

Aesthetic Values

Climate Vulnerability Assessment and Adaptation Strategies for Maui, Lānaʻi, and Kahoʻolawe

ECOSYSTEM SERVICE DESCRIPTION

Aesthetic ecosystem services include the value of visual scenery, emotional response, and appreciation of the natural environment experienced by humans (e.g., sand between toes, smell of a plant, joy of a sunset). The perception of visual aesthetic value increases with perceived naturalness, well-preserved manmade cultural elements, percentage of plant cover, presence of water or mountains, color contrasts, and landscape heterogeneity. Aesthetic values and wildness (or naturalness) are two of the most important predictors of place attachment.



ECOSYSTEM SERVICE VULNERABILITY

The sensitivity of aesthetic ecosystem services to climate change is closely tied to the magnitude of change occurring, with large changes impacting human appreciation of the landscape to a greater degree. This ecosystem service is sensitive to factors that impact or alter iconic or highly valued natural areas (e.g., beaches, waterfalls). Significant alterations in the natural landscape, such as the loss of native species, forest dieback, or severe beach erosion, are likely to affect aesthetic values for many user groups (e.g., recreational users). Non-climate stressors also contribute to the loss of native habitats and/or degrade sites valued for their aesthetic qualities. Tourism is a large part of the economy of Maui, which is known for its beautiful landscapes, so public support for aesthetic values is relatively high; however, this ecosystem service receives little support as a management priority.



Drivers of Ecosystem Service Vulnerability

- **Climatic factors and disturbance regimes:** Sea level rise, coastal erosion, precipitation, tropical storms/hurricanes, wildfire, insects
- **Non-climate factors:** Residential & commercial development, agriculture & aquaculture

ADAPTIVE CAPACITY

Factors that enhance adaptive capacity:

- + Maui is well known for its beautiful beaches, forests, and alpine landscapes
- + Aesthetic values are important to both residents and tourists
- + Economic value of tourism and renaissance of Hawaiian culture may increase willingness to consider climate change impacts
- + Management may protect small areas of intact natural habitat from climate-driven changes
- + Studies from other islands have documented the economic value of this service at \$1–3 billion within a single watershed

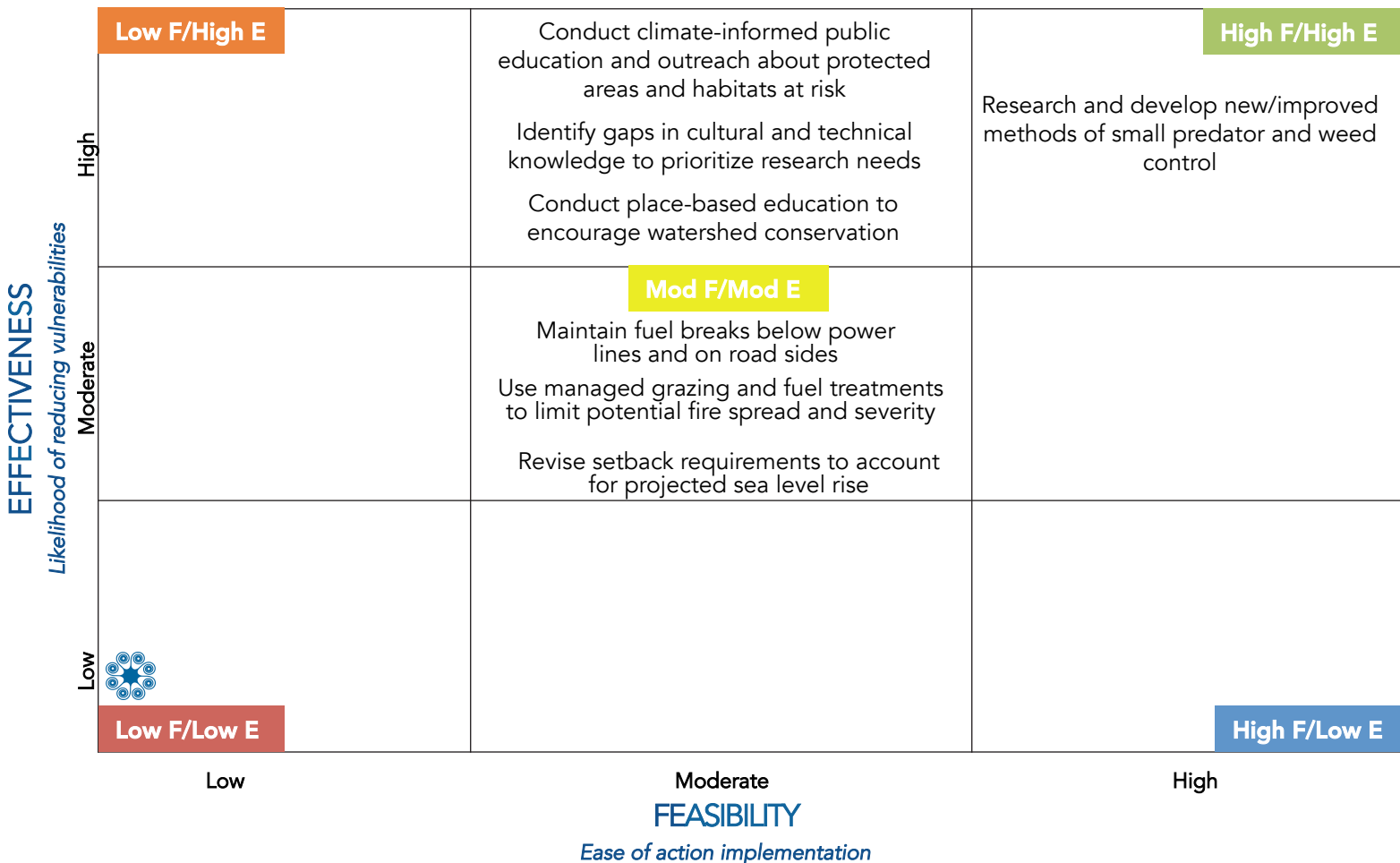
Factors that undermine adaptive capacity:

