10532

Northern Rocky Mountain Ponderosa Pine Woodland and Savanna - Xeric

BpS Model/Description Version: Aug. 2020

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

Forest and Woodland

Map Zones

7, 9

Model Splits or Lumps

This Biophysical Setting (BpS) is split into a mesic and xeric type. This model is the xeric and more commonly found in map zone (MZ)09. It is represented by a longer mean fire return interval (MFRI) than the mesic ponderosa variant and is found in areas with 43cm/yr (17in) precipitation.

Geographic Range

This BpS occurs in the forest-shrub steppe interface along the east side of the Fremont and Deschutes National Forests (NF) and along the southern fringe of the Blue Mountains to the Idaho border.

Biophysical Site Description

This BpS generally occurs in precipitation zones between 38-43cm/yr (15-17in); it is known from a few areas near Bend, Oregon, with annual precipitation as low as 12in. This precipitation band reaches from the east side of the Fremont NF north along the east side of the Deschutes NF to the south edge of the Blues and east along the Ochocos and the Malheur NF. This type may occur in Idaho adjacent to the Snake River Plain. This BpS also occurs on shallow lithic soils in higher precipitation zones (up to 51cm/20in+).

Vegetation Description

Tree species common in this type are PIPO and JUOC. Minor amounts of PSME may occur. Understory vegetation is dominated by ARTR2, ARAR, CELE3, and PUTR2. Important herbaceous species include FEID, AGSP (now PSSP6), SIHY, POSA, and various Stipa species.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| PIPO | *Pinus ponderosa* | Ponderosa pine |
| ARAR | *Artemisia arbuscular* | Low Sagebrush |
| ARTR2 | *Artemisia tridentata* | Big Sagebrush |
| PUTR2 | *Purshia tridentata* | Bitterbrush |
| CELE3 | *Cercocarpus ledifolius* | Curl-leaf Mtn. Mahogany |
| JUOC | *Juniperus occidentalis* | Western juniper |
| POSA3 | *Poa sandbergii* | Sandberg’s bluegrass |

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

Disturbance Description

Mixed and stand-replacement fires dominate this type. Large wind-driven events originating in the shrub-steppe or juniper woodland vegetation zones heavily influence this BpS. Fire return intervals (FRI) in this type are more like adjacent shrub-steppe or juniper woodland communities than typical low-intensity, frequent fire of mesic ponderosa pine communities.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 258 | 18 | 150 | 450 |
| Moderate (Mixed) | 100 | 47 | 50 | 200 |
| Low (Surface) | 136 | 35 | 50 | 150 |
| All Fires | 47 | 100 | 21 | 72 |

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

Stand-replacement events can be tens of thousands of acres in size.

Adjacency or Identification Concerns

Typically, this vegetation type occurs between JUOC/ARTR, JUOC/ARAR, JUOC/PUTR, ARTR or PUTR, and PIPO or dry mixed-conifer sites with frequent FRIs. These communities have higher shrub components and longer FRIs with more of a mixed-severity fire regime.

This type is distinct from ponderosa pine mesic (RA: R#PIPOm; LANDFIRE: 10531) in that it typically occurs in regions with <43cm/yr (17in) precipitation. This model is designed to address the mappable pockets of PIPO that exist on low-productivity, low-moisture, and high-stress sites, resulting in lower reproductive rates and slower growth.

Issues or Problems

This model attempts to capture the forest-shrub steppe interface areas where lack of fuel continuity increases the FRIs and significant dry shrub communities increase the occurrence of stand-replacement and mixed fires.

Native Uncharacteristic Conditions

Comments

James Dickinson, Andrew Merschel, and Mike Simpson refined this model during the 2016 review period. Changes include: revised s-class age ranges, revised s-class mapping rules, adjusted FRIs, corrected species codes, and minor additions to the description.

Amy Waltz (awaltz@tnc.org) and Kori Blankenship (kblankenship@tnc.org) helped develop the original LANDFIRE model.

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 | A | A | A | A | A | A | A | A | A | A |
| Tree | 5-10 | A | A | A | A | A | A | A | A | A | A |
| Tree | 10-25 | C | C | C | B | B | B | B | B | B | B |
| Tree | 25-50 | D | D | D | E | E | E | E | E | E | E |
| Tree | >50 | D | D | D | E | E | 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 16 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| ARTR2 | Artemisia tridentate | Big Sagebrush | Upper |
| CHVI8 | Chrysothamnus viscidiflorus | Yellow rabbitbrush | Middle |
| PSSP6 | Pseudoroegneria spicata | Bluebunch wheatgrass | Lower |
| ELEL5 | Elymus elymoides | Squirreltail | Lower |

Description

Grass/forb/shrub and seedling/sapling stage. Initial establishment of grass and herbaceous species (and CHVI if present in the pre-disturbance community) gives way to shrubs at 15-30yrs. JUOC and PIPO are often established after the shrub community is in place. Reestablishment of the tree components (especially PIPO) may be delayed by the large disturbance size and removal of nearby seed sources.

Typical structure for this class could include: herbs 0-1m tall, 0-30% cover; shrubs 0-3m tall, 0-30% cover; trees 0-5m tall, 0-30% cover. Total cover of herbs and shrubs in this class is unlikely to be greater than 60%; higher cover may indicate a different BpS. Height-diameter regressions built from USFS Region 6 inventory data (CVS plots) indicate that trees transition into Class B or C at about 6m (20ft) tall.

