2012 – 2013 ANNUAL REPORT: PACIFIC RISA

1. **Award Title**: **Climate Adaptation Partnership for the Pacific (CAPP): Pacific RISA Phase II**

2. **Performance Period**: **May 31, 2012 – June 1, 2013**

3. Who are your **Team Members**?

*Lead Principal Investigator***:**

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4. What are your **new areas of focus or partnerships** that have begun this past year?

- ***Social Network Analysis.*** Pacific RISA Research Fellows Dr. Victoria Keener and Dr. Kati Corlew launched a multi-year social network analysis project examining communications patterns and how climate information spreads across different sectors and countries in the Pacific Islands region. Using the December 2012 release of the Pacific Islands Regional Climate Assessment (PIRCA) report as a springboard, they are collecting data to analyze the professional and scientific networks of climate stakeholders in Hawai‘i and the US-Affiliated Pacific Islands. By tracking information flows, key hubs, and isolated groups using network analysis and statistical methods, the researchers plan to map out strengths and gaps in the delivery of climate information, allowing Pacific RISA and other groups to focus research and resources on areas that may have been previously ignored.

- ***Hawai‘i Commission on Water Resource Management (CWRM).*** Pacific RISA launched a knowledge exchange with members of CWRM, and Department of Land and Natural Resources staff for CWRM, regarding climate change adaptation in Hawai‘i’s water resources sector. Following the Center for Island Climate Adaptation and Policy (ICAP) spring/summer 2012 workshops, at which several members of CWRM participated, ICAP Senior Attorney Richard Wallsgrove presented findings at CWRM’s August 2012 meeting. Shortly after, Water Commissioner Jonathan Starr attended Pacific RISA’s September 2012 team meeting and gave a presentation titled, “Changing Waters of Maui: An Ongoing Science Experiment,” about Maui’s water history and current water challenges. More recently, Research Fellow Victoria Keener was invited to present findings from the 2012 PIRCA to CWRM at their March 2013 public meeting, and researchers Melissa Finucane, Victoria Keener, and Alan Mair presented background information and discussed a potential climate scenario framework to a group of ten CWRM staff. Pacific RISA is continuing outreach and meetings with the Water Commission to support their adaptation-related efforts.

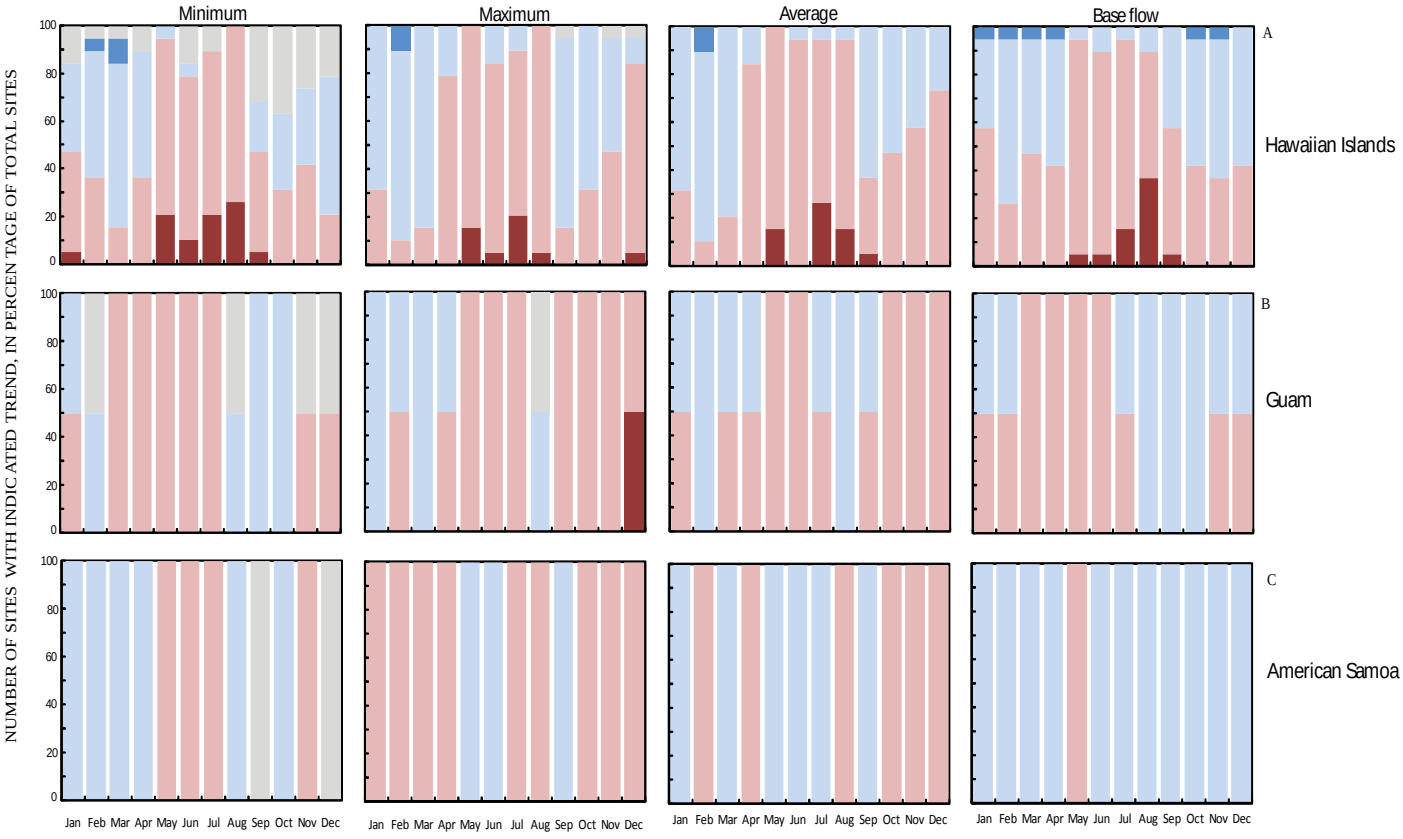
- ***American Samoa Water Resource Policy Study.*** The law and policy research team is analyzing water issues and policies in American Samoa, with the goal to assess the potential value of certain adaptive law and policy tools in a U.S. Pacific Island context beyond Hawai‘i. American Samoa was selected as the next study location partly due to interest that partners and the Pacific RISA Advisory Committee expressed during workshops on climate change impacts and freshwater resources in July 2011 and at the December 2012 Advisory Committee meeting. A second important consideration is the recent designation of the University of Hawai‘i Water Resources Research Center as the USGS research institute for American Samoa. While every U.S. state has a water resources research institute or center, American Samoa has not previously received support from this USGS national program. Pacific RISA PI Dr. Aly El-Kadi was instrumental in establishing the WRRC as American Samoa’s research institute, and he will lead its inaugural research projects. As new scientific information about water resources becomes available, researchers will need to know how that information can be utilized in a policy and management context. A better understanding of the law and policy framework, cultural context, and local knowledge and information gaps can help

