10380

North Pacific Maritime Mesic Subalpine Parkland

BpS Model/Description Version: Aug. 2020

Update: 6/6/2018

|  |  |  |  |
| --- | --- | --- | --- |
| **Modelers** |  | **Reviewers** |  |
| Robin Lesher | rlesher@fs.fed.us |  |  |
| Jan Henderson | jahenderson@fs.fed.us |  |  |
|  |  |  |  |

Vegetation Type

Forest and Woodland

Map Zones

1, 7

Geographic Range

This system occurs throughout the mountains of the Pacific Northwest, from the southern Cascades of Oregon to the mountains of south-central Alaska. It occurs at the transition zone of forest to alpine, forming a subalpine forest-meadow ecotone.

Biophysical Site Description

This type occurs on the west side of the Cascade Mountains where deep, late-lying snowpack, steepness of slope and temperature are important environmental factors. Communities are typically on ridge crests, shoulders, or upper slopes.

Vegetation Description

Clumps of trees interspersed with low shrublands and meadows characterize this system. Associations include forested and subalpine meadow types. Major tree species are *Tsuga mertensiana, Abies lasiocarpa, A. amabilis,* and Chamaecyparis. Meadows include *Phyllodoce* spp., *Cassiope* spp., *Vaccinium* spp., *Carex* spp., and *Luzula* spp.

Tree establishment happens in waves depending on seed years, weather, climate and snowpack. Hundreds of years can pass to reestablish trees. Snow breakage was significant 500yrs ago, but is reduced now during a different climate. This breakage worked to convert tree islands toward meadows, thus eliminating many tree islands. There is lots of regeneration recently, but past waves of regeneration suggest that survivorship may be pretty limited.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| TSME | *Tsuga mertensiana* | Mountain hemlock |
| ABLA | *Abies lasiocarpa* | Subalpine fir |
| ABAM | *Abies amabilis* | Pacific silver fir |
| CHNO | *Chamaecyparis nootkatensis* | Alaska cedar |

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

Disturbance Description

There is very little disturbance, either windthrow or fire. Regeneration of forest species may be impacted by long-term climate patterns. Snow breakage, and avalanches are the most significant medium-term disturbances. Fire occurs as lightning strikes in tree islands, killing individuals trees or clumps. These patches act as a fire break, suppressing fires from lower elevations. Climate change is the main factor that determines succession patterns and patch reinitiation. Changes in temperature and precipitation patterns affect tree/meadow dynamics.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 5066 | 100 |  |  |
| Moderate (Mixed) |  |  |  |  |
| Low (Surface) |  |  |  |  |
| All Fires | 5066 | 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

Fires in this type can occur in very small patches associated with lightning strikes. Ignitions of this type are probably quite common but typically remain in the 1-10ac size.

Adjacency or Identification Concerns

Above this type are alpine meadows and fell-fields, below could be TSME woodlands.

Issues or Problems

Native Uncharacteristic Conditions

Comments

Map zones 1 and 7 were combined during 2015 biophysical setting (BpS) Review.

Parts of the text were taken from the NatureServe description of the type.

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 | B | B | B | B | B | B | B | B | B | B |
| Tree | 5-10 | B | B | B | B | B | B | B | B | B | B |
| Tree | 10-25 | B | B | B | B | B | B | B | B | B | B |
| Tree | 25-50 | B | B | B | B | B | B | B | B | B | B |
| Tree | >50 | B | B | B | B | B | B | B | B | B | B |

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 94 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PHEM | Phyllodoce empetriformis | Pink mountainheath | Upper |
| CAME7 | Cassiope mertensiana | Western moss heather | Upper |
| VADE | Vaccinium deliciosum | Cascade bilberry | Upper |

Description

These meadows are dominated by resprouting shrubs and herbs. Tree seedlings and saplings can be present at low cover. Species present include: *Phyllodoce empetriformis, Cassiope* *mertensiana, Vaccinium deliciosum, Lupinus latifolius, Valeriana sitkensis, Erigeron perigrinus, Carex* spp., and *Luzula* spp.

*Maximum Tree Size Class*  
None

Class B 6 Late Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| TSME | Tsuga mertensiana | Mountain hemlock | Upper |
| ABLA | Abies lasiocarpa | Subalpine fir | Upper |
| ABAM | Abies amabilis | Pacific silver fir | Upper |
| CHNO | Chamaecyparis nootkatensis | Alaska cedar | Upper |

Description

Hemlock and fir are the most common species in these tree clumps. Patches can occur even up to about one-tenth acre in size. Canopy closure can be quite high. CHNO usually occurs in moister sites. (Alt succession is used to maintain the landscape at about 5% tree clumps, 95% meadow. Changes from this ratio could reflect meadow invasion due to increased seed production, precipitation and temperature.)

*Maximum Tree Size Class*  
Medium 9-21"DBH

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:ALL | 0 | Late1:CLS | 150 |
| Late1:CLS | 151 | 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** |
| Replacement Fire | Early1:ALL | Early1:ALL | 0.0002 | 5000 | Yes | 0 |
| Replacement Fire | Late1:CLS | Early1:ALL | 0.0002 | 5000 | Yes | 0 |
| Alternative Succession | Late1:CLS | Early1:ALL | 0.1 | 10 | Yes | 0 |

References

Agee, James K. 1993. Fire Ecology of Pacific Northwest Forests. Washington, DC: Island Press.

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

Franklin, J.F., W.H. Moir, M.A. Hemstrom, S.E. Greene and B. Smith. 1988. The Forest Communities of Mount Rainier National Park: Scientific Monograph Series #19.

Hemstrom, Miles Arthur. 1979. A recent disturbance history of forest ecosystems at Mount Rainier National Park. PhD dissertation. Corvallis, OR: Oregon State University.

Hemstrom, M.A. and J.F. Franklin. 1982. Fire and other disturbances of the forests in Mount Rainer National Park. Quaternary Research 18: 32-51.

Henderson, Jan A. 1973. Composition, Distribution and Succession of Subalpine Meadows in Mount Rainier National Park, Washington. Unpublished PhD dissertation. Corvallis, OR: Oregon State University.

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