

## 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 change and Resilience
- Cultural Resources
- Hazards
- Historic Preservation
- Infrastructure
- Land Use
- Environment
- Emergency Services
- Other Services and Facilities

Mark: "allow for migration, and incorporate future sea level rise scenarios" needs more explanation, not clear

## Policies

Michael comment: the new wetlands bill has defined what constitutes a wetland in Maui County and clearly states the methods used to delineate wetlands

2.4.1 | 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.

Planning: of wetlands  
Mark: "allow for migration, and incorporate future sea level rise scenarios" needs more explanation, not clear what this refers to. Mark: regenerative design

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.

Mark: need to define "nature-based solutions"

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.

Michael: supports

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.

Mark: positive impact development

Left off here 1/25

2.4.5 | 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. Robin: remove unless...

2.4.6 | To reduce sediment loss and protect water quality, redevelopment and new development shall be encouraged to improve degraded areas by planting appropriate native plants.

Mark: Native plants are important but I would not restrict it to natives... vetiver, pigeon pea, sweet potato, ulu, just to name a few can be established quickly and easily and help stabilize while more native systems are developing

2.4.7 | To support watershed management and protect water quality, redevelopment and new development shall be encouraged to avoid, minimize, and mitigate impacts to the existing surface and groundwater hydrology. Wetland, 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.

Rob: Discourage beach nourishment and t-groin projects to protect ocean water quality

Red text indicates department recommended changes.

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 to use native coastal vegetation in landscaping; **Mark: limiting to just natives can be prohibitive to some very good nature-based solutions of non-native species**
- c. Encouraging dune restoration and native planting efforts, and limit irrigation;
- d. Supporting regional beach management at the beach cell level.  
**Mark: "beach management" should be defined**

2.4.10 | Require new development and redevelopment to include native and endemic plants appropriate for the microclimate to conserve water, provide shade, beauty, and reduce sediment runoff. All new landscaping must minimize irrigation needs.  
**Rob: remove "and endemic" because that is a subset of "**

**Mark: many non-native plants can be used while native species are being established**

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 open space areas as important assets of the region. Habitat connectivity for native species, watersheds, undeveloped shoreline areas, and other environmentally sensitive areas will be preserved.  
**Lehua: and culturally**

**Michael: supports**

**Mark: positive impact development**

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

**Mark: regenerative design**

2.4.14 | Encourage the provision of public restrooms in major parks and public spaces and explore implementing composting toilets. Rob comment: why is this not in the parks sec

Mark comment: composting toilets can be a game changer for water conservation and creating

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