the WRRC set priorities for research and monitoring and also can inform the design and delivery of products and tools for water managers. Senior Attorney Richard Wallsgrove and Research Assistant Zena Grecni are investigating American Samoa's water resource issues and policies. Steps to date include: (1) gathering and reading relevant literature (e.g., existing water resource work, climate adaptation plans, and peer-reviewed literature on existing legal structures, climate science, and water science); and (2) holding informational meetings and conference calls with resource managers and other on-the-ground experts. After reviewing themes that emerge during this early scoping phase, researchers will compile a report identifying information needs and several options for potential next steps. This report will serve as the foundation for making decisions, in consultation with the Pacific RISA team, about the best research direction to pursue in response to stakeholder needs.

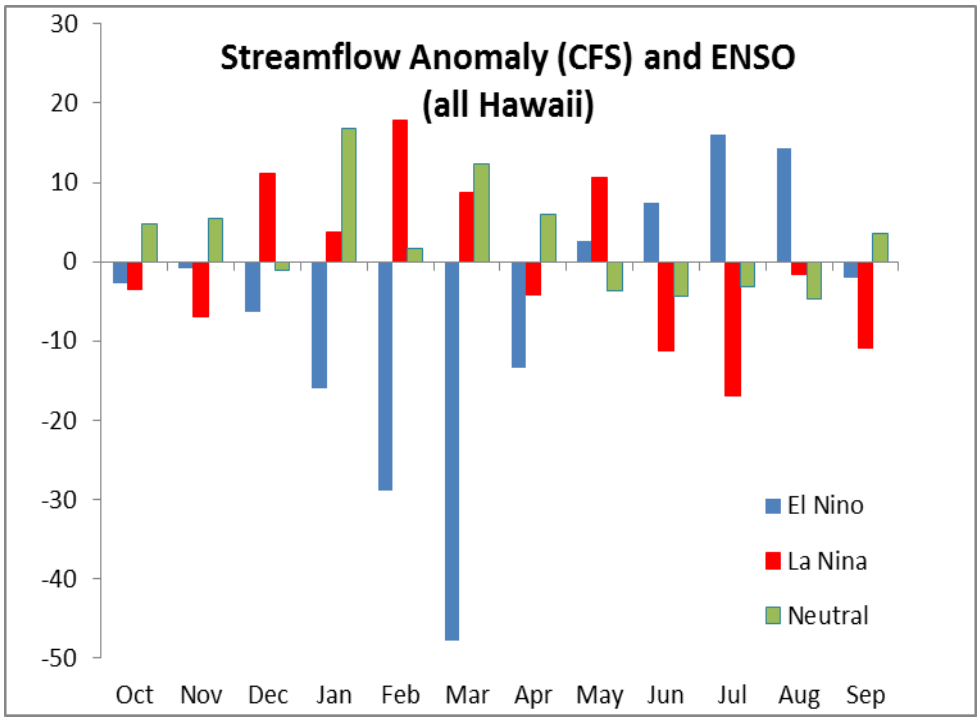
5. Please provide a list of 1 - 5 **research findings** – Please try to include examples that span disciplinary and interdisciplinary work. Examples might be: a) dust-on-snow reduces Colorado River runoff by 5%, or b) analysis revealing the presence or absence of adaptive capacity in legal and policy frameworks for managing resources.

