



PACIFIC ISLANDS
CLIMATE CHANGE COOPERATIVE

2013 Annual Report



"We, the people, still believe that our obligations as Americans are not just to ourselves, but to all posterity. We will respond to the threat of climate change, knowing that the failure to do so would betray our children and future generations. Some may still deny the overwhelming judgment of science, but none can avoid the devastating impact of raging fires and crippling drought and more powerful storms."

U.S. President Obama, Second Inaugural Address, January 2013

"Climate change has arrived. It is the greatest threat to the livelihoods, security and well-being of the peoples of the Pacific and one of the greatest challenges for the entire world."

Majuro Declaration for Climate Leadership, Pacific Islands Forum, September 2013

The PICCC's purpose is to assist those who manage native species, island ecosystems and key cultural resources in adapting their management to climate change for the continuing benefit of the people of the Pacific Islands.

A NOTE FROM THE PICCC CHAIR

2013 proved to be a productive and exciting year for the PICCC. We welcomed the Micronesia Conservation Trust as our newest Steering Committee Member, launched a strategic planning effort, completed the nation's most extensive climate change vulnerability assessment ever conducted, and saw seven major research projects come to completion.

The year also was punctuated by several watershed moments that highlighted for the PICCC partnership the importance of our work at local, regional, national, and international levels. In June U.S. President Barack Obama unveiled a comprehensive climate action plan and subsequently appointed the Governors of Hawai'i and Guam to a State, Local, and Tribal Leaders Task Force on Climate Preparedness and Resilience. In September, leaders from nations across the Pacific signed the Majuro Declaration for Climate Leadership which Republic of Marshall Islands President Christopher Loeak presented to UN Secretary-General Ban Ki-moon during the General Assembly Leaders' week later that month. In November, super typhoon Haiyan, one of the strongest storms recorded on the planet, tore across the Western Pacific leaving a wake of destruction and reminded us all of how precious and vulnerable our islands are to a changing climate.

This report highlighting just some of the PICCC's projects and activities in 2013 that are helping to build our island communities' collective resilience to the changes we face now and those yet to come.

Me ke aloha pumehana,

Melia Lane-Kamakele

Chairperson

PROJECT HIGHLIGHTS

Our investment in cutting-edge research since the PICCC's first funding cycle in 2010 is beginning to reap multiple dividends. 2013 saw the completion of seven major external projects the PICCC funded and one internal project. The external projects covered diverse topics including:

- Dynamical climate downscaling for the main Hawaiian islands at scales relevant to resource managers working on small, topographically complex islands;
- Sea level rise impacts to wetlands on two Hawaiian islands (O'ahu and Maui) and the management implications for resident and migratory waterbirds;
- Coral responses to changes in temperature, ocean chemistry, and light utilizing sophisticated analytical techniques;
- A first-ever analysis of Micronesian bird species' responses to vegetation changes; and
- Endemic Hawaiian Mamane tree ring analysis to estimate past rainfall patterns and present a window into future forest responses to changing rainfall.

Two additional projects are spotlighted below.

Climate Change Vulnerability of Native Plants in Hawai'i

The isolation of the Hawaiian Islands has resulted in diverse plant life that is extremely unique and fragile. Over 200 species of plants already have gone extinct because of habitat loss, competition from invasive species, and grazing by introduced herbivores. Within this sobering context, conservation biologists and managers in Hawai'i are concerned that global climate change will further impact the beleaguered Hawaiian flora. The question remains: how vulnerable to climate change are Hawai'i's native plants?



The endangered Konahuanu (Lobelia oahuensis) is an endemic Hawaiian plant vulnerable to climate change. It's found only on the island of O'ahu.

To answer this question, PICCC's Dr. Lucas Fortini assembled a technical team including experts from US Geological Survey, US Fish & Wildlife Service, The Nature Conservancy of Hawai'i, University of Hawai'i, and USDA Natural Resources Conservation Service. In 2013 the team completed a climate change vulnerability assessment for all native Hawaiian plants. This species vulnerability assessment is the largest ever conducted in

the United States, with analyses for more than 1,000 species that include 37% of all the endangered or threatened plant species in the United States.