- Support for aesthetic ecosystem services receives <1% of the state budget and changes with the political climate
- Difficult to estimate the value of aesthetic ecosystem services, frequently resulting in their omission from analyses (there are no studies of the economic value of this ecosystem service on Maui Nui)

| PROJECTED FUTURE CHANGES | POTENTIAL IMPACTS ON AESTHETIC VALUES |
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| Increased rate of sea level rise & coastal erosion +0.4m (1.3 ft) to +3.3m (10.8 ft) of sea level rise | <ul style="list-style-type: none"> • Flooding at coastal heritage sites with high aesthetic value • Increased beach erosion and sedimentation of estuaries, impacting aspects of the landscape tied to aesthetic value |
| Reduced precipitation Except for windward slopes | <ul style="list-style-type: none"> • Reduced health and integrity of native ecosystems and species due to increased water stress • Lower streamflows, impacting streams and waterfalls with high aesthetic value |
| Increased frequency & strength of tropical storms/hurricanes | <ul style="list-style-type: none"> • Wind, wave, and flood damage to sites with high aesthetic value, including beaches, and cultural/heritage sites • Wind damage to native forest vegetation, resetting succession and allowing the establishment of invasive plants |
| Increased wildfire | <ul style="list-style-type: none"> • Reduced landscape aesthetic quality due to active wildfires and burned areas • Increased erosion and downstream flooding/sedimentation where vegetation has been removed |
| Increased insects | <ul style="list-style-type: none"> • Damage and mortality to large areas of forest, especially keystone species that contribute to aesthetic quality |

ADAPTATION STRATEGIES FOR AESTHETIC VALUES

| Types of Adaptation Approaches | Adaptation Strategy | Specific Action |
|---|--|--|
| Resistance: Prevent climate change from affecting a resource <i>Near-term approach</i> | Improve fire prevention and response | <ul style="list-style-type: none"> Maintain fuel breaks below power lines and on road sides Use managed grazing and fuel treatments to limit potential fire spread and severity |
| Resilience: Help resources weather climate change by avoiding the effects of or recovering from changes <i>Near- to mid-term approach</i> | Maintain intact, native-dominated ecosystems | <ul style="list-style-type: none"> Support healthy native forests through land acquisition and plant restoration |
| Response: Intentionally accommodate change and adaptively respond to variable conditions <i>Long-term approach</i> | Implement climate-informed coastal zoning protections | <ul style="list-style-type: none"> Revise setback requirements to account for projected sea level rise |
| Knowledge: Gather information about climate impacts and/or management effectiveness in addressing climate challenges <i>Near- to long-term approach</i> | Conduct research to support adaptive policies and technology | <ul style="list-style-type: none"> Identify gaps in cultural and technical knowledge to prioritize research needs Research and develop new/improved methods of small predator and weed control |
| Collaboration: Coordinate efforts and capacity across landscapes and agencies <i>Near- to long-term approach</i> | Build support with public education and advocacy | <ul style="list-style-type: none"> Conduct climate-informed public education and outreach about protected areas and habitats at risk Conduct place-based education to encourage watershed conservation |



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.

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