- Pacific RISA and the USGS Pacific Islands Water Science Center (PI-WSC) are investigating the effects of seasonal climate variability on historic long-term streamflow at sites throughout Hawai'i, American Samoa, and Guam. Streamflow represents combined precipitation over a large spatial area and a multi-day timeframe, and thus is a good indicator variable to observe short-term climatic fluctuations that impact the Pacific Islands region, such as the El Niño-Southern Oscillation (ENSO). Pacific RISA hydrologist Dr. Victoria Keener and PI-WSC collaborators are investigating how ENSO has historically affected trends in streamflow across the Pacific Islands, and how those effects may be shifting with climate change and the potential advent of new ENSO regimes. Previous work by the USGS found significant annual decreases in baseflow (the groundwater component of streamflow) over the last century across the Hawaiian Islands, and this current research finds that the majority of decreasing streamflow trends occur in the dry-season summer months (May through August). The figure below shows the trends in streamflow for Hawai'i, Guam, and American Samoa over the last three decades. Researchers have also identified a potential post-1990 distribution shift and decrease in streamflow potentially in response to increasing El Niño Modoki events, characterized by central Pacific warming, the hydroclimatic effects of which are largely not defined in the Pacific Islands. To date, the study's key findings include:
  - Significantly decreasing streamflow trends in the dry-season months (May-August) across Hawai'i from 1978 to 2008
  - A shift in character of average, maximum, and minimum flow distributions across all sites post-1990 to higher frequencies of low-flows, which may be associated with central Pacific warming (El Niño Modoki) events
  - At most sites on O'ahu and Kaua'i, and half on Maui, dry season flows post 1990 have significantly decreased.
  - Analysis of flow trends with ENSO indices show a potential for increased winter drought, especially in La Niña years

Streamflow Trends in the Hawaiian Islands, Guam, and American Samoa, 1978-2008



Trends in minimum, maximum, average, and base streamflow values for the Hawaiian Islands, Guam, and American Sāmoa, 1978–2008. Dark red bars indicate significant decreased flows, concentrated during the summer (dry season) months. (Miller and Keener, forthcoming)



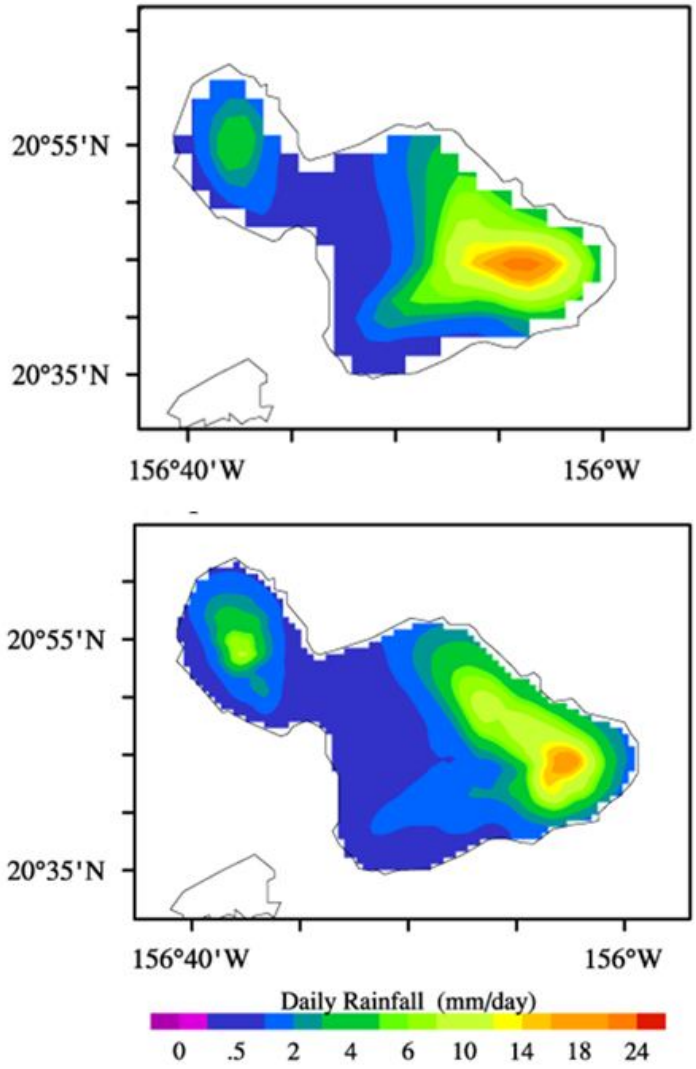
Patterns of monthly average streamflow emerge clearly when NIÑO 3.4 SST designations are used to separate El Niño, La Niña, and Neutral phases. ENSO patterns associated with rainfall are seen even more clearly in streamflow patterns: wet La Niña winters and dry El Niño winters. Also of interest is that Neutral winters may have high flow anomalies as well, and the clearer patterns in the summer of anomalously dry La Niñas and wet El Niños, while neutral years by and large stay very close to average. (Miller and Keener, forthcoming).

- The International Pacific Research Center (IPRC) found that their 20-year "present day" simulations at 3 km horizontal resolution produced reasonably realistic results for the air temperature, surface humidity, frequency of Trade Wind inversion occurrence, Trade Wind inversion height, and Trade Wind cloud properties of the Hawaiian Islands. The island-scale rainfall is well simulated and even the day-to-day variations in rainfall are generally well captured through the 20-year time series. The detailed geographical pattern of mean rainfall on the individual islands has some quite realistic features, but some details of the rainfall distribution on Maui and O'ahu are not adequately simulated. A hypothesis that the deficiencies in the detailed rainfall distribution could be attributed to the 3 km resolution of the topography in the models was formulated and tested for Maui by analyzing the 11-year simulation at 1 km resolution. The result demonstrated marked improvement in the geographical distribution of mean rainfall on Maui.