The assessment ranks all native plant species in terms of their vulnerabilities to climate change based on climate suitability modeling. Of particular concern are the 55 species that clearly face extinction as, by the year 2100, no areas will remain that provide them with climatically suitable habitat. Given the large number of already vulnerable Hawaiian plants, this assessment suggests that without significantly increased conservation efforts, Hawai'i is likely to lead the world in future climate-induced plant extinctions.

This plant vulnerability assessment offers a wealth of information for prioritization of conservation efforts, and the PICCC is working with partners to explore the many ways in which the results can inform ongoing conservation in Hawai'i, including development of species lists for restoration efforts, selection of areas for focused habitat conservation, prioritization of species for listing under the Endangered Species Act, and banking of seeds for preservation of genetic diversity. We have devised novel ways for users to interact with the information such as geo-spatial tools that reveal vulnerability results for specific areas of interest and free open-source visualization tools (using Google Earth™) for information to be easily accessed and utilized.

The report shows that despite the fact that there are multiple recognized threats to island ecosystems that may have greater urgency than climate change at the present, there are many occasions where acting on climate change information now is the only hope for long-term conservation of Hawai'i's unique plant communities and the species they support.

To download a copy of the report, visit:

http://hilo.hawaii.edu/hcsu/documents/TR44_Fortini_plant_vulnerability_assessment.pdf



Akoko is an endemic species with its current range (in blue) limited to the top of the Ko'olau Mountains on the island of O'ahu. Akoko is one of 55 species that are extremely vulnerable to climate change because of the projected loss of all climate-compatible habitats by the year 2100.

The Future of Coral Reefs Projected and Mapped on Google Earth

Pacific Island communities are closely tied to the ocean. The islands' beautiful coral reefs provide food and commercial fisheries, protect coastlines from waves, support tourism, and are inextricably interwoven into the cultural foundations for millions of people throughout the tropical oceans.

But corals are known to be susceptible to high temperatures that cause harm to these living organisms; these events, called "coral bleaching" can kill corals over large reef areas, and repopulation by corals, fish and other reef species may take a decade or more. As global warming proceeds, the temperature stress that causes bleaching is projected to become more severe and recur more often, eventually happening every year. It's unlikely that most coral reefs can survive annual bleaching events. In addition, rising carbon dioxide concentrations will cause increasing ocean acidification, gradually reducing the ability of corals to form the stony skeletons that give reefs structure.



A team of PICCC-funded researchers has used climate projections from the Intergovernmental Panel on Climate Change's (IPCC) latest report to show how the twin stresses of rising ocean temperatures and ocean acidification are poised to eliminate coral reefs as we know them around the world before the end of this century.

The study shows that the decade in which these stresses to reefs reach critical levels varies by latitude, and depends on rates of global greenhouse gas emissions. Annual bleaching is projected to occur sooner near the equator and later at higher latitudes. Although these high-latitude reefs will not experience regular bleaching events as soon as equatorial corals, they'll be exposed to higher levels of ocean acidification sooner.

By publishing their results in two major journals and creating a web-based visualization tool hosted by NOAA's Coral Reef Watch, the team led by Jeffrey Maynard and Ruben van Hooidonk have made projections of these combined stresses available to the public for the first time. These state-of-the-art global maps show every coral reef location in the world and indicate the decade when conditions within a specific area will become incompatible with the persistence of coral reefs as functioning ecosystems under all IPCC global warming scenarios.

