11450

Rocky Mountain Subalpine-Montane Mesic Meadow

BpS Model/Description Version: Aug. 2020

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Vegetation Type

Herbaceous

Map Zones

29

Geographic Range

Found in the Rocky Mountains, restricted to the subalpine zone typically above 3,000m in the southern part, 1,500m in the north. These tall forb systems are scattered throughout the Bighorn and Pryor Mountains of MZ29. Uncommon in Pryor Mountains.

Biophysical Site Description

Finely textured soils. Snow deposition, windswept dry conditions limit tree establishment. On gentle to moderate gradient slopes. Soils seasonally moist in spring, and might occasionally dry out later in the growing season. Deep and poorly drained, higher elevation valley bottoms and other flat areas commonly flooded in spring and by early summer snowmelt. Elevations between 6,000-9,000ft.

This is a forb-dominated, lush wet system.

Vegetation Description

Vegetation is typically forb-rich (more currently than historically), with forbs contributing more to overall herbaceous cover than graminoids. Important taxa include *Agastache urticifolia*, (*Chamerion angustifolium* in MZ21), *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., and *Wyethia amplexicaulis*.

Graminoids are *Deschampsia caespitosa*, *Carex* spp. and *Juncus* spp., *Danthonia intermedia*, and *Phleum alpinum*.

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 |
| CAREX | *Carex* | Sedge |

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

Disturbance Description

Fires are primarily replacement and occur at rotations related to adjacent vegetation. Where near mountain big sagebrush, this may be 135yrs, and where near lodgepole pine, this may be 300yrs. The ignition source is generally not in this type and could possibly be associated with native burning in the fall and spring, but spreads from adjacent shrub or tree dominated sites, such as mountain big sagebrush, lodgepole pine and aspen.

In MZ29, this would also be adjacent to mountain big sagebrush, lodgepole, subalpine fir, spruce and Douglas-fir.

Also, in MZ21, because fire was assumed to occur in the fall and spring when the summer's green and wet biomass would be dead and cured, replacement fire has little effect on annual tall forbs themselves. Fires would affect encroaching shrubs. In MZ21, fire occurrence would primarily be concentrated to the fall burning season due to narrower growing season at higher elevation fringes. Meadows only approach burning conditions in extreme drought or late season at higher elevation.

In MZ29, fire occurrence would primarily be concentrated to the fall burning season due to narrower growing season at higher elevation fringes.

FRI should be similar to adjacent forest type, but then a bit less frequent, because this is a bit wetter.

Hailstorms are another disturbance in this system, although this is questionable.

Fire intervals (less fire) for MZ21 were originally decreased approximately seven times (from 30yrs to 200yrs). After an extensive model review process, LANDFIRE leadership/guidance determined that the original modelers for MZ21 used an interpretation of the fire information available that did not represent the majority expert opinion/interpretation of the fire literature. The original MZ21 model was therefore altered to reflect majority opinion/interpretation of literature regarding the fire regime of this system and that used in MZs 10, 19 and 23. A FRI of 40yrs replacement fire was used. Mixed fire was removed from the model adapted from MZs 10 and 19 due to a new understanding of severity types.

During review for MZ20, this frequent fire return interval of 40yrs MFRI was questioned. Multiple other models (in the Great Basin and MZs 10 and 19) used a frequent FRI, as this type occurs in mosaics with woodlands and dense shrublands. It is doubtful, however, that mesic, forbaceous meadows at about 3000m would have MFRIs of less than 150-300yrs, in contrast to the Great Basin's model and FRI of 40yrs. If this type is primarily a high elevation, subalpine wet-forb community (ie, MZs 10 and 19 description says >3,000m--which would be too high for the Northern Rockies, where it would be more like 2,000-3,000m), a 150-200yr MFRI would likely apply. However, if this type is a lower montane-to-subalpine type (as per NatureServe (NS) description), a lower MFRI could apply. MZ20 decided to go with a model with a 75-100yr MFRI (using 85yr MFRI as a midpoint), since NS's description called for more of that type of an MFRI as opposed to the high-high elevation, which would not occur in the north-central region (Barrett, pers comm). Also - this 85yr MFRI is similar to the MFRI chosen for MZ20's 1140 as well, since the range could vary greatly and due to both of the systems' ambiguous descriptions. MZ29 also adopted MZ20's reasoning.

