



PACIFIC RISA: YEAR ONE

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On August 31, 2011, the Pacific Regional Integrated Sciences and Assessments (RISA) completed a busy and successful first year of our research program. Year One of the five-year Pacific RISA program, funded by the National Oceanic and Atmospheric Administration (NOAA), concentrated on initiating strategic research protocols, nurturing existing partnerships, and developing new relationships with stakeholders in Hawai‘i, American Samoa, Guam, and the Republic of the Marshall Islands. In Hawai‘i, relationship building concentrated on stakeholders identified as key to the Central O‘ahu Water-

shed Assessment project, a regional contribution to the National Climate Assessment (NCA). In addition, Pacific RISA has been actively establishing team processes and updating its public presence via the public web page, informational brochures, brief video “Documoments,” and general outreach and communications activities.

CLIMATE MODELING RESEARCH

Research during Year One has focused on the calibration, testing, and generation of regional models capable of accurately simulating the ocean-atmosphere physics and climate for Hawai‘i and the Pacific Islands. Large-scale General Circulation Models (GCMs) fail to reproduce many of the unique and complex climatological features associated with islands, making the specific calibration of a regional model our first priority. Dr. Kevin Hamilton and his team of scientists at the University of Hawai‘i’s International Pacific Research Center (IPRC) are working to improve simulations of historic and projected climate at both regional and island scales.

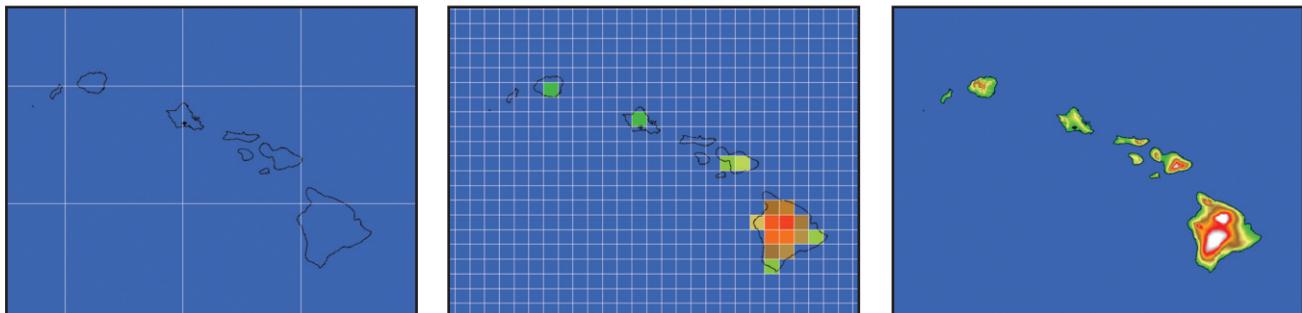


Figure 1. The Hawaiian Islands as seen in a GCM (left), a regional model (center), and a downscaled climate model (right). (Figure courtesy of Axel Lauer, IPRC.)

- Using an improved regional climate model (iRAM) to simulate regional cloud dynamics in the Pacific, Drs. Axel Lauer and Kevin Hamilton, along with researchers at the IPRC, found that the response of Pacific-region clouds to increased sea surface temperatures amplifies warming trends. These improved cloud simulations provide evidence pointing towards the high end of current global temperature predictions (Lauer et al., 2010).
- More recently, IPRC collaborators have completed a working configuration of the Weather Research and Forecasting (WRF) model for the Hawaiian Islands as a regional climate model (HRCM). They have drafted a paper documenting the model configuration and presenting a preliminary evaluation based on a

continuous one-year simulation with 3-km horizontal grid spacing. Major improvements in the model include a better representation of the land surface properties, and better simulations of the trade wind inversion and boundary layer clouds. The model simulated the spatial distribution of precipitation reasonably well. In particular, the model reproduced the precipitation diurnal cycle realistically. These results demonstrate that the model could be used as a useful tool for dynamical downscaling of regional climate over the Hawaiian Islands, and will be used in Year Two research in conjunction with hydrological models. In Years 3–5, we hope to expand into the US-affiliated Pacific Islands.

