster preparedness training to governmental, private, and non-profit entities, incorporating urban planning with an emphasis on community preparedness and at-risk populations.

The focus of the NDPTC is on building community resilience to all hazards by developing and providing training to first responders, decision makers, policy analysts and urban planners.

The NDPTC will partner with key federal, state, local and international partners to develop and implement training on disaster preparedness, response, and recovery relevant to the special needs and conditions of Pacific island communities and others at risk from natural and technological hazards.

The NDPTC will provide training consisting of formal degrees and certificate programs, as well as specialized courses, workshops and conferences; coordinate the sharing of data and information related to disaster preparedness, mitigation, response and recovery; and serve as an incubator for new ideas, technologies, business and partnerships between academia, business and government.

As a land, sea, and space grant institution with national and international recognition for its academic and research excellence in the fields of urban planning and earth sciences, the University of Hawaii has the expertise and research and training programs in the fields of disaster management and related topics to conduct research and develop specific models and tools for monitoring natural hazards and evaluating risk to urban areas. Planning for the response, recovery and reconstruction of communities affected by natural disasters will include a special emphasis on islands and at risk vulnerable populations.

To date, we have attended two quarterly meetings of the Consortium to learn about the training activities of the other six centers. We have also had productive and informative meetings with the Emergency Management Institute (FEMA) and others within the Department of Homeland Security involved with training and community preparedness, response and recovery. We have also interacted with the Natural Hazards Center at the University of Colorado, Boulder as well as other national and international training and research partners. We have been also working closely with other entities and organizations within Hawaii and the region involved with disaster management. It is evident that the work of the NDPTC will play an important role in addressing needs of both Pacific island communities and also other coastal communities as well as those affected by natural disasters throughout the nation.

REFERENCES

Haines, A., R. S. Kovats, D. Campbell-Ledrum, and C. Corvalan. (2006) Climate Change and Human Health: Impacts, Vulnerability and Public Health. Public Health. 120. Pp. 586-596.

Huang, J. C. K. (1998) Climate Change and Integrated Coastal Management: A Challenge for Small Island Nations. Ocean and Coastal Management. Vol. 37. No. 1. Pp. 95-107.

New Scientist (2007). 2100: A World of Wild Weather. January 20, 2007. Pp. 6-7.

State of Hawaii (1998). Hawaii Climate Change Action Plan. Department of Business, Economic Development and Tourism, Energy, Resources and Technology Division and Department of Health, Clean Air Branch. State of Hawaii. Honolulu. HI.

Phillips, M. R. and A. L. Jones (2007) Erosion and Tourism Infrastructure in the Coastal Zone: Problems, Consequences and Management. Tourism Management. 27. Pp. 517-524.

Schiedek, D., B. Sundelin, J. Readman, and R. Macdonald. (2007) Interactions Between Climate Change and Contaminants. Marine Pollution Bulletin. 54. Pp. 1847-1856.

Smit, B. and J. Wandel. (2006) Adaptation, Adaptive Capacity and Vulnerability. Global Environmental Change. 16. Pp. 282-292.

Turner, R. K., D. Burgess, D. Hadley, E. Coombes N. Jackson. (2007) A Cost-Benefit Appraisal of Coastal Managed Realignment Policy. Global Environmental Change. 17. Pp. 397-407.