- The IPRC's late-21st century simulations showed some very consistent patterns in the projected climate changes from present day. In particular, (i) a clear intensification of surface warming with topographic height is simulated, and (ii) a general pattern over the islands of increased rainfall in the regions where heavy rainfall is driven in the current

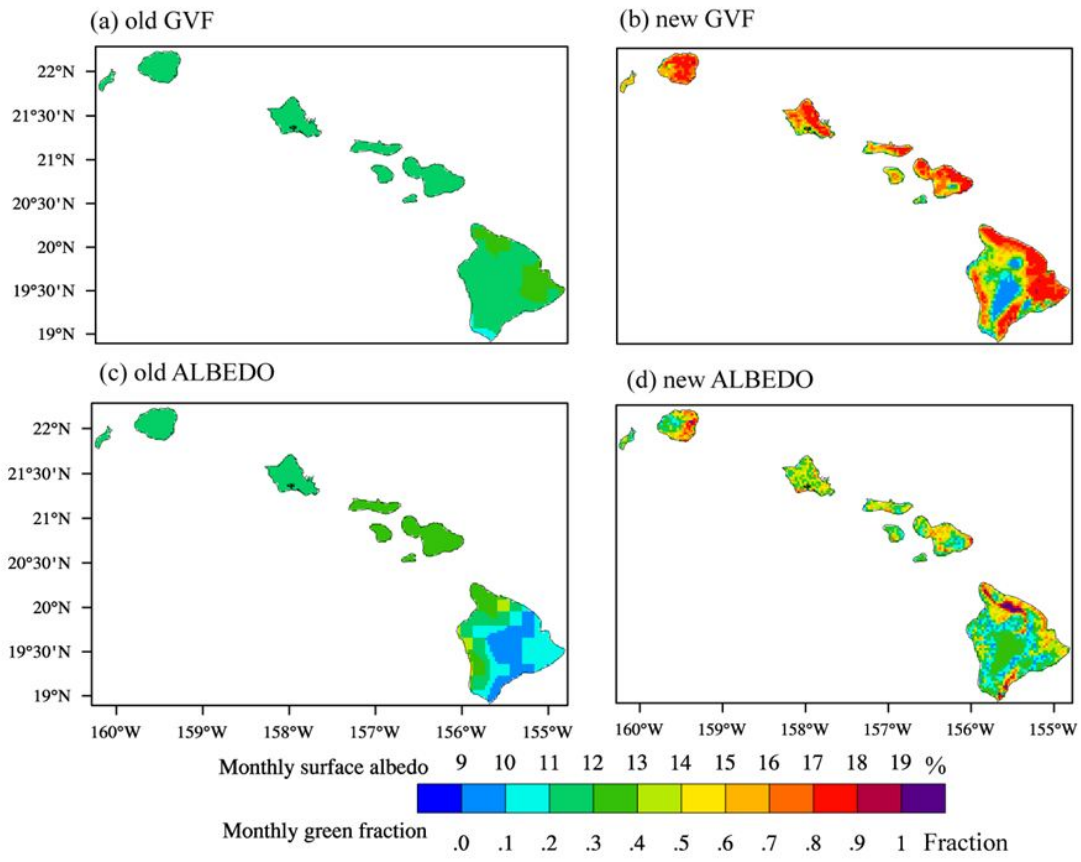
climate by surface convergence and lifting, and decreased rainfall in areas that are dry in the current climate. Comparison of the 3 km model resolution and the 1 km model resolution results from Maui show that employing the fine resolution version does significantly alter the projected rainfall changes as well as the mean rainfall in the base climate simulation.

Maui Long-term Annual Average Rainfall Rate Simulated by HCRM at 3 km and 1 km Grid Resolution



(Top) Long-term annual average rainfall rate simulated by the doubly-nested version of the Hawaii Regional Climate Model (HRCM) with 3 km horizontal grid resolution over Maui. (Bottom) The results in the triply nested HRCM with 1 km resolution over Maui.

Improved Representation of Green Vegetation and Albedo in the Hawaii Regional Climate Model (HRCM)



(a) The fraction of the surface assumed to be covered by green vegetation ("green vegetation fraction" or GVF) specified over Hawai'i in the standard version of the WRF regional atmospheric model; (b) The GVF as implemented in the Hawaii Regional Climate Model (HRCM) that was developed from WRF in this project; (c) The surface albedo in the standard WRF model; (d) The surface albedo in the HRCM.

- At workshops hosted by the Center for Island Climate Adaptation and Policy (ICAP), participants examined the twelve adaptive tools recommended in the 2012 ICAP white paper through facilitated discussion. To further gather specific feedback, a written questionnaire was administered toward the end of each session, and participants were asked to prioritize and rank the tools according to their importance and ability to be implemented within the existing legal structure. ICAP found that over half of stakeholders selected a market-based measure among the top three to five tools they thought would be most effective for addressing climate change impacts on water resources. "Relate Water Commission Fees More Closely to the Cost of Water Management and Watershed Protection" was selected by 18 respondents, or 51%, and 42% (15 respondents) selected "Adopt a Public Goods Charge for Water Use." Those two measures were selected more times than any others, and the same tools were the subject of substantial discussion at the workshops. This suggests that the best

opportunities to lend support might be through assisting with the further development and implementation of these market-based strategies. Additionally, stakeholders' discussion at the three outreach workshops held in 2012 revealed several major themes:

