

**TESTIMONY OF
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BEFORE THE
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Mr. Chairman, Members of the Commission, Admiral Lautenbacher, distinguished guests, ladies and gentlemen, aloha and thank you for the opportunity to discuss some of the climate-related challenges and opportunities facing Pacific Islands. It is a privilege to be able to share with you some of the insights gained through the recent work of the East-West Center and our colleagues at the University of Hawaii, the University of Guam, NOAA and other partners in the U.S. and throughout the Pacific. Most of what I will share with you today emerged in the context of a Pacific Islands Regional Assessment of the Consequences of Climate Variability and Change that was completed last October. You have each been provided with a copy of the project's final report "Preparing for a Changing Climate: Pacific Islands" which served as the Pacific Islands regional contribution to the first U.S. National Assessment of the Consequences of Climate Variability and Change. I hope that you will find this testimony and the full report helpful in your deliberations.

"For Pacific Island states, climate change and its associated effects are our main security concern." Leo A. Falcam, President of the Federated States of Micronesia, HONOLULU ADVERTISER, August 12, 2001.

President Falcam's words highlight the importance that Pacific Island governments, businesses and communities place on dealing with changes in climate. In this context, they are as concerned with reducing vulnerability to today's patterns of climate variability as they are with planning for a future that is being shaped, in part, by long-term climate change associated with greenhouse gas emissions. Changes in climate matter in the Pacific:

- Year-to-year variability in the climate system – most notably the El Niño-Southern Oscillation (ENSO) cycle – has significant consequences;
- Climate processes in the Pacific Ocean are key to year-to-year variability and will play a central role in determining the nature and consequences of long-term climate change;
- Pacific Islands and coastal communities are considered among the most vulnerable in assessments of climate change;
- Economic plans for Pacific Island nations are dependent on climate-sensitive sectors and resources; and
- The Pacific Region is rich in biodiversity and unique ecosystems.

The Pacific Islands Regional Assessment of the Consequences of Climate Variability and Change (Pacific Assessment) was designed to explore how and why changes in climate matter to the peoples of the American Flag and U.S. Affiliated Pacific Islands (the State of Hawaii, American Samoa, Guam, the Commonwealth of the Northern Mariana Islands, the Federated States of Micronesia, the Republic of the Marshall Islands and the Republic of Palau). The Pacific Assessment was an exciting and highly interactive process involving over 200 participants engaged in research, focused discussions and two major workshops designed to support two, mutually supportive objectives:

- Develop a more complete understanding of the regional consequences of climate variability and change for Pacific Island jurisdictions in light of existing social, economic and environmental stresses; and
- Support a dialogue among scientists, governments and communities in the Pacific region that promotes the use of climate information to support decision making.

The Pacific Assessment focused on an exploration of climate “vulnerability” in order to understand climate exposure and sensitivity (impacts) and look for opportunities to enhance resilience (adaptive capacity). By focusing on the identification of appropriate response options, the Pacific Assessment process was able to engage experts from all walks of life in a process of shared learning and joint problem solving. Pacific Assessment research, modeling and dialogue activities addressed climate-related challenges and opportunities in six key areas: providing access to fresh water; protecting public health; ensuring public safety and protecting community infrastructure; sustaining tourism; sustaining agriculture; and promoting wise use of coastal and marine resources. I would like to take an opportunity here to highlight some of the key findings in two of these areas: protecting public health and promoting wise use of coastal and marine resources.

The current state of *public health* in the Pacific Islands is sensitive to climate variability and change largely through effects on infectious disease vectors and pathogens (and the ecosystems that support them), fresh water resources and food supplies. The public health systems of Pacific Islands are already stressed and island communities are vulnerable to epidemics and the introduction of diseases through arriving visitors and imported goods. Participants in the Pacific Assessment identified a number of actions that could enhance the resilience of Pacific Island public health systems in light of climate variability and change, including:

- Improve hospitals, emergency services and public health infrastructure;
- Improve freshwater and sanitation infrastructure;
- Enhance quality and availability of climate information and integrate climate information (such as ENSO forecasts) into decision making;
- Enhance public health surveillance systems;
- Update and implement comprehensive emergency management programs;
- Improve healthcare education and training;
- Update health plans and emphasize prevention;

- Integrate traditional knowledge and practices with new technologies and scientific insights;
- Enhance public education and healthcare training; and
- Pursue community planning with an emphasis on sustainability.

I would like to briefly cite a specific example of how the incorporation of information on climate variability and change can improve public health in Pacific Islands. I am currently working with colleagues at the University of Hawaii and public health officials in a number of Pacific Island states to explore the connections between ENSO and dengue fever and other key diseases in the region. The project includes a retrospective analysis of climate conditions and epidemiological statistics for the period 1977 through 1996 coupled with a detailed analysis of the 1997-1998 El Niño event. This ongoing research program is already pointing to important ways in which El Niño forecasts – and climate information more generally – can be applied to mitigate public health threats associated with outbreaks of dengue fever and other potentially climate-related diseases in Pacific Islands.

The effects of climate variability and change on *marine and coastal resources* can be categorized in two ways – effects on human populations and effects on the natural resources upon which those coastal communities depend. For, example, coral reef ecosystems provide shoreline protection and habitat for important coastal and pelagic fish species. Healthy reefs are important assets for the economically important tourism sector as well as for residents of many islands but reefs are sensitive to near-term changes in temperature associated with ENSO and considered highly vulnerable to long-term climate change. Coastal and marine fisheries, including valuable near-shore species as well as commercially important pelagic species such as tuna and billfishes are also affected by climate variability and change. In all of these examples, changes in climate must be viewed in the context of multiple stresses such as changes in rainfall, temperature, sea level and the pressures imposed by human activities. Participants in the Pacific Assessment highlighted the need to understand and address the consequences of both long-term trends – such as changes in sea level – and climate-related extreme events such as tropical cyclones.

