10540

Southern Rocky Mountain Ponderosa Pine Woodland

BpS Model/Description Version: Aug. 2020

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

Forest and Woodland

Map Zones

20

Geographic Range

This BpS is located in southeastern MT, the Missouri River Breaks of northern MT and in MT in on Rocky Mountain Front. It occurs throughout all sections of MZ20. It probably also occurs through to MZ29.

Biophysical Site Description

The geology is typically sedimentary in origin. Often found extending from mountain foothills and plains, but can also be found on buttes, hogbacks, rocky outcrops, and steep, rocky slopes.

Elevations range from approximately 2,500 to 4,500 feet. It occurs at 2,500-4,000ft on southerly aspects and 3,500-4,000ft on northerly aspects.

In MZ20, the Missouri Breaks sites described by this BpS are located on southerly aspects, or on upper edges of coulees (more gentle slopes, or above 3,400ft elevation. (The remainder of the Breaks is modeled under 201045PP, which covers northerly aspects that are generally steep, and sites below 3400ft elevation.)

Vegetation Description

This type is dominated by ponderosa pine and is often the only tree present.

Understory composition varies but Rocky Mountain Juniper, skunkbush sumac, mountain mahogany, snowberry, yucca and rosa are common woody species. Currant and chokecherry are found in the MT portion of the range. In the Missouri Breaks at elevations above 3400ft, horizontal juniper can dominate the understory. This may also be an association with Neldore soils.

Northerly aspects of the Breaks where Douglas-fir co-dominates or dominates the canopy, are NOT included in this model and are instead in 1045 ponderosa pine.

Herbaceous species include needlegrasses, gramma grasses, little bluestem, threadleaf sedge and western wheatgrass. In the southeastern portion of MT, sunsedge and buffalograss are significant components.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| PIPO | *Pinus ponderosa* | Ponderosa pine |
| PASM | *Pascopyrum smithii* | Western wheatgrass |

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

Disturbance Description

Generally frequent fires of low severity (Fire Regime Group I or III). Mixed severity fire occurs in the closed canopy conditions with a frequency of between 20-150yrs, and stand replacement fire is very infrequent (300yrs+). Surface fires are frequent and range from <10yrs to more than 20yrs (Barrett 2004; Brown and Sieg 1999, Fisher et al. 1987).

The majority of RA review agreed with the original model's parameters for mixed fire, but thought surface fire could be slightly less frequent. One review contended that there is no evidence of mixed severity fire in this type at all, and that the overall MFI should be around 25yrs. As a compromise, surface fires were reduced in frequency. Mixed severity fire was left in the model based on in-workshop and post-workshop review. These changes resulted in a higher MFI and an increase in the amount of the landscape in the mid- and late-development open classes

Variation in precipitation and temperature interacting with fire and ungulate grazing affects pine regeneration. Windthrow, storm damage and mountain pine beetles were minor disturbances in this type unless stands reach high densities. The interactions between drought, insects and disease are not well understood.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 231 | 6 |  |  |
| Moderate (Mixed) | 76 | 18 |  |  |
| Low (Surface) | 18 | 76 |  |  |
| All Fires | 14 | 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

Patch size probably ranged from 10s to 1,000s of acres.

Adjacency or Identification Concerns

This type is surrounded by Northwestern Great Plains Mixedgrass Prairie and the dominant sagebrush system. At the upper elevation, it transitions into 2010452 Northern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest-Ponderosa Pine.

Ponderosa pine in this BpS has encroached into the mixedgrass prairie type in many areas due to fire suppression and grazing. Tree density has greatly increased today.

This BpS is intermingled within the 1045 ponderosa pine split in MZ20 which models the relatively cooler and more mesic sites in the Missouri Breaks. This BpS 1054 models the warmer, dryer sites in the Breaks. In MZ20, the Missouri Breaks sites described by this BpS are located on southerly aspects, or on upper edges of coulees (more gentle slopes, or above 3400ft elevation. (The remainder of the Breaks is modeled under 201045PP, which covers northerly aspects that are generally steep, and sites below 3400ft elevation.)

Issues or Problems

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 | C | C | C | C | C | B | B | B | B | B |
| Tree | 5-10 | C | C | C | C | C | E | E | E | E | E |
| Tree | 10-25 | D | D | D | D | D | E | E | E | E | E |
| Tree | 25-50 | D | D | D | D | D | E | E | E | E | E |
| Tree | >50 | D | D | D | D | D | 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 10 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| NAVI | Navarretia viscidula | Sticky pincushionplant | Upper |
| PASM | Pascopyrum smithii | Western wheatgrass | Upper |
| ROSA | Rorippa sarmentosa | Longrunner | Upper |
| SYMPH | Symphoricarpos | Snowberry | Upper |

Description

This community is dominated by herbaceous and woody species, including the graminoids needlegrasses, western wheatgrass and little bluestem in moister areas, and various shrubs including skunkbush and snowberry. Ponderosa pine seedlings are scattered and found in small clumps.