- Funding for implementation and enforcement is critically needed. Fees charged in conjunction with providing water and permits should relate more closely to the actual cost of managing water. Also, after resource managers are educated on adaptive concepts and needs, they are more likely to identify opportunities for implementing adaptive concepts into existing (and already-funded) management strategies.
- Enhanced scientific monitoring, water use reporting, and data on water availability are needed to support adaptive water management. Decision-makers also need better access to existing data from the University of Hawai‘i and other groups.
- Long-term, integrated planning (incorporating agriculture, energy generation, infrastructure repair, and conservation efforts) could improve water resource management as a whole, while also potentially creating cost savings.
- Water conservation and recycling can improve Hawai‘i's ability to adapt to decreasing freshwater availability; however water conservation alone cannot ensure resource sustainability, so other strategies are needed as well.

- Dr. Susi Moser completed a qualitative evaluation of Pacific RISA's progress through external partner's perspectives. The evaluation involved a survey, completed by 13 partners, and interviews with 9 individuals. In the November 2012 evaluation report, *The Pacific RISA, Phase II: Through External Collaborators' Eyes*, Dr. Moser concludes that Pacific RISA is indeed known, recognized, and appreciated for what it chooses to focus on, how it approaches it, and what it sets out to achieve. The table below contains direct quotes from the interviews, which were excerpted from the evaluation report. Additionally, the evaluation suggests a number of opportunities for promoting and strengthening Pacific RISA's position in Hawai‘i and the Pacific. Areas particularly emphasized include, for example: (1) broaden partners' familiarity with Pacific RISA's goals and strengths to ensure they are recognized at every level among partner organizations; (2) intensify outreach, communication, and stakeholder engagement; and (3) explore new collaborative opportunities such as building online portals and data management tools for the Pacific region. A separate analysis surveyed participants at the Pacific Islands Regional Climate Assessment (PIRCA) technical workshops, held November 2011 through January 2012, and found that the workshops received high ratings for usefulness, ideas captured well, good start to the sustained process, satisfaction with the final decisions about which variables to include, satisfaction with the scientific consensus process, and willingness to participate again.

Recognized and unique strengths
• "They focus on a politically and socially important topic [freshwater]."
• "They're really good with doing assessments. It helps us refine our products."
• "Very strong social science skills, often lacking elsewhere."
• "The expertise in the RISA team is unparalleled."
How the RISA works and becomes impactful/influential
• "RISA is involved with people in the sand and reef; they understand information needs and how to reach people."
• "They're exemplary in putting decision-making at the center of what they do – compared to us geeks who start with scientific problems… So we learn from them."
• "They're the 'boots on the ground'. They can validate forecasts, and document what impacts people are experiencing. … They help us achieve end-to-end goals, i.e. ensure that climate forecasts get used. So that increases preparedness."
• "I send people to Melissa to get the information they need."
Quality of work
• "They're always there, always engaged, here to help."
• "They make sure the job gets done."
• "We hear good things about them in communities."
Leadership
• "Melissa is on my shortlist of people to go to. She is very knowledgeable, has a huge network, is articulate, and easy to work with."
• "Melissa keeps us informed, she's open to dialog, she's great!"
• "Leadership is collaborative, communicative, passionate, focused, shared vision and actions, engaged and caring."
Specific projects or achievements mentioned
• "I really liked RISA's videos. Really well done on timely, good topics. We need more of these."
• "…its role in drafting the state climate change adaptation policy was a huge success."
• "I learned a lot at their water and climate change workshop."
Other expressions of appreciation
• "A very effective partner."
• "They [RISA team members] come to us."
• "I wish there was three of them."

6. Please provide a summary of 1 – 5 narrative **ACCOMPLISHMENTS** – These should be similar to what you submit to the RISA Annual Report as "Highlights" and describe outcomes of individual projects or the combination of multiple projects over the course of your award.

- Pacific RISA hosted the PIRCA Forum in partnership with the Pacific Islands Climate Change Cooperative (PICCC) and the DOI Pacific Islands Climate Science Center December 10-12, 2012 at the Imin International Conference Center in Honolulu, Hawai'i. The purpose of the Forum was twofold: 1) to officially release the PIRCA reports, and (2) to gather a group of diverse stakeholders in order to disseminate the PIRCA information, discuss the usefulness and gaps in that information, and discuss the National Climate Assessment process more generally. The morning sessions on the first day were open to the public, and featured: (1) a keynote speech by Lt. Governor (now US Senator) Brian Schatz; (2) an overview presentation that summarized PIRCA findings across all sub-regions and technical areas; (3) a panel of high-level sector representatives from across Hawai'i and the Pacific region, who spoke about the importance of climate information to their specific sectors (education, security, agriculture, land management, urban planning, and international negotiations); and (4) a public question and answer session. Over the day and a half following the public forum, invited participants joined discussion sections divided according to the PIRCA technical areas (freshwater and drought, sea-level rise and coastal inundation, and terrestrial and marine ecosystems), and then by economic sector and areas covered in the example case studies. Main themes emerging from those discussions included:
    - **The importance of outreach to the wider community.**
    - **Know your audience**, not only other scientists and policy-makers. Work with the community first to learn what information they need and what formats work best, and then provide that to them.
    - **Problems of communication** – There is a lack of understanding of climate information because of language barriers, lack of trust, and difficult politics.
    - **The importance of trust** in providing information to people. Trust enables people to actually listen to and act on the information. Find and utilize local "champions."
    - **Cost data –** More information is needed on the costs and benefits of climate change adaptation measures.
    - **Natural disasters make people think about climate change.**
    - **The importance of no-regrets and win-win planning.**
    - **The importance of long-term monitoring.**
    - **A need for government mandates –** We must have a regulatory/policy framework to guide the planning process and 'direct' climate change information incorporation.