Participants in the Pacific Assessment suggested a number of ways to enhance the resilience of Pacific Island coastal communities and resources, including:

- Adopting flexible, adaptive resource management approaches that recognize the dynamic character of coastal and marine ecosystems, provide the capability to adjust to changing conditions and provide for the routine integration of climate information in planning and regulatory processes;
- Reduce the risk of economic losses in the critical fisheries sector through innovative approaches such as regional revenue sharing, industry diversification and stock enhancement, including aquaculture and mariculture;
- Pursue integrated coastal zone management principles to provide a framework for adaptation, engage experts from affected businesses and communities, and

- coordinate activities and decisions among sectors and across levels of government;
- Control the introduction of invasive and alien species; and
 - Enhance education and public awareness programs.

Whether their primary interest was in coastal management, water resources, public health and safety or any of the other sectors addressed in the Pacific Assessment, the participants highlighted a number of shared principles designed to enhance the resilience of Pacific Islands to climate variability and change. I suspect that many of these principles may also apply to other ocean policy issues being addressed by the Commission. First, the Pacific Assessment points to the **importance of being proactive** in climate adaptation and mitigation efforts. Some of our colleagues from the Federated States of Micronesia encouraged the adoption of the local concept of “meninkairoir” or taking the long view and thinking several generations ahead when evaluating today’s decisions.

Secondly, the Pacific Assessment points to the value **of using climate information to meet today’s needs as well as to support planning for the future**. A related recommendation encourages Pacific Island governments and communities to place a high priority on **addressing current constraints on critical infrastructure** such as water, sanitation, transportation and public health systems.

The Pacific Assessment, like other recent climate assessment efforts, points to the importance of **planning for extreme events** as an important aspect of enhancing resilience in the face of climate variability and change. Participants in the Pacific Assessment pointed to the importance of pursuing comprehensive emergency management programs as a way to improve current capabilities to respond and reduce long-term vulnerability to climate-related extreme events such as hurricanes, droughts and floods.

The Pacific Assessment points to the value of a strong **program of education, outreach and dialogue** designed to enhance public awareness and support a sustained, participatory process to understand and respond to the challenges and opportunities presented by climate variability and change.

Finally, the Pacific Assessment calls for the **adoption of flexible management approaches that integrate climate information into decision making** in a regular and sustained manner. One specific example highlighted during the Pacific Assessment involves the work of the Pacific ENSO Applications Center (PEAC) to support the use of ENSO forecast information to support decision making in the American Flag and U.S.-Affiliated Pacific Islands. Responding to the recommendations of a 1992 forecast applications workshop held here in Honolulu, NOAA’s Office of Global Programs initiated PEAC as a research pilot project in 1994. Beginning in fiscal year 2002, the National Weather Service Pacific Region has assumed operational responsibility for PEAC with resources made available through NOAA’s Climate Observations and Services initiative. PEAC is a partnership of the University of Hawaii, the University of

Guam, NOAA and the Pacific Basin Development Council with each partner contributing their special expertise to support the development, dissemination and application of ENSO forecast information to support decision making in critical sectors including health, disaster management, water resource management, agriculture and coastal management. During the 1997-1998 El Niño, Pacific Island governments responded to PEAC forecasts and public education programs by establishing government-wide task forces to prepare for anticipated drought conditions. While those drought conditions were extensive enough to require water rationing in some jurisdictions (in the case of the Marshall Islands, 7 hours every 14 days until reverse osmosis units became available), the availability and application of advanced forecast information significantly mitigated the negative impacts the 1997-1998 event. A more detailed summary of the PEAC experience during the 1997-1998 El Niño can be found in the full Pacific Assessment report and additional information can be found on the PEAC website (<http://lumahai.soest.hawaii.edu/Enso/>).

The PEAC example also highlights the kind of climate information that the Pacific Assessment identified as essential to support climate adaptation including: baseline information on climate processes, ecosystem dynamics and socio-economic patterns; historical data on climate-related events and past response options; an improved understanding of the nature and consequences of extreme events; the development of location-specific predictions of climate variability and assessments of long-term patterns, trends and consequences for vulnerability; and useful and usable climate forecast, assessment and information products specifically designed to meet information needs identified by user communities.

Addressing these needs will require strong and sustained partnerships in climate observations, modeling, research, forecasting, assessment and information management that combine the unique capabilities and special responsibilities of individuals and institutions at international, regional, national and local levels. Together, these partnerships will help create a new climate information system that more effectively links climate science with decisionmaking and policy formulation. The attached figure represents the Pacific Assessment's conceptual view of such a Pacific Climate Information System designed to incorporate science and broad-based collaboration in public decisionmaking. Whether discussing climate, marine resources or coastal management, a conceptual framework that supports shared learning and joint problem-solving is essential to closing the information gap between ocean science and policy.

If you would like to learn more about the Pacific Assessment, please do not hesitate to contact me (lewisn@EastWestCenter.org) or the project's Principal Investigator, Eileen Shea (sheae@EastWestCenter.org). You can also find the full text of the Pacific Assessment on-line at (<http://www2.EastWestCenter.org/climate/assessment>).

I would be happy to answer any questions the Commission might have. Thank you, again, for the opportunity to appear before you today and the best of luck as you continue the Commission's important work.