16650

Alaskan Pacific-Aleutian Coastal Dune, Beach and Beach Meadow

Model Date: 04/01/08 Report Date: 9/11/15

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Vegetation Type

Upland Grassland/Herbaceous

Map Zones

76, 78

Geographic Range

This system is found along the North Pacific coastline from Prince William Sound through southeast AK, the Alaska Peninsula, and the Aleutian Islands.

Biophysical Site Description

This system includes moist and wet meadows associated with delta deposits and uplifted marsh and beach deposits as well as coastal sandy beaches, meadows, beach dunes and sand spits. Vegetation zonation in this system is related to exposure to salt spray and disturbance. Sandy soils may be periodically exposed to overwash from storm surges and exceptionally high tides, but they drain quickly and precipitation rapidly leaches salt from the system (Boggs 2000).

The dune component of this BpS can be found up to 2 km inland. These sites may be unstable, including eroding coastal bluffs and isolated blowouts. Other dune sites have loamy soils on colluvium that are nutrient-enriched by seabirds.

Vegetation Description

Plant communities on these coastal sand systems can be dominated by a variety of grasses and forbs. Salt tolerant forb communities featuring Honckenya peploides and Mertensia maritima var. asiatica (not common in SE AK) often occur just above mean high tide. As dune height and distance from the ocean increases, the sites are dominated by Leymus mollis then co-dominated by Lathyrus maritimus (Lathyrus japonicus var. maritimus) and Leymus mollis. These sites are above the high tide line but still experience storm surges. Tidally flooded dune slacks may be colonized by herbaceous communities dominated by Equisetum variegatum, and may eventually succeed to shrub communities with Malus fusca, Alnus rubra, Myrica gale (not common in SE AK) and Salix spp. (not common in SE AK except in riparian areas).

Rich forb types occur on dunes and back beaches even further removed from the ocean. Species composition is variable but may include any of the following: Deschampsia beringensis, Festuca rubra, Potentilla egedii, Castilleja spp., Heracleum maximum, Parnassia palustris, Lupinus nootkatensis, Angelica lucida, A. genuflecta, Carex mackenziei, C. lyngbyei, Hordeum brachyantherum, Poa eminens, Achillea millefolium ssp. borealis, Fragaria chiloensis, Calamagrostis canadensis, Ligusticum scoticum, Claytonia sibirica, and Senecio pseudoarnica.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| HOPE | Honckenya peploides | Seaside sandplant |
| LEMO8 | Leymus mollis | American dunegrass |
| LAJAM | Lathyrus japonicus var. maritimus | Beach pea |
| EQVA | Equisetum variegatum | Variegated scouringrush |
| POEM | Poa eminens | Largeflower speargrass |
| FERU2 | Festuca rubra | Red fescue |
| DESCH | Deschampsia | Hairgrass |
| LUNO | Lupinus nootkatensis | Nootka lupine |
| HEMA80 | Heracleum maximum | Common cowparsnip |

Disturbance Description

Vegetation dynamics in dunes and beach meadows are driven by salinity and sand deposition both of which vary depending on distance from the water (i.e. possibility of inundation). Beach succession is not always unidirectional; shifting sand or beach subsidence may cause less salt tolerant species to die and halophytic herbs to regain dominance.

Dunes perturbations include eroding coastal bluffs and isolated blowouts. Community self-replacement likely occurs. The disturbance processes on the mesic loamy-sandy substrates are unclear.

These communities are relatively stable over time although isostatic rebound may allow spruce communities to eventually occupy what are now meadow sites (in the southern areas of SE Alaska, where the rate of isostatic rebound is much slower, this may not be so obvious).

Fire Frequency

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

Scale Description

Small to large patch, can be linear.

Non-Fire Disturbances

Other 1: storm surge

Adjacency or Identification Concerns

This type is found adjacent to the coastline.

Issues or Problems

The state-and-transition model for this BpS is conceptual. There was no information to support the probabilities in the model.

Native Uncharacteristic Conditions

Recent research has shown that the abundance of graminoids in the Aleutian Islands can be reduced due to a reduction in nutrient inputs from seabird colonies; where seabirds have been impacted by introduced predators, the cover of graminoid species is lower (Croll et al. 2005, Byrd 1984).

Comments

Review Needed:

* Need review of the two successional states defined for this BpS. Do they capture the dynamics of the system? Are the indicator species accurate? Are the disturbance transitions appropriate?

In 2021 NatureServe merged Alaskan Pacific Maritime Coastal Meadow and Slough-Levee (16650) and Aleutian American Dunegrass Grassland (16710) into one system called Alaskan Pacific-Aleutian Coastal Dune, Beach and Beach Meadow. Kori Blankenship merged the BpS concepts into this unified description. BpS 16650 was created by Amy Miller and Karen Dillman and reviewed by Tom DeMeo. BpS 16710 was created by Kori Blankenship and Keith Boggs and reviewed by Jeff Williams. Blankenship also modified the model to include an early successional herbaceous state and a later successional state where shrubs could establish.

Succession Classes

Class A 50 Early Development 1 - All Structures

Structural Information

Upper Layer Lifeform: Herb

Tree Size Class: None

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| LEMO8 | Leymus mollis | American dunegrass | Upper |
| HEMA80 | Heracleum maximum | Common cowparsnip | Upper |
| LAJAM | Lathyrus japonicus var. maritimus | Beach pea | Upper |
| POEM | Poa eminens | Largeflower speargrass | Upper |

Description

Pioneer herbaceous communities establish. Beach meadows that are exposed to the open ocean are more likely to be buried or flooded compared to inland areas due to the proximity to severe weather in outer coast areas. Pioneer species must tolerate heat, salt spray, low nutrients and water. Species composition is variable. Storm surge can deposit sediment and bury existing vegetation.

Class B 50 Late Development 1 - All Structures

Structural Information

Upper Layer Lifeform: Shrub/herb

Tree Size Class: None

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| DESCH | Deschampsia | Hairgrass | Upper |
| EQVA | Equisetum variegatum | Variegated scouringrush | Upper |
| ALRU2 | Alnus rubra | Red alder | Upper |
|  |  |  |  |

Description

Over time pioneer species build up the foredune and less stress-tolerant species can establish on dunes and back beaches further removed from the ocean. Shrubs, including Alnus rubra and Salix spp., may eventually establish. Wind disturbance is common and isolated blowouts occur. Extreme weather or storm surge events might reset succession.

References

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