11450

Rocky Mountain Subalpine-Montane Mesic Meadow

BpS Model/Description Version: Aug. 2020

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

Herbaceous

Map Zones

9, 10, 19

Geographic Range

Found in the Rocky Mountains. Restricted to the sub-alpine zone; typically above 3,000m in the southern part and 1,500m in the north. This type can occur in sub-alpine regions in the Blue and Wallowa mountains of Oregon and Washington.

Biophysical Site Description

Fine-texture soils. Snow deposition; wind-swept, dry conditions limit tree establishment. On gentle to moderate-gradient slopes. Soils seasonally moist in spring, drying out later in the growing season.

Vegetation Description

Vegetation is typically forb-rich, with forbs contributing more to overall herbaceous cover than graminoids. Important taxa include *Agastache urticifolia*, *Chamerion angustifolium*, *Erigeron* spp., *Senecio* spp., *Helianthella* spp., *Mertensia* spp., *Penstemon* spp., *Campanula* spp., *Hackelia* spp., *Lupinus* spp., *Solidago* spp., *Ligusticum* spp., *Osmorhiza* spp., *Thalictrum* spp., *Valeriana* spp., *Veratrum* spp., *Delphinium* spp., *Aconitum* spp., *Balsamorhiza sagitatta*, and *Wyethia* spp. Burrowing mammals can increase forb density.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| ERIGE2 | *Erigeron* | Fleabane |
| MERTE | *Mertensia* | Bluebells |
| PENST | *Penstemon* | Beardtongue |
| CAMPA | *Campanula* | Bellflower |
| LUPIN | *Lupinus* | Lupine |
| SOLID | *Solidago* | Goldenrod |
| DECA18 | *Deschampsia caespitosa* | Tufted hairgrass |
| KOELE | *Koeleria* | Junegrass |

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

Disturbance Description

Fires are primarily replacement. Mixed-severity fire occurs in late-development meadows and removes shrubs. The ignition source is generally not in this type and is probably associated with Native American ignitions in the fall and spring, but spreads from adjacent shrub- or tree-dominated sites, such as mountain big sagebrush, ponderosa pine, and aspen.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 40 | 80 |  |  |
| Moderate (Mixed) | 161 | 20 |  |  |
| Low (Surface) |  |  |  |  |
| All Fires | 32 | 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

Ranges in size from >10-300ac.

Adjacency or Identification Concerns

This Biophysical Setting (BpS) could be confused with low forb/alpine shrub communities. Often adjacent to aspen/tall forb communities, mountain or big sagebrush/tall forb communities, and upper montane/sub-alpine spruce-fir communities. In degraded sites, this community may convert to silver sagebrush/tall forb.

Issues or Problems

With heavy grazing, these sites can convert to undesirable forbs and grasses such as *Circium* spp. (thistle, any species), *Galium* spp. (bedstraw), *Rudbeckia occidentalis* (coneflower), *Helenium hoopesii* (orange sneezeweed), *Polygonum* spp. (knotweed), *Rumex* spp. (sorrel or dock), *Taraxacom officinale* (dandelion), *Wyethia amplexicaulis* (mule ears), *Madia glomerata* (mountain tarweed), *Descurainia* spp. (tansymustard), *Nemophila brevifolia* (basin blue eyes), *Poa pratensis* (Kentucky bluegrass), *Agrostis exarata* (bentgrass), *Dactylis glomerata* (orchardgrass), *Bromus inermis* (smooth brome), *Bromus tectorum* (cheatgrass), *Poa bulbosa* (bulbous bluegrass), and *Vulpia octoflora* (six-week fescue). Roads and trails can impact these sites.

There is not much information about this type. We estimated the fire frequency of 40yrs based on adjacent aspen and herbaceous and sagebrush communities. Also, because fire was assumed to occur in the fall and spring, when the summer’s green and wet biomass was dead and cured, replacement fire had little effect on annual tall forbs themselves. Fires would affect encroaching shrubs.

