10560

Rocky Mountain Subalpine Mesic-Wet Spruce-Fir Forest and Woodland

BpS Model/Description Version: Aug. 2020

|  |  |  |  |
| --- | --- | --- | --- |
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Vegetation Type

Forest and Woodland

Map Zones

1, 7, 8, 9

Geographic Range

This type occurs in the Blue and Wallowa mountains in northeast Oregon and southeast Washington.

Biophysical Site Description

These sites are characterized by mid elevations to upper timberline (4,200-7,800ft), cold temperatures, on a variety of aspects. Soils tend to be relatively deep (depth >30in) on most parent materials but can be more shallow (depth ~20in) on colluvium and alluvium.

Vegetation Description

Dominated by subalpine fir and Engelmann spruce. Engelmann spruce live longer and are more disease resistant than subalpine fir, but are less tolerant. Engelmann spruce can be climax in some riparian zones. Douglas-fir, lodgepole pine, and western larch are important species in the sere, with Douglas-fir on drier, warmer sites at lower elevations. Understory indicators include false bugbane, *Clintonia*, Labrador tea, *Menziesia*, and twinflower at lower elevations, and big huckleberry.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| ABLA | *Abies lasiocarpa* | Subalpine fir |
| PIEN | *Picea engelmannii* | Engelmann spruce |
| PICO | *Pinus contorta* | Lodgepole pine |
| VAME | *Vaccinium membranaceum* | Thinleaf huckleberry |
| CLUN2 | *Clintonia uniflora* | Bride’s bonnet |
| LIBO3 | *Linnaea borealis* | Twinflower |
| LEGL | *Ledum glandulosum* | Western Labrador-tea |

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

Disturbance Description

Fires tend to be replacement events when they occur; both subalpine fir and Engelmann spruce have little resistance to fire. Root diseases, dwarf mistletoe, and (especially) bark beetles are important disturbance agents.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 121 | 78 |  |  |
| Moderate (Mixed) | 417 | 22 |  |  |
| Low (Surface) |  |  |  |  |
| All Fires | 94 | 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

The Biophysical Setting (BpS) can cover hundreds or thousands of acres, and fires can cover a large area, too, once initiated.

Adjacency or Identification Concerns

This type occurs adjacent to BpS 1047 (moist mixed conifer) at low elevations and BpS 1055 (dry-mesic subalpine fir) on drought-prone sites and windswept high elevations. Subalpine fir also occurs in map zone (MZ) 1 within the Pacific Northwest Region.

Issues or Problems

Local experts should review and correct as necessary. There should be some discussion as to whether the MZ01 and MZ08 models should be the same.

Native Uncharacteristic Conditions

Comments

As a result of LANDFIRE National QC in MZ09, the deterministic transition from D to B was changed to D to D because the original transition caused the ages to NOT line up along the main successional pathway, violating a LANDFIRE modeling rule.

Tom DeMeo assisted with model development. We started model development with the same values as for the Rocky Mountain spruce-fir, but here there is a warmer environment with a shorter replacement fire return interval.

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 | A | A | A | A | A |
| Tree | 5-10 | B | B | B | B | B | B | B | B | B | B |
| Tree | 5-10 | C | C | C | C | C | C | C | C | C | C |
| Tree | 10-25 | D | D | D | D | D | D | D | D | D | D |
| Tree | 10-25 | B | B | B | B | B | B | B | B | B | B |
| Tree | 25-50 | D | D | D | D | D | D | D | D | D | D |
| Tree | 25-50 | E | E | E | E | E | E | E | E | E | E |
| Tree | >50 | E | E | E | E | E | E | E | E | E | E |
| Tree | >50 | D | D | D | D | D | D | D | D | D | D |

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 21 Early Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| CHAN9 | Chamerion angustifolium | Fireweed | Upper |
| SASC | Salix scouleriana | Scouler’s willow | Upper |
| VAME | Vaccinium membranaceum | Thinleaf huckleberry | Upper |
| PICO | Pinus contorta | Lodgepole pine | Upper |

Description

Early succession after stand-replacement fires. Herbaceous species dominate for the first 5-10yrs, followed by co-dominant shrubs and tree saplings. Tree regeneration is dominated by lodgepole pine. Occasionally, a lack of lodgepole seed source allows spruce and fir to dominate from the beginning.

