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Hawai'i Subalpine Mesic Shrubland

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Vegetation Type

Shrubland

Map Zones

79

Geographic Range

These mesic shrublands have a narrow range and are found in a relative narrow subalpine band on mesic slopes of the windward side of Haleakala on eastern Maui, Hawai'i. This ecological system can also be found on the outer north slopes of Haleakala Crater, from 1,950-2,300m elevation. Sites include ridges and upper slopes that are dissected.

Biophysical Site Description

This montane to subalpine ecological system occurs within the seasonal mesic zone (zone 4) of the seven moisture zones developed for the Hawaiian Islands by Price et al. (2007). This ecological system occurs on mesic, windward slopes of eastern Maui and outer north slopes of Haleakala Crater, from 1,950-2,300m elevation. Sites include ridges and upper slopes that are dissected. The thin cinder-derived soil has many rock outcrops. Annual precipitation is 1,300-1,900mm with rain distributed fairly evenly throughout the year. The thin cinder-derived soil has many rock outcrops (Gagne and Cuddihy 1990, J. Jacobi pers. comm.).

Vegetation Description

Vegetation is a closed shrubland dominated by *Sadleria cyatheoides* and *Vaccinium calycinum*. At higher elevations and on ridges, there is a single shrub layer 1-1.2m tall; at lower elevation, stands often have two shrub layers: a tall *Vaccinium*-dominated shrub layer (2 m tall) emergent over a 1-m tall dense shrub layer dominated by other shrubs. Other characteristic shrubs include *Coprosma ernodeoides*, *Geranium multiflorum*, *Rubus hawaiiensis*, *Rubus macraei*, and *Vaccinium reticulatum*. *Lycopodium venustulum* is important in the Kipahulu Valley stands. Herbaceous species are generally sparse, e.g., *Deschampsia nubigena* and *Fragaria chiloensis* ssp. *sandwicensis*. Ferns include *Dryopteris wallichiana* and *Pteridium aquilinum*. Diagnostic species for this system are *Vaccinium calycinum*, *Geranium multiflorum*, *Rubus hawaiiensis*, and *Rubus macraei*.

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
ARGR5	<i>Argyroxiphium grayanum</i>	Hana forest silversword
SACY3	<i>Sadleria cyatheoides</i>	Amaumau fern
GEMU	<i>Geranium multiflorum</i>	Manyflower geranium

Shrub	1.0-3.0	B	B	B	B	B	B	C	C	C	C
Shrub	>3.0	B	B	B	B	B	B	C	C	C	C
Tree	0-5	C	UN	UN	UN	UN	UN	UN	UN	UN	UN
Tree	5-10	C	UN	UN	UN	UN	UN	UN	UN	UN	UN
Tree	10-25	C	UN	UN	UN	UN	UN	UN	UN	UN	UN
Tree	25-50	C	UN	UN	UN	UN	UN	UN	UN	UN	UN
Tree	>50	C	UN	UN	UN	UN	UN	UN	UN	UN	UN

Succession class letters A-E are described in the Succession Class Description section. Some classes use a leafform distinction where a qualifier is added to the class letter: Brdl (broadleaf), Con (conifer), or Mix (mixed conifer and broadleaf). UN refers to uncharacteristic native or a combination of height and cover that would not be expected under the reference condition. NP refers to not possible or a combination of height and cover which is not physiologically possible for the species in the BpS.

Description

Class A 2 Early Development 1 - All Structures

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
SACY3	Sadleria cyatheoides	Amaumau fern	Upper
VARE	Vaccinium reticulatum	Ohelo 'ai	Upper

Description

Cinder and rock outcrops, early successional.

Maximum Tree Size Class

None

Class B 8 Mid Development 1 - Open

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
SACY3	Sadleria cyatheoides	Amaumau fern	Upper
VARE	Vaccinium reticulatum	Ohelo 'ai	Upper
LUHA2	Luzula hawaiiensis	Hawai'i woodrush	Lower
GEMU	Geranium multiflorum	Manyflower geranium	Upper

Description

Open mix of shrubs and some grasses/ferns/forbs.

Maximum Tree Size Class

None

Class C 90 Late Development 1 - Closed

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
RUMA6	Rubus macraei	'akala	Upper
ARGR5	Argyroxiphium grayanum	Hana forest silversword	Mid-Upper
FRCHS2	Fragaria chiloensis ssp. sandwicensis	Sandwich beach strawberry	Lower
LUHA2	Luzula hawaiiensis	Hawai'i woodrush	Lower

Description

Closed, dense shrubland. This seral stage persists indefinitely.

Maximum Tree Size Class

None

Model Parameters

Deterministic Transitions

From Class	Begins at (yr)	Succeeds to	After (years)
Early1:ALL	0	Mid1:OPN	10
Mid1:OPN	11	Late1:CLS	15
Late1:CLS	16	Late1:CLS	999

Probabilistic Transitions

Disturbance Type	Disturbance occurs In	Moves vegetation to	Disturbance Probability	Return Interval (yrs)	Reset Age to New Class Start Age After Disturbance?	Years Since Last Disturbance
Optional 1	Early1:ALL	Early1:ALL	0.5	2	No	0
Optional 1	Mid1:OPN	Early1:ALL	0.002	500	Yes	0
Mixed Fire	Mid1:OPN	Mid1:OPN	0.02	50	No	0
Optional 1	Late1:CLS	Early1:ALL	0.002	500	Yes	0
Mixed Fire	Late1:CLS	Mid1:OPN	0.02	50	Yes	0

Optional Disturbances

Optional 1: Landslides

References

Gagne, W.C., and L.W. Cuddihy. 1990. Vegetation. Pages 45-114 in: W.L. Wagner, D.R. Herbst, and S.H. Sohmer, editors. Manual of the Flowering Plants of Hawaii. 2 Volumes. University of Hawaii Press, Honolulu.

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