18170

Hawai'i Lowland Dry Shrubland

BpS Model/Description Version: Aug. 2020

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Vegetation Type

Shrubland

Map Zones

79

Geographic Range

This dry lowland forest ecological system occurs on the leeward side of all islands except Ni'ihau and Kaho'olawe.

Biophysical Site Description

Dry lowland shrublands occur mostly on leeward side of all the main islands between 10-1,000m in elevation. Generally less than two meters in height. Rain fall is 500-1,500mm, generally too dry to support forest or woodland, mostly restricted to the winter months, with summers hot and dry. Soils vary from silty loams to relatively unweathered ‘a‘ā or pāhoehoe lava.

Vegetation Description

Vegetation consists of low shrubland dominated by *Dodonaea viscosa*, *Wikstroemia* spp., *Bidens* spp., *Sida fallax*, *Waltheria*, *Chamaesyce* spp., or *Sesbania tomentosa*. Stands often have other native shrubs such as *Gossypium*, *Hibiscus brackenridgei*, *Canthium odoratum*, *Capparis sandwichiana*, *Acyranthes* spp., *Nototrichium*, *Styphelia tameiameiae*, *Senna gaudichaudii*, *Canavalia* spp., *Cassytha filiforme*, *Argemone glauca*, *Peperomia tetraphylla*, and *P. leptostegia*, *Plectranthus australis*, *Lipochaeta* spp., *Portulacca* spp., *Santalum ellipticum*, *Abutilon* spp., *Sicyos* spp., *Ipomoea* spp., *Myoporum sandvicense*, ferns (*Doryopteris* and *Pellaea*), and also grasses such as *Heteropogon*, *Eragrostis*, *Panicum*. A few tree species (*Erythrina*, *Reynoldsia*, etc.) may be scattered in this type.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| DOVI | *Dodonaea viscosa* | Florida hopbush |
| WIKST | *Wikstroemia* | False ohelo |
| STTA | *Styphelia tameiameiae* | Pukiawe |
| WAIN | *Waltheria indica* | 'uhaloa |
| HIBR | *Hibiscus brackenridgei* | Brackenridge's rosemallow |
| CAOD2 | *Canthium odoratum* | Alahe'e |
| GOTO | *Gossypium tomentosum* | Hawai'i cotton |
| SIFA | *Sida fallax* | Yellow llima |

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

Disturbance Description

The density and height of shrubs may be reduced by recent fire or increase with increased moisture, for example when near riparian areas. Lowland dry shrublands are relatively intolerant to grazing pressure and fire and are replaced by grasses or, in modern times, by alien-dominated communities when subject to these disturbances. Severe drought can favor grasses. Hawaiian burning to encourage *Heteropogon* could suppress shrubs in favor of grasses.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 81 | 15 |  |  |
| Moderate (Mixed) |  |  |  |  |
| Low (Surface) | 15 | 85 |  |  |
| All Fires | 12 | 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

This system forms mosaics with adjacent grasslands and lowland dry and mesic forest.

Issues or Problems

Native Uncharacteristic Conditions

Trees when present seldom, if ever, achieve more than 10% canopy closure.

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 | C | C | C | C | C | C | C | C | C | C |
| Herb | 0.5-1.0 | C | C | C | C | C | C | C | C | C | C |
| Herb | >1.0 | C | C | C | C | C | C | C | C | C | C |
| Shrub | 0-0.5 | A | A | A | B | B | B | B | B | B | B |
| Shrub | 0.5-1.0 | A | A | A | B | B | B | B | B | B | B |
| Shrub | 1.0-3.0 | A | A | A | B | B | B | D | D | D | D |
| Shrub | >3.0 | A | A | A | B | B | B | D | D | D | D |
| Tree | 0-5 | D | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 5-10 | D | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 10-25 | D | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 25-50 | D | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | >50 | D | 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 3 Early Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| HECO10 | Heteropogon contortus | Tanglehead | Upper |
| WAIN | Waltheria indica | 'uhaloa | Low-Mid |
| DOVI | Dodonaea viscosa | Florida hopbush | Upper |
| DORYO | Doryopteris | Doryopteris | Lower |

Description

Barren lava/cinder/soil to early mixed grassland and shrubland in <30yrs.

*Maximum Tree Size Class*  
None

Class B 11 Mid Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| DOVI | Dodonaea viscosa | Florida hopbush | Upper |
| SIFA | Sida fallax | Yellow llima | Upper |
| HECO10 | Heteropogon contortus | Tanglehead | Upper |
| WAIN | Waltheria indica | 'uhaloa | Low-Mid |

Description

Shrubland with grasses subdominant.

*Maximum Tree Size Class*  
None

Class C 35 Mid Development 2 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| HECO10 | Heteropogon contortus | Tanglehead | Upper |
| DOVI | Dodonaea viscosa | Florida hopbush | Upper |

Description

Disturbances in this class include lava flows. Other disturbances that affect this seral stage include surface fire.

*Maximum Tree Size Class*  
None

Class D 51 Late Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| DOVI | Dodonaea viscosa | Florida hopbush | Upper |
| GOTO | Gossypium tomentosum | Hawai'i cotton | Upper |
| WIKST | Wikstroemia | False ohelo | Upper |
| OSAN | Osteomeles anthyllidifolia | Hawai’i hawthorne | Upper |

Description

Shrubland, grasses infrequent.

*Maximum Tree Size Class*  
None

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:OPN | 0 | Mid1:CLS | 30 |
| Mid2:CLS | 1 | Mid2:CLS | 11 |
| Mid1:CLS | 31 | Late1:CLS | 40 |
| Late1:CLS | 41 | 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:OPN | Early1:OPN | 0.001 | 1000 | No | 0 |
| Optional 1 | Mid1:CLS | Early1:OPN | 0.001 | 1000 | Yes | 0 |
| Replacement Fire | Mid1:CLS | Mid2:CLS | 0.02 | 50 | Yes | 0 |
| Alternative Succession | Mid2:CLS | Mid1:CLS | 1 | 1 | Yes | 9 |
| Optional 1 | Mid2:CLS | Early1:OPN | 0.001 | 1000 | Yes | 0 |
| Surface Fire | Mid2:CLS | Mid2:CLS | 0.2 | 5 | No | 0 |
| Optional 1 | Late1:CLS | Early1:OPN | 0.001 | 1000 | Yes | 0 |
| Replacement Fire | Late1:CLS | Mid2:CLS | 0.02 | 50 | Yes | 0 |

Optional Disturbances

Optional 1: Lava Flows

References

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