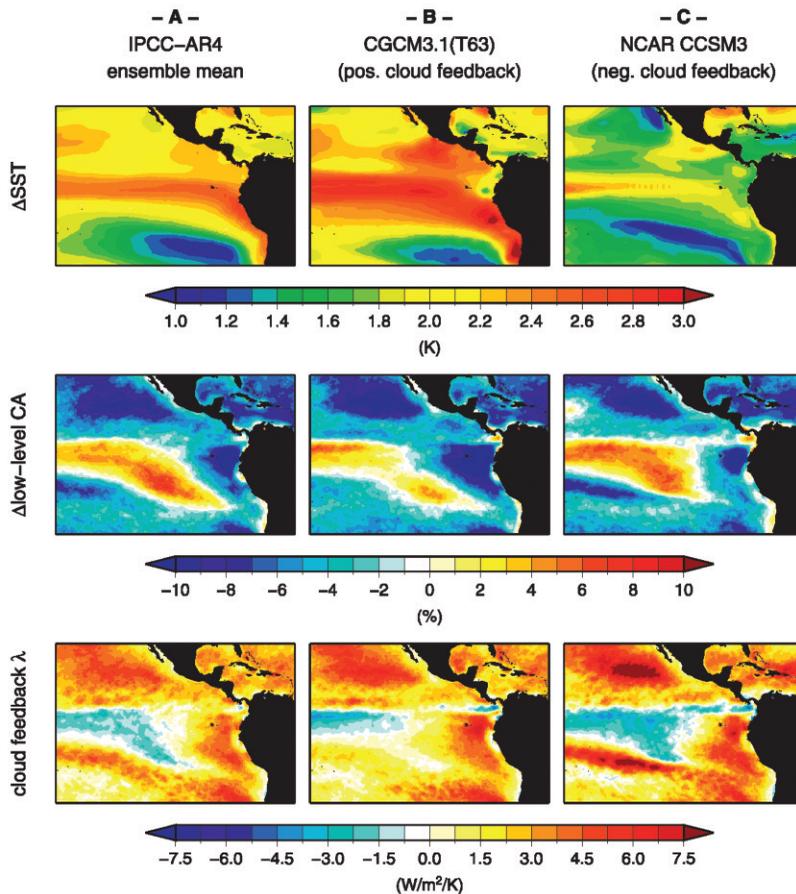


Figure 2. The 10-year average change in (middle) low-level cloud amount (DCA), (bottom) cloud feedback parameters (λ), and (top) the underlying global warming signals in sea surface temperatures (DSST) for the three global warming cases A–C, compared with present-day conditions (1999–2008). (From Lauer et al., 2010.)

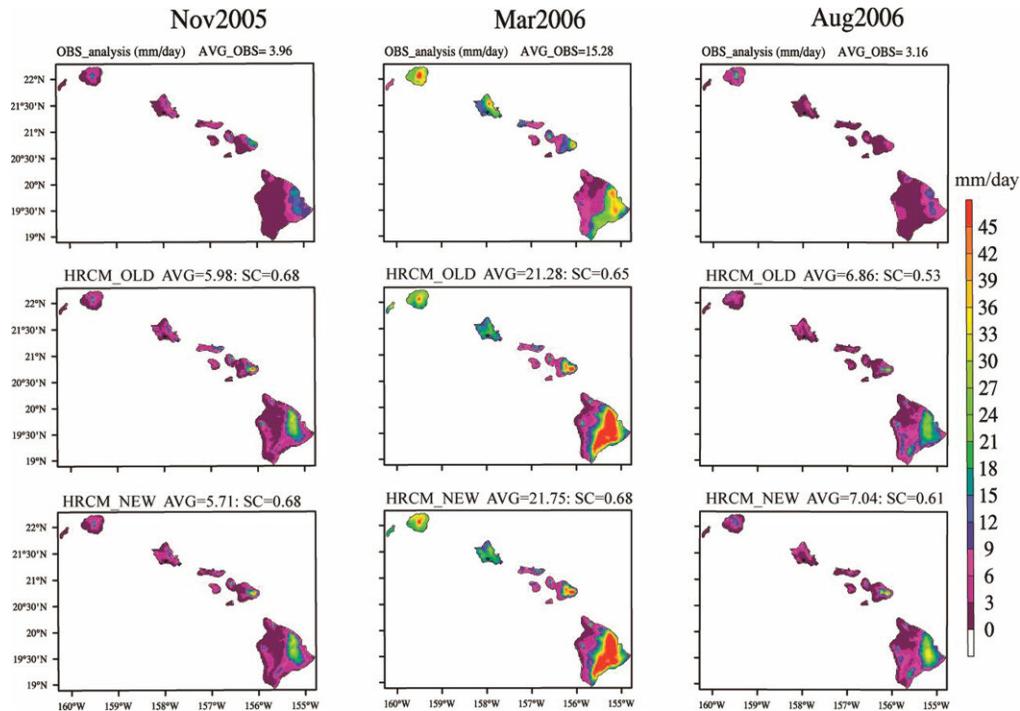


Figure 3. The observed and the HRCM-simulated monthly mean precipitation for November 2005 (left), March 2006 (middle), and August 2006 (right). The numbers above the plots give the average for all island and spatial correlation coefficient of model results with observations. (From Zhang et al., 2011 submitted.)

HYDROLOGICAL RESEARCH

- Drs. Aly El-Kadi and Alan Mair at the University of Hawai‘i at Mānoa Water Resources Research Center (WRRC), in collaboration with Mr. Steve Anthony and Dr. Scot Izuka at the United States Geological Survey (USGS) Pacific Islands Water Science Center, have developed expertise for the analysis of rainfall and temperature data to produce maps of rainfall intensity, identify periods of severe drought, and accurately assess the temperature-altitude relationship. The results of these analyses are used to develop different input climate scenarios for water balance modeling. Such modeling will provide spatially distributed estimates of groundwater recharge as input to the numerical groundwater model that will be coupled with output from the Hawaiian Islands regional climate model in Year Two.

- Drs. El-Kadi, Mair, and Klaus Hagedorn prepared a report reviewing and providing an inventory of groundwater research studies carried out in Hawai‘i’s most important aquifer system—the Pearl Harbor aquifer—with an emphasis on modeling as a tool for quantifying and managing potable water resources under a changing climate. Variability of meteorological, geological, and land-use conditions is a major hurdle for the successful application of models. This report presents state-of-the-art modeling tools capable of improving our understanding of the influence of climatic parameters on groundwater availability in Hawai‘i and similar volcanic island settings. Data needed for successful implementation of these models are also highlighted. This report was prepared in support of the Central O‘ahu Watershed project.