Above: Dr. Victoria Keener presents findings from the PIRCA report to an audience of 200 stakeholders at the PIRCA Forum in December 2012.
Below: (from left) an audience member poses a question to the panelists; panelist Ms. Olai Uludong, the incoming Lead Negotiator for the Alliance of Small Island States in UN climate negotiations, speaks to the audience; copies of the PIRCA report, executive summary, and case studies were available at the Forum; The Forum's facilitator, Johnathan Likelike Scheuer, greets a participant.

- Pacific RISA has received significant media coverage since the release of the PIRCA report, bringing climate change issues into focus for the public. Examples include stories about the PIRCA report and forum in the *Honolulu Star-Advertiser*, on *Honolulu Civil Beat*'s website, and in *ClimateWire*. A news segment featuring interviews with the report's editors and contributors aired on the network KHON in Hawai'i the evening of December 10, and a second news segment ran on Fiji TV in January 2013. Climate change, the PIRCA, and Pacific RISA researchers Dr. Melissa Finucane, Dr. Victoria Keener, and Mr. Richard Wallsgrove were also featured in the cover story, "Climate Change in Hawaii - It's Here," for the Jan 2, 2013 issue of *Honolulu Weekly*. The Hawaii League of Women Voters took out a full page ad on January 5 in the *Honolulu Star-Advertiser*, targeted at bringing climate issues to President Obama's attention while he was visiting Hawai'i. On Feb 14, 2013, Dr. Victoria Keener was part of a panel discussion with coastal geologist Chip Fletcher, DLNR Director William Aila Jr., and Cultural Adaptation Coordinator Stanton Enomoto on the PBS Hawaii show *Insights*: http://www.youtube.com/watch?feature=player_embedded&v=7ghy7ArhCvg.

- A network analysis survey was developed and survey invitations were distributed to over 1,000 climate change professionals in the Pacific Islands between December 2012 and March 2013. The survey contains questions aimed at collecting information in several categories, including professional and personal demographics, network connectedness, climate change risk perception and resiliency, and sense of community. Pacific RISA distributed the survey online through surveygizmo.com. In addition, paper copies were distributed at three subregional meetings, two in Honolulu and one in Fiji, and contact information was collected so that email invitations could be sent to additional potential participants. Email, phone, and face-to-face follow-up inquiries were attempted for the entire list of invitees. As of early June 2013, 340 surveys have been completed. (The number of individuals with sufficient data to be included in the network analysis map is yet undetermined, but a rough estimate is 1,000 individuals). During the development and implementation period, regular team meetings allowed the researchers to adjust strategies and troubleshoot logistical complications. Similarly, communication was kept open with the Network Analysis team at the Alaska Center for Climate Assessment and Policy (ACCAP) for a beneficial cross-RISA comparison of methods and survey design. Throughout the data collection period, Dr. Kati Corlew has exchanged email conversations, phone calls, and face-to-face discussions with hundreds of climate change professionals across the region regarding the need for a network resource and support for increased collaboration, especially in remote areas in the Pacific.

Dr. Kati Corlew distributes fact sheets about the network analysis project and surveys to participants of the 2013 Pacific Islands Climate Services Forum in Suva, Fiji.

- Pacific RISA launched a new website in September 2012 at www.PacificRISA.org. The user-friendly site features interactive media and a wealth of information about current Pacific RISA research projects and places in the Pacific Islands region. An integral part of the website is the news blog, updated regularly with content ranging from decision-support tools, to climate-related events and news articles. Social media integration allows users to share content and select options to receive Pacific RISA's updates via email, RSS feed, or Facebook.

- Upon the release of the policy white paper *Water Resources and Climate Change Adaptation in Hawai'i: Adaptive Tools in the Current Law and Policy Framework* in early 2012, researchers at the Center for Island Climate Adaptation and Policy (ICAP) proceeded with the next phase of the project, to further engage water decision-makers, stakeholders, and legislators on the various Hawaiian Islands. The goal of that outreach was three-fold: (1) to identify priorities and barriers for implementing the recommended adaptive tools, in specific regard to each island setting; (2) to identify the most efficient and advantageous support that Pacific RISA can lend to the next steps of implementation; and (3) to educate regarding the existing findings and recommendations. ICAP held outreach workshops on the island of O'ahu in April and May 2012. After acquiring feedback from those events, ICAP held a subsequent workshop on Maui in July 2012. The outreach workshops convened water resource decision-makers from: state, county, and federal agencies; businesses; non-profit organizations; the state legislature; and public boards and councils. (A table below gives the numbers of participants at each workshop by category of affiliation.) Each workshop opened with a presentation of the legal analysis and findings, and an overview of the twelve adaptive tools. Where possible, ICAP presented models that have been tested in Hawai'i or the US continent or elsewhere to illustrate the various planning, regulatory, and market-based strategies. Discussion followed the presentation and detailed notes were projected on a screen so that participants could ensure their comments were accurately captured. In August 2012, ICAP compiled a report describing outreach activities to date, summarizing key stakeholder feedback, and identifying opportunities for further outreach, research, and implementation. The report also includes a brief case study specific to stakeholder feedback concerning the island of Maui. Seven specific recommended next steps are provided in the report's conclusion.