Native Uncharacteristic Conditions

Comments

Kori Blankenship reviewed the use of mixed-severity fire in this model during the 2017 BpS review to determine whether its use was consistent with LANDFIRE’s definition of the term. LANDFIRE defines a fire that top-kills 25-75% of the upper layer lifeform as mixed severity. In this model, mixed fire is used to transition from Late 1 Open to Mid 1 Open. Although fire would probably kill or top-kill the shrubs in this BpS (according to Fire Effects Information System species reviews), comments about map zone (MZ) 13 and MZ16 note that fires probably burned in the fall and spring, when the dominant forbs were dead and cured, and therefore not affected by fire. The MZ09/10/19 model variant also mentions the possible presence of trees in the Late 1 Open class. In these circumstances, mixed fire seemed to be appropriate, and Blankenship decided to leave the model unchanged.

MZ09, MZ10, and MZ19 were combined during the BpS review. During the review, it was noted that MZ22 and MZ28 have the same VDDT model as the combined zones, but due to species and s-class rule differences, MZ22 and MZ28 will be combined and maintained as a unique model.

The model was reviewed for MZ10 and MZ19 by Mary Manning (mmanning@fs.fed.us).

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 | B | B | B | B | B | B | B | B | B | B |
| Herb | >1.0 | B | B | B | B | B | B | B | B | B | B |
| Shrub | 0-0.5 | C | C | C | C | C | C | C | C | C | C |
| Shrub | 0.5-1.0 | C | C | C | C | C | C | C | C | C | C |
| Shrub | 1.0-3.0 | C | C | C | C | C | C | C | C | C | C |
| Shrub | >3.0 | C | C | C | C | C | C | C | C | C | C |
| Tree | 0-5 | C | C | C | C | C | UN | UN | UN | UN | UN |
| Tree | 5-10 | C | C | C | C | C | UN | UN | UN | UN | UN |
| Tree | 10-25 | C | C | C | C | C | UN | UN | UN | UN | UN |
| Tree | 25-50 | C | C | C | C | C | UN | UN | UN | UN | UN |
| Tree | >50 | C | C | C | C | C | UN | UN | UN | UN | UN |

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 5 Early Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| ERIGE2 | Erigeron | Fleabane | Upper |
| LUPIN | Lupinus | Lupine | Upper |
| DECA18 | Deschampsia caespitosa | Tufted hairgrass | Upper |

Description

Vegetation is typically forb-rich, with forbs contributing more to overall herbaceous cover than graminoids. Replacement fire presumably occurred during the fall and spring, therefore removing dead biomass completely. But, in these early-development meadows, fire would not cause an ecological setback (i.e., relative age = 0), because fire would simply remove dead annual forbs.

*Maximum Tree Size Class*  
None

Class B 47 Mid Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| ERIGE2 | Erigeron | Fleabane | Upper |
| LUPIN | Lupinus | Lupine | Upper |
| DECA | Delphinium californicum | California larkspur | Upper |

Description

Vegetation is typically forb-rich, with forbs contributing more to overall herbaceous cover than graminoids. Some increase in shrub component, with young shrubs providing <5% cover. Replacement fire removes shrubs.

*Maximum Tree Size Class*  
None

Class C 48 Late Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| ASTER | Aster | Aster | Middle |
| LUPIN | Lupinus | Lupine | Middle |
| ROWO | Rosa woodsii | Woods' rose | Middle |
| RIBES | Ribes | Currant | Middle |

Description

Vegetation is typically forb-rich, with forbs contributing more to overall herbaceous cover than graminoids. Five percent to 10% of cover in late seral may be woody species from adjacent plant communities such as *Populus tremuloides*, *Artemisia cana*, *Artemisia tridentata*, *Rosa woodsii*, *Ribes* spp., and *Amelanchier* spp. Mixed-severity fire removes shrubs from overstory.

*Maximum Tree Size Class*  
Seedling <4.5ft

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:OPN | 0 | Mid1:OPN | 2 |
| Mid1:OPN | 3 | Late1:OPN | 22 |
| Late1:OPN | 23 | Late1:OPN | 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:OPN | Early1:OPN | 0.025 | 40 | Yes | 0 |
| Replacement Fire | Mid1:OPN | Early1:OPN | 0.025 | 40 | Yes | 0 |
| Mixed Fire | Late1:OPN | Mid1:OPN | 0.013 | 77 | Yes | 0 |
| Replacement Fire | Late1:OPN | Early1:OPN | 0.025 | 40 | Yes | 0 |

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