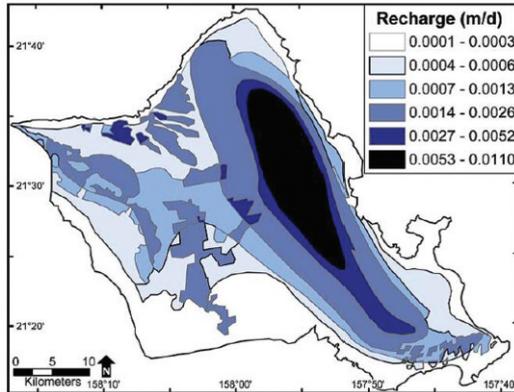


Figure 4. The distribution of groundwater recharge on O'ahu computed by regression analysis by Shade and Nichols (1996) for mid-1980s land use is shown to the left. One problem with the recharge assessments based on regression analysis between rainfall and recharge is that they are based on long-term climate and recharge averages from water budget studies and, thus, do not account for short-term recharge.

POLICY-RELATED RESEARCH

Researchers at the East-West Center (EWC) and the University of Hawai'i's Center for Island Climate Adaptation and Policy (ICAP) collaborated closely in Year One on the Central O'ahu Watershed Assessment project, a key regional contribution to the United States Third National Climate Assessment (NCA), by conducting stakeholder interviews, an online survey, and two stakeholder workshops.

- For the Central O'ahu Watershed project, the assessment services team (EWC and ICAP) conducted 23 in-depth interviews using a semi-structured interview protocol. Interviewees included water resource managers, administrators in state and federal agencies, policymakers, landowners and land managers, neighborhood board members, cultural practitioners, and water users. The team also sent out a web-based survey concerning freshwater resources and climate information needs to over 140 targeted stakeholders. The results of the survey work will be analyzed and included in the forthcoming NCA report.
- In-depth interviews with key stakeholders in the Central O'ahu Watershed revealed: (1) a range of freshwater resource management decisions that are currently, or potentially could be, informed by climate information

(e.g., development planning, energy security, irrigation strategies); (2) various planning timelines across stakeholder groups, ranging from less than one year to decades; (3) varying contextual factors constraining/facilitating use of climate information (e.g., permitting process doesn't allow for long-range planning, agricultural planning demands long-term information, but legislature not providing funds); and (4) varying levels of knowledge about where/how to access climate information.

- ICAP has completed a draft white paper titled "Hawai'i's Law & Policy Toolkit: Climate Change Adaptation and Water Resource Management," which found, in part, that the political framework of Hawai'i has potentially significant adaptive capacity. Some of the initial findings were presented by attorney Richard Wallsgrove for stakeholder feedback at the Central O'ahu Watershed workshops in July 2011 (see below). The report, with incorporated stakeholder input, will be presented to the State Water Commission, water resource managers, and policymakers in early 2012. Lessons learned will be considered when repeating the streamlined process for US-affiliated Pacific Islands. The paper identifies 12 potentially adaptive tools that are not presently implemented in Hawai'i, or are implemented only in part. Each tool is consistent with the existing law and policy framework, and each exhibits adaptive characteristics.

These tools include:

1. Incorporate climate change scenario planning into the Hawai‘i Water Plan
2. Adopt existing models of integrating watershed conservation with water resource planning
3. Implement mandatory water conservation and recycling plans
4. Enforce statewide water resource monitoring and reporting
5. Adopt more adaptive conditions for all water use, well construction, and stream diversion permits
6. Encourage water-conscious construction and modifications with green-building tax credits, rebates, and other incentives
7. Relate Water Commission fees more closely to the cost of water management

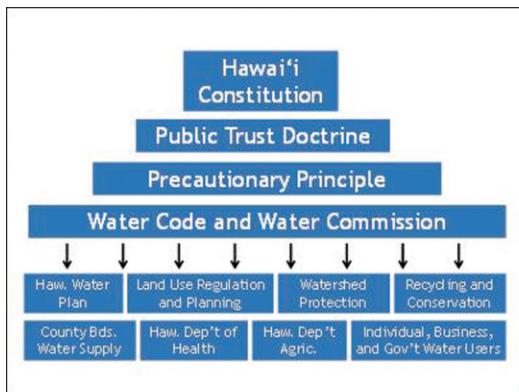


Figure 5. Map of water law and policy schemes in Hawai‘i. (From Richard Wallsgrove, 2011.)

- ICAP has developed a working paper on Pacific indigenous environmental knowledge (IEK), which serves as background research for a forthcoming book chapter on strategies to incorporate IEK as a central component of climate change adaptation knowledge. The working paper briefly examines definitions of IEK, how it has historically informed resource man-

agement, and extant policies that support and mandate the inclusion of IEK in capacity building for adaptation.

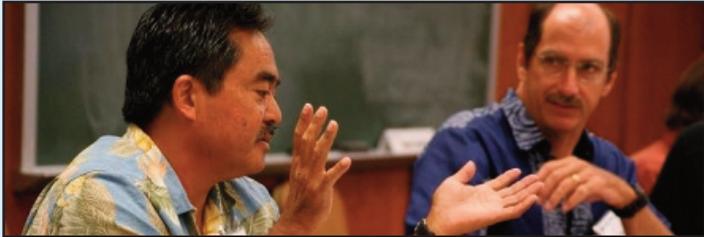
- On July 8 and 15, 2011, the East-West Center hosted workshops organized by Pacific RISA on “Climate Change Impacts on Freshwater Resources in Hawai‘i.” The workshops sought to understand decisions about how to manage freshwater resources sustainably in the face of a changing climate.

