



Pacific Islands Climate Change Cooperative

Brief Summary (Abstract): The Pacific Islands Climate Change Cooperative (PICCC) is one of a network of 22 Landscape Conservation Cooperatives working across North America, the Pacific Islands, and the Caribbean to address large-scale conservation issues such as climate change, habitat fragmentation, invasive species, and other large-scale stressors. The PICCC partnership brings together state and federal agencies, cultural and natural resource managers, universities, conservation groups, educators and other key partners to understand and adapt to the critical impacts of climate change on native species, island ecosystems, and cultural resources in the Pacific Islands. The PICCC's members and partners span the Pacific region, from Hawai'i and the US affiliated islands in the Samoan, Mariana, and Micronesian archipelagoes.

Project Location: Hawai'i and US Affiliated Pacific Islands

Partners: PICCC Steering Committee Members include: American Bird Conservancy, Bishop Museum, Hawai'i Conservation Alliance, Kamehameha Schools, Micronesia Conservation Trust, National Park Service Inventory and Monitoring, National Park Service Pacific West Region, NOAA National Marine Fisheries Service, NOAA NESDIS NCEM Climate Services Pacific Region, NOAA Office of National Marine Sanctuaries, NOAA Pacific Services Center, Office of Hawaiian Affairs, Pacific Coast Joint Venture, Pacific Science Association, State of Hawai'i Department of Land and Natural Resources, The Nature Conservancy of Hawai'i Office, Trust for Public Lands Hawai'i, U.S. Army Garrison Hawai'i Natural Resource Program, U.S. Department of Agriculture Forest Service Pacific Southwest Research Station, U.S. Department of Agriculture Natural Resources Conservation Service, U.S. Department of the Interior Office of Insular Affairs, U.S. Fish and Wildlife Service Ecological Services Pacific Islands Fish and Wildlife Office, U.S. Fish and Wildlife Service Migratory Birds, U.S. Fish and Wildlife Service National Wildlife Refuge System Hawaiian and Pacific Islands National Wildlife Refuges, U.S. Fish and Wildlife Service Wildlife and Sport Fish Restoration Program, U.S. Geological Survey Pacific Island Ecosystems Research Center, U.S. Geological Survey Pacific Islands Water Science Center, University of Hawai'i at Hilo Office of Research, University of Hawai'i at Mānoa Center for Conservation Research and Training, and University of Hawai'i at Mānoa Social Science Research Institute.

Background: Global climate change is occurring in the Pacific Islands. Native biodiversity, ecosystem function, and the ecosystem services that support traditional lifestyles, customary practices, and resource stewardship are being progressively degraded. Sustaining these biocultural resources and benefits requires effective adaptation to climate change. 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. Its strategic direction is to promote climate change adaptation involving ecosystem and human-ecological interactions by influencing targeted resource management plans and actions and fostering the partnerships necessary for effective adaptation to occur on the ground and in the water. These efforts focus on specific islands or atolls in Hawai'i, American Samoa, Republic of the Marshall Islands, Federated States of Micronesia,



Commonwealth of the Northern Mariana Islands, Guam, the Republic of Palau, and within the Marine National Monuments.

Project Goals:

- To provide the science and technical expertise needed to support conservation planning at landscape scales that are beyond the reach or resources of any one organization.
- To generate the tools, methods, and data that managers need to design and achieve their combined conservation and climate change adaptation goals.
- To promote collaboration among members in defining shared conservation/adaptation goals.

The PICCC provides scientific and technical expertise for landscape-scale conservation in an adaptive management framework by supporting resource management planning, conservation design in a cultural context, prioritization and coordination of research, and communication and outreach. These functions are accomplished by a core team working at the direction of the PICCC Steering Committee and interacting at multiple levels with the technical and executive staffs of the member organizations. Specific functions include:

- Iterative science-based planning and landscape-level prioritization that focuses conservation programs on the components of the landscape most sensitive to environmental change, including analyses of landscape components of particular cultural use or other significance.
- A collaborative infrastructure that allows the full spectrum of conservation activities (planning, implementation, monitoring, evaluation, and research) to function as an integrated yet iterative endeavor.
- Coordinated application of geospatial and other information management technologies as necessary to plan, monitor, and evaluate activities and outcomes at various eco-regional scales.
- Coordinated and leveraged delivery of private, state, and federal conservation program actions targeted at priority species, habitats, and other natural and cultural resources.
- Engagement with communities regarding future directions in island ecosystems and conservation priorities.
- Analyses of climate change adaptation frameworks and actions for policy makers, resource managers, and Pacific Island communities.

