

2.4 Goal | Mauka to makai watershed management

Why is it important?

Traditionally, Native Hawaiians divided land using the ahupua'a system that ran mauka to makai, like a watershed system. An ahupua'a is like a slice of pie, usually with a narrow beginning at the top of a mountain becoming broader toward the ocean. 'Ōiwi who lived inland and those who lived near the ocean shared resources while caring for the land. There was recognition that what happened mauka impacted areas makai. This holistic system allowed Native Hawaiians to thrive, creating a sustainable environment with healthy forests and farmland, functional wetlands and dunes, and vibrant fishponds and reefs.

Watersheds throughout South Maui have become degraded due to a decline in native forest cover in favor of intensive farming and ranching, the introduction of invasive plants and grazing animal species, and filling-in of wetlands and grading over sand dunes for development. These changes have altered watershed hydrology and increased stormwater runoff. Excess stormwater in South Maui causes flood damage and pollution that are difficult and costly to clean up. Compounding the issue, global climate change has increased extreme weather patterns and events such as heavy rain, drought, and rising sea levels. This Plan recognizes the need to manage watershed resources in a more holistic way by engaging in sustainable stewardship practices and more culturally and ecologically friendly development.

How will setting this goal affect our future?

With this goal, South Maui is committed to supporting holistic land use and watershed management from mauka to makai that reduce risks from flooding and improves South Maui's long-term resiliency.

Definitions

The following terms are used throughout the Plan, and it is important to understand their definitions and use for planning.

Green infrastructure are drainage systems that slow down or control stormwater runoff to be utilized for non-potable use (e.g. irrigation) or provide additional environmental benefits (e.g. groundwater recharge, evaporation, reduced pollution, etc.). Examples of green infrastructure include permeable pavements, bioswales, rain gardens, or other rainwater catchment systems.

Low-impact development is a subset of green infrastructure improvements that manages stormwater runoff as close to the source as possible by incorporating natural features into the urban landscape (e.g. rain gardens, porous pavement, bioswales and increased tree cover). The main difference between green infrastructure and low-impact development is the size and scale of the improvement.

Cross-cutting topics:

- Climate **eC**hange and Resilience
- Cultural Resources
- Hazards
- Historic Preservation
- Infrastructure
- Land Use
- Environment
- Emergency Services
- Other Services and Facilities

Policies

~~2.4.1 | [Preserve wetlands with buffers](#) Protect ocean and stream water quality by requiring that wetlands, as defined by traditional historic knowledge or Section 404 of the Clean Water Act except for the requirement of a "federal nexus", be preserved with environmentally protective vegetated buffers. The buffers shall be~~ adequate to mitigate pollutants and support ecosystem functions, allow for migration, and incorporate future sea level rise scenarios.

2.4.2 | Prioritize "nature-based solutions", low-impact design, and green infrastructure strategies rather than "gray" infrastructure to manage flooding and prevent surface water pollutants from flowing into streams and reaching the ocean.

2.4.3 | Support restoration and conservation efforts to improve and restore degraded wetlands and hydrologically connected systems and their buffers to enable wetland systems to migrate and shift as environmental conditions change.

2.4.4 | Protect coastal water quality and nearshore marine environment by requiring redevelopment and new developments to include low-impact development techniques such as adequate bioswales and other green infrastructure and nature-based solutions to minimize stormwater runoff and coastal nonpoint source pollution.

~~2.4.5 a | [For redevelopment, gulches and drainageways, as identified in the map in Figure 3.17 \(pg. 106\) of this Plan, must remain in open space, and no new permanent structures may be developed in or within 100 feet of the top of the bank of identified gulches and drainageways unless low-impact development strategies are implemented to prevent stormwater runoff, including but not limited to Mā'alaea, Kanaio, Pōhākea, Waikapū, Waiakoa, Kūlanihāko'i, Waipu'ilani, Waimāha'iha'i, Lilioholo, Keawakapu, Wailea, Kama'ole, and Kapunakea gulches.](#)~~

~~Gulches as identified in the map in Figure 3.17 (pg. 106) of this Plan, must remain in open space and no new permanent structures may be developed in or within 100 feet of the top of the bank of identified gulches unless low-impact development strategies are implemented to prevent stormwater runoff.~~

~~2.4.5 b | [For new developments and subdivisions, gulches and drainageways, as identified in the map in Figure 3.17 \(pg. 106\) of this Plan, must remain in open space, and no new permanent structures may be developed in or within 100 feet of the top of the bank of identified gulches and drainageways \(with the exception of public bridge crossings and public utilities\), including but not limited to Mā'alaea, Kanaio, Pōhākea, Waikapū, Waiakoa, Kūlanihāko'i, Waipu'ilani, Waimāha'iha'i, Lilioholo, Keawakapu, Wailea, Kama'ole, and Kapunakea gulches.](#)~~

2.4.6 | To reduce sediment loss and protect water quality, redevelopment and new development shall ~~be encouraged~~prioritize ~~to improve degraded areas by~~ planting appropriate native plants to improve degraded areas on site and, as needed, ecologically advantageous non-invasive plants.

2.4.7 | To support watershed management and protect water quality, redevelopment and new development shall be ~~encouraged~~required to avoid, minimize, and mitigate impacts to the existing surface and groundwater hydrology. Wetlands, wetland buffers, and recharge area conservation and restoration will be prioritized.

2.4.8 | Encourage reestablishing historic hydrology and management of hydrologically connected systems where appropriate.

2.4.9 | Preserve and protect native coastal vegetation and coastal processes by:

- ~~a. Appropriately regulating and limiting development in the shoreline setback area;~~
- b. Requiring all proposed shoreline developments prioritize planting appropriate native plants and, as needed, ecologically advantageous non-invasive plants~~to use native coastal vegetation in landscaping;~~
- c. Encouraging dune restoration and native planting efforts, and ~~limiting~~ irrigation to plant establishment period;
- d. Supporting regional beach management at the beach cell level.

2.4.10 | Require new development and redevelopment to include native plants and, as needed, ecologically advantageous non-invasive plants ~~native and endemic plants~~ appropriate for the microclimate to conserve water, provide shade, and beauty, and reduce sediment runoff. All new landscaping must minimize potable water irrigation needs.

2.4.11 | Require affordable housing using Chapter 201H, Hawaii Revised Statutes 2.96 or 2.97, MCC process to be outside the Special Flood Hazard Areas (SFHA), which includes V, VE, A, AO, AH, and AE.

2.4.12 | Protect and preserve areas designated open space ~~areas~~ as important assets of the region. Habitat connectivity for native species, watersheds, undeveloped shoreline areas, wetlands, and other environmentally and culturally sensitive areas will be preserved.

2.4.13 | Require the implementation of low-impact development or permaculture design practices, where appropriate, in developments in South Maui to reduce stormwater runoff and protect water quality. ~~Encourage~~ Require management of flows that are greater than the five-year storm ~~event to retain, filter, and sink as much stormwater~~ remove pollutants through low-impact design or permaculture design as feasible on site.

~~2.4.14 | Encourage the provision of public restrooms in major parks and public spaces and explore implementing composting toilets.~~

2.4.15 | ~~Encourage~~ Any new shoreline developments and redevelopments or improvements ~~to~~ should include public restrooms near beach access points to improve ocean water quality.

Added by CPAC | Discourage restrooms at Mākena State Park until the technology has improved and will not degrade water quality.

Added by CPAC | Encourage coordination between South Maui and Upcountry groups in discussing planning and managing Kula and Honua'ula Watersheds.