



## Evaluating the economic impacts of climate variability and change on Maui's freshwater resources and ecosystem services

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*West Maui viewed from the air.*

Often people think of nature as priceless. After all, what is the value of rain falling on a native forest, or of snorkeling along a healthy coral reef? Yet, when natural areas are unable to function effectively there *is* a direct cost. Native forests and other vegetation provide unique habitats for endemic species, while slowing rainfall to recharge aquifers and prevent damaging runoff erosion or flash flooding. Coral reefs act as the foundations for complex coastal ecosystems, and also provide food and recreation opportunities for local residents and the tourists that underpin the Hawaiian economy. Irreplaceable Hawaiian ecosystems and their services are valuable assets to the natural and human worlds.

For this project, we are examining the economic effects of climate change on Maui's ecosystems. We plan to re-cast climate information and analysis into a socio-economic framework to assign costs to the vulnerabilities and climate impacts on freshwater resources and ecosystem services in West Maui. With the specific future conditions unclear and the choice of adaptation measures broad, we will consider several climate

scenarios to assess different adaptation outcomes, chosen with community participation.

Our work will help Maui stakeholders, including community members, natural resource managers, and county water and planning departments, prepare for a changing climate by giving them information about the socio-economic costs of different adaptation plans. They can consider projected outcomes and trade-offs for alternative scenarios, from business-as-usual to extensive adaptation planning. Ideally this will allow for optimal resource protection and management while allowing sustainable development and use.



*Hawaiian reefs provide food as well as recreation.*

## Quick Summary

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- Governments have a variety of options when preparing for the long-term effects of climate change, and want to be able to compare benefits and costs in socio-economic terms. By developing economic-ecologic models and environmental services valuations, ecological impacts can be considered on an equal footing with more obvious planning costs such as infrastructure development.
- Our work will use novel ecological-economic modelling and environmental valuation methods as well as community consultation to model and evaluate the impacts of climate change under a variety of adaptation plans.
- Our model outcomes and scenario analyses will allow community stakeholders to compare different adaptation plans and make informed choices to maintain functional ecosystems as the climate changes.



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