*Maximum Tree Size Class*  
Sapling >4.5ft; <5" DBH

Class B 12 Mid Development 2 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| ABLA | Abies lasiocarpa | Subalpine fir | Upper |
| PIEN | Picea engelmannii | Engelmann spruce | Upper |
| PSME | Pseudotsuga menziesii | Douglas-fir | Upper |
| ABGR | Abies grandis | Grand fir | Upper |

Description

Stands composed of mid-size spruce and fir, 5-15in DBH, with minor lodgepole pine, Douglas-fir, grand fir, and larch. Stand-replacement fires are not unusual, but insect/disease outbreaks are rare. Fires are somewhat less frequent than in lodgepole-dominated stands because of greater ground fuel moisture content. Stands are 30-100yrs old.

*Maximum Tree Size Class*  
Medium 5-15" DBH

Class C 38 Mid Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PICO | Pinus contorta | Lodgepole pine | Upper |
| LIBO3 | Linnaea borealis | Twinflower | Lower |
| VAME | Vaccinium membranaceum | Thinleaf huckleberry | Lower |
| VASC | Vaccinium scoparium | Grouse whortleberry | Lower |

Description

Stands composed of pole-size lodgepole pine (5-9in DBH), with minor amounts of other species, typically suppressed in the understory. Lodgepole pine are still small enough to be less susceptible to bark beetles. Stands are 30-80yrs old.

*Maximum Tree Size Class*  
Pole 5-9" DBH

Class D 23 Late Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PICO | Pinus contorta | Lodgepole pine | Upper |
| LIBO3 | Linnaea borealis | Twinflower | Lower |
| VAME | Vaccinium membranaceum | Thinleaf huckleberry | Lower |
| VASC | Vaccinium scoparium | Grouse whortleberry | Lower |

Description

Stands composed of medium-size lodgepole pine (9-20in DBH), with subalpine fir and Engelmann spruce typically present in the understory. Pine are highly susceptible to outbreaks of mountain pine beetles. Stands between about 80-160yrs.

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

Class E 6 Late Development 2 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| ABLA | Abies lasiocarpa | Subalpine fir | None |
| PIEN | Picea engelmannii | Engelmann spruce | None |
| CLUN2 | Clintonia uniflora | Bride’s bonnet | None |
| VAME | Vaccinium membranaceum | Thinleaf huckleberry | None |

Description

Large subalpine fir and Engelmann spruce (>15in DBH), with minor amounts of other conifers. These stands are susceptible to spruce beetle and roots diseases (*Phellinus*, *Armillaria*). These stands are also susceptible to windthrow. Fires are somewhat less frequent than in lodgepole-dominated stands because of greater ground fuel moisture content.

*Maximum Tree Size Class*  
Very Large >33" DBH

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:OPN | 0 | Mid1:ALL | 29 |
| Mid1:ALL | 30 | Late1:ALL | 79 |
| Mid2:ALL | 30 | Late2:ALL | 99 |
| Late1:ALL | 80 | Late1:ALL | 159 |
| Late2:ALL | 100 | Late2: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** |
| Alternative Succession | Early1:OPN | Mid2:ALL | 0.007 | 143 | Yes | 0 |
| Replacement Fire | Early1:OPN | Early1:OPN | 0.007 | 143 | Yes | 0 |
| Mixed Fire | Mid1:ALL | Mid1:ALL | 0.005 | 200 | No | 0 |
| Replacement Fire | Mid1:ALL | Early1:OPN | 0.01 | 100 | Yes | 0 |
| Replacement Fire | Mid2:ALL | Early1:OPN | 0.007 | 143 | Yes | 0 |
| Mixed Fire | Late1:ALL | Late1:ALL | 0.002 | 500 | No | 0 |
| Wind or Weather or Stress | Late1:ALL | Mid1:ALL | 0.004 | 250 | Yes | 0 |
| Replacement Fire | Late1:ALL | Early1:OPN | 0.0085 | 118 | Yes | 0 |
| Insects or Disease | Late1:ALL | Mid1:ALL | 0.013 | 77 | Yes | 0 |
| Insects or Disease | Late2:ALL | Mid1:ALL | 0.004 | 250 | Yes | 0 |
| Replacement Fire | Late2:ALL | Early1:OPN | 0.005 | 200 | Yes | 0 |
| Wind or Weather or Stress | Late2:ALL | Mid2:ALL | 0.007 | 143 | Yes | 0 |
| Insects or Disease | Late2:ALL | Mid2:ALL | 0.007 | 143 | Yes | 0 |

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