16443

Alaskan Pacific Sitka Spruce Forest and Beach Ridge - Beach Ridge

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| None | None | None | None |
| None | None | None | None |

Vegetation Type

Forest and Woodland

Map Zones

76, 77, 78

Geographic Range

This system is found along the Alaska Gulf Coast in the following areas: Copper River Delta, Cape Yakataga, Yakutat forelands and the outer coast of Glacier Bay National Park. On the Yakutat foreland the beach ridge formations are found between Dry Bay and Dangerous River (Shephard 1993, Shephard 1995). It also occurs on Kodiak Island.

Biophysical Site Description

This type is found on sub-parallel sandy ridges oriented parallel to the coast that form as a result of longshore transport, riverine processes and tectonic or isostatic uplift following glacial retreat which allows upland species to colonize (Shephard 1995). These processes are still active allowing the formation of new beach ridges and an expansion of the area occupied by the beach ridge community (Shephard 1995). The age of the beach ridges increases with distance from the coast (Shephard 1995). On the Yakutat Foreland this type is found on well drained sandy soils within 10 kilometers of the coast (Shephard 1993). The height of beach ridges varies from 5 meters near the coast to 35 meters further inland (Shephard 1993). Salt spray is a primary factor influencing this community and helps to maintain the dominance of Sitka spruce which seems to be more salt tolerant than other tree species found in the area. Limited species diversity in the surrounding area also contributes to low species diversity in this BpS.

Vegetation Description

Picea sitchensis is usually dominant in the canopy, but Tsuga heterophylla can be codominant especially on older sites (Shephard 1993). Oplopanax horridus is usually the most abundant understory shrub but other common shrubs include Vaccinium ovalifolium, Viburnum edule and Rubus spectabilis. Other species include Circea alpina, Rubus pedatus, Streptopus amplexifolius, Tiarella trifoliata, Athyrium felix-femina, Dryopteris expansa, and Gymnocarpium dryopteris (Shephard 1993). Common moss species include Hylocomium splendens, Rhytidiadelphus loreus and Dicranum spp (Shephard 1993). Mature forests usually have very little downed wood or snags (NatureServe 2008).

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| PISI | Picea sitchensis | Sitka spruce |
| OPHO | Oplopanax horridus | Devilsclub |
| TSHE | Tsuga heterophylla | Western hemlock |
| VIED | Viburnum edule | Squashberry |
| VACCI | Vaccinium | Blueberry |
| ALVIS | Alnus viridis ssp. sinuata | Sitka alder |
| RUSP | Rubus spectabilis | Salmonberry |
| RUPE | Rubus pedatus | Strawberryleaf raspberry |

Disturbance Description

The non-forested beach meadow is likely the early sere of the forested beach ridge community prior to tectonic or isostatic uplift (Shephard 1993), although it is considered a separate BpS for LANDFIRE. Spruce can become established about 130yrs after beach ridges form (Shephard 1993). As the spruce stands age, understory recruitment decreases. Tsuga heterophylla may codominate in the later seral stages (Shephard 1993) and/or this type may succeed to Tsuga heterophylla forest (Shephard 1995 p.36). Succession to Tsuga heterophylla forest is most likely after a wind disturbance and would depend on available seed source. Eventually, peatlands may replace the forested community but that is not considered in this model.

Wind is the primary disturbance in this system. Beach ridges tend to have a distinct edge with younger trees on the outside that tend to make them somewhat resistant to windthrow; however, if the young tree buffer is lost, possibly as a result of flooding, they become susceptible to windthrow. The annual probability of wind disturbance for modeling is unclear. In this model it is set to 0.003 to achieve the approximate class percents that likely occur in a "naturally" functioning system.

Insects and disease play a minor role in beach ridge communities. A reviewer noted that spruce beetle and inadequate nitrogen levels were the cause of disturbance of similar even aged spruce stands in deglaciated areas of Glacier Bay; although these are different substrates, it is conceivable that the same processes could play out between Glacier Bay and these ridges. There is some evidence of fire in this system but it appears to be human-caused, very infrequent and limited in extent.

Fire Frequency

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

Scale Description

Matrix

Non-Fire Disturbances

Wind/Weather/Stress

Adjacency or Identification Concerns

Fen and bog communities can be found in the interspaces between the linear beach ridges (Shephard 1995). Along the coast, the adjacent non-forest vegetation is primarily comprised of a rye-grass dune community and a strawberry-yarrow beach meadow community which forms further inland on higher ground (Shephard 1995).