Number of years in this class is variable depending on climatic patterns and fire disturbances.

Upper Layer Lifeform is not the dominant lifeform. Both shrubs and herbaceous are the upper layer lifeform - approximately same height in this class.

*Maximum Tree Size Class*  
no data

Class B 1 Mid Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PIPO | Pinus ponderosa | Ponderosa pine | Upper |

Description

Multi-story stand of small and medium trees with saplings and seedlings coming in as clumps. Understory is sparse.

*Maximum Tree Size Class*  
Pole 5-9" DBH

Class C 18 Mid Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PIPO | Pinus ponderosa | Ponderosa pine | Upper |

Description

Generally single story stands with a few pockets of regeneration. Low shrubs such as snowberry and skunkbush are present as well as grass and forbs. Rocky Mountain juniper present in patches.

*Maximum Tree Size Class*  
Pole 5-9" DBH

Class D 67 Late Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PIPO | Pinus ponderosa | Ponderosa pine | Upper |

Description

Generally single story stands of large ponderosa pine with pockets of smaller size classes (replacement). Snowberry, skunkbush, patches of Rocky Mountain juniper and grasses are still present.

*Maximum Tree Size Class*  
Very Large >33"DBH

Class E 4 Late Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PIPO | Pinus ponderosa | Ponderosa pine | Upper |

Description

Multi-story stands of large, medium, small and seedling ponderosa pine. Shrubs and grasses are sparse. This type generally exceeds 70% canopy cover.

Because this class is dense, the max tree size class is smaller. Maximum DBH is probably approximately 15in.

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

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:ALL | 0 | Mid1:OPN | 29 |
| Mid1:OPN | 30 | Late1:OPN | 104 |
| Mid1:CLS | 30 | Late1:CLS | 144 |
| Late1:OPN | 105 | Late1:OPN | 999 |
| Late1:CLS | 145 | 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 | 25 |
| Replacement Fire | Early1:ALL | Early1:ALL | 0.02 | 50 | Yes | 0 |
| Surface Fire | Early1:ALL | Early1:ALL | 0.03 | 33 | No | 0 |
| Mixed Fire | Early1:ALL | Early1:ALL | 0.05 | 20 | No | 0 |
| Alternative Succession | Mid1:OPN | Mid1:CLS | 1 | 1 | Yes | 40 |
| Replacement Fire | Mid1:OPN | Early1:ALL | 0.0015 | 667 | Yes | 0 |
| Mixed Fire | Mid1:OPN | Mid1:OPN | 0.006 | 167 | No | 0 |
| Surface Fire | Mid1:OPN | Mid1:OPN | 0.06 | 17 | No | 0 |
| Surface Fire | Mid1:CLS | Mid1:CLS | 0.005 | 200 | No | 0 |
| Insects or Disease | Mid1:CLS | Mid1:CLS | 0.02 | 50 | No | 0 |
| Replacement Fire | Mid1:CLS | Early1:ALL | 0.02 | 50 | Yes | 0 |
| Mixed Fire | Mid1:CLS | Mid1:OPN | 0.06 | 17 | Yes | 0 |
| Alternative Succession | Late1:OPN | Late1:CLS | 1 | 1 | Yes | 40 |
| Replacement Fire | Late1:OPN | Early1:ALL | 0.0015 | 667 | Yes | 0 |
| Mixed Fire | Late1:OPN | Late1:OPN | 0.006 | 167 | No | 0 |
| Insects or Disease | Late1:OPN | Late1:OPN | 0.02 | 50 | No | 0 |
| Surface Fire | Late1:OPN | Late1:OPN | 0.06 | 17 | No | 0 |
| Wind or Weather or Stress | Late1:CLS | Late1:OPN | 0.002 | 500 | Yes | 0 |
| Insects or Disease | Late1:CLS | Late1:OPN | 0.004 | 250 | Yes | 0 |
| Surface Fire | Late1:CLS | Late1:CLS | 0.005 | 200 | No | 0 |
| Replacement Fire | Late1:CLS | Early1:ALL | 0.02 | 50 | Yes | 0 |
| Mixed Fire | Late1:CLS | Late1:OPN | 0.06 | 17 | Yes | 0 |

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