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 Zone

28

Geographic Range

Generally found in Arizona, New Mexico, and southwestern Colorado. This is a transition forest that occurs between the warm/dry mixed conifer and subalpine forest.

Biophysical Site Description

This Biophsyical Setting (BpS) distribution is strongly driven by moisture gradients such as aspect and elevation. It is found on all aspects and slopes and a wide elevational band bounded by warm/dry mixed conifer at the low end and the subalpine forest on the upper end. In southwestern Colorado, cool/moist mixed conifer can be found from 2,125-3,180m (7,000-10,500ft). Soils are generally of sandstone and shale. The same moisture gradients will influence the cool/moist mixed conifer's distribution elsewhere, and it can be found in much lower and much higher elevations than those described here.

Vegetation Description

The mixed conifer is a transitional forest and therefore best thought of as a continuum that follows a moisture gradient driven by elevation and aspect. The cool, moist mixed conifer will have much less ponderosa pine than the warm/dry. However, ponderosa pine is found in small groups or isolated places usually in open areas, edges of meadows, and ridges. Ponderosa pine and Douglas-fir are often canopy dominants with a heavy white fir understory in the southern part of the BpS. The major tree species found in the cool/moist are Douglas-fir, ponderosa pine, blue spruce, and aspen. Other tree species encountered are Rocky Mountain juniper and southwestern white pine. Near riparian areas, wetlands, and drainages, blue spruce can be quite common. These stands are predominantly composed of white fir, aspen, and Douglas-fir.

Major understory species at the lower elevational range include Gambel oak, *Arcotstaphylos uva-ursi*, *Chimaphila umbellatum*, *Delphinium nelsoni*, *Mertensia* spp,, *Carex gyeri*, etc. Upper-elevation understory species vary by region.

ABCO is not found north of Colorado Springs. PICO is rare in southern Colorado.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| ABCO | *Abies concolor* | White fir |
| POTR | *Poa tracyi* | Tracy's bluegrass |
| PSME | *Pseudotsuga menziesii* | Douglas-fir |
| PIPO | *Pinus ponderosa* | Ponderosa pine |
| PIFL2 | *Pinus flexilis* | Limber pine |
| PIEN | *Picea engelmannii* | Engelmann spruce |
| PICO | *Pinus contorta* | Lodgepole pine |
| ABLA | *Abies lasiocarpa* | Subalpine fir |

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

Disturbance Description

Fire is the primary disturbance, although insects can also play a major role. Fire frequencies are very variable and the cool/moist supports a mixed fire regime. Mixed-severity fires occurred every 6-60yrs. Lethal fires are usually at longer intervals, 100yrs+.

Insect and disease can act as thinning agents to larger-scale mortality agent but was not modeled.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 200 | 27 | 80 | 200 |
| Moderate (Mixed) | 143 | 37 | 35 | 250 |
| Low (Surface) | 151 | 36 | 10 | 200 |
| All Fires | 54 | 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

Large patch, 50-2,000ha.

Adjacency or Identification Concerns

Issues or Problems

Could not model the aspen and mixed conifer succession in one model because of box limitations.

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 8 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| POTR5 | Populus tremuloides | Quaking aspen | All |
| ABCO | Abies concolor | White fir | All |
| PSME | Pseudotsuga menziesii | Douglas-fir | All |
| SYOR2 | Symphoricarpos oreophilus | Mountain snowberry | All |

Description

Post-lethal fire vegetation will depend on what was on site before it burned. Aspen may or may not be present, depending on what was present prior to the fire or other replacement disturbance. The site will start as grass/forb/shrub; aspen may also be present. Fire will maintain or prolong this stage. Conifers may be present. Any surviving conifers will be seed source. This class may look like a pure aspen stand from above.

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

Class B 38 Mid Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| POTR5 | Populus tremuloides | Quaking aspen | Upper |
| PSME | Pseudotsuga menziesii | Douglas-fir | Mid-Upper |
| ABCO | Abies concolor | White fir | Mid-Upper |
| JUCO | Juncus compressus | Roundfruit rush | Lower |

Description

If present, aspen will be >10ft tall and very dense. Seedling/medium-sized conifers can be found mixed with aspen, if present. Understory may include mountain snowberry, common juniper, wild rose, and many species of grasses and forbs.

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

Class C 25 Mid Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PSME | Pseudotsuga menziesii | Douglas-fir | Upper |
| PIEN | Picea engelmannii | Engelmann spruce | Upper |
| ABCO | Abies concolor | White fir | Upper |

Description

If present, aspen will be >10ft tall and patchy. Seedling/medium-sized conifers can be found mixed with aspen, if present. Understory may include mountain snowberry, common juniper, wild rose, and many species of grasses and forbs. Canopy cover is low.

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

Class D 14 Late Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PSME | Pseudotsuga menziesii | Douglas-fir | Upper |
| PIEN | Picea engelmannii | Engelmann spruce | Upper |
| ABCO | Abies concolor | White fir | Upper |

Description

Aspen will be rare and mid-level. Understory will be sparse.

*Maximum Tree Size Class*  
None

Class E 15 Late Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PSME | Pseudotsuga menziesii | Douglas-fir | Upper |
| PIEN | Picea engelmannii | Engelmann spruce | Upper |
| ABCO | Abies concolor | White fir | Upper |

Description

Dense conifer stand. Blue spruce and subalpine fir can come in. Aspen present in small amounts. Lots of dead and downed material. Understory possibly depauperate.

*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:OPN | 39 |
| Mid1:OPN | 40 | Late1:OPN | 149 |
| Mid1:CLS | 40 | Late1:CLS | 149 |
| Late1:OPN | 150 | Late1:CLS | 189 |
| Late1:CLS | 150 | 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** |
| Alternative Succession | Early1:ALL | Mid1:CLS | 1 | 1 | Yes | 20 |
| Replacement Fire | Early1:ALL | Early1:ALL | 0.005 | 200 | Yes | 0 |
| Surface Fire | Early1:ALL | Mid1:OPN | 0.02 | 50 | Yes | 0 |
| Alternative Succession | Mid1:OPN | Mid1:CLS | 1 | 1 | Yes | 40 |
| Replacement Fire | Mid1:OPN | Early1:ALL | 0.005 | 200 | Yes | 0 |
| Surface Fire | Mid1:OPN | Mid1:OPN | 0.013 | 77 | No | 0 |
| Replacement Fire | Mid1:CLS | Early1:ALL | 0.005 | 200 | Yes | 0 |
| Mixed Fire | Mid1:CLS | Mid1:OPN | 0.01 | 100 | Yes | 0 |
| Competition or Maintenance | Mid1:CLS | Mid1:CLS | 0.012 | 83 | No | 0 |
| Replacement Fire | Late1:OPN | Early1:ALL | 0.005 | 200 | Yes | 0 |
| Surface Fire | Late1:OPN | Late1:OPN | 0.013 | 77 | Yes | 0 |
| Replacement Fire | Late1:CLS | Early1:ALL | 0.005 | 200 | Yes | 0 |
| Mixed Fire | Late1:CLS | Late1:OPN | 0.02 | 50 | Yes | 0 |

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