Issues or Problems

Native Uncharacteristic Conditions

Comments

Review questions:

-In 2021 NatureServe merged Alaskan Pacific Maritime Sitka Spruce Beach Ridge (16540), Alaskan Pacific Maritime Periglacial Woodland and Shrubland (16500), and Alaskan Pacific Maritime Sitka Spruce Forest (16440) to create one revised Ecological System called Alaskan Pacific Sitka Spruce Forest and Beach Ridge. Currently each of the original BpS has its own model and description. Should any or all of these BpS be merged and represented by one or two BpS models and descriptions?

This system was created during LANDFIRE National for the AK Maritime region and did not receive review for other regions in the state. This model was developed by Michael Shephard and is largely based on his work (Shephard 1993) on the Yakutat Ranger District. Review comments resulted in minor additions to the description.

Succession Classes

Class A 30 Early Development 1 - Closed

Structural Information

Upper Layer Lifeform: Tree

Upper Layer Canopy Cover: Closed (60-100% tree cover) - Closed (60-100% tree cover)%

Upper Layer Canopy Height: Dwarf Tree (< 3 m) - Tree (> 3 m)

Tree Size Class: Med. 9–20" (swd)/11–20" (hwd)

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PISI | Picea sitchensis | Sitka spruce | Upper |
| OPHO | Oplopanax horridus | Devilsclub | Lower |

Description

Early, ecotone community between the non-forested beach and the beach ridge-Picea sitchensis/Oplopanax horridus community. Found on beach formations < 130yrs old (Shephard 1993).This ecotonal community is characterized by young, very dense stands of sitka spruce with a moss understory (Shephard 1993).

Class B 30 Mid Development 1 - All Structures

Structural Information

Upper Layer Lifeform: Tree

Upper Layer Canopy Cover: Open (25-59% tree cover) - Closed (60-100% tree cover)%

Upper Layer Canopy Height: Tree (> 3 m) - Tree (> 3 m)

Tree Size Class: Large 20" – 40"

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PISI | Picea sitchensis | Sitka spruce | Upper |
| OPHO | Oplopanax horridus | Devilsclub | Lower |
| VIED | Viburnum edule | Squashberry | Lower |
| VACCI | Vaccinium | Blueberry | Lower |

Description

Young. Picea sitchensis/Oplopanax horridus community. Found on beach ridge formations 130-300yrs old (Shephard 1993). Cover of Viburnum edule and Vaccinium ssp. is typically higher during this stage than later seral stages (Shephard 1993). Common moss species include Hylocomium splendens, Rhytidiadelphus loreus and Dicranum spp (Shephard 1993).

Class C 40 Late Development 1 - All Structures

Structural Information

Upper Layer Lifeform: Tree

Upper Layer Canopy Cover: Open (25-59% tree cover) - Closed (60-100% tree cover)%

Upper Layer Canopy Height: Tree (> 3 m) - Tree (> 3 m)

Tree Size Class: Very Large 40.0"+

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PISI | Picea sitchensis | Sitka spruce | Upper |
| OPHO | Oplopanax horridus | Devilsclub | Lower |
| ALVIS | Alnus viridis ssp. sinuata | Sitka alder | Lower |
| RUSP | Rubus spectabilis | Salmonberry | Lower |

Description

Middle-Aged and Old. This class combines the Middle-Aged and Old stages defined by Shephard (1993) because they could not be distinguished for mapping using LANDFIRE’s methods. Picea sitchensis/Oplopanax horridus community which can range from 300 to well over 500yrs old. With age, the stand tends to become more open. Tsuga heterophylla can eventually be codominant (Shephard 1993). Alnus viridis ssp. sinuata and Rubus spectabilis tend to be more prevelant in the middle and old stages than in the early and young stages (Shephard 1993). Climacium dendroides can be found in addition to those moss species listed in the young stage (Shephard 1993).

References

NatureServe. 2008. International Ecological Classification Standard: Terrestrial Ecological Classifications. Draft Ecological Systems Description for the Alaska Maritime Region.

Shephard, M. E. 1993. Structure and Composition of a Forested Beach Ridge Chronosequence on the Yakutat Foreland, Alaska. Proceedings of the Third Glacier Bay Science Symposium. Dr. Engstrom (ed.), National Park Service, Alaska, 1993. p. 129-136.

Shephard, M.E. 1995. Plant community ecology and classification of the Yakutat Foreland, Alaska. Technical Report R10-TP-56. Juneau, AK: USDA Forest Service, Alaska Region. 206 p.