As part of Pacific RISA’s efforts to promote dialogue among key decision makers, the two workshops brought academics, policymakers, technical specialists, and community and non-profit leaders together to answer four key questions: What impacts will climate change have on freshwater resources in the next 10–50 years? What do we need to know to effectively prepare for these impacts? What organizational, capacity, political, and other challenges do we face when gathering and using climate information to address these impacts? And how can we best confront these challenges?

After presentations from local climate change experts, including University of Hawai‘i professors Dr. Tom Giambelluca and Dr. Kevin Hamilton, workshop participants engaged in a candid discussion of the future of local freshwater management in the face of potentially drier conditions. A drier climate will have ramifications for a wide variety of sectors. For example, compromised aquifer resources—both in terms of quantity, as demand for freshwater grows, and quality, due to saltwater intrusion—may lead to reduced agricultural productivity, altered infrastructure needs, and demographic displacement of native plant and animal species. To mitigate and adapt to these potential setbacks, participants in both workshops



Participants gathered at the East-West Center for the Pacific RISA workshop on “Climate Change Impacts on Freshwater Resources in Hawai‘i” on July 8 and 15, 2011. *(Photo credits: EWC External Affairs.)*



Workshop participants included Barry Usagawa, Program Administrator, Water Resources, Honolulu Board of Water Supply; and Gary Gill, Deputy Director of the Department of Health’s Environmental Planning Office.



Also participating were Taylor Savusa, Manager, American Samoa Power Authority; Steve Anthony, Director of the USGS Pacific Islands Water Science Center; and Carlton Saito, Committee Clerk for the Office of Senator Mike Gabbard.

stressed the need for greater information sharing and sustained efforts to translate the science into actionable language for policymakers, as well as the general public. Such mainstreaming of climate science will require continued dialogue among government agencies and other public- and private-sector stakeholders on the ground.

- The framework for external evaluation of Pacific RISA was developed by Dr. Susanne

Moser. Dr. Moser established foundational knowledge among team members about evaluation and conveyed the importance of evaluation for the Pacific RISA’s ongoing growth and broader social science contributions. Dr. Moser also provided team members with a project tracking template to keep track of deliverables and progress, and showed the importance of monitoring external factors on research progress.

PACIFIC ISLANDS REGIONAL CLIMATE ASSESSMENT (PIRCA)

The Pacific Islands Regional Climate Assessment (PIRCA) has been heavily involved in organizing and providing support to the National Climate Assessment (NCA). The NCA provides knowledge that can be used by communities to create a more sustainable and environmentally sound plan for the future. Conducted under the auspices of the United States Global Change Research Act of 1990, which requires that a report be submitted to the US president and congress every four years, the NCA:

- Evaluates the effectiveness of climate mitigation and adaptation activities
- Identifies economic opportunities that arise as the climate changes
- Integrates scientific information from multiple sources
- Highlights key findings and gaps in our knowledge

The PIRCA (<http://www.eastwestcenter.org/PIRCA>) is a collaborative effort that assesses the state of climate knowledge, impacts, and adaptive capacity in Hawai'i and the US-affiliated Pacific Islands. The PIRCA engages federal, state, and local government agencies, non-government organizations, businesses, and community groups to inform and prioritize their activities in the face of a changing climate. The PIRCA represents a "network of networks" that relies on the regional culture of communication and collaboration to support a sustained climate assessment process, as well as a Climate Impacts Forum in the summer of 2012. The PIRCA focuses on three subregions: (1) the Western North Pacific, (2) the Central North Pacific, and (3) the Central South Pacific.

PIRCA activities include dialogues, workshops, and a regional forum to facilitate sharing, analyzing, and reporting on scientific consensus, knowledge gaps, sectoral needs, and adaptive capacity for addressing the changing climate. The most immediate focus is on bringing together scientific experts and practitioners to generate an integrated report that will provide a regional contribution to the NCA by March 2012.

The pillars of the PIRCA framework are the three regional focus areas established at the March 2011 Pacific Climate Information System (PaCIS) Steering Committee meeting: (1) preserving freshwater resources and minimizing the impacts of drought; (2) fostering community resilience to the impacts of sea-level rise, coastal inundation, and extreme weather; and (3) sustaining marine, freshwater, and terrestrial ecosystems. The PIRCA will examine impacts and adaptive capacity of communities regarding climate change effects on the water-energy nexus; cultural resources and indigenous environmental knowledge; regional and community economies; adaptation policy; urbanization, transportation, and infrastructure vulnerabilities; ecosystem services; and ocean resource sustainability and coastal zone management. Specific topics of interest include:

- Climate variability and change science, including historical observations, trends, and climatologies
- Freshwater resource sustainability, flow trends, groundwater recharge, demographic stresses
- Sea-level rise and coastal inundation projections and scenarios, and current and projected coastal hazards and impacts
- Ecosystem assessments, including climate effects on marine systems, sea-level rise impacts on ocean and coastal habitats and

species, and species/habitat responses to changes in precipitation and temperature

- The adaptive capacity of different communities and institutions and related opportunities and limitations

Primary oversight of the PIRCA is being carried out jointly by representatives from the NOAA NESDIS National Climatic Data Center and PaCIS, the Pacific Regional Integrated Sciences and Assessments (RISA) program through the East-West Center, and the Pacific Islands Climate Change Cooperative (PICCC). Other key contributors include the NOAA National Ocean Service; NOAA Pacific Services Center; NOAA

Pacific Islands Fisheries Science Center; NOAA Center for Operational Oceanographic Products and Services; NOAA Coastal Storms Program; NOAA Coastal Services Center; the Pacific Risk Management Ohana (PRiMO); National Marine Fisheries Service; United States Geological Survey Pacific Islands Water Science Center; United States Fish and Wildlife Service; UH School of Ocean and Earth Science and Technology, Department of Oceanography; UH International Pacific Research Center; UH Sea Level Center; UH Sea Grant and the Center for Island Climate Adaptation and Policy; Water and Environmental Research Institute, University of Guam; and the Western Regional Climate Center.

