11390

Northern Rocky Mountain Lower Montane-Foothill-Valley Grassland

BpS Model/Description Version: Aug. 2020

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Vegetation Type

Herbaceous

Map Zones

21

Geographic Range

Northern Rockies throughout MT, northern ID, northeastern WA (Okanogan Highlands), eastern ID and northwestern WY. May occupy river valleys, including the Salmon, Snake and Clearwater Rivers, and the Upper Madison River, Upper Yellowstone River, Upper Salt River, Upper Snake River, Upper Green River, Upper Wind River, Shoshone River, and Centennial Valley. Drier portions of this type will resemble bluebunch wheatgrass communities in Columbia Basin.

Biophysical Site Description

This type occupies productive uplands below lower treeline or in small pockets where cold air drainage or shallow soils inhibit conifer growth, generally ranging from 4,000-7,000ft.

There is discrepancy as to how to distinguish BpS 1126 mountain big sagebrush and this BpS in terms of biophysical gradients. It has been suggested that they be distinguished by elevation, soil and precipitation. Other Forest Service (Tart, personal correspondence) data lists the elevation of this BpS (FEID) at up to over 9,000ft. It is thought that this BpS might start at the higher elevation, whereas the mountain big sage would be at the lower elevation (Tart, personal correspondence).

Mueggler and Stewart state that the FEID/AGSP habitat type is found at elevations ranging from 4,500-7,500ft and tends to occur more on northerly exposures at the lower elevations and on southerly exposures at the higher elevations. The ARTR/FEID occurs from 6,000-8,000ft. The FEID grasslands on the Pinedale RD more closely resemble FEID/CAFI and FEID/AGCA types which range from 6,500-9,200ft.

In the high valleys of southwestern MT, sagebrush was probably the historical dominant on sites having either coarse or clayey soils (Morris et al. 1976 in Arno and Gruell 1983). Grasses are poorly adapted to these soils, which have droughty surface conditions, whereas deep-rooting big sagebrush is well-adapted (Arno and Gruell 1983).

Vegetation Description

This type is dominated by bluebunch wheatgrass with Idaho fescue as dominant associate. Rough fescue is only in the Centennial Valley in MZ21. Bluebunch wheatgrass is more prevalent in drier areas. Mueggler and Stewart (1980) have described these types as: FEID/AGSP and FESC/AGSP. The FEID grasslands on the Pinedale RD in MZ21 more closely resemble FEID/CAFI and FEID/AGCA. Additional species include needle and thread, Sandberg bluegrass, arrowleaf balsamroot and western needlegrass and a variety of mesic forbs (eg, showy cinquefoil, sticky geranium, phlox, lupine and yarrow). In MZ21, there is also *Achnatherum nelsonii*, *Achnatherum letermanii*, *Elymus trachycaulus*, *Trisetum spicata*, *Elymus lanceolatus*, *Koeleria macrantha*, *Eriogonum* spp., *Antennaria* spp., *Poa secunda*, and *Poa pratensis*.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| PSSP6 | *Pseudoroegneria spicata* | Bluebunch wheatgrass |
| FEID | *Festuca idahoensis* | Idaho fescue |
| ERIOG | *Eriogonum* | Buckwheat |
| ACNE9 | *Achnatherum nelsonii* | Columbia needlegrass |
| ELTR7 | *Elymus trachycaulus* | Slender wheatgrass |
| ACLE9 | *Achnatherum lettermanii* | Letterman's needlegrass |
| PHLOX | *Phlox* | Phlox |
| GEVI2 | *Geranium viscosissimum* | Sticky purple geranium |

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

Disturbance Description

For MZ21, fire rotation was roughly estimated at 66yrs, ranging from 50-80yrs. This was estimated by taking an estimate composite frequency of 33yrs and multiplying it by two to arrive at 66yrs (Baker in press).

Another reviewer for MZ21 stated that the MFI methodology used above is in question.

