11450

Rocky Mountain Subalpine-Montane Mesic Meadow

BpS Model/Description Version: Aug. 2020

|  |  |  |  |
| --- | --- | --- | --- |
| **Modelers** |  | **Reviewers** |  |
| Cheri Howell | chowell02@fs.fed.us | None | None |
| Julia Richardson | jhrichardson@fs.fed.us | None | None |
| None | None | None | None |

Reviewer: Kori Blankenship

Vegetation Type

Herbaceous

Map Zone

16

Geographic Range

Found in the Rocky Mountains and Great Basin at high elevation ranges, typically above 3,000m (9,800ft) in elevation in the southern part of its range and above 1,500m (5,000ft) in the northern part.

Biophysical Site Description

This Rocky Mountain ecological system is restricted to sites in the sub-alpine zone where fine-texture soils, snow deposition, or wind-swept dry conditions limit tree establishment. The soils are typically cryic and seasonally moist to saturated in the spring, but if so will dry out later in the growing season. These upland communities occur on gentle to moderate-gradient slopes.

Vegetation Description

This Biophysical Setting (BpS) is often termed tall forbs. 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., *Balsamorhiza sagittata*, *Wyethia* spp., *Bromus carinatus*, *Danthonia intermedia*, *Deschampsia caespitosa*, *Koeleria macrantha*, *Elymus tachycaulus*, *Phleum alpinum*, and *Dasiphora fruticosa*. Burrowing mammals can increase forb diversity.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| LIGUS | *Ligusticum* | Licorice-root |
| SENEC | *Senecio* | Ragwort |
| PENST | *Penstemon* | Beardtongue |
| HACKE | *Hackelia* | Stickseed |
| LUPIN | *Lupinus* | Lupine |
| OSMOR | *Osmorhiza* | Sweetroot |
| THALI | *Thalia* | Alligator-flag |
| ERIGE | *Erigenia* | Erigenia |

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, but spreads from adjacent shrub-or tree-dominated sites, such as mountain big sagebrush, ponderosa pine, and aspen. Fires are probably associated with Native American burning in the fall and spring.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 39 | 80 |  |  |
| Moderate (Mixed) | 156 | 20 |  |  |
| Low (Surface) |  |  |  |  |
| All Fires | 31 | 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

Range in size from <10-300ac.

Adjacency or Identification Concerns

In map zone (MZ) 12 and MZ17, this BpS could be confused with low forb/alpine shrub communities. It is often adjacent to aspen/tall forb communities and mountain or sub-alpine big sagebrush/tall forb 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), *Veratrum californicum* (false hellebore), *Wyethia amplexicaulis* (mule ears), *Potentilla gracilis* (cinquefoil), *Geum marcophyllum* (avens), *Arnica chamissonis* (arnica), *Collomia linearis* (tiny trumpet), *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.

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 from MZ13 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.

During review, it was noted that 1611450 and 2411450 have identical models. The primary difference between the two zones is the list of dominant species in the description.

There is not much information about this type. We estimated the fire frequency 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. Fire would affect encroaching shrubs.

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** |
| ASTER | Aster | Aster | Upper |
| APIAC | <NOT FOUND IN NRCS> | <NOT FOUND IN NRCS> | Upper |
| BORAG | Borago | Borage | Upper |
| SCROP | Scrophularia | Figwort | Upper |

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., *Balsamorhiza sagittata*, *Wyethia* spp., *Bromus carinatus*, *Danthonia intermedia*, *Deschampsia caespitosa*, *Koeleria macrantha*, *Elymus tachycaulus*, *Phleum alpinum*, and *Dasiphora fruticosa*. Replacement fire presumably occurred during the fall and spring, therefore removing dead biomass completely. But, in these early-development meadows, fire would not cause a change in successional age (i.e., succession is not delayed) 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** |
| ASTER | Aster | Aster | Upper |
| APIAC | <NOT FOUND IN NRCS> | <NOT FOUND IN NRCS> | Upper |
| BORAG | Borago | Borage | Upper |
| SCROP | Scrophularia | Figwort | Upper |

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., *Balsamorhiza sagittata*, *Wyethia* spp., *Bromus carinatus*, *Danthonia intermedia*, *Deschampsia caespitosa*, *Koeleria macrantha*, *Elymus tachycaulus*, *Phleum alpinum*, and *Dasiphora fruticosa*. There will be some increase in the shrub component between Class A and Class B. Shrubs in this class are young and provide <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 |
| APIAC | <NOT FOUND IN NRCS> | <NOT FOUND IN NRCS> | Middle |
| BORAG | Borago | Borage | Middle |
| SCROP | Scrophularia | Figwort | Middle |

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., *Balsamorhiza sagittata*, *Wyethia* spp., *Bromus carinatus*, *Danthonia intermedia*, *Deschampsia caespitosa*, *Koeleria macrantha*, *Elymus tachycaulus*, *Phleum alpinum*, and *Dasiphora fruticosa*.

The dominant lifeform is herbaceous, dominated by forbs. The cover range of forbs may be 50-100%, with height ranges of short (<0.5m) to tall (>1m). Five percent to 10% of cover in this class 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 | 522 |

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 | No | 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 |

References

Barrett, S.W. 1984. Fire history of the River of No Return Wilderness: River Breaks Zone. Final Report. Missoula, MT: Systems for Environmental Management. 40 pp + appendices.

Fischer, W.C. and A.F. Bradley. 1987. Fire ecology of western Montana forest habitat types. Gen. Tech. Rep. INT-223. Ogden, UT: USDA Forest Service, Intermountain Research Station. 95 pp.

Lackschewitz, K. 1991. Vascular plants of west-central Montana--identification guidebook. Gen. Tech. Rep. INT-227. Ogden, UT: USDA Forest Service, Intermountain Research Station. 648 pp.

Lotan, J.E., M.E. Alexander, S.F. Arno and others. 1981. Effects of fire on flora: A state-of-knowledge review. National fire effects workshop; 1978 April 10-14; Denver, CO. Gen. Tech. Rep. WO-16. Washington, DC: USDA Forest Service. 71 pp.

Manning, M.E. and W.G. Padgett. 1995. Riparian Community Type Classification for Humboldt and Toiyabe National Forests, Nevada and Eastern California. USDA Forest Service, Intermountain Region.

NatureServe. 2007. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA. Data current as of 10 February 2007.

Young, R.P. 1986. Fire ecology and management in plant communities of Malheur National Wildlife Refuge. Portland, OR: Oregon State University. 169 pp. Thesis.