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Hawai'i Dry Coastal Strand

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Vegetation Type

Shrubland

Map Zones

79

Geographic Range

This ecological system occurs on sandy coastlines on Midway Atoll, on the drier leeward side of the larger Hawaiian Islands all of the main Islands and on all sides of the smaller arid islands and atolls.

Biophysical Site Description

This is a coast line ecosystem that is restricted to the shoreline and the zone immediately back of it where sites are strongly influenced by surf, wind and salt spray. Substrates are variable, ranging from gentle to steep rocky, cobbly shores, derived from tuff or disintegrating lava or raised coral beds (limestone), and lava flows (basalt) to flat surf-pounded sandy beaches, some with adjacent dunes or low alkaline flats above the saturated zone and behind the high-tide mark. These are dry sandy shorelines, on the smaller islands and generally on the leeward side of the larger islands, that receive <1,200mm in yearly precipitation. This habitat is driven by low moisture and its proximity to the sea, with wind and salt spray and forces that create and maintain unconsolidated sand. This arid to moderately dry coastal strand ecological system occurs 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).

Vegetation Description

The dry strand vegetation varies largely with substrate but tends to be sparse and patchy. Stands include succulent herbs, low wind-sheared shrubs, grasslands, a mix of shrub and grass or taller shrublands. Native species that may be dominant locally include graminoids *Fimbristylis cymosa*, *Eragrostis variabilis*, or *Sporobolus virginicus*, or forbs *Boerhavia acutifolia*, *Boerhavia repens*, *Nama sandwicense*, and *Sesuvium portulacastrum*, or *Sida fallax* mats with *Jacquemontia ovalifolia* ssp. *sandwicensis* or *Scaevola sericea* shrub. Other shrubs, such as *Chamaesyce celastroides*, *Chenopodium oahuense*, *Gossypium tomentosum*, *Heliotropium anomalum*, *Lipochaeta* spp., *Myoporum sandwicense*, *Scaevola coriacea*, *Tetramolopium rockii*, *Tribulus cistoides*, and *Vitex rotundifolia*, may also dominate stands. Other common native dry strand species are *Capparis sandwichiana*, *Chamaesyce degeneri*, *Chamaesyce skottsbergii*, *Cocos nucifera*, *Cordia subcordata*, *Cyperus javanicus*, *Lycium sandwicense*, *Heliotropium curassavicum*, *Heteropogon contortus*, *Ipomoea pes-caprae*, *Nama sandwicense*, *Pandanus tectorius*, *Panicum fauriei*, *Panicum torridum*, *Pseudognaphalium sandwicense*, *Sesbania*

tomentosa, *Solanum nelsonii*, *Tetramolopium rockii*, *Vigna marina*, and *Waltheria indica* (Warshauer et al. 2008). Many species occur in both dry strand and wet-mesic strand, including *Chenopodium oahuense*, *Nama sandwicense*, *Panicum fauriei*, *Panicum torridum*, *Sesbania tomentosa*, *Tetramolopium rockii*, and *Waltheria indica* (Warshauer et al. 2008).

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
SETO3	<i>Sesbania tomentosa</i>	Oahu riverhemp
SCSE6	<i>Scaevola sericea</i>	Beach naupaka
HEAN8	<i>Heliotropium anomalum</i>	Polynesian heliotrope
SPVI3	<i>Sporobolus virginicus</i>	Seashore dropseed
SCCO7	<i>Scaevola coriacea</i>	Dwarf naupaka
CHCE	<i>Chamaesyce celastroides</i>	'ekoko
PSSA8	<i>Pseudognaphalium sandwicense</i>	'ena'ena
SONE2	<i>Solanum nelsonii</i>	Nelson's horsenettle

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

Disturbance Description

landslides, wind, salt spray, storm surge (major disturbance), salt to soils. Storm surges can scour soil off to bare lava/rock (box A), or can partially remove/kill vegetation and leave the bit of soil, and hence have more rapid recovery of the vegetation (box B).

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

This is narrow linear zone is found along coast; likely not able to be mapped for LANDFIRE.

Adjacency or Identification Concerns

Issues or Problems

Native Uncharacteristic Conditions

Comments

Succession Classes

Mapping Rules

		Canopy Cover (%)
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Post-lava flow hitting the coast, veg is barren / sparse early successional.

Maximum Tree Size Class

None

Class C 58 Late Development 1 - Open

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
FICY	Fimbristylis cymosa	Tropical fimbry	Upper
HEAN8	Heliotropium anomalum	Polynesian heliotrope	Upper
SETO3	Sesbania tomentosa	Oahu riverhemp	Upper
SONE2	Solanum nelsonii	Nelson's horsenettle	Upper

Description

On all substrates sand, cobble, rock, etc. Vegetation is more developed but still open shrubby/herbaceous.

Disturbances in this class include lava flows and wave surges. Wave surges result in exposure of bare rock and when they occur can impact large areas on coast. Other disturbances that affect this seral stage include landslides and moderate waves.

Maximum Tree Size Class

None

Model Parameters

Deterministic Transitions

From Class	Begins at (yr)	Succeeds to	After (years)
Early1:ALL	0	Mid1:OPN	20
Mid1:OPN	21	Late1:OPN	40
Late1:OPN	41	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 Wind or Weather or Stress	Early1:ALL	Early1:ALL	0.001	1000	No	0
	Early1:ALL	Early1:ALL	0.05	20	No	0
Optional 1	Mid1:OPN	Early1:ALL	0.001	1000	Yes	0
Optional 2	Mid1:OPN	Mid1:OPN	0.004	250	No	0
Wind or Weather or Stress	Mid1:OPN	Mid1:OPN	0.02	50	No	0
Optional 1	Late1:OPN	Early1:ALL	0.001	1000	Yes	0
Optional 2	Late1:OPN	Mid1:OPN	0.004	250	Yes	0

Wind or Weather or Stress	Late1:OPN	Early1:ALL	0.005	200	Yes	0
Wind or Weather or Stress	Late1:OPN	Mid1:OPN	0.02	50	Yes	0

Optional Disturbances

Optional 1: Lava Flows

Optional 2: Landslides

References

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