  Since the last outreach workshop, the research team along with Pacific RISA's core office have maintained regular communication with key stakeholders and deepened the partnerships that began to take shape at the workshops. Primarily, that dialogue has centered on assisting policy makers and agency staff to identify opportunities to implement adaptive tools, and also on understanding and eliminating perceived legal and technical barriers that to implementation. In addition, the research team is currently analyzing how climate adaptation concepts were integrated into a recent decision by the State of Hawai'i Commission on Water Resource Management, concerning water banking and sustainable yield accounting.

Workshop Logistics Overview

Adapted from Table 2 in *Report on Phase 1 Stakeholder Outreach, and Summary Maui Case Study*

	Date	Location	Opening Remarks	Presentation	Closing Remarks
WS 1	April 20, 2012	State of Hawai'i Department of Land and Natural Resources (DLNR), Honolulu, O'ahu	Guy Kaulukukui, Deputy Director, DLNR	Richard Wallsgrove, Senior Attorney and White Paper Co-Author, ICAP	Melissa Finucane, Principal Investigator, Pacific RISA
WS 2	May 17, 2012	Hawai'i State Capitol, Honolulu, O'ahu	William Tam, Deputy Director, DLNR	Richard Wallsgrove, Senior Attorney and White Paper Co-Author, ICAP	Victoria Keener, Program Coordinator, Pacific RISA
WS 3	July 12, 2012	Pacific Disaster Center, Kihei, Maui	Melissa Finucane, Principal Investigator, Pacific RISA	Richard Wallsgrove, Senior Attorney and White Paper Co-Author, ICAP	Richard Wallsgrove, Senior Attorney and White Paper Co-Author, ICAP

Participant Overview

Adapted from Table 3 in *Report on Phase 1 Stakeholder Outreach, and Summary Maui Case Study*

	County	State	Federal	Government Partnership	University	Non-Government	Workshop Totals
WS 1	2	7	1	1	2	2	**15**
WS 2	1	6	1	0	0	1	**9**
WS 3	6	1	1	0	0	3	**11**
Sector Totals	**9**	**14**	**3**	**1**	**2**	**6**	**35**

Richard Wallsgrove presents research findings to stakeholders at the July 2012 ICAP workshop on Maui.

- Pacific RISA is taking a place-based approach to stakeholder outreach and assessment on the island of Maui in Hawai‘i, with the ‘Iao-Waihe‘e watershed in central and west Maui as a focal point for integrated research. The stakeholder assessment team has identified key stakeholders, and has been engaging them in initial participatory meetings (see table below). An agenda was developed to facilitate discussion of the project purpose and methods with key stakeholders and to elicit input on potential variables to include in hydrological models. Simultaneously, the University of Hawai‘i Water Resources Research Center (WRRC) has focused on developing a method for converting preliminary 1 km and 3 km climate simulation data into formats that can be used to input into the water budget model for the Maui study area. Together, WRRC and International Pacific Research Center (IPRC) researchers determined which hydrological data would be predicted by the IPRC. The WRRC then refined their scheme for processing climate simulation data and used their models to process the IPRC data for the island of Maui. WRRC also developed draft test scenarios for assessing groundwater availability under climate and land use changes, using Maui as the test site. Recent meetings with over 50 representatives of various Maui-based water management groups were overwhelmingly positive and facilitated stakeholder input on key factors for assessing changes in groundwater availability under changing climate and management conditions (see table below).

Maui Stakeholders Meetings

Date of Meeting	Stakeholder Groups Present	Main Issues of Concern in Climate Scenarios
4/3/2013	Maui Department of Water Supply	Including climate impacts on groundwater recharge in Maui Water Use Development Plan; Development and zoning in county’s Maui Island Plan; Sugarcane agriculture
4/30/2013	Maui County Department of Planning (Long	Groundwater availability in targeted growth

	Range Planning, Wastewater Division, Water Resources & Planning, Environmental Management);	areas; Identification of priority growth areas with respect to groundwater availability; Sugarcane agriculture; wastewater reuse effects
4/3/2013	Maui County Council –Water Resources Committee	Groundwater availability in targeted growth areas; Wastewater reuse effects
4/4/2013	Hawai'i Commission on Water Resources Management (Deputy Director, groundwater branch, planning branch, surface water branch, water resources protection planning, data branch, sustainable yield and deep monitors branch)	Upcoming update of State Water Resources Conservation Plan; Restoration/ conservation proof of concept simulations under future climate; Sugarcane agriculture
4/18/2013	Department of Hawaiian Homelands	Groundwater availability in targeted growth areas; Restoration/ conservation proof of concept simulations under future climate
4/29/2013	Hawai'i Commercial & Sugar Company (HC&S)	Effect of converting sugarcane agriculture to rangeland or urbanized area
4/30/2013	Maui Watershed Partnerships (The Nature Conservancy, Sierra Club, East Maui Watershed Partnership, Maui Tomorrow, West Maui Mountains Watershed Partnership, Surfrider Foundation, Maui Tomorrow, Sustainability Dir. From Maui Mayor's Office, Permaculture Maui)	Restoration/ conservation proof of concept simulations under future climate; Impacts of water conservation in future; Targeting stream diversions to sensitive recharge areas; impacts to native forest
5/7/2013	Kamehameha Schools Land Holdings Division	Restoration/ conservation proof of concept simulations under future climate; Sugarcane agriculture
6/7/2013	Hawai'i Department of Agriculture	*Forthcoming*

7. List of **key publications** from the past year - We are seeking ~ 5 publications, give or take a few, to be highlighted on the CPO webpage. These can be either non-peer reviewed or peer-reviewed. For peer-review publications, please list either **published** or in **press**, but ***not*** "in review". For non peer-review, please provide a hyperlink or webpage wherever possible.