Where these systems occur within forested ecosystems, fire frequency will be strongly influenced by the surrounding forest's fire regime (eg, 10-20yrs). Where these systems occur below lower treeline, fire frequencies may be longer (eg, 20-30yrs).

It is debatable as to whether fire is needed at moderately high frequencies to keep sagebrush out of these grassland systems, or whether sagebrush is invading in current times due to overgrazing and/or climate change.

Baker (personal correspondence) states that Sindelar (1981) in western MT did not think that grasslands invaded by ARTRV were primarily fire maintained and instead implicated livestock grazing removal of competition from grasses in ARTRV invasion. Mountain big sagebrush has colonized some mountain grasslands in present day, but not all.

For those areas with mountain big sage that might be maintained as grassland along ponderosa pine or Douglas-fir ecotones, FRI (questionable as to whether reported as CFI) has been indicated between 10-40yrs (Winward 1984; Winward 1991; Johnson 2000; Miller and Tausch 2001; Tart 1996) and greater than 50yrs (Welch and Criddle 2003) and between 35-100yrs (Baker in press).

Baker (in press) states that nearby CFI estimates need to be corrected for adjacency and for unburned area. Grasslands are about two to two and a half times less likely than forests to ignite and the fire density (#fires per unit area) is about 4 times lower in grasslands than in forests. Correcting Houston (1973) estimate of 20-25yrs, Arno and Gruel (1983) of 35-40yrs and Arno and Gruel (1986) estimate of 25yrs using a 2.0 adjacency correction and assuming a mean unburned area similar to that in sagebrush (21%), the estimated fire rotations would be 51-63yrs, 89-101yrs, and 63yrs, respectively. Thus, about 50-100yrs from these estimates.

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 for MZ21. An interval of 30yrs was chosen for MZ21, based on expert opinion as well as based on intervals of adjoining systems; the interval for BpS 1139 is thus lower than that for 1126 and 1145. This new interval of 30yrs was consistent with the 17yrs FRI for the original zone 10 and 19 models, and the 40yrs FRI used in the original zone 18 model.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 32 | 100 | 20 | 80 |
| Moderate (Mixed) |  |  |  |  |
| 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

This type can occupy broad expanses and also narrow bands below the lower montane forest. It may occur as small patches within forested ecosystems as a topoedaphic climax. In large valleys, fires may have been expansive historically, up to thousands of acres.

Adjacency or Identification Concerns

Since this is a broad type, the dry bluebunch wheatgrass-needle and thread variant will probably have more bareground and a slightly higher MFI. Response to fire may differ slightly also.

Non-native species present today can include spotted knapweed, leafy spurge, smooth brome and cheatgrass. Historical livestock grazing may lower fuel loads and lengthen MFI, allowing sagebrush and conifers to invade.

This type is now limited on the Bridger-Teton, as most sites like this have been converted to non-native grasses like *Phleum pratense* or *Bromus*.

*Poa pratensis* is a debatable native/non-native most likely found in this BpS.

Some grassland systems are invaded by sagebrush today in larger quantities. These grassland systems might today have mountain big sage, and pre-European settlement, might have had a bit of mountain sage. Pre-European settlement they would have been grassland systems, whereas today they might be confused for mountain big sage systems. It might be difficult to distinguish this type from the first successional stage/seral stage of BpS 1126 mountain big sage. Elevational range should be considered when trying to distinguish this grassland from 1126.

Fire exclusion is a major effect of livestock grazing in dynamic sagebrush/grassland systems (Miller et al. 1994; Miller and Rose 1999; Miller and Eddleman 2001).

Sindelar (1981) in western MT did not think that grasslands invaded by ARTRV were primarily fire maintained and instead implicated livestock grazing removal of competition from grasses in ARTRV invasion. Mountain big sagebrush has colonized some mountain grasslands in present day, but not all.

