

Cultural Knowledge & Heritage Values

Climate Vulnerability Assessment and Adaptation Strategies for Kaua'i

ECOSYSTEM SERVICE DESCRIPTION

Native Hawaiian cultural and heritage values are inextricably tied to the surrounding environment and ecosystem health. Native Hawaiians place great value on aloha 'āina (love of the land), and maintain a reciprocal relationship with ecosystems, ensuring that benefits are both received from and returned to a resource. Important physical components of cultural knowledge and heritage include lo'i kalo (flooded kalo [taro; *Colocasia esculenta*] farmland), loko i'a (fishponds), lo'i pa'akai (salt ponds), community-based subsistence fishing areas (e.g., Hā'ena), beaches held in public trust, iwi kūpuna (ancestral burials), and native species that hold cultural significance, such as maile (*Alyxia oliviformis*) used for making lei.



ECOSYSTEM SERVICE VULNERABILITY

Cultural knowledge and heritage is vulnerable to climate changes that impact the health and integrity of ecosystems and/or native species, or damage/destroy valued cultural assets and heritage sites. Disturbance events such as wildfire can affect large areas, causing extensive damage and loss and limiting access. Many non-climate stressors are associated with changes in land use and the overuse of natural resources, and have resulted in fragmentation and degradation of natural habitats. Invasive species have had an especially large impact by altering ecosystem functions and driving the loss of native species and habitats. This service is valued and some communities have been able to maintain local access to resources and traditional practices, and climate change may increase commitments to protect cultural values.



Drivers of Ecosystem Service Vulnerability

- **Climatic factors and disturbance regimes:** Sea level rise, saltwater intrusion, air temperature, wind/circulation, wildfire, riverine flooding, insects, disease
- **Non-climate factors:** Residential and commercial development, agriculture/aquaculture, pollution/poisons, roads/highways/trails, groundwater development, water diversions, recreation, invasive species (flammable grasses, amphibians/reptiles, mammalian predators, ungulates, trees/shrubs, fish)

PROJECTED FUTURE CHANGES	POTENTIAL IMPACTS ON CULTURAL KNOWLEDGE & HERITAGE VALUES
Increased rate of sea level rise and saltwater intrusion +0.4m (1.3 ft) to +3.3m (10.8 ft) of sea level rise	<ul style="list-style-type: none"> • Increased coastal flooding and erosion, threatening coastal structures, artifacts, and iwi kūpuna (ancestral burials) • Altered fishpond and anchialine pool size, abundance, and distribution • Reduced salt harvesting period • Increased groundwater salinity, impacting freshwater species, fishponds, and kalo crops
Increased air temperature	<ul style="list-style-type: none"> • Increased evaporative demand, elevating water stress in native vegetation • Shifts in species distribution • Upslope expansion of avian malaria which threatens endemic forest birds
Changes in wind and circulation	<ul style="list-style-type: none"> • Increased plant water stress and shifts in habitat distribution due to reduced rainfall • Vegetation damage and increased fire risk during high winds
Increased wildfire	<ul style="list-style-type: none"> • Native habitat loss and establishment of invasive grasses • Reduced forest access for gathering traditional materials
Increasingly variable riverine flooding	<ul style="list-style-type: none"> • Damage to culturally-valued species, heritage sites, and infrastructure
Increased insects and disease	<ul style="list-style-type: none"> • Damage and mortality to native species, which may impact large areas

ADAPTIVE CAPACITY

Factors that enhance adaptive capacity:

