

**18240**

## **Hawai'i Alpine Dwarf-Shrubland**

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### **Vegetation Type**

Shrubland

### **Map Zones**

79

### **Geographic Range**

This ecological system is restricted to dry alpine and upper subalpine slopes of Haleakala, Maui and Mauna Kea and Mauna Loa, Hawai'i above 3,000 m.

### **Biophysical Site Description**

This ecological system occurs on dry alpine slopes of Maui and Hawai'i from near 3,000-3,400m (9,835-11,150ft) elevation extending down into the subalpine (Gagne and Cuddihy 1990). This alpine ecological system is restricted to the arid zone (zone 1) of the seven moisture zones developed for the Hawai'ian Islands by Price et al. (2007). The wet trade winds frequently do not rise above 1,900m, being suppressed by the tropical inversion layer, leaving upper slopes too dry to support wet vegetation (Mueller-Dombois and Fosberg 1998). Annual rainfall is generally 750-1,250 mm and falls from October to March. Sites are wind exposed. Frost is frequent even during summer months. Substrates are well-drained and gravelly derived from cinder and ash, but can include glacial moraine.

### **Vegetation Description**

Vegetation is characterized by open dwarf shrubs characterized by *Argyroxiphium* spp., *Dubautia menziesii*, *Silene struthioloides*, and sometimes scattered *Tetramolopium humile* or *Styphelia tameiameia*, *Vaccinium* spp., *Geranium* spp. (Gagne and Cuddihy 1990). Scattered grasses may also be present (*Agrostis sandwicensis*, *Deschampsia nubigena*, *Trisetum glomeratus*), forbs (*Gnaphalium sandwicense*), ferns (*Pellaea ternifolia*, *Asplenium adiantum-nigrum*, *A. trichomanes*), lichens (*Lecanora melaena*), and mosses (*Grimmia haleakalae*, *Rhacomitrium* spp.).

### **BpS Dominant and Indicator Species**

| Symbol | Scientific Name              | Common Name          |
|--------|------------------------------|----------------------|
| ARGYR  | <i>Argyroxiphium</i>         | Silversword          |
| VACCI  | <i>Vaccinium</i>             | Blueberry            |
| DUME4  | <i>Dubautia menziesii</i>    | Mountain dubautia    |
| SIST2  | <i>Silene struthioloides</i> | Alpine catchfly      |
| TEHU   | <i>Tetramolopium humile</i>  | Alpine tetramolopium |
| STTA   | <i>Styphelia tameiameia</i>  | Pukiawe              |

|       |                                     |                   |
|-------|-------------------------------------|-------------------|
| AGSA3 | <i>Agrostis sandwicensis</i>        | Hawai'i bentgrass |
| PSSA8 | <i>Pseudognaphalium sandwicense</i> | 'ena'ena          |

Species names are from the NRCS PLANTS database. Check species codes at <http://plants.usda.gov>.

### Disturbance Description

Primary disturbances in this system include lava flow and/or ash deposition.

## Fire Frequency

| Severity         | Avg FI | Percent of All Fires | Min FI | Max FI |
|------------------|--------|----------------------|--------|--------|
| Replacement      |        |                      |        |        |
| Moderate (Mixed) |        |                      |        |        |
| Low (Surface)    |        |                      |        |        |
| All Fires        |        |                      |        |        |

Fire interval is expressed in years for each fire severity class and for all types of fire combined (All Fires). Average FI is the central tendency modeled. Percent of all fires is the percent of all fires modeled in that severity class. Minimum and Maximum FIs show the relative range of fire intervals as estimated by model contributors, if known.

### Scale Description

### Adjacency or Identification Concerns

Adjacent ecological systems include Hawai'i Montane-Subalpine Dry Forest and Woodland and Hawai'i Montane-Subalpine Dry Shrubland. This ecological system may co-occur with the alpine bedrock and scree ecological system, but it generally occurs on more exposed, more xeric sites. May be confused with the subalpine dry shrubland, except the vegetation in this is more sparse, and perhaps "lower" in growth form.

## Issues or Problems

## Native Uncharacteristic Conditions

## Comments

## Succession Classes

## Mapping Rules

[illegible]



| From Class | Begins at (yr) | Succeeds to | After (years) |
|------------|----------------|-------------|---------------|
| Early1:ALL | 0              | Late1:OPN   | 50            |
| Late1:OPN  | 51             | Late1:OPN   | 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 2       | Early1:ALL            | Early1:ALL          | 0.001                   | 1000                  | No                                                  | 0                            |
| Optional 1       | Early1:ALL            | Early1:ALL          | 0.001                   | 1000                  | No                                                  | 0                            |
| Optional 2       | Late1:OPN             | Early1:ALL          | 0.001                   | 1000                  | Yes                                                 | 0                            |
| Optional 1       | Late1:OPN             | Early1:ALL          | 0.001                   | 1000                  | Yes                                                 | 0                            |

### Optional Disturbances

Optional 1: Lava Flows

Optional 2: Ash Deposits

### 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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