

10490

Rocky Mountain Foothill Limber Pine-Juniper Woodland

BpS Model/Description Version: Aug. 2020

Modelers		Reviewers	
Tim Kramer	tim_kramer@blm.gov	Mark Williams	mark_a_williams@blm.gov
Roger Bankert	roger_bankert@blm.gov	George Soehn	george_soehn@blm.gov
None	None	Kirk Strom	kirk_strom@blm.gov

Vegetation Type

Forest and Woodland

Map Zones

16, 22

Geographic Range

This Biophysical Setting (BpS) can occur throughout the entire map zone (MZ) 22 in all sections.

Northern Montana to central Colorado, on escarpments across Wyoming into the Black Hills.

Biophysical Site Description

Occurs in foothill and lower montane zones into the western Great Plains. Elevation ranges from 870-2,600m. Occurs in shallow soils with high rock component, often gravelly and calcareous. Occurs on rolling hills and slopes that are moderately steep to steep.

Vegetation Description

Open canopy dominated by *Pinus flexilis*, *Juniperus scopulorum* (occurs on wetter drainage bottoms), and/or *Juniperus osteosperma*. Site can have varying overstory dominance of either of those three species. The site can be associated with *Pinus ponderosa*. *Pinus edulis* is not present.

The shrub layer is sparse to moderately dense. Herbaceous species is sparse to moderately robust. Limber pine at lower elevations appear to be short-lived compared to those found at higher elevations.

Other dominant species for MZ22 could be spike fescue LEKI2.

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
PIFL2	<i>Pinus flexilis</i>	Limber pine
JUSC2	<i>Juniperus scopulorum</i>	Rocky mountain juniper
JUOS	<i>Juniperus osteosperma</i>	Utah juniper
ARNO4	<i>Artemisia nova</i>	Black sagebrush
ARTR2	<i>Artemisia tridentata</i>	Big sagebrush
BOGR2	<i>Bouteloua gracilis</i>	Blue grama
PSSP6	<i>Pseudoroegneria spicata</i>	Bluebunch wheatgrass

FEID	<i>Festuca idahoensis</i>	Idaho fescue
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Species names are from the NRCS PLANTS database. Check species codes at <http://plants.usda.gov>.

Disturbance Description

Primary disturbances for this community are fire and insect/disease outbreaks. Limber pine bark at the base of older trees may be 2in (5cm) thick; therefore, these trees can withstand stem scorch from low-severity fires. Terminal buds are somewhat protected from the heat associated with crown scorch by the tight clusters of needles around them. A reviewer for MZ22 stated that limber is not very tolerant to fire.

The fire regime of surrounding communities may have an impact on limber pine systems. Fire return interval (FRIs) vary between this 1049 system and BpS 1115 Juniper Savanna. The Inter-Mtn Basins Juniper Savanna has a different moisture regime than the Foothill Limber Pine-Juniper Woodland -- the moisture tends to come at a different time of year. In the Foothill Limber Pine-Juniper Woodland that occurs on the Medicine Bow Routt National Forests, we can get extensive fog at any time of the year, which leads to extensive white pine blister rust in the limber pine but also would influence the moisture content of fine fuel and subsequently the fire regime. There also tend to be more shrubs in the Limber Pine-Juniper Woodland than the Inter-Mtn Basins Juniper Savanna.

Most of the fires in the Bighorn Basin occur in the mountain sage/juniper/ponderosa pine or limber pine complex. Therefore, fire frequency could also vary from as little as 30yrs to 80yrs, depending on drought and wet periods.

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	213	100		
Moderate (Mixed)				
Low (Surface)				
All Fires	213	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

10s to 1,000s of acres.

Adjacency or Identification Concerns

Where limber pine grows in association with other trees and shrub communities, the fire regimes of those species are relevant and affect FRI.

In some cases, in the mid and late seral stages, limber pine may not exist, although the site could still be classified as late seral by absence of understory. In some cases, instead of limber pine, ponderosa pine might occur.

