10510

Southern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest and Woodland

BpS Model/Description Version: Aug. 202003/02/05

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Vegetation Type

Forest and Woodland

Map Zones

15, 16, 17, 22, 23, 24, 25

Geographic Range

Occurs throughout the southern Rockies, north and west into Utah, Nevada, western Wyoming, and Idaho.

Biophysical Site Description

This type is generally located just above sagebrush ecosystems and adjacent to ponderosa pine woodlands. These are mixed-conifer forests occurring on all aspects at elevations ranging from 1,200-3,300m. Rainfall averages <75cm per year (40-60cm) with summer "monsoons" during the growing season contributing substantial moisture. The composition and structure of overstory is dependent upon the temperature and moisture relationships of the site and the succession status of the occurrence.

Vegetation Description

*Pseudotsuga menziesii* and *Abies concolor* are most frequent, but *Pinus ponderosa* may be present to co-dominant. *Pinus flexilis* is common in Nevada. *Pseudotsuga menziesii* forests occupy drier sites, and *Pinus ponderosa* is a common co-dominant. *Abies concolor*-dominated forests occupy cooler sites, such as upper slopes at higher elevations, canyon side slopes, ridge tops, and north- and east-facing slopes, which burn somewhat infrequently. *Picea pungens* is most often found in cool, moist locations, often occurring as smaller patches within a matrix of other associations. As many as seven conifers can be found growing in the same occurrence, and there are a number of cold-deciduous shrub and graminoid species common, including *Arctostaphylos uva-ursi*, *Mahonia repens*, *Paxistima myrsinites*, *Symphoricarpos oreophilus*, *Jamesia americana*, *Quercus gambelii*, and *Festuca arizonica*.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| PSEUD7 | *Pseudotsuga* | Douglas-fir |
| ABCO | *Abies concolor* | White fir |
| PIPO | *Pinus ponderosa* | Ponderosa pine |
| PICO | *Pinus contorta* | Lodgepole pine |
| CARU | *Calamagrostis rubescens* | Pinegrass |
| CAGA3 | *Carex garberi* | Elk sedge |

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

Disturbance Description

Areas dominated by Douglas-fir have a fire regime dominated by frequent low- and mixed-severity fires. Some portions of these sites are transition zones to fire regimes that are characterized by high-frequency, high-severity fires or moderate-frequency, low- and mixed-severity fires. Frequent surface and mixed-severity fires were the common fire regime characteristics. Surface fire intervals ranged from 10-50yrs, and replacement severity occurred at intervals of 150-400yrs+ (Crane 1986; Barrett 1988; Bradley 1992a and 1992b; Brown 1994; Morgan et al. 1996). Mixed-severity fires were assumed to have an intermediate fire return interval of 45-75yrs on average. Stand-replacement fires were generally restricted to the closed canopy forest and the stand initiation conditions.

The high-frequency, low- and mixed-severity fire regime characteristics are facilitated by understory vegetation dominated by fine fuel (grasses, sedges, and forbs), landscape position, and adjacency to other frequent fire Biophysical Settings (BpSs). Much of the forest structure was open canopy overstory that resulted in an understory dominated by healthy and vigorous plants (grasses, sedges, and forbs) and generally continuous fine fuel layer. This fine fuel facilitated fire spread and thinning of the conifer or aspen seedlings (thus promoting aspen suckering).

Other disturbances included insects and disease and drought, wind, and ice damage. Competition among trees was also a factor that increasingly slowed succession dynamics in more closed stands. Fire was by far the dominant disturbance agent.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 89 | 12 |  |  |
| Moderate (Mixed) | 76 | 14 |  |  |
| Low (Surface) | 14 | 74 | 10 | 50 |
| All Fires | 11 | 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 BpS occurs in patches ranging from 1,000s-10,000s of acres.

Adjacency or Identification Concerns

Aspen patches occurred at smaller scales than in more mesic mixed-conifer forests. These more mesic sites would have had grass understories that did not cure as early in the year as surrounding areas, especially under a closed forest canopy, and these mesic areas often experience quicker humidity recovery in the evenings. These circumstances tended to lessen the fire severity in the aspen stands, which acted as fire-safe sites compared to the surrounding landscape. This was important because aspen is much less resistant to fire than Douglas-fir. Greater suckering would occur at the edges of aspen patches.

If aspen is present in large patches or if conifers are not coming in after ~30yrs, the BpS is probably misclassified, and one of the pure aspen types should be examined (Rocky Mountain Aspen Forest and Woodland [1011] or Intermountain Basins Aspen-Mixed Conifer Forest and Woodland [1061]).

BpS is often transitional between non-forested areas or between *Pinus ponderosa* (at lower elevations) and spruce-fir at higher elevations. It may, thus, grade into Southern Rocky Mountain Ponderosa Pine Woodland (1054) at lower elevations and Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland (1055).

