10520

Southern Rocky Mountain Mesic Montane Mixed Conifer Forest and Woodland

BpS Model/Description Version: Aug. 2020

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

Forest and Woodland

Map Zones

16, 23, 24

Geographic Range

Rocky Mountains west into the ranges of the Great Basin.

Biophysical Site Description

Elevations range from 1,200-3,300m. Sites are dry/steep montane with a variety of aspects (often northerly) and soil conditions. Occurrences of this system are found on cooler and more mesic sites than Rocky Mountain Montane Dry-Mesic Mixed Conifer Forest and Woodland (1051). Mesic sites where it may be found include lower and middle slopes of ravines; stream terraces; moist, concave topographic positions; and north- and east-facing slopes, which burn somewhat infrequently.

Vegetation Description

*Pseudotsuga menziesii* and *Abies concolor* are most common canopy dominants, but *Picea engelmannii*, *Picea pungens*, or *Pinus ponderosa* may be present. This system includes mixed-conifer/*Populus tremuloides* stands. A number of cold-deciduous shrub species can occur, including *Acer glabrum*, *Acer grandidentatum*, *Alnus incana*, *Betula occidentalis*, *Cornus sericea*, *Jamesia americana*, *Physocarpus malvaceus*, *Robinia neomexicana*, *Vaccinium membranaceum*, and *Vaccinium myrtillus*. Herbaceous species include *Bromus ciliatus*, *Carex geyeri*, *Carex rossii*, *Carex siccata*, *Muhlenbergia virescens*, *Pseudoroegneria spicata*, *Erigeron eximius*, *Fragaria virginiana*, *Luzula parviflora*, *Osmorhiza berteroi*, *Packera cardamine*, *Thalictrum occidentale*, and *Thalictrum fendleri*.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| PSEUD7 | *Pseudotsuga* | Douglas-fir |
| PICO | *Pinus contorta* | Lodgepole pine |

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

Disturbance Description

Naturally occurring fires are of variable return intervals and are mostly light, erratic, and infrequent due to the cool, moist conditions. These ecological systems are characterized by a moderate-frequency, low- and mixed-severity fire regime. Some portions of these sites are transition zones to fire regimes characterized by more frequent fires or less frequent, higher severity fires. This vegetation is a transition between the frequent surface and mixed-severity fires and the more-stand replacement regimes common in high-elevation fir and spruce ecosystems.

Surface fire and mixed-severity fire intervals were ~30-50yrs (Brown et al. 1994). Stand-replacement fires occurred at intervals of 120-400yrs+ (Crane 1986; Barrett 1988; Bradley 1992a and 1992b; Brown et al. 1994; Morgan et al. 1996). Likelihood of stand-replacement fires increased with canopy closure and fuel ladders caused by white fir growth; however, ground fires acted as replacement fires during early stand development.

Other disturbances included insect, disease, drought, and wind and ice damage. Fire was by far the dominant disturbance agent.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 178 | 18 | 120 | 400 |
| Moderate (Mixed) | 88 | 37 |  |  |
| Low (Surface) | 74 | 45 |  |  |
| All Fires | 33 | 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

This Biophysical Setting (BpS) occurs in patches ranging from 100s to 1,000s of acres.

Adjacency or Identification Concerns

Occurrences of this system are found on cooler and more mesic sites than Rocky Mountain Montane Dry-Mesic Mixed Conifer Forest and Woodland (1051).

This ecological system is often transitional between high-frequency, low- and moderate-severity fire regimes and low-frequency, high-severity fire regimes at higher elevations. It may grade into Rocky Mountain Dry-Mesic Mixed Conifer Forest and Woodland (1051), Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland (1055), Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland (1056), and Rocky Mountain Lodgepole Pine Forest (1050).

Issues or Problems

During LANDFIRE National, an anonymous reviewer had concerns with mixed-severity fire in Class A. Others would have expected higher percentages in mid and late closed classes but still works.

Native Uncharacteristic Conditions

Comments

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

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 16 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PSEUD7 | Pseudotsuga | Douglas-fir | Upper |
| ABCO | Abies concolor | White fir | Upper |

Description

Tree seedling and/or shrub, grass, or forbs.

