

10680

North Pacific Dry and Mesic Alpine Dwarf-Shrubland or Fell-Field or Meadow

BpS Model/Description Version: Aug. 2020

Modelers		Reviewers	
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None	None	None	None
None	None	None	None

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Vegetation Type

Shrubland

Map Zones

1, 7

Geographic Range

This system occurs above the environmental limit of trees, at the highest elevations of the mountain regions of the Pacific Northwest Coast.

Biophysical Site Description

This Biophysical Setting (BpS) occupies sites above the environmental limit of trees, bluffs, and cliffs on islands of the Alaska Peninsula or on active talus slopes with little vegetation. It is confined to the coldest, wind-blown areas above tree line. This system is found at elevations above 2,350m (7,200ft) in the Klamath Mountains and Cascades north into the Cascade and Coastal mountains of British Columbia. It occurs on slopes and depressions where the snow lingers, soil has become relatively stabilized, and the water supply is more or less constant. Vegetation in these areas is controlled by snow retention, wind desiccation, permafrost, and a short growing season. These large, late-season snowfields are often found in the upper reaches of large bowls with coarser soils than the surrounding alpine tundra dry meadow.

Fell-fields often intermingle with alpine dwarf-shrubland. These systems are controlled by snow retention, wind desiccation, and permafrost. When vegetation is present (<25% cover), it is typically dwarf (prostrate) shrubs (vascular species) and lichens. The substrate is bedrock or colluvium.

Vegetation Description

This BpS is commonly comprised of a mosaic of plant communities with characteristic species including *Cassiope mertensiana*, *Phyllodoce empetrifomis*, *Luetkea pectinata*, *Saxifraga tolmiei*, *Penstemon rupicola*, and *Vaccinium uliginosum*.

Communities are fell-fields and graminoid- and foliose lichen-dominated. *Dryas octopetala* and high bryophyte and lichen diversity are often found in this system. Grasses such as *Festuca altaica*, *Hierochloe alpina*, and *Carex nardina* are characteristic of grassy tundra.

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
CAME7	<i>Cassiope mertensiana</i>	Western moss heather
PHEM	<i>Phyllodoce empetrifomis</i>	Pink mountainheath
LUPE	<i>Luetkea pectinata</i>	Partridgefoot
SATO2	<i>Saxifraga tolmiei</i>	Tolmie's saxifrage
PERU	<i>Penstemon rupicola</i>	Cliff beardtongue
VAUL	<i>Vaccinium uliginosum</i>	Bog blueberry
DROC	<i>Dryas octopetala</i>	Eightpetal mountain-avens

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

Disturbance Description

Vegetation in these areas is controlled by snow retention, wind desiccation, permafrost, and a short growing season. Dry summers associated with major drought years favor grasses over forbs, whereas wet summers cause a more diverse mixture of forbs and graminoids. Avalanches on steeper slopes where soil accumulated can cause infrequent soil slips, which expose bare ground. Very small burns of a few square meters (replacement fire) caused by lightning strikes were included as a rare disturbance, although lightning storms are frequent at these elevations. Native herbivores (Rocky Mountain bighorn sheep, mule deer, and elk) were common in the alpine but probably did not greatly affect vegetation cover because animals move frequently as they reduce vegetation cover.

This type is rather stable from a vegetation and fuels perspective. Lightning strikes may occur, but do not spread. Any change in the area of this type would be a function of climate change, volcanic eruption, or development (for ski operations, etc.).

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 BpS can occupy large areas of the alpine. Patch size varies from a few acres to 100ac in mountain basins. Stand-replacement fires may be caused by lightning strikes that do not spread due to the sparse cover of fine fuels and extensive barren areas acting as fire breaks.

Adjacency or Identification Concerns

Issues or Problems

There are very few data about this system. The modeler put this model together from literature review of similar models.

Native Uncharacteristic Conditions

Comments

Kathleen Roche reviewed this BpS during the 2016 BpS review.

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	A	A	A	A	A	A	A	A	A	A
Shrub	1.0-3.0	A	A	A	A	A	A	A	A	A	A
Shrub	>3.0	A	A	A	A	A	A	A	A	A	A
Tree	0-5	A	A	A	A	A	UN	UN	UN	UN	UN
Tree	5-10	A	A	A	A	A	UN	UN	UN	UN	UN
Tree	10-25	A	A	A	A	A	UN	UN	UN	UN	UN
Tree	25-50	A	A	A	A	A	UN	UN	UN	UN	UN
Tree	>50	A	A	A	A	A	UN	UN	UN	UN	UN

Succession class letters A-E are described in the Succession Class Description section. Some classes use a leaf form 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 100 Late Development 1 - All Structures

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
SATO2	<i>Saxifraga tolmiei</i>	Tolmie's saxifrage	Upper
PERU	<i>Penstemon rupicola</i>	Cliff beardtongue	Upper
LUPE	<i>Luetkea pectinata</i>	Partridgefoot	Upper

Description

Alpine community is dominated by semi-continuous layer of ericaceous shrubs. Plant cover may vary from 10% on exposed sites to as much as 50% on mesic and more protected sites.

Maximum Tree Size Class

None

Model Parameters

Deterministic Transitions

From Class	Begins at (yr)	Succeeds to	After (years)
Late1:ALL	0	Late1:ALL	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	Late1:ALL	Late1:ALL	0.001	1000	Yes	0
Wind or Weather or Stress	Late1:ALL	Late1:ALL	0.01	100	Yes	0

Optional Disturbances

Optional 1: Avalanche

References

Franklin, J., and C.T. Dyrness. 1988. Natural Vegetation of Oregon and Washington. Corvallis, OR: Oregon State University Press.

NatureServe. 2007. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA. Data current as of 10 February 2007.

Zwinger, Ann H. and Beatrice E. Willard. 1972. Land above the trees: A guide to American Alpine Tundra. New York, NY: Harper and Row. 487 pp.