Issues or Problems

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 | D | D | D | D | E | E | E | E | E | E |
| 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 22 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| CARU | Calamagrostis rubescens | Pinegrass | Low-Mid |
| CAGA3 | Carex garberi | Elk sedge | Low-Mid |
| PSEUD7 | Pseudotsuga | Douglas-fir | Upper |
| PIPO | Pinus ponderosa | Ponderosa pine | Upper |

Description

Grass/forb/shrub/tree seedlings.

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

Class B 7 Mid Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PSEUD7 | Pseudotsuga | Douglas-fir | Upper |
| ABCO | Abies concolor | White fir | Upper |
| PIPO | Pinus ponderosa | Ponderosa pine | Upper |
| PICO | Pinus contorta | Lodgepole pine | Upper |

Description

Closed stand with trees, poles, saplings, grass, and scattered shrub, 75-100% Douglas-fir and/or white fir.

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

Class C 12 Mid Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PSEUD7 | Pseudotsuga | Douglas-fir | Upper |
| PIPO | Pinus ponderosa | Ponderosa pine | Upper |

Description

Open trees (poles and saplings) of Douglas-fir and occasional ponderosa pine with grass and scattered shrubs.

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

Class D 58 Late Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PSEUD7 | Pseudotsuga | Douglas-fir | Upper |
| PIPO | Pinus ponderosa | Ponderosa pine | Upper |

Description

Open large tree/grass and scattered shrubs; Douglas-fir with occasional ponderosa pine.

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

Class E 1 Late Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PSEUD7 | Pseudotsuga | Douglas-fir | Upper |
| ABCO | Abies concolor | White fir | Upper |
| PICO | Pinus contorta | Lodgepole pine | Upper |
| PIPO | Pinus ponderosa | Ponderosa pine | Middle |

Description

Closed large trees of Douglas-fir, white fir, and occasional lodgepole pine and scattered shrubs.

*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 | 34 |
| Mid1:OPN | 35 | Late1:OPN | 104 |
| Mid1:CLS | 35 | Late1:CLS | 104 |
| Late1:OPN | 105 | Late1:OPN | 999 |
| Late1:CLS | 105 | 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** |
| Mixed Fire | Early1:ALL | Early1:ALL | 0.01 | 100 | No | 0 |
| Replacement Fire | Early1:ALL | Early1:ALL | 0.04 | 25 | Yes | 0 |
| Alternative Succession | Mid1:OPN | Late1:CLS | 1 | 1 | Yes | 68 |
| Wind or Weather or Stress | Mid1:OPN | Early1:ALL | 0.001 | 1000 | Yes | 0 |
| Replacement Fire | Mid1:OPN | Early1:ALL | 0.0025 | 400 | Yes | 0 |
| Competition or Maintenance | Mid1:OPN | Mid1:OPN | 0.005 | 200 | No | 0 |
| Insects or Disease | Mid1:OPN | Mid1:OPN | 0.01 | 100 | No | 0 |
| Mixed Fire | Mid1:OPN | Mid1:OPN | 0.013 | 77 | No | 0 |
| Surface Fire | Mid1:OPN | Mid1:OPN | 0.1 | 10 | No | 0 |
| Wind or Weather or Stress | Mid1:CLS | Early1:ALL | 0.004 | 250 | Yes | 0 |
| Replacement Fire | Mid1:CLS | Early1:ALL | 0.007 | 143 | Yes | 0 |
| Insects or Disease | Mid1:CLS | Mid1:OPN | 0.01 | 100 | Yes | 0 |
| Competition or Maintenance | Mid1:CLS | Mid1:CLS | 0.01 | 100 | No | 0 |
| Mixed Fire | Mid1:CLS | Mid1:OPN | 0.0222 | 45 | Yes | 0 |
| Alternative Succession | Late1:OPN | Late1:CLS | 1 | 1 | Yes | 70 |
| Competition or Maintenance | Late1:OPN | Late1:OPN | 0.001 | 1000 | No | 0 |
| Wind or Weather or Stress | Late1:OPN | Early1:ALL | 0.001 | 1000 | Yes | 0 |
| Replacement Fire | Late1:OPN | Early1:ALL | 0.002 | 500 | Yes | 0 |
| Insects or Disease | Late1:OPN | Late1:OPN | 0.01 | 100 | No | 0 |
| Mixed Fire | Late1:OPN | Late1:OPN | 0.013 | 77 | No | 0 |
| Surface Fire | Late1:OPN | Late1:OPN | 0.1 | 10 | No | 0 |
| Wind or Weather or Stress | Late1:CLS | Early1:ALL | 0.004 | 250 | Yes | 0 |
| Replacement Fire | Late1:CLS | Early1:ALL | 0.007 | 143 | Yes | 0 |
| Insects or Disease | Late1:CLS | Late1:OPN | 0.01 | 100 | Yes | 0 |
| Competition or Maintenance | Late1:CLS | Late1:CLS | 0.01 | 100 | No | 0 |
| Surface Fire | Late1:CLS | Late1:CLS | 0.02 | 50 | No | 0 |
| Mixed Fire | Late1:CLS | Late1:OPN | 0.0222 | 45 | Yes | 0 |

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