

10532

Northern Rocky Mountain Ponderosa Pine Woodland and Savanna - Xeric

BpS Model/Description Version: Aug. 2020

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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	<i>Pinus ponderosa</i>	Ponderosa pine
ARAR	<i>Artemisia arbuscular</i>	Low Sagebrush
ARTR2	<i>Artemisia tridentata</i>	Big Sagebrush
PUTR2	<i>Purshia tridentata</i>	Bitterbrush

CELE3	<i>Cercocarpus ledifolius</i>	Curl-leaf Mtn. Mahogany
JUOC	<i>Juniperus occidentalis</i>	Western juniper
POSA3	<i>Poa sandbergii</i>	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.

Sapling >4.5ft; <5" DBH

Class B	9	Mid Development 1 - Closed
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PIPO	<i>Pinus ponderosa</i>	Ponderosa pine	Upper
JUOC	<i>Juniperus occidentalis</i>	Western juniper	Mid-Upper
FEID	<i>Festuca idahoensis</i>	Idaho fescue	Lower
ARTR2	<i>Artemisia tridentata</i>	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
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PIPO	<i>Pinus ponderosa</i>	Ponderosa pine	Upper
JUOC	<i>Juniperus occidentalis</i>	Western Juniper	Mid-Upper
ARTR2	<i>Artemisia tridentata</i>	Big sagebrush	Middle
PUTR2	<i>Purshia tridentata</i>	Antelope bitterbrush	Middle
PSSP6	<i>Pseudoroegneria spicata</i>	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
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PIPO	<i>Pinus ponderosa</i>	Ponderosa pine	Upper
ARTR2	<i>Artemisia tridentata</i>	Big Sagebrush	Middle
CELE3	<i>Cercocarpus ledifolius</i>	Curl-leaf mountain mahogany	Middle
ELEL5	<i>Elymus elymoides</i>	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
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PIPO	<i>Pinus ponderosa</i>	Ponderosa pine	Upper
CELE3	<i>Cercocarpus ledifolius</i>	Curl-leaf mountain mahogany	Middle
JUOC	<i>Juniperus occidentalis</i>	Western juniper	Mid-Upper
FEID	<i>Festuca idahoensis</i>	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)
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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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