*Maximum Tree Size Class*  
Seedling <4.5ft

Class B 28 Mid Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PSEUD7 | Pseudotsuga | Douglas-fir | Upper |
| ABCO | Abies concolor | White fir | Upper |

Description

Closed trees, sapling, large poles, grass, and scattered shrub, 75-100% Douglas-fir/white fir, some lodgepole pine and spruces at higher elevations.

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

Class C 28 Mid Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PSEUD7 | Pseudotsuga | Douglas-fir | Upper |
| ABCO | Abies concolor | White fir | Upper |

Description

Open pole-sapling/grass and scattered shrubs; maybe 90% Douglas-fir.

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

Class D 17 Late Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PSEUD7 | Pseudotsuga | Douglas-fir | Upper |
| ABCO | Abies concolor | White fir | Upper |
| ABLA | Abies lasiocarpa | Subalpine fir | Mid-Upper |

Description

Open large tree/grass and scattered shrubs; potentially 90% Douglas-fir.

*Maximum Tree Size Class*  
Large 21-33" DBH

Class E 11 Late Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PSEUD7 | Pseudotsuga | Douglas-fir | Upper |
| ABCO | Abies concolor | White fir | Upper |
| ABLA | Abies lasiocarpa | Subalpine fir | Upper |

Description

Closed medium to large trees, scattered shrubs; 60-100% Douglas-fir.

*Maximum Tree Size Class*  
Large 21-33" DBH

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:ALL | 0 | Mid1:CLS | 29 |
| Mid1:CLS | 30 | Late1:CLS | 99 |
| Mid1:OPN | 31 | Late1:OPN | 99 |
| Late1:OPN | 100 | Late1:OPN | 999 |
| Late1:CLS | 100 | 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** |
| Wind or Weather or Stress | Early1:ALL | Early1:ALL | 0.007 | 143 | Yes | 0 |
| Replacement Fire | Early1:ALL | Early1:ALL | 0.008 | 125 | Yes | 0 |
| Mixed Fire | Early1:ALL | Early1:ALL | 0.02 | 50 | No | 0 |
| Alternative Succession | Mid1:OPN | Mid1:CLS | 1 | 1 | Yes | 35 |
| Wind or Weather or Stress | Mid1:OPN | Mid1:OPN | 0.001 | 1000 | No | 0 |
| Replacement Fire | Mid1:OPN | Early1:ALL | 0.0025 | 400 | Yes | 0 |
| Insects or Disease | Mid1:OPN | Mid1:OPN | 0.01 | 100 | No | 0 |
| Surface Fire | Mid1:OPN | Mid1:OPN | 0.025 | 40 | No | 0 |
| Wind or Weather or Stress | Mid1:CLS | Mid1:OPN | 0.005 | 200 | Yes | 0 |
| Replacement Fire | Mid1:CLS | Early1:ALL | 0.008 | 125 | Yes | 0 |
| Insects or Disease | Mid1:CLS | Mid1:CLS | 0.02 | 50 | No | 0 |
| Mixed Fire | Mid1:CLS | Mid1:OPN | 0.021 | 48 | Yes | 0 |
| Alternative Succession | Late1:OPN | Late1:CLS | 1 | 1 | Yes | 35 |
| Wind or Weather or Stress | Late1:OPN | Late1:OPN | 0.001 | 1000 | No | 0 |
| Replacement Fire | Late1:OPN | Early1:ALL | 0.0025 | 400 | Yes | 0 |
| Insects or Disease | Late1:OPN | Late1:OPN | 0.01 | 100 | No | 0 |
| Surface Fire | Late1:OPN | Late1:OPN | 0.025 | 40 | No | 0 |
| Wind or Weather or Stress | Late1:CLS | Late1:OPN | 0.005 | 200 | Yes | 0 |
| Insects or Disease | Late1:CLS | Mid1:OPN | 0.008 | 125 | Yes | 0 |
| Replacement Fire | Late1:CLS | Early1:ALL | 0.008 | 125 | Yes | 0 |
| Insects or Disease | Late1:CLS | Late1:OPN | 0.012 | 83 | Yes | 0 |
| Mixed Fire | Late1:CLS | Late1:OPN | 0.021 | 48 | Yes | 0 |
| Surface Fire | Late1:CLS | Late1:CLS | 0.021 | 48 | No | 0 |

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