Moreover, the general absence of frequently fire-scarred trees adjacent to high elevation mesic meadows suggests that the BpS likely has fire frequencies similar to the adjacent tree'd landscape (Barrett, pers comm). The MFRI depends on the size of these meadows and fuel load of adjacent veg presumably conifer forest. If the meadow is larger, it might act as a fire break and not completely burn. It depends on the moisture in the meadow and fuel load. Determining one value for an MFRI will be difficult - will depend on size of meadow, landscape position and associated valley type, surrounding vegetation type, patterns of fuel build-up, moisture, density and type of meadow - wet, dry, forb dominated, sedge dominated, moss dominated, etc. (Manning, pers comm).

Burrowing mammals can increase density.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 84 | 100 | 30 | 200 |
| Moderate (Mixed) |  |  |  |  |
| Low (Surface) |  |  |  |  |
| All Fires | 84 | 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

They range in size from less than ten acres to 150ac.

Adjacency or Identification Concerns

This BpS could be confused with low forb/alpine shrub communities. Often adjacent to aspen/tall forb communities, mountain big sagebrush/tall forb communities and upper montane/subalpine spruce-fir communities.

Different from 1140 Montane Subalpine Grassland - this BpS doesn't have wheatgrass or Idaho fescue.

With heavy grazing these sites can convert to undesirable forbs and grasses such as *Cirsium* spp. (thistle), *Galium* spp. (bedstraw), *Helenium hoopesii* (Orange sneezeweed), *Polygonum* spp. (knotweed), *Rumex* spp. (sorrel or dock), *Taraxacum officinale* (dandelion), *Madia glomerata* (mountain tarweed), *Descurainia* spp. (tansymustard), *Poa pratensis* (Kentucky bluegrass), *Agrostis exarata* (bentgrass), *Dactylis glomerata* (orchardgrass), *Bromus inermis* (smooth brome), *Bromus tectorum* (cheatgrass), and *Poa bulbosa* (bulbous bluegrass). Roads and trails can impact these sites.

*Deschampsia* is probably significantly reduced due to livestock grazing (Mueggler and Stewart re: DECA/CAREX h.t.)

Due to grazing, higher forb and less grass component (so is departed), it would appear departed if looking at it on the ground. Structure might not appear departed, however. It would be difficult to show departure in this system via remote sensing. Biomass would be similar between grasses and forbs. Composition would change, but biomass may not.

In MZ29, there is some invasion of spotted knapweed, *Centaurea biebersteinii*, dalmatian toadflax, and *Linaria dalmatica*, which can occur along recreational use activity corridors.

Expansion of Douglas-fir along the perimeter of the habitat has produced some encroachment in MZ21.

Issues or Problems

There is not much information about this type.

Native Uncharacteristic Conditions

Grasses over one meter would be very uncharacteristic.

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 | B | B | B | B | B | B | B | B | B | B |
| Herb | >1.0 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | 0-0.5 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | 0.5-1.0 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | 1.0-3.0 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | >3.0 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 0-5 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 5-10 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 10-25 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 25-50 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | >50 | UN | UN | UN | UN | UN | 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 2 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 |
| CAREX | Carex | Sedge | Upper |

Description

Vegetation is typically forb-rich (currently more than historically), with forbs contributing more to overall herbaceous cover than graminoids.

*Maximum Tree Size Class*  
None

Class B 98 Mid 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 |
| CAREX | Carex | Sedge | Upper |

Description

Vegetation is typically forb-rich (currently more than historically), with forbs contributing more to overall herbaceous cover than graminoids. Some shrub species might be present - less than five percent cover and less than 0.5 m.

*Maximum Tree Size Class*  
None

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:OPN | 0 | Mid1:OPN | 2 |
| Mid1:OPN | 3 | Mid1: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 | 0.0118 | 85 | Yes | 0 |
| Replacement Fire | Mid1:OPN | Early1:OPN | 0.0118 | 85 | Yes | 0 |

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