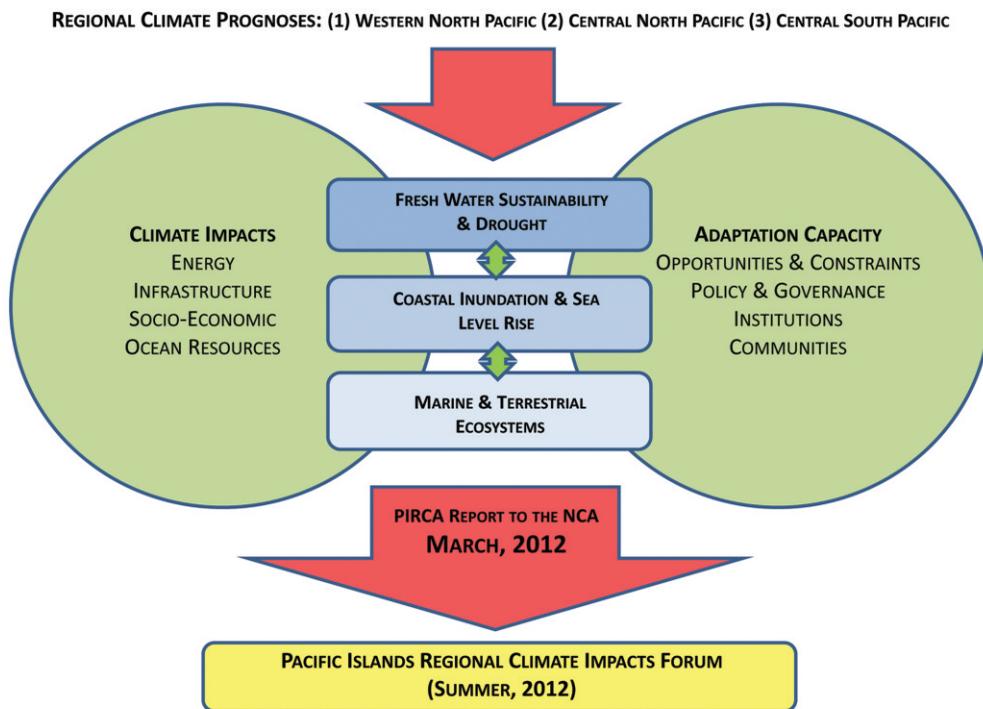


Figure 6. PIRCA is an integrated and multidisciplinary process. Overarching themes stressing the impacts of climate change and the adaptation capacity of different Pacific Island communities and institutions will cut across the technical focus areas.

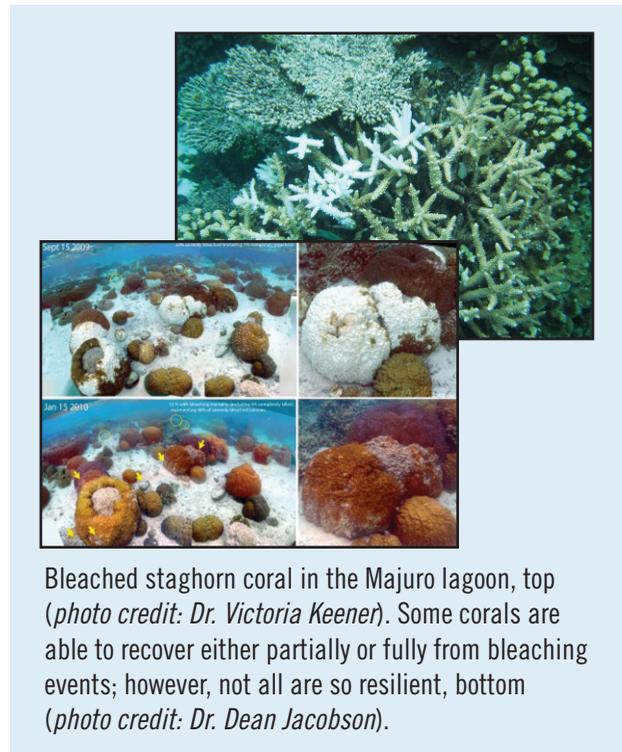
OUTREACH

An important component of Pacific RISA's work includes outreach of our research activities to stakeholders and communities. In Year One, outreach programs concentrated on building knowledge about Pacific RISA by attending meetings and giving presentations on the RISA program in general and Pacific RISA in particular, conducting specific research projects, and creating a series of climate-themed "Documoment" videos about how climate matters to different people and industries in Hawai'i.

