

10510

Southern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest and Woodland

BpS Model/Description Version: Aug. 2020

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Vegetation Type

Forest and Woodland

Map Zones

18, 21

Geographic Range

Occurs throughout the southern Rockies, north and west into Utah, western Wyoming, and Idaho. Restricted to northern locations in map zone (MZ) 17. This Biophysical Setting (BpS) is restricted to dry, lower-elevation sites in the northwest portion of MZ18.

Biophysical Site Description

This type is generally located just above sagebrush ecosystems. These are mixed-conifer forests occurring on all aspects at elevations ranging from 1,200-3,300m (4,000-11,000ft). Rainfall averages <75cm (29in) per year, 40-60cm (16-24in) with summer "monsoons" during the growing season contributing substantial moisture in the eastern Great Basin. The composition and structure of overstory is dependent upon the temperature and moisture relationships of the site and the successional status of the occurrence. At lower elevations, this system occurs on north and east aspects. At higher elevations, all aspects may be represented.

Vegetation Description

Abies concolor with *Pseudotsuga menziesii* are most frequent; *Pinus ponderosa* is incidental but present more frequently in MZ18 (northwest area). *Pinus flexilis* is common in Nevada.

Pseudotsuga menziesii forests occupy drier sites, mostly in the northeastern corner of MZ17.

Abies concolor-dominated forests occupy cooler sites, such as upper slopes at higher elevations, canyon side slopes, ridge tops, and north- and east-facing slopes, which burn somewhat infrequently.

In MZ18, most occurrences of this system are dominated by a mix of *Pseudotsuga mensiesii* and *Pinus ponderosa* with lesser amounts of *Abies grandis*. Other typically seral species include *Pinus contorta*, *Pinus monticola*, and *Larix occidentalis*. *Picea engelmannii* and *Taxus brevifolia* become increasingly common toward the eastern edge of the range: *Tsuga heterophylla* and *Thuja plicata* may be associated on more mesic sites. *Abies grandis* (a fire-sensitive, shade-tolerant species) included on sites once dominated by *Pseudotsuga mensiesii* and *Pinus ponderosa*, which were formerly maintained by wildland fire. There are a number of cold-deciduous shrub and graminoid species common, including *Arctostaphylos uva-ursi*, *Mahonia*

repens, *Paxistima myrsinites*, *Symphoricarpos oreophilus*, *Jamesia americana*, *Quercus gambelii*, *Festuca arizonica*, *Symphoricarpos oreophilus*, and *Ceanothus*.

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
ABCO	<i>Abies concolor</i>	White fir
PIFL2	<i>Pinus flexilis</i>	Limber pine
CAGA3	<i>Carex garberi</i>	Elk sedge
CARU	<i>Calamagrostis rubescens</i>	Pinegrass
PSEUD7	<i>Pseudotsuga</i>	Douglas-fir
PICO	<i>Pinus contorta</i>	Lodgepole pine
PIPO	<i>Pinus ponderosa</i>	Ponderosa pine

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

Disturbance Description

Disturbance regime described here is for Douglas-fir. Fire regime is typically dominated by frequent low- and mixed-severity fires, but some portions of these sites are transition zones to fire regimes that are characterized by high-frequency, high-severity fires or moderate-frequency, low- and mixed-severity fires. Frequent surface and mixed-severity fires were the common fire regime characteristics. Surface fire intervals ranged from 10-50yrs, and replacement-severity occurred at intervals of 150-400yrs+ (Crane 1986; Barrett 1988; Bradley 1992a and 1992b; Brown 1994; Morgan et al. 1996). Mixed-severity fires were assumed to have an intermediate fire return interval of 45-75yrs on average. Stand-replacement fires were generally restricted to the closed canopy forest and the stand initiation conditions.

The high-frequency, low- and mixed-severity fire regime characteristics were facilitated by understory vegetation dominated by fine fuel (grasses, sedges, and forbs), landscape position, and adjacency to other frequent fire BpSs. Much of the forest structure was open canopy overstory that resulted in an understory dominated by healthy and vigorous plants (grasses, sedges, and forbs) and generally continuous fine fuel layer. This fine fuel facilitated fire spread and thinning of the conifer or aspen seedlings (thus promoting aspen suckering).

Other disturbances include insect outbreaks, disease, drought, and wind and ice damage. Competition among trees was also a factor that increasingly slowed successional dynamics in more closed stands. Fire was by far the dominant disturbance agent.

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	90	12		
Moderate (Mixed)	77	14		
Low (Surface)	14	74	10	50
All Fires	11	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

This BpS occurs in patches ranging from 1,000-10,000s of acres in many western locations; however, in MZs 12 and 17, patch size may be much smaller (<100ac).

Adjacency or Identification Concerns

The BpS may be too small to be mappable in MZ18 and should probably be included in BpS 1052 (Rocky Mountain Mesic Montane Mixed Conifer Forest and Woodland) due to the dominance of white fir