Issues or Problems

This is a highly variable type, which includes most of Mueggler and Stewart's habitat types. The literature in FEIS suggests a MFI of between 10-30yrs for this type. The Lewis and Clark range type classification needs to be incorporated into this model also.

This type is now limited on the Bridger-Teton, as most sites like this have been converted to non-native grasses like *Phleum pratense* or *Bromus*.

*Poa pratensis* is a debatable native/non-native most likely found in this BpS.

Native Uncharacteristic Conditions

Shrub or tree cover over 10% is uncharacteristic.

Comments

Original modelers for MZ21 were Reggie Clark, Clayton Marlow, Tim Klukas, John Simons and one anonymous modeler. Additional reviewers for MZ21 were Sarah Canham, Brenda Fiddick, Rod Dykehouse and Dave Tart.

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 | B | B | B | C | C | C | C |
| Herb | 0.5-1.0 | A | A | A | B | B | B | C | C | C | C |
| Herb | >1.0 | A | A | A | B | B | B | C | C | C | C |
| Shrub | 0-0.5 | C | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | 0.5-1.0 | C | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | 1.0-3.0 | C | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | >3.0 | C | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 0-5 | C | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 5-10 | C | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 10-25 | C | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 25-50 | C | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | >50 | C | 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 3 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PSSP6 | Pseudoroegneria spicata | Bluebunch wheatgrass | Upper |
| KOMA | Koeleria macrantha | Prairie junegrass | Upper |
| POSA | Poa saltuensis | Oldpasture bluegrass | Upper |

Description

Post fire, early seral community dominated by bunchgrasses and forbs. Herbs and forbs will generally have higher cover than pre-burn and may include astragalus, balsamroot, lupines, yarrow and prairie junegrass. Idaho fescue may be present, but will recover more slowly than the bluebunch wheatgrass after fire.

In this environment (and a number of the other grassland, shrub steppe types) forb density and cover are most responsive to climatic conditions. Hence fire response will vary according to precipitation patterns before and immediately after the fire. Grasses are less “ephemeral” and tend to respond to the fire directly. That’s why we elected to not identify specific forb species response.

*Maximum Tree Size Class*  
None

Class B 65 Mid Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PSSP6 | Pseudoroegneria spicata | Bluebunch wheatgrass | Upper |
| FEID | Festuca idahoensis | Idaho fescue | Upper |
| POSA | Poa saltuensis | Oldpasture bluegrass | Upper |
| STCO | Stachys coccinea | Scarlet hedgenettle | Upper |

Description

Mid-development with moderate canopy closure dominated by bunchgrasses with forb cover generally higher than pre-burn.

*Maximum Tree Size Class*  
None

Class C 32 Late Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PSSP6 | Pseudoroegneria spicata | Bluebunch wheatgrass | Upper |
| FEID | Festuca idahoensis | Idaho fescue | Upper |
| POSA | Poa saltuensis | Oldpasture bluegrass | Upper |
| STCO | Stachys coccinea | Scarlet hedgenettle | Upper |

Description

Late-development, closed canopy of grasses and forbs. Bunchgrasses dominate with low densities of shrubs in some areas, particularly where this BpS transitions to shrub or tree-dominated communities. Shrub species may include *Artemisia tridentada*, *Ceanothus*, bitterbrush, and *Symphorocarpus*. Some Douglas-fir and Rocky Mt. juniper could be present. Other forbs include *Eriogonum* (buckwheats).

*Maximum Tree Size Class*  
None

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:ALL | 0 | Mid1:CLS | 1 |
| Mid1:CLS | 2 | Late1:CLS | 35 |
| Late1:CLS | 36 | 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** |
| Replacement Fire | Early1:ALL | Early1:ALL | 0.03 | 33 | Yes | 0 |
| Replacement Fire | Mid1:CLS | Early1:ALL | 0.03 | 33 | Yes | 0 |
| Replacement Fire | Late1:CLS | Early1:ALL | 0.0333 | 30 | Yes | 0 |

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