- A press release was distributed highlighting the IPCC's findings on the impacts of global warming on marine boundary-layer cloud dynamics in the Pacific, which was published by Lauer et al. in the *Journal of Climate*. This paper served as the basis for interviews with Drs. Kevin Hamilton and Axel Lauer, resulting in articles in the Discovery Channel News (<http://news.discovery.com/earth/clouds-may-make-warming-worse.html>), *New Scientist* (<http://www.newscientist.com/article/mg20827893.400-goodbye-grey-skies-hello-extra-warming.html?DCMP=OTC-rss&nsref=environment>), *Japan Herald* (<http://story.japanherald.com/index.php/ct/9/cid/c4f2dd8ca8c78044/id/713730/cs/1/>), *Tehran Times* (<http://www.tehrantimes.com/PDF/11025/11025-6.pdf>), and China's *Yeeyan News* (<http://article.yeeyan.org/view/189830/153238>).
- In February 2011, ICAP and the University of Hawai'i Kamakūōkalanī Center for Hawaiian Studies convened a roundtable of natural resource specialists and decision makers to review current trends affecting the water supply and explore approaches to improve resiliency in Hawai'i's freshwater systems. Held in Halau O Haumea, a shared-use auditorium for campus and community groups, the event was the second in the 'O Ke Au I Kāhuli: Pehea Lā Ka Hawai'i E Pono Ai? series of traveling forums. Over 70 members of the campus and broader community were in attendance. Speakers included William Aila, Jr., Director of the State of Hawai'i Department of Land and Natural Resources, and Dr. Tom Giambelluca, Professor of Geography at the University of Hawai'i at Mānoa. Panelists responded to over 25 audience questions, and they identified a number of potential adaptation tools and several possible priority areas for revising existing programs, laws, and administrative procedures on which ICAP will concentrate research efforts.
- In September 2010, Pacific RISA Project Assistant Rachel Miller participated in two dialogues conducted by the Pacific Climate Information System (PaCIS) in Guam and American Samoa, entitled "Dialogue with Local Decision-makers about Water Resource and Drought-related Issues in Light of a Changing Climate." Miller traveled with a team of five researchers from various branches of NOAA and the Pacific ENSO Applications Climate Center (PEAC), as well as the Pacific Islands Climate Change Cooperative (PICCC), to Guam on September 13–15 and to American Samoa on September 20–23. The team conducted meetings in both places with diverse stakeholders to discuss local needs, capacity, and decision-making capabilities in regard to water resources and climate change more broadly. Meetings in Guam included stakeholders from the Telecommunication and Distance Education Operation (TADEO)/PeaceSat; US Senator B.J. Cruz's office; University of Guam Water and Environmental Research Institute (WERI), Marine Lab, and Center for Island Sustainability; the US Na-

tional Park Service; National Weather Service Guam, Weather Forecast Office; Bureau of Statistics and Planning; and the Department of Agriculture. Meetings in American Samoa included stakeholders from American Samoa Community College Land Grant Office; National Weather Service Samoa, Weather Forecast Office; Department of Marine and Wildlife Resources; Haleck Enterprises; Pago Pago Pure Water; Department of Homeland Security; National Park Service; American Samoa Power Authority; Island Breeze Water; Department of Agriculture; Department of Commerce; Pacific Energy; Coral Reef Advisory Group; Department of Health; Department of Public Works; Department of Education; Bluesky Communications; Department of Parks and Recreation; American Samoa Visitors Bureau; and American Samoa Environmental Protection Authority.

- In September 2011, Project Assistant Rachel Miller and EWC Fellow and RISA Project Manager Dr. Victoria Keener spent five days in Majuro, the capital of the Republic of the Marshall Islands, meeting with representatives from government, academia, and business about fair representation and contributing inputs to the NCA and the PIRCA report. Keener and Miller met with stakeholders from the Majuro National Weather Service; professors and students at the University of the South Pacific; the editor of the *Marshall Islands Journal*; professors at the College of the Marshall Islands; Namdrik Atoll Senator and Minister of Resources and Development Mattlan Zackhras and Secretary of Resources and Development Tommy Kijiner; Marshall Islands EPA; Marshall Islands Conservation Society; Office of Environmental Planning and Policy Coordination; Robert Reimers Enterprises and Pacific



Bleached staghorn coral in the Majuro lagoon, top (photo credit: Dr. Victoria Keener). Some corals are able to recover either partially or fully from bleaching events; however, not all are so resilient, bottom (photo credit: Dr. Dean Jacobson).

Pure Water; Martina Enterprises; and several representatives from the US Embassy. New contacts were made, and many potential inputs to the PIRCA report were gathered to ensure that the Republic of the Marshall Islands is fairly represented.

- As part of Pacific RISA’s climate communications and outreach plan, Dr. Melissa Finucane worked with professional filmmakers to create three “Climate Matters Documoments.” Each video clip focuses on a different aspect of how climate information matters to people of different professions around the Hawaiian Islands. On the Big Island, independent cattle rancher Michelle Galimba was interviewed about about how drought on her Ka’u ranch affects both her livelihood and locally produced food. In Nānākuli, O’ahu, at the PVT construction landfill, Vice President Steve Jacobs proudly showed how PVT responded to a climate forecast of a strong La Niña event by upgrading its

storm drains, thus avoiding potential catastrophe when a 100-year storm dropped over 10 inches of rain in 24 hours. Finally, on the famous beaches of Waikiki, O‘ahu, the president of Kyo-Ya Company, Greg Dickens, described changes in the Waikiki shoreline over the last 50 years, and how potential sea-level rise effects on Waikiki beaches could be devastating for the local tourist economy.