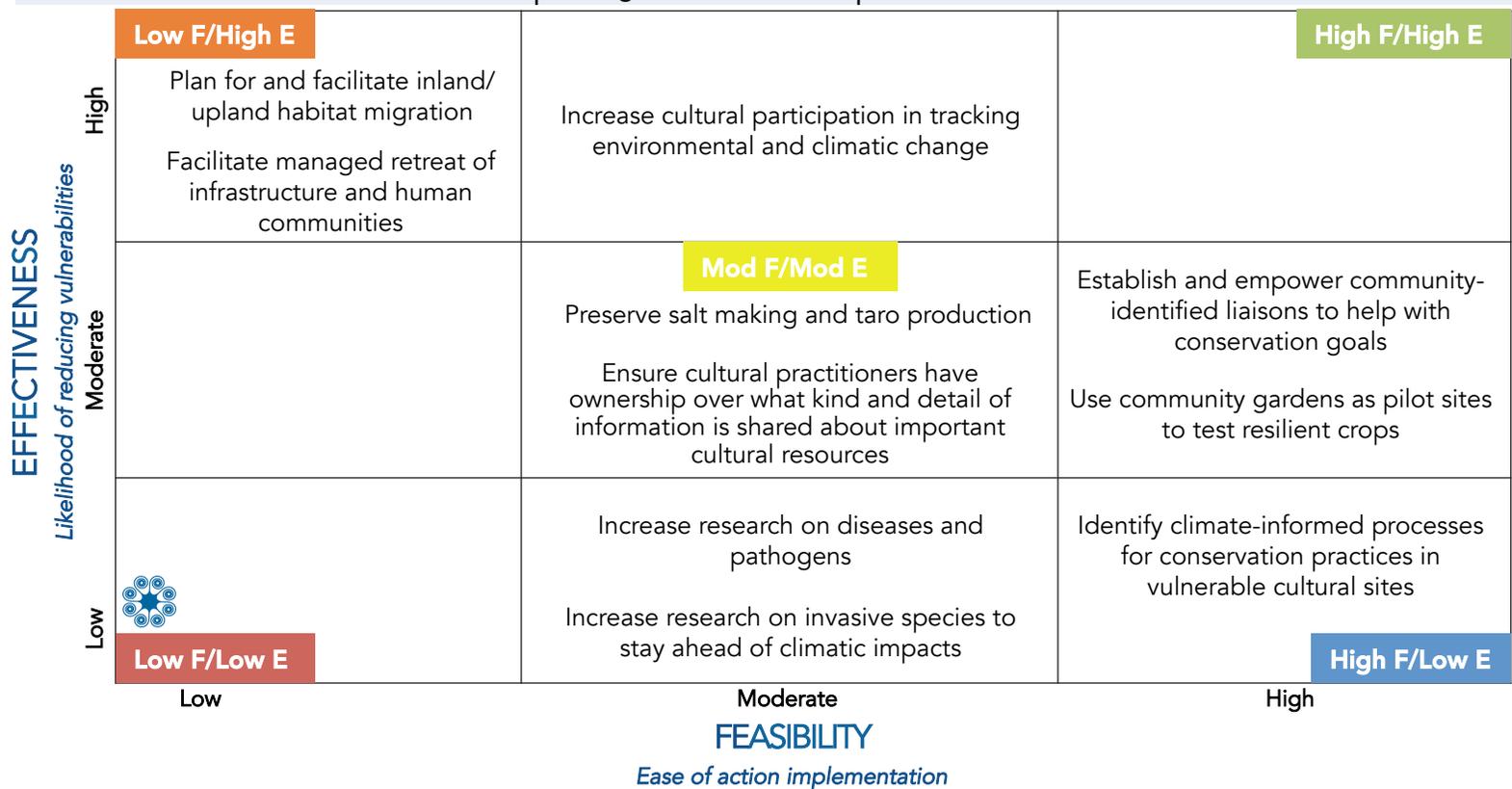
- + Cultural values such as the aloha spirit are part of what bring people to the island
- + Climate change will catalyze a commitment to protect cultural values
- + Recognized in the Hawai'i State Constitution, which provides some protections
- + Community-based subsistence fishing areas and traditional kalo cultivation increase food security

Factors that undermine adaptive capacity:

- Human willingness to change behavior declines when changes will affect the economy
- Monotypic agriculture and wildlife habitat management can conflict with this service
- Native Hawaiians are impacted by the ongoing effects of colonialism

ADAPTATION STRATEGIES FOR CULTURAL KNOWLEDGE & HERITAGE VALUES

Types of Adaptation Approaches	Adaptation Strategy	Specific Action
Resistance: Prevent climate change from affecting a resource. <i>Near-term approach</i>	Protect cultural sites and practices	<ul style="list-style-type: none"> • Ensure cultural practitioners have ownership over the kind and detail of information shared about important cultural resources • Identify climate-informed processes for conservation practices in vulnerable cultural sites
Resilience: Help resources weather climate change by avoiding the effects of or recovering from changes <i>Near- to mid-term approach</i>	Increase food security to build resilient cultural communities	<ul style="list-style-type: none"> • Use community gardens as pilot sites to test resilient crops • Preserve salt making and taro production
Response: Intentionally accommodate change and adaptively respond to variable conditions <i>Long-term approach</i>	Anticipate and facilitate habitat migration	<ul style="list-style-type: none"> • Plan for and facilitate inland/upland habitat migration • Facilitate managed retreat of infrastructure and human communities
Knowledge: Gather information about climate impacts and/or management effectiveness in addressing climate challenges <i>Near- to long-term approach</i>	Conduct research on native species, habitat requirements, and threats	<ul style="list-style-type: none"> • Increase research on diseases and pathogens • Increase research on invasive species to stay ahead of climatic impacts
Collaboration: Coordinate efforts and capacity across landscapes and agencies <i>Near- to long-term approach</i>	Create dialogue between cultural practitioners and natural resource managers	<ul style="list-style-type: none"> • Establish and empower community-identified liaisons to help with conservation goals • Increase cultural participation in tracking environmental and climatic change



Further information and citations can be found in the *Hawaiian Islands Climate Vulnerability and Adaptation Synthesis and other products available online at www.bit.ly/HawaiiClimate.*

Hilberg LE, Reynier WA, Gregg RM. 2018. Cultural Knowledge & Heritage Values: Vulnerability and Adaptation Brief for Kaua'i. EcoAdapt, Bainbridge Island, WA.

Produced in cooperation with the Pacific Islands Climate Change Cooperative, with funding from the U.S. Fish and Wildlife Service.