- Anderson, C.L. (2012a). Overview of climate risk reduction in the US Pacific Islands Freely Associated States. Honolulu, HI: Hazards, Climate & Environment Program, University of Hawai'i Social Science Research Institute, Technical Report No. 201103B. Available at http://www.pacificrisa.org/wp-content/uploads/2013/02/Anderson-Overview-of-Climate-Risk-Reduction-in-the-US-PI-FAS.pdf.

- Anderson, C. L. (2012b). Overview of climate risk reduction in the US Pacific Islands hazard mitigation planning efforts. Honolulu, HI: Hazards, Climate & Environment Program, University of Hawai'i Social Science Research Institute, Technical Report No. 201103A. Available at http://www.pacificrisa.org/wp-content/uploads/2013/02/Anderson-Overview-of-Climate-Risk-Reduction-in-the-US-PI-Hazard-Mitigation-Planning.pdf

- Keener, V.W., Marra, J.J., Finucane, M.L., Spooner, D., & Smith, M.H. (Eds.) (2012). Climate Change and Pacific Islands: Indicators and Impacts. Report for the 2012 Pacific Islands Regional Climate Assessment. Washington, DC: Island Press. Available at www.pacificrisa.org/projects/pirca/.

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8. Please fill out the attached project database template for projects that meet all of the following criteria (NOTE: These criteria are generally a judgment call on the part of the Principal Investigator(s) and/or the Program Managers and do not require extensive analysis. Criteria should NOT be listed in database.):

- Core RISA projects – Determined by one or more of the following:
  i. RISA investigator is leading the effort
  ii. RISA is primary source of funding
  iii. RISA capacity is critical to the project (e.g. Regional Chapters/Technical Inputs of the NCA)
- Current projects – Determined by one or more of the following:
  i. Recently completed (i.e. finished within the last six months)
  ii. Ongoing (i.e. initiated, but not completed)
  iii. Planned (i.e. funded but not started)

APPENDIX: Presentations of the Pacific Islands Regional Climate Assessment (PIRCA), Dec. 2012 – May 2013

No.	***Date***	***Name***	***Title of talk***	***Conference or Event***	***Location***	***Estimated Attendance***
1	12/10/2012	Victoria Keener	Pacific Islands Regional Climate Assessment	PIRCA Forum	East-West Center, Honolulu	200
2	1/17/2013	Kati Corlew	Human Dimensions of Climate Change in the Pacific	The NYU Faculty Resource Network Winter Professional Enrichment Seminar	Chaminade University, Honolulu	20
3	1/23/13(?)	Victoria Keener	Pacific Islands Regional Climate Assessment	Pacific Islands Climate Services Forum	University of the South Pacific, Laucala Campus, Suva, Fiji	180
4	2/6/2013	Victoria Keener	Climate Change in the Pacific Islands: Indicators and Impacts	Future Leaders of the Pacific conference	Pago Pago, American Samoa	35
5	2/22/2013	Victoria Keener and Melissa Finucane	Indicators and Impacts of Climate Change in the Pacific Islands (V. Keener) and "Context is Everything" (M. Finucane)	University of Hawai‘i (UH) Manoa Center for Pacific Island Studies, Waves of Change Tok Stori Session	UH Manoa, Moore Hall, Honolulu	30

6	2/21/2013	Victoria Keener	Pacific Islands Regional Climate Assessment	PICCC webinar	Online	
7	3/13/2013	Victoria Keener	Pacific Islands Regional Climate Assessment	Pacific Risk Management ‘Ohana (PRiMO) Conference, 2013	Hawai‘i Convention Center, Honolulu	35
8	3/20/2013	Victoria Keener	Pacific Islands Regional Climate Assessment	Commission on Water Resource Management	Dept. of Land and Natural Resources (DLRN) Conference Room, Honolulu, HI	15
9	4/5/2013	Melissa Finucane and John Marra	Pacific Islands Regional Climate Assessment	UH Center for Pacific Islands Studies Waves of Change Conference	UH Manoa, Honolulu, HI	50
10	4/16/2013	Victoria Keener	Climate Change in the Pacific Islands: Indicators and Impacts	US Green Building Council Hawaii chapter	Kakaako, HI	30
11	4/22/2013	Victoria Keener	Pacific Islands Regional Climate Assessment	Professor Tom Giambelluca's climate class	UH Manoa, Honolulu, HI	35

12	5/1/2013	Melissa Finucane, Victoria Keener, John Marra, Deanna Spooner	Climate Change in the Pacific Islands: Indicators and Impacts	NOAA One Seminar	Online	35
13	5/8/2013	Victoria Keener	Pacific Islands Regional Climate Assessment	Hawai‘i American Water Works Association	Hawai‘i Convention Center, Honolulu	50