18250

Hawai'i Dry Cliff

BpS Model/Description Version: Aug. 2020

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Vegetation Type

Shrubland

Map Zones

79

Geographic Range

This ecological system occurs on the larger Hawai'ian Islands on dry cliffs away from the direct influence of the shoreline.

Biophysical Site Description

This ecological system occurs on dry cliffs away from the direct influence of the shoreline (surf, wind and salt spray) on the larger islands extending up to montane and subalpine slopes on Maui and Hawai'i from 15-3,000m (50-9,835ft) elevation. This lowland to montane dry cliff ecological system occurs over a broad moisture range within the arid, very dry, and moderately dry zones (zones 1, 2, and 3) of the seven moisture zones developed for the Hawai'ian Islands by Price et al. (2007). Stands occur on the leeward sides of islands in the rain shadows. Annual rainfall is generally low 500-1,500 mm. Substrates include sandy loam soils derived from cinder, volcanic ash, and weathered basaltic lava with little soil development. Many sites are wind exposed.

Vegetation Description

Vegetation is variable but is generally sparse composed of an open shrub or herbaceous layer and restricted to ledges or less steep slopes. Common grass and fern species include *Heteropogon contortus*, *Dechampsia nubigena*, *Peperomia tetraphylla*, *Plectranthus parviflorus*, *Trisetum glomeratum*, and shrubs such as *Artemisia mauiensis*, *Chamaesyce celastroides*, and *Psydrax oderata* (Mueller-Dombois and Fosberg 1998). Stands are often weedy being invaded by several introduced species such as *Rhynchelytrum* (*melinis*) *repens*, *Lantana camara*, *Leucaena leucocephala*, *Acacia farnesiana*, and *Prosopis pallida*.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| HECO10 | *Heteropogon contortus* | Tanglehead |
| PETE8 | *Peperomia tetraphylla* | Acorn peperomia |
| PLPA3 | *Plectranthus parviflorus* | Little spurflower |
| TRGL3 | *Trisetum glomeratum* | Pili uka |
| ARAU3 | *Artemisia australis* | Oahu wormwood |
| CHCE | *Chamaesyce celastroides* | 'ekoko |
| LEBI | *Lepidium bidentatum* | Kunana pepperwort |
| TEFI2 | *Tetramolopium filiforme* | Ridgetop tetramolopium |

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

Disturbance Description

Landslides and fire are the primary disturbances that occur in this system. Mixed-severity fire burns infrequently because of pili grass presence, but does not really affect structure & composition.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement |  |  |  |  |
| Moderate (Mixed) | 533 | 100 |  |  |
| Low (Surface) |  |  |  |  |
| All Fires | 533 | 100 |  |  |

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

Issues or Problems

Native Uncharacteristic Conditions

Comments

Succession Classes

**Mapping Rules**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Upper Layer Lifeform** | **Height (m)** | **Canopy Cover (%)** | | | | | | | | | |
| **0-10** | **11-20** | **21-30** | **31-40** | **41 - 50** | **51-60** | **61-70** | **71-80** | **81-90** | **91-100** |
| Herb | 0-0.5 | A | A | A | A | A | A | A | A | A | A |
| Herb | 0.5-1.0 | A | A | A | A | A | A | A | A | A | A |
| Herb | >1.0 | A | A | A | A | A | A | A | A | A | A |
| Shrub | 0-0.5 | A | A | A | A | A | A | A | A | A | A |
| Shrub | 0.5-1.0 | B | B | B | B | B | B | B | B | B | B |
| Shrub | 1.0-3.0 | B | B | B | B | B | B | B | B | B | B |
| Shrub | >3.0 | B | B | B | B | B | B | B | B | B | B |
| Tree | 0-5 | B | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 5-10 | B | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 10-25 | B | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 25-50 | B | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | >50 | B | 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 5 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PLPA3 | Plectranthus parviflorus | Little spurflower | Upper |
| ERVA | Eragrostis variabilis | Kawelu | Upper |

Description

Landslide slip; bare landslide scar, both grasses and shrubs colonize this.

*Maximum Tree Size Class*  
None

Class B 95 Late Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| ARAU3 | Artemisia australis | Oahu wormwood | Upper |
| LEBI | Lepidium bidentatum | Kunana pepperwort | Upper |
| BIME | Bidens menziesii | Mauna loa beggarticks | Upper |
| ERVA | Eragrostis variabilis | Kawelu | Upper |

Description

Denser shrubs, but still a lot of bare rock/soil due to dry conditions. 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 | 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 1 | Early1:ALL | Early1:ALL | 0.002 | 500 | No | 0 |
| Optional 1 | Late1:OPN | Early1:ALL | 0.001 | 1000 | Yes | 0 |
| Mixed Fire | Late1:OPN | Late1:OPN | 0.002 | 500 | No | 0 |

Optional Disturbances

Optional 1: Landslides

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