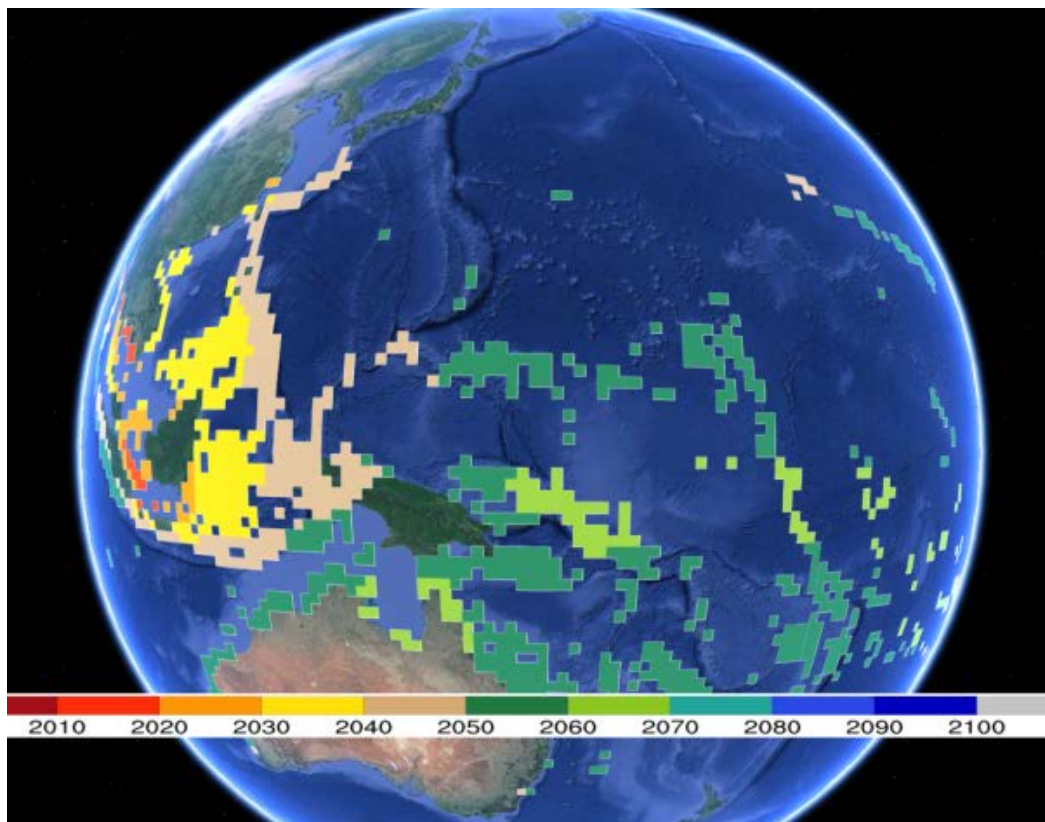
Under the current trend in CO₂ emissions, all reefs globally would be seriously affected by “bleaching” every year by the mid-2050s or even earlier. Beyond that decade it is not likely that reefs could persist as the healthy, vibrant ecosystems island communities depend on.

This visualization tool is aimed at senior policy-makers and large-scale marine managers to help them plan actions and initiatives to support reef resilience, prioritize protection and restoration actions, and communicate looming climate change impacts to the public. Research suggests that the extent and rate of these impacts will depend on how effectively the other stresses on coral reefs – such as land-based sources of pollution and overfishing – are managed in the coming decades.

This image shows a timeline of coral reef ecosystem decline for the Pacific and Indian Oceans. The warmer colors (red, orange, yellow) indicate the reefs that are reaching temperature and acidification tolerance thresholds beginning this decade and into the 2030s.

The tool is available at:

http://coralreefwatch.noaa.gov/climate/projections/piccc_oa_and_bleaching/index.php



COLLABORATION AND COORDINATION

Pacific Islands Regional Climate Assessment

In 2013 the PICCC continued to partner with the NOAA Pacific Islands Regional Climate Services, the Pacific Regional Integrated Sciences and Assessments (Pacific RISA), and other key partners to disseminate the Pacific Island Regional Climate Assessment (PIRCA) report, published in December, 2012, which also serves as the basis for the region's technical submission to the forthcoming National Climate Assessment. The report's findings have been presented to local, regional, and international audiences in Hawai'i, Fiji, and other Pacific Islands, as well as via webinar talks, with hundreds of hard copies presented to decision makers and resource managers. Most recently, the PIRCA report was cited by Hawai'i's Governor Abercrombie at the first meeting of President Obama's State, Local, and Tribal Leaders Task Force on Climate Preparedness and Resilience. The full report, executive summary, and case studies can be downloaded at <http://www.cakex.org/virtual-library/climate-change-and-pacific-islands-indicators-and-impacts>.

The PIRCA, being a sustained process, continues to strengthen ties between climate change professionals. This is illustrated through an innovative social network analysis conducted by the Pacific RISA under the aegis of the PIRCA. The analysis literally maps communications of the climate change community across the region. Due to the strength of our partnership, PICCC Coordinator Deanna Spooner is one of the most "connected" individuals across the entire network. You can view the network maps at <http://www.pacificrisa.org/projects/social-network-analysis/>.