- New Pacific RISA-related media are continually being developed. Project Manager Dr. Victoria Keener updated the public web page,

www.PacificRISA.org, with current research projects, maps, collaborations, contacts, and informational links. For internal communications, all projects, presentations, research articles and reports, stakeholder meetings, and conferences attended are updated and stored on a comprehensive project-based Google Site. Maintenance of these sites is done by Project Assistant Rachel Miller. Additionally, with comments and feedback from the core team, Miller led the development of a new brochure and logo for Pacific RISA.



KEY PRESENTATIONS AND MEETINGS ATTENDED

- Dr. Melissa Finucane gave a public presentation on “Pacific RISA: The Climate Adaptation Partnership for the Pacific” at the SOEST (School of Ocean and Earth Science and Technology) workshop on the **Science of Climate Change** in Honolulu, Hawai‘i, January 20, 2011. Dr. Finucane also presented a poster on “Climate Adaptation by Pacific Islanders: Integrating Physical and Social Sciences to Support Decision Making about Complex Systems on Multiple Timescales” at the annual meeting of the **Society for Judgment and Decision Making**, St. Louis, Missouri, November 19–22, 2010.
- At a meeting hosted by the **Pacific Islands Climate Change Cooperative** (PICCC), Dr. Melissa Finucane participated in a meeting with representatives of the Department of Interior Assistant Secretary Thomas Strickland and Department of Commerce Assistant Secretary Dr. Larry Robinson, December 2010. PICCC and Pacific Climate Information System (PaCIS) representatives discussed effective interagency communication, coordination, and collaboration on climate change issues in the Pacific Islands region.
- Dr. Axel Lauer gave a public presentation on the “State of Regional Atmospheric Modeling for the Hawai‘i Climate Prediction Problem” at the SOEST workshop on the **Science of Climate Change** in Honolulu, Hawai‘i, January 19–20, 2011.
- All Pacific RISA principal investigators and several associated researchers and assistants participated in the **PaCIS Steering Committee Meeting** from March 22–24, 2011. Several researchers were involved in leading breakout groups and assuming chair positions of relevant working groups, including the Preserving Freshwater Resources and Minimizing Impacts of Drought and the Research and Assessment groups.
- Dr. Nancy Lewis attended and presented “Islands in a Sea of Change: Climate Change, Health, and Human Security in Small Island States” for the **NATO Advanced Workshop on Climate Change, Human Health and National Security** in Dubrovnik, Croatia, April 27–29, 2011. Dr. Lewis also presented “Climate Change, Health, and Human Security; Small Island States and Asia's Coastal Megacities” at the **Association of American Geographers** meeting, April 13–17, 2011.
- Pacific RISA Project Manager Dr. Victoria Keener attended the **NOAA/Sea Grant Climate Adaptation Workshop** during April 18–21, 2011, in Kihei, Maui. Victoria informally discussed downscaling of climate information for island-specific water resource planning with County of Maui Water and Planning representatives, in preparation for Year Two research activities linking climate and hydrological simulation models.



The damaged park and eroded beach road next to the Humpback Whale Sanctuary in Kihei, Maui, shows how potentially vulnerable Maui is to storms and climate phenomena. After an abnormally rainy La Niña winter season, beaches and shoreline infrastructure were already affected when surge from the Japan earthquake caused additional damage. (Photo credits: Dr. Victoria Keener.)

- In May 2011, Drs. Melissa Finucane and RISA collaborator John Marra presented a paper entitled “The Challenge of Understanding and Communicating Climate Change” to local business leaders at the **AsiaPacific Breakfast Briefing**, Honolulu, Hawai‘i.
- In May 2011, ICAP Director Maxine Burkett presented at the **Threatened Island Nations: Legal Implications of Rising Seas and a Changing Climate** meeting, co-sponsored by the Center for Climate Change Law at Columbia Law School and the Republic of the Marshall Islands. Environmental lawyers, island political leaders, and other stakeholders came together to discuss the international legal implications of climate change and to take the first steps toward shaping policies that will protect island governments from climate change. Professor Burkett delivered a paper titled “The Nation Ex-Situ,” proposing a new kind of international status for governments whose land has been destroyed by climate change.
- In June 2011, the **Pacific RISA hosted representatives from the NOAA Climate Program Office**. RISA National Program Manager Adam Parris and Sea Grant Knauss Fellow Chelsea Friedman visited Honolulu for three days, and were treated to presentations from and strategic meetings with Pacific RISA principal investigators. One of the highlights of the visit was a tour into the Waihe‘e Tunnel, where Honolulu Board of Water Supply Hydrologist-Geologist Glenn Oyama gave participants an inside look at the mountain from which much of O‘ahu’s drinking water comes. After braving the tunnel, participants hiked to a waterfall and pumping station farther up the mountain.
- Dr. Melissa Finucane presented a briefing, “Managing Climate Risks Facing Pacific Islanders:



Tour participants listen to Glenn Oyama before entering the dark and wet Waihe‘e tunnel, left, and stop at a waterfall and pumping station farther up the mountain. (Photo credits: Dr. Victoria Keener.)

Why Science Alone Won’t Solve the Climate Crisis,” at the **Hawai‘i State Legislators Briefing** at the East-West Center on June 29, 2011.