It was discussed among MZ22 reviewers as to whether or not BpS 1115 truly occurs historically or if rather it is a seral component, Class A or B, of this BpS 1049. Original modelers for BpS 1115 feel that Juniper Savanna is indeed a system within this MZ and that it should not be combined with the Limber Pine-Juniper Woodland. More juniper savanna would occur in the

southwestern portion of this MZ and more limber pine-juniper type in the eastern and northern portions of this MZ.

Issues or Problems

Non-native white pine blister rust is a concern in Wyoming and northern Colorado today. Fire history is lacking and has a wide range, making modeling difficult. As a whole, fire has occurred in this community in relation to fuel types adjacent to and within the woodland site. On shallow, rocky sites, fire may have occurred less frequently. On deeper-soiled sites, the associated vegetation is more robust and would support a more frequent FRI.

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	A	A	B	B	C	C	C	C	C	C
Tree	5-10	B	B	B	B	C	C	C	C	C	C
Tree	10-25	B	B	B	B	C	C	C	C	C	C
Tree	25-50	B	B	B	B	C	C	C	C	C	C
Tree	>50	B	B	B	B	C	C	C	C	C	C

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 34 Early Development 1 - All Structures

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PSSP6	Pseudoroegneria spicata	Bluebunch wheatgrass	Upper
POSE	Poa secunda	Sandberg bluegrass	Upper
JUOS	Juniperus osteosperma	Utah juniper	Upper

ARTR2	Artemisia tridentata	Big sagebrush	Upper
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Description

On shallow, rocky sites, seedlings tend to establish in protected areas, such as sheltered spaces in rocky outcrops. On these sites, there is little grass or herb competition. On deeper-soiled sites, there is a significant herbaceous component, and seedlings are established from bird seed caches and seed from limber pine and juniper that were not killed. Other indicator species may include PSSP6, FEID, and PUTR2. Other indicator species might be CEMO2, PIFL, JUSC2, and spike fescue.

This class is initially (during the first 25yrs) dominated by shrub and herbaceous vegetation. Toward end of class, pine and juniper increase. When pine and juniper become dominant, tree canopy cover is 10-20%, and tree height reaches 4-8ft.

Maximum Tree Size Class

Seedling <4.5ft

Class B	26	Mid Development 1 - Open
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PIFL	Pieris floribunda	Mountain fetterbush	Upper
JUSC2	Juniperus scopulorum	Rocky mountain juniper	Upper
JUOS	Juniperus osteosperma	Utah juniper	Upper
ARTR2	Artemisia tridentata	Big sagebrush	Middle

Description

Trees are established but typically short and widely spaced. Grasses and herbs are sparse in shallow, rocky soils. On deeper-soiled sites, grasses and shrubs are prevalent. Another indicator species might be CEMO2.

Maximum Tree Size Class

Pole 5-9" DBH

Class C	40	Late Development 1 - Closed
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PIFL	Pieris floribunda	Mountain fetterbush	Upper
JUSC2	Juniperus scopulorum	Rocky mountain juniper	Upper
JUOS	Juniperus osteosperma	Utah juniper	Upper

Description

Mature trees. On shallow, rocky sites, trees dominate the site with sparse shrub-grass understory. On deeper-soiled sites, mature trees are co-dominant with shrub-grass understory with an increasing component of younger age class limber pine and juniper that will shade out shrubs and eventually leave a woodland site dominated by pine or pine-juniper overstory and grass understory.

It is possible that limber pine might not occur in this stage in some areas.

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	50
Mid1:OPN	51	Late1:CLS	100
Late1:CLS	101	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
Replacement Fire	Mid1:OPN	Early1:ALL	0.005	200	Yes	0
Replacement Fire	Late1:CLS	Early1:ALL	0.005	200	Yes	0
Insects or Disease	Late1:CLS	Early1:ALL	0.0066	152	Yes	0

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