PICCC and PICSC Talk Science

The first annual Pacific Islands Climate Science Center / PICCC Science Symposium took place in July of 2013 at the University of Hawai'i Mānoa campus immediately preceding the annual Hawai'i Conservation Conference. Research teams who received funding from the Pacific Islands Climate Science Center (PICSC) or the PICCC presented on the results of their projects. Nearly all funded researchers attended and

What our Steering Committee Members are saying about PICCC

"[Being part of the PICCC] has increased communication that, in turn, has led to better coordination in and amongst researchers working on [climate change] in the Pacific. Personally, it has resulted in the development of new research efforts that have been funded and others under review."

~ USGS Pacific Island Ecosystems Research Center

"The recent PICCC-hosted presentations by Dr. Morgan Pratchett regarding the effects of climate change on fisheries and the protocols for current fishery management in island nations were very informative and helpful. The dire predictions of fish supplies reinforced the need to restore and reinvigorate our Loko I'a, or fishponds, to help supplement our fish supplies in the future."

~ Kamehameha Schools

"TNC's association with PICCC has led to a new project in Sāmoa, assisting with [climate change] planning there. The newly-developed plant vulnerability assessment of PICCC promises to identify our regions and species most at risk of climate change-related habitat loss, and inform our future strategies in acquisition and management."

~ The Nature Conservancy Hawai'i

despite a packed schedule the room was filled to overflowing. The meeting, widely considered to have been a great success, stimulated much conversation and sharing of ideas between attendees. The PICSC & PICCC clearly stimulated and supported an impressive range of excellent research on Pacific islands climate issues. The US Department of the Interior's investment in our two organizations demonstrably has enhanced research capacity on climate impacts and responses in the region.

PICCC on US Delegation to Pacific Islands Forum

PICCC Coordinator Deanna Spooner was a member of the US delegation participating in the Pacific Islands Forum annual meeting in Majuro, Republic of the Marshall Islands (RMI). Secretary of the Interior Sally Jewell led the U.S. delegation which included high-level representation from the Departments of Interior, State, and Defense. The Majuro embassy did a fantastic job documenting the week on its Facebook page, including a profile of the PICCC (<https://www.facebook.com/EmbMaj692>).

The theme of the 2013 meeting was "Marshalling the Pacific Response to the Climate Challenge". The selection of climate change as the key theme of the meeting followed recent climate induced disasters, including an ongoing drought and the inundation RMI's capitol, Majuro, set against the news that the world is on track for global warming of 4 degrees centigrade or more. The major public output of the meeting was the Majuro Declaration for Climate Leadership (<http://www.majurodeclaration.org/>) which is open to any nation, government, non-governmental organizations, and interested individuals to pledge specific commitments to reduce greenhouse gas emissions.



US delegation to the 44th Pacific Islands Forum was led by DOI Secretary Sally Jewell (seated second from right) and included PICCC Coordinator Deanna Spooner (standing third from right).

The forum provided an unparalleled opportunity for the PICCC to strengthen regional partnerships as well as build new connections, demonstrate our continued commitment to climate change action in the Pacific Islands, and support our partner nations at this critical juncture.

Facilitating the Climate Adaptation Conversation

In 2013 the PICCC joined with Steering Committee members and other partners in hosting a series of high-level briefings and presentations on climate change, conservation, and the future of islands. The list of distinguished participants included The Honorable Ronald Jumeau, Seychelles Ambassador for Climate Change and Small Island Developing State Issues and Co-Chair of the Global Island Partnership (GLISPA); Department of the Interior (DOI) Secretary Sally Jewel; and US Fish and Wildlife Service Director Dan Ashe. While it is sobering to discuss topics like islands disappearing under rising seas and endangered species winking out due to shifting climate zones, the PICCC partnership is uniquely poised not only to facilitate these conversations but also to propose a course to navigate forward. Mahalo nui loa to GLISPA, Hawai'i Green Growth, Bishop Museum, DOI, US Fish and Wildlife Service, the US Geological Survey, and the many individuals who worked with us on these events.