- Dr. Melissa Finucane was interviewed on **Hawai‘i Public Radio’s “The Conversation”** on July 6, 2011, about how people think about risk and uncertainty while making decisions, and the applicability to climate change communication. The interview can be found at http://hawaiiconverstaion.org/audio/TC_070611.mp3, approximately two-thirds of the way through the show.
- In August 2011, Dr. Wendy Lin Bartels (post-doctoral researcher, University of Florida and the Southeast Climate Consortium RISA) met with Pacific RISA researchers to provide input and post-workshop data evaluation. As an agricultural anthropologist and ecologist in the southeast, Dr. Bartels was interested in visiting a small farm to view local practices. We spent the day visiting with the Reppuns at their

family farm in Waiāhole, O‘ahu, discussing freshwater policy and local hydrology and agriculture, sharing a meal, and helping with farm duties such as weeding the taro patches and harvesting corn.

- Other visitors to the Pacific RISA included Peggy Denny (Program Administrator, i*recycle Program, Guam), Sam Walker (Institutional Researcher, Center for Island Sustainability, University of Guam), Taylor Savusa and Danielle Mauga (American Samoa Power Authority), and Dan Ferguson (CLIMAS, the southwest region’s RISA), who participated as observers in the **Climate Change Impacts on Freshwater Resources in Hawai‘i** workshops. The visitors offered critiques of the methods and data, as well as assessed if similar workshops would be helpful or feasible in their own locales.
- Dr. Melissa Finucane and collaborators Dr. John Marra, Maxine Burkett, Deanna Spooner, and Zena Grecni attended and participated in the **Futures and Visioning Workshop for Developing a Statewide Climate Change Policy**, August 22–23, 2011, organized by the State of Hawai‘i’s Department of Business Economic Development and Tourism, Office of Planning. The workshop included public,

private, and community stakeholders, who engaged in a series of discussions and small group activities facilitated by Drs. Jim Dator and Donna Ching. Outputs from this meeting were used to inform the drafting of a Hawai‘i State Climate Adaptation Policy in the State Planning Act (HRS §226–101) that will be introduced to the legislature in early 2012.

- Professor and RISA collaborator Maxine Burkett represented the Hawaiian Islands in the **24-Hour Climate Reality Project** in September 2011. The Climate Reality Project aims to bring facts about the climate crisis into the mainstream and engage the public in conversation about how to solve it. Founded and chaired by Al Gore, Nobel laureate and former vice president of the United States, the Climate Reality Project has more than five million members and supporters worldwide. For 24 hours, one presenter from each time zone spoke about the climate crisis to a global audience.
- East-West Center Fellow and Pacific RISA Project Manager Dr. Victoria Keener presented a guest lecture at the University of Hawai‘i at Mānoa **Department of Geography’s Climatology Seminar** on September 28, 2011, entitled “Use of Spectral Methods for Extracting Non-Stationary Hydro-Climatic Oscillations.”



Pacific RISA researchers visited the Reppun Farm in Waiāhole, where they helped shuck corn they picked (left) and weeded taro (middle). The Waiāhole Valley is a contentious site for water rights in O‘ahu (right). (Photo credits: Dr. Victoria Keener and Dr. Wendy Lin Bartels.)

MEET THE PACIFIC RISA YEAR ONE HIRES

To help accomplish its research and outreach goals, the Pacific RISA program hired ten new employees in its first year. Reflecting the mul-

tidisciplinary nature of the research, the new hires span several different social and physical science fields.



Kati Corlew, Pacific RISA Research Assistant, (MA, Community and Cultural Psychology)



Zena Grecni, ICAP Program Assistant



Victoria Keener, PhD, Fellow, East-West Center; Pacific RISA Program Manager (Hydrological Engineering and Climatology)



Scott Kiefer, MS (Indigenous Environmental Knowledge Research Specialist, ICAP)



Axel Lauer, PhD, Researcher, IPRC (Climatology)



Rachel Miller, MA, Pacific RISA Research Assistant (Pacific Islands Studies)



Richard Wallsgrove, JD, Senior Attorney, ICAP



Alan Mair, PhD, Researcher, WRRRC



David Penn, Legal Research Assistant, ICAP

Not pictured:

Pradip Raj Pant, Graduate Research Assistant, SSRI

PUBLICATIONS

Burkett, M. January 2011. "In Search of Refuge: Pacific Islands, Climate-Induced Migration, and the Legal Frontier." *AsiaPacific Issues* 98: 1–8. <http://www.eastwestcenter.org/fileadmin/stored/pdfs/api098.pdf>.

Chowdhury, R., A.G. Barnston, C. Guard, S. Duncan, T.A. Schroeder, and P.S. Chu. October 2010. "Sea-level Variability and Change in the US-affiliated Pacific Islands: Understanding the High Sea Levels during 2006–2008." *Royal Meteorological Society's Weather* 65(10): 263–268. <http://www.soest.hawaii.edu/MET/Hsco/Paper/Weather-65-10263-68.pdf>.

Lauer, A., K. Hamilton, Y. Wang, V.T.J. Phillips, and R. Bennartz. November 2010. "The Impact of Global Warming on Marine Boundary Layer Clouds over the Eastern Pacific: A Regional Model Study." *Journal of Climate* 23(21): 5844–5863. <http://iprc.soest.hawaii.edu/users/kph/paper/2010jcliLaueretal.pdf>.

Zhang, C., Y. Wang, and K. Hamilton. 2011. "Improved Representation of Boundary Layer Clouds over the Southeast Pacific in WRF-ARW Using a Modified Tiedtke Cumulus Parameterization Scheme." *Monthly Weather Review*, in press.

Zhang, C., W. Wang, A. Lauer, and K. Hamilton. 2011. "Configuration and Evaluation of the WRF Model for the Study of Hawaiian Regional Climate." Submitted to *Monthly Weather Review*, September.