*Maximum Tree Size Class*  
Sapling >4.5ft; <5" DBH

Class B 9 Mid Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PIPO | Pinus ponderosa | Ponderosa pine | Upper |
| JUOC | Juniperus occidentalis | Western juniper | Mid-Upper |
| FEID | Festuca idahoensis | Idaho fescue | Lower |
| ARTR2 | Artemisia tridentata | Big Sagebrush | Middle |

Description

Pole to medium tree-dominated sites with significant competition between trees even though canopy cover does not typically exceed 60%. Shrub and herbaceous species are often depauperate or declining in this stage due to the competition from overstory trees. This stage is susceptible to mountain pine beetle attack.

Typical structure for this class could include: trees 5-20m tall. Canopy cover >60% may indicate a different BpS, likely the mesic ponderosa pine. Height-diameter regressions built from USFS Region 6 inventory data (CVS plots) indicate that trees transition into Class E at about 20m (65-75ft) tall.

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

Class C 27 Mid Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PIPO | Pinus ponderosa | Ponderosa pine | Upper |
| JUOC | Juniperus occidentalis | Western Juniper | Mid-Upper |
| ARTR2 | Artemisia tridentata | Big sagebrush | Middle |
| PUTR2 | Purshia tridentata | Antelope bitterbrush | Middle |
| PSSP6 | Pseudoroegneria spicata | Bluebunch wheatgrass | Lower |

Description

Pole- to small-size-class trees with open canopies. Understories are more vigorous than Class B and have similar species composition to Class A.

Typical structure for this class could include: trees 5-20m tall. Height-diameter regressions built from USFS Region 6 inventory data (CVS plots) indicate that trees transition into Class D at about 20m (65-75ft) tall.

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

Class D 46 Late Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PIPO | Pinus ponderosa | Ponderosa pine | Upper |
| ARTR2 | Artemisia tridentate | Big Sagebrush | Middle |
| CELE3 | Cercocarpus ledifolius | Curl-leaf mountain mahogany | Middle |
| ELEL5 | Elymus elymoides | Squirreltail | Lower |

Description

Large trees (20in+ DBH) and open canopy conditions give this class a savanna-like appearance. Shrub and herbaceous communities are similar to Class A.

Typical structure for this class could include: trees 20-40m tall. Taller trees may indicate a different BpS, likely the mesic ponderosa pine.

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

Class E 2 Late Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PIPO | Pinus ponderosa | Ponderosa pine | Upper |
| CELE3 | Cercocarpus ledifolius | Curl-leaf mountain mahogany | Middle |
| JUOC | Juniperus occidentalis | Western juniper | Mid-Upper |
| FEID | Festuca idahoensis | Idaho fescue | Lower |

Description

Large trees and relatively closed canopy conditions. This stage is susceptible to western pine beetle events.

Typical structure for this class could include: trees 20-40m tall. Taller trees or canopy cover >60% may indicate a different BpS, likely the mesic ponderosa pine.

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

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:ALL | 0 | Mid1:OPN | 49 |
| Mid1:OPN | 50 | Late1:OPN | 149 |
| Mid1:CLS | 50 | Late1:CLS | 249 |
| Late1:OPN | 150 | Late1:OPN | 999 |
| Late1:CLS | 250 | 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 | 0.004 | 250 | Yes | 0 |
| Alternative Succession | Early1:ALL | Mid1:CLS | 0.005 | 200 | Yes | 0 |
| Mixed Fire | Early1:ALL | Early1:ALL | 0.01 | 100 | No | 0 |
| Alternative Succession | Mid1:OPN | Mid1:CLS | 1 | 1 | Yes | 98 |
| Replacement Fire | Mid1:OPN | Early1:ALL | 0.004 | 250 | Yes | 0 |
| Surface Fire | Mid1:OPN | Mid1:OPN | 0.01 | 100 | No | 0 |
| Mixed Fire | Mid1:OPN | Mid1:OPN | 0.01 | 100 | No | 0 |
| Competition or Maintenance | Mid1:CLS | Mid1:CLS | 0.001 | 1000 | No | 0 |
| Replacement Fire | Mid1:CLS | Early1:ALL | 0.0067 | 149 | Yes | 0 |
| Mixed Fire | Mid1:CLS | Mid1:OPN | 0.01 | 100 | Yes | 0 |
| Insects or Disease | Mid1:CLS | Mid1:OPN | 0.01 | 100 | Yes | 0 |
| Alternative Succession | Late1:OPN | Late1:CLS | 1 | 1 | Yes | 150 |
| Replacement Fire | Late1:OPN | Early1:ALL | 0.0033 | 303 | Yes | 0 |
| Insects or Disease | Late1:OPN | Late1:OPN | 0.005 | 200 | No | 0 |
| Surface Fire | Late1:OPN | Late1:OPN | 0.01 | 100 | No | 0 |
| Mixed Fire | Late1:OPN | Late1:OPN | 0.01 | 100 | No | 0 |
| Replacement Fire | Late1:CLS | Early1:ALL | 0.004 | 250 | Yes | 0 |
| Insects or Disease | Late1:CLS | Mid1:OPN | 0.01 | 100 | Yes | 0 |
| Mixed Fire | Late1:CLS | Late1:OPN | 0.01 | 100 | Yes | 0 |

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