PICCC Steering Committee Members Selected for LCC Council

The Landscape Conservation Cooperative (LCC) Network is vast, encompassing the U.S. Affiliated Caribbean and Pacific Islands, the U.S. continental states, and portions of Canada and Mexico. To provide national-level support and coordination for the LCCs, a Council of interagency, tribal, indigenous, and non-governmental representatives formed in 2013. The LCC Council will serve the LCC network by learning from LCCs and helping to identify the ecological and institutional challenges that should be addressed at national and international scales. Congratulations to Steering Committee Members Ulalia Woodside of Kamehameha Schools and Willy Kostka of the Micronesia Conservation Trust for being selected to serve on this prestigious Council!

PICCC Connects with Other Island LCCs

Of the 22 Cooperatives that make up the Landscape Conservation Cooperative (LCC) Network, three of them consist entirely of islands: the PICCC, the Aleutian & Bering Sea Islands LCC, and the Caribbean LCC. Many of the overarching issues the LCC Network is tackling as a whole take on nuanced differences when faced with the unique challenges and opportunities of insular systems. For example the underlying concepts of landscape conservation design rest upon an understanding of how landscapes and species interact across continental landscapes with connected terrestrial habitats and widely distributed species. As a result, the PICCC is working with our island counterparts to identify issues and concepts, such as landscape conservation design, that we can adapt and make relevant to island conservation.

In December, the Caribbean LCC (CLCC) hosted PICCC Cultural Adaptation Coordinator Stanton Enomoto in San Juan, Puerto Rico to share perspectives and experiences from the PICCC and attend a Steering Committee meeting and a workshop of regional

partners. During his remarks to the Steering Committee and CLCC partners, Stanton highlighted the history of PICCC, summarized past research funding, the preparation of the Integrated Science Framework, and the PICCC's current Strategic Planning efforts. A field trip rounded out this invaluable opportunity to exchange knowledge and experiences between the Caribbean and Pacific LCCs.

STRATEGIC PLANNING FOCUSES COLLECTIVE PRIORITIES

The PICCC embarked on a Strategic Planning process in 2013 to focus our efforts over the next 3-5 years. Here's an update on where we are in the process.

Phase 1 - Assessing the lay of the land (Landscape/SWOT Analysis) – Who's doing what? What resources do we have? Who are potential partners and competitors of the PICCC? What unique niche can the PICCC fill? What are our strengths and weaknesses?

Phase 2 – Getting everyone on the same page (Strategic Goal Setting Exercise) – Of all the possible things the PICCC could focus on, what is most important? How will we prioritize our actions?

Phase 3 – Preparing a logical plan (Logic Model Development) – What specifically will we do to achieve our goals? How can we be certain our plan will work? How will we measure our success? How can we test our assumptions?

Phase 4 – Implementation and evaluation – How are we doing? What have we learned? What course corrections are needed?



PICCC Steering Committee and Team Members take a break from the strategic planning retreat to celebrate the birthday of Ulalia Woodside, our fearless Chairperson Emeritus and LCC Council member. Hau'oli lā hānau!

CLOSING THOUGHTS

Over this past year the PICCC celebrated a major milestone in seeing the completion of our first batch of funded research. Clearly identifying how we build on this success was a major incentive behind our focus on defining 3-5 year priorities within a climate change adaptation context. As 2013 came to a close, we affirmed the cooperative's vision of sustaining biocultural resources for the benefit of the people of the Pacific Islands as we continue to navigate the changes transforming our lands and seas.

PICCC Executive Council for 2013-14

Chairperson - Melia Lane-Kamahele, National Park Service
Vice Chairperson - Sam Gon, The Nature Conservancy Hawai'i
Chair Emeritus - Ulalia Woodside, Kamehameha Schools
Member at Large - Kristina Kekuwa, NOAA Pacific Services Center
Member at Large - George Wallace, American Bird Conservancy
Ex-Officio Member - John Marra, NOAA NESDIS NCEC Regional Climate Services
Ex-Officio Member - Dave Helweg, USGS Pacific Islands Climate Science Center

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For more information about the PICCC visit
<http://piccc.net/>

For more information about the LCC Network visit
<http://lccnetwork.org/>

Mahalo to our partners for the photos used in this report. Cover photo (Chuuk Island) courtesy of Jeffrey Maynard; photos on pages 2 and 9 courtesy of Deanna Spooner USFWS; page 4 photo of healthy coral reef courtesy of National Park of American Samoa; page 6 photo of US Delegation courtesy of US Embassy Majuro.