Strategy Goals Implemented: Strategy 3.2: Facilitate a coordinated response to climate change at landscape, regional, national, and international scales across state, federal, and tribal natural resources agencies and private conservation organizations.

Climate Impacts Addressed: Pacific Islands including Hawai'i, the Mariana Islands, America Samoa, and other island groups are facing multiple challenges from a warming climate. Thousands of unique island plant and animal species, including more than 450 species on the U.S. Endangered Species list, are threatened by a variety of effects of environmental change. As mentioned in the 2010 State of the Birds report, oceanic birds risk losing essential habitats from rising sea levels and invasive species. Over 90%



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of U.S. coral reefs are also located around the Pacific Islands, which are at risk from increased ocean temperatures and acidification. Other negative impacts of a warming climate include changes to rainfall patterns and freshwater availability; increasing diseases in wildlife, corals, and fisheries; wildfires; coastal erosion; and even the permanent flooding of low-lying islands.

Status of Project Implementation (Timeline, Milestones, Next Steps): The PICCC was established in 2009, and in 2010 the Steering Committee developed and adopted an organizational Charter. The Charter lays out an operational framework built on a shared vision of supporting and developing climate change adaptation capacity in the Pacific Islands region. The Steering Committee also elected an Executive Council and devised an annual election and rotation strategy to ensure both continuity of institutional knowledge and equitable representation.

From 2010-2014 the PICCC annually funded research to address the desire of its membership to understand how to achieve shared adaptation goals in the face of high-priority climate factors such as changes in rainfall, storm frequency and intensity, sea level, ocean chemistry, and sea surface temperature. In 2012 the Steering Committee identified additional research priorities to address the need for: critical climate change information at island-relevant scales; better understanding of ecological and social responses to climate change; advanced analytical methods and models to evaluate adaptive responses; and tools to visualize or compare future states for natural and cultural resource managers. Beginning in 2015, the PICCC will fund comprehensive Adaptation Initiatives to support resource management decisions with multi-disciplinary research design, data management and communications strategies, and evaluation/assessment frameworks.

Project Outcomes: The PICCC has funded a series of projects that are vastly improving our understanding of how global climate change is manifesting. PICCC projects include:

- Climate Modeling for the Hawaiian Archipelago. Regional climate modeling (both dynamical and statistical) to produce climate change projections at a scale that is ecologically relevant to natural resources management on small islands.
- Coral Bleaching and Ocean Acidification Projections. Global model showing projected coral bleaching and ocean acidification to support economic and coastal planning and coral reef management. Google Earth™ is required to view this product.
- Mapping Sea-Level Rise. Spatial and temporal modeling of sea-level rise on sites of high significance on the coastal plains of O‘ahu and Maui (Hawai‘i) in order to define potential ecological and cultural impacts and support management responses.
- Bioclimate Projections. Projections of changes in the distributions of native Hawaiian plants and forest birds based on projected future temperature and precipitation estimates to inform large-scale conservation planning and design.
- Incorporating Traditional Ecological Knowledge into Adaptation Planning. Supporting a process of collaboration with resident community members, lineal descendants, and key resource users and managers in Ka‘ūpūlehu (Hawai‘i) to identify local knowledge relevant to climate and environmental change; the biological and cultural resources most valued by community members; and coping



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mechanisms, adaptation strategies, and resources that promote social-ecological resiliency to climate change.

Funding Sources: US Fish and Wildlife Service, US Geological Survey, National Park Service

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- 1) Dennis LaPointe, USGS
- 2) Jim Maragos, U.S. Fish and Wildlife Service
- 3) Deanna Spooner, U.S. Fish and Wildlife Service

Suggested Photo Caption:

- 1) The Amakihi Honeycreeper, *Hemignathus virens*, and other native Hawaiian forest birds are at risk from avian malaria as mosquitos expand their range “uphill” into high-elevation forests along with a warming climate.
- 2) Coral reefs are the “rainforests of the sea.” They provide habitat for a diversity of resident and migratory species, food security for island communities, recreational opportunities for tourists, and a buffer from wave-driven erosion. Corals are threatened by warming sea-surface temperature and changes in ocean chemistry driven by global climate change. (Photo taken at Palmyra Atoll National Wildlife Refuge)
- 3) Temperatures at high-elevations in Hawai‘i are rising faster than the global average, putting at risk the extremely rare flora and fauna of the planet’s most isolated island archipelago. (Photo of the endangered, endemic koli‘i (*Trematolobelia macrostachys*) taken at Mt. Ka‘ala Natural Area Reserve, O‘ahu, Hawai‘i)