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Coral Reef Resilience to Climate Change in CNMI; Field-based Assessments and Implications for Vulnerability and Future Management

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Project Information

Affiliation: Pacific Islands CSC (https://nccwsc.usgs.gov/display-csc/4f8c650ae4b0546c0c397b48)

Principal Investigator(s):

Laurie Raymundo (*Marine Laboratory, University of Guam*)
Jeffrey Maynard (*UNCW Center for Marine Science*)

Co-Investigator(s):

Steven McKagen (*NOAA Fisheries in Saipan, CNMI*)
Steven Johnson (*CNMI Division of Environmental Quality*)

Start Date: September 2013

End Date: September 2014

Project Status: In Progress

Tags: CSC, Pacific Islands CSC, 2013, Coral Reef Resilience, Vulnerability, Management

Fiscal Year: FY 2013 Projects (/projects-list/526964d6e4b0584cbe9168d9)

Summary

Scientists agree that climate change poses the single greatest long-term threat to coral reefs. Among other impacts, climate change is expected to result in more frequent severe tropical storms and more frequent and severe coral bleaching events. Coral reefs are also under great pressure from human activities, like overfishing and coastal development, that increase the sensitivity of organisms on reefs to climate change threats. There is now unprecedented pressure on the natural resilience of coral reef systems; their ability to endure and recover from stress events. Managers thus have to provide for sustainable use and maintain cultural values associated with coasts while supporting reef resilience by limiting human impacts. The proposed research focuses on assessing the resilience potential of coral reefs in the region of the Commonwealth of the Northern Mariana Islands (CNMI) in the west Pacific. The outcomes will help managers to use their limited resources to target actions in CNMI that support and build reef resilience. Coral reefs are 'downstream' of all environmental choices in-land and along the coasts. Targeting actions to support resilience reduces impacts and gives reefs the best chance to continue to provide the resources upon which hundreds of millions depend.

ScienceBase Url: https://www.sciencebase.gov/catalog/item/52165ec0e4b0b45d6ba39122 (https://www.sciencebase.gov/catalog/item/52165ec0e4b0b45d6ba39122)

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Expanding a Dynamic Model of Species Vulnerability to Climate Change for Hawai`i and Other Pacific Island Ecosystems

Project Information

Affiliation: Pacific Islands CSC (https://nccwsc.usgs.gov/display-csc/4f8c650ae4b0546c0c397b48)

Principal Investigator(s):

Lucas Fortini (*Pacific Island Ecosystems Research Center (PIERC)*)

Cooperator(s)/Partner(s):

James Jacobi (*U.S. Geological Survey*)
Jonathan Price (*University of Hawai`i at Hilo*)
Sam 'Ohukani'ohi'a Gon III (*The Nature Conservancy*)
Adam Vorsino (*U.S. Fish and Wildlife Service*)
Gregory Koob (*USDA Natural Resources Conservation Service*)
Eben Paxton (*U.S. Geological Survey*)
Ann Sakai (*University of California at Irvine*)

Start Date: August 2013

End Date: August 2015

Project Status: In Progress

Tags: CSC, Pacific Islands CSC, 2013, Bayesian Network Model, Landscape Vulnerability, Species Traits

Fiscal Year: FY 2013 Projects (/projects-list/526964d6e4b0584cbe9168d9)

Summary

As global climate change continues to impact Pacific Islands, the need for local and regional adaptation has made vulnerability assessments increasingly useful decision-making tools for resource managers. A vulnerability assessment can help resource managers prioritize conservation actions and guide climate change adaptation. In collaboration with research and management partners from federal, state and non-profit organizations, project researchers have devised a flexible species vulnerability approach that can be easily updated with improved data and thus better fits the Pacific reality of often limited and uncertain information. Recently the completion of their first species vulnerability assessment showed that the researchers can use their novel model approach to assess the vulnerability of each individual native Hawaiian plant species to climate change (1086 species). However, given some shortcomings of the original approach the team proposes to make substantial expansion and improvements in their assessment efforts to comprehensively consider the full range of species responses to climate change and thus fill a critical knowledge gap defined by natural resource scientists and managers in the region.

ScienceBase Url: https://www.sciencebase.gov/catalog/item/52165f2ce4b0b45d6ba395e9 (https://www.sciencebase.gov/catalog/item/52165f2ce4b0b45d6ba395e9)

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21st Century High-Resolution Climate Projections for Guam and American Samoa

Project Information

Affiliation: Pacific Islands CSC (https://nccwsc.usgs.gov/display-csc/4f8c650ae4b0546c0c397b48)

Principal Investigator(s):

Yuqing Wang (*International Pacific Research Center, University of Hawai`i at Manoa*)
Kevin Hamilton (*International Pacific Research Center, University of Hawai`i*)
Alex Lauer (*International Pacific Research Center, University of Hawai`i*)
H. Annamalai (*International Pacific Research Center, University of Hawai`i*)

Start Date: September 2012

End Date: August 2014

Project Status: In Progress

Tags: extreme events, climate modeling, Science Project, CSC, Pacific Islands CSC, 2012

Fiscal Year: FY 2012 Projects (/projects-list/5006f8a0e4b0abf7ce733fbd)

Summary

The Pacific Islands are expected to be particularly vulnerable to the anticipated impacts of climate change due to their small, geographically isolated ecosystems and economies, and are extremely susceptible to rising sea-levels. Despite a high level of concern for the Pacific Islands, there is currently a lack of adequate small-scale projections of climate change in the American Samoa region. This study will use high-resolution (one kilometer) climate models to project anticipated 21st century changes in such things as rainfall, surface temperature and wind on Guam in the Mariana

Islands and Tutuila in American Samoa. This work will build on and leverage ongoing modeling efforts of current and predicted climate change in Hawai`i. Results from this study, including estimates of the change in seasonal climatology and the frequency of extreme weather events, will be available for use by other researchers to inform hydrological and ecosystem models to predict future impacts of climate change.

ScienceBase Url: https://www.sciencebase.gov/catalog/item/50118ddce4b0d78fd4e59ba3 (https://www.sciencebase.gov/catalog/item/50118ddce4b0d78fd4e59ba3)

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