

10540

Southern Rocky Mountain Ponderosa Pine Woodland

BpS Model/Description Version: Aug. 2020

Modelers		Reviewers	
Julia H. Richardson	jhrichardson@fs.fed.us	Louis Provencher	lprovencher@tnc.org
None	None	None	None
None	None	None	None

Vegetation Type

Forest and Woodland

Map Zone

17

Geographic Range

Biophysical Setting (BpS) is found on a few ranges in the Great Basin and Mojave Desert and southern Utah High Plateau.

Biophysical Site Description

These woodlands occur at the lower treeline/ecotone between grassland or shrubland and more mesic coniferous forests typically in warm, dry, exposed sites. Elevations range from <500m in British Columbia to 2,800m in the New Mexico mountains. Occurrences are found on all slopes and aspects; however, moderately steep to very steep slopes or ridgetops are most common. This ecological system generally occurs on soils derived from igneous, metamorphic, and sedimentary material, with characteristic features of good aeration and drainage, coarse textures, circumneutral to slightly acid pH, an abundance of mineral material, rockiness, and periods of drought during the growing season.

Vegetation Description

Pinus ponderosa is the predominant conifer; *Pinus monophylla*, *Pinus edulis*, and *Juniperus* spp. may be present in the tree canopy. The understory is usually shrubby with *Artemisia nova*, *Artemisia tridentata*, *Arctostaphylos patula*, *Arctostaphylos uva-ursi*, *Cercocarpus montanus*, *Cercocarpus ledifolius*, *Purshia stansburiana*, *Purshia tridentata*, *Quercus gambelii* (eastern map zones 12 and 17), *Symphoricarpos oreophilus*, *Prunus virginiana*, *Amelanchier alnifolia*, and *Rosa* spp. Common grass species include *Pseudoroegneria spicata* and species of *Hesperostipa*, *Achnatherum*, *Festuca*, and *Muhlenbergia*. *Pinus ponderosa*/*Arctostaphylos patula* represents the extreme with a typically high percentage of rock and bare soil present.

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
PIPO	<i>Pinus ponderosa</i>	Ponderosa pine
ARTR2	<i>Artemisia tridentata</i>	Big sagebrush
SYOR	<i>Symphoricarpos orbiculatus</i>	Coralberry
ARPA6	<i>Arctostaphylos patula</i>	Greenleaf manzanita
QUGA	<i>Quercus gambelii</i>	Gambel oak
PSSP6	<i>Pseudoroegneria spicata</i>	Bluebunch wheatgrass

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

Disturbance Description

These sites are in a high-frequency, low- and mixed-severity fire regime group. Some portions of these sites are transition zones to high-frequency, high-severity and moderate-frequency, low- and mixed-severity fire regime groups. Frequent surface and mixed-severity fires were the common fire regime characteristics (Bradley 1992), with mixed severity being predominant due to the presence of shrubs with a mean fire return interval of <35yrs. Surface fire intervals ranged from 10-50yrs, and replacement severity occurred at intervals of 150-400+yrs (Brown 2000; Crane 1986; Bradley 1992a; Bradley 1992b; Barrett 1988; Morgan et al 1996; Brown 1994). Stand-replacement fires were generally restricted to the closed canopy forest and the stand initiation conditions. Topography (aspect, substrate depth, slope, position, etc.) exerted strong control over fire behavior, producing spatially and temporally mixed-severity regimes (Stanley Kitchen, USFS, personal communication).

Bark beetle outbreaks are highly related to stand density. Denser stands in relation to site capacity will favor outbreaks, which will decrease as trees are thinned.

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	256	6	150	400
Moderate (Mixed)	38	39		
Low (Surface)	28	55	10	50
All Fires	15	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

BpS is found throughout the Great Basin, although it is not common. Patch size is mostly 10-100ac with 1,000ac less common.

Adjacency or Identification Concerns

This system intergrades with Rocky Mountain Ponderosa Pine Savanna (1117). It is distinguished by the high-frequency, surface-fire regime, less steep or rocky environmental setting, and more open grassy understory structure of the savanna system.

This ecological system is often transitional between non-forested areas or between *Pinus ponderosa* (at lower elevations) and Douglas-fir/white fir/lodgepole pine at higher elevations. It is usually found on sites that are dry montane with a variety of slopes, aspects, and soil conditions. If a large component of aspen is present, model BpS 1061 should be used.

Issues or Problems

Ponderosa pine woodlands and savannas should be better researched for the Great Basin. Many scattered PIPO patches in the Great Basin were completely logged during the mining era of 1850-1900 (e.g., several 100ac in the Clover Mountains on the Great Basin-Mojave Desert boundary in eastern Nevada) and during the railroad construction era throughout the western United States. It is also thought that the dominance of shrubs in understories is greater today than during pre-settlement because livestock grazing greatly reduced grasses in the southern portion

of the Great Basin. Therefore, shrubby woodlands today may have been grassy savannas in the past.

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	B	B	B	B	B	B
Tree	5-10	C	C	C	C	B	B	B	B	B	B
Tree	10-25	D	D	D	D	D	D	D	D	D	D
Tree	25-50	D	D	D	D	E	E	E	E	E	E
Tree	>50	D	D	D	D	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 14 Early Development 1 - All Structures

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PIPO	<i>Pinus ponderosa</i>	Ponderosa pine	Upper
QUGA	<i>Quercus gambelii</i>	Gambel oak	Upper
SYOR	<i>Symphoricarpos orbiculatus</i>	Coralberry	Upper
ARPA6	<i>Arctostaphylos patula</i>	Greenleaf manzanita	Upper

Description

Openings with grass, shrub, and forbs created after replacement fire. May have seedlings of ponderosa pine or other species (e.g., white fir).

Pole 5-9" DBH

Class B	9	Mid Development 1 - Closed
----------------	----------	-----------------------------------

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PIPO	<i>Pinus ponderosa</i>	Ponderosa pine	Upper
PIMO	<i>Pinus monophylla</i>	Singleleaf pinyon	Mid-Upper
JUOS	<i>Juniperus osteosperma</i>	Utah juniper	Mid-Upper
ABCO	<i>Abies concolor</i>	White fir	Mid-Upper

Description

Closed pole-sapling/grass and shrubs. Shrub cover can be dense.

Maximum Tree Size Class

Medium 9-21" DBH

Class C	18	Mid Development 1 - Open
----------------	-----------	---------------------------------

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PIPO	<i>Pinus ponderosa</i>	Ponderosa pine	Upper
ABCO	<i>Abies concolor</i>	White fir	Upper
ARPA6	<i>Arctostaphylos patula</i>	Greenleaf manzanita	Low-Mid
PSSP6	<i>Pseudoroegneria spicata</i>	Bluebunch wheatgrass	Lower

Description

Open pole-sapling/grass and shrubs. Ponderosa pine dominates with white fir present.

Maximum Tree Size Class

Medium 9-21" DBH

Class D	58	Late Development 1 - Open
----------------	-----------	----------------------------------

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PIPO	<i>Pinus ponderosa</i>	Ponderosa pine	Upper
ABCO	<i>Abies concolor</i>	White fir	Upper
ARPA6	<i>Arctostaphylos patula</i>	Greenleaf manzanita	Low-Mid
PSSP6	<i>Pseudoroegneria spicata</i>	Bluebunch wheatgrass	Lower

Description

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	0.01	100	Yes	0
Alternative Succession	Mid1:OPN	Mid1:CLS	1	1	Yes	25
Replacement Fire	Mid1:OPN	Early1:ALL	0.0025	400	Yes	0
Mixed Fire	Mid1:OPN	Mid1:OPN	0.028	36	No	0
Surface Fire	Mid1:OPN	Mid1:OPN	0.04	25	No	0
Replacement Fire	Mid1:CLS	Early1:ALL	0.0067	149	Yes	0
Mixed Fire	Mid1:CLS	Mid1:OPN	0.04	25	Yes	0
Insects or Disease	Mid1:CLS	Mid1:OPN	0.04	25	Yes	0
Alternative Succession	Late1:OPN	Late1:CLS	1	1	Yes	50
Replacement Fire	Late1:OPN	Early1:ALL	0.0025	400	Yes	0

Mixed Fire	Late1:OPN	Late1:OPN	0.028	36	No	0
Surface Fire	Late1:OPN	Late1:OPN	0.05	20	No	0
Replacement Fire	Late1:CLS	Early1:ALL	0.0067	149	Yes	0
Insects or Disease	Late1:CLS	Late1:OPN	0.02	50	Yes	0
Mixed Fire	Late1:CLS	Late1:OPN	0.05	20	Yes	0

References

Barrett, S.W. 1988. Fire Suppression effects on Forest Succession within a Central Idaho Wilderness. Western J. of Applied Forestry. 3(3): 76-80.

Barrett, S.W. 1994. Fire Regimes on the Caribou National Forest, Southern Idaho. Final Report – Contract No. 53-02S2-3-05071. September 1994.

Bradley, A.F., W.C. Fischer and N.V. Noste. 1992. Fire Ecology of the Forest Habitat Types of Eastern Idaho and Western Wyoming. Intermountain Research Station, Ogden UT 84401. GTR-INT-290.

Bradley, A.F., N.V. Noste and W.C. Fischer. 1992. Fire Ecology of the Forests and Woodland in Utah. Intermountain Research Station, Ogden UT 84401. GTR-INT-287.

Brown, J.K., S.F. Arno, S.W. Barrett and J.P. Menakis. 1994. Comparing the Prescribed Natural Fire Program with Presettlement Fires in the Selway-Bitterroot Wilderness. Int. J. Wildland Fire 4(3): 157-168.

Brown, J.K. and J. Kapler-Smith, eds. 2000. Wildland fire in ecosystems: effects of fire on flora. Gen. Tech. Rep. RMRS-GTR-42-vol. 2. Ogden, UT: USDA Forest Service, Rocky Mountain Research Station. 257 pp.

Crane, M.F. 1986. Fire Ecology of the Forest Habitat Types of Central Idaho. Intermountain Research Station, Ogden UT 84401. GTR-INT-218.

Kitchen, S.G. and E.D. McArthur. 2003. Ponderosa pine fire history in a marginal eastern Great Basin stand. Pages 152-156 in K.E.M. Galley, R.C. Klinger and N.G. Sugihara, eds. Proceedings of Fire Conference 2000: The first national congress on fire ecology, prevention, and management. Miscellaneous Publication 13, Tall Timbers Research Station, Tallahassee, FL.

Morgan, P., S.C. Bunting, [and others]. 1996. Fire Regimes in the Interior Columbia River Basin: Past and Present. Final Report For RJVA-INT-94913: Course-scale classification and mapping of disturbance regimes in the Columbia River Basin. Submitted to: Intermountain Fire Science Lab., Intermountain Research Station, Missoula, Montana, USDA Forest Service.

NatureServe. 2007. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA. Data current as of 10 February 2007.

Steele, R., R.D. Pfister, R.A. Ryker and J.A. Kittams. 1981. Forest Habitat Types of Central Idaho. USDA For. Serv. Tech. Rep. INT-114, 138 p. Intermt. For. and Range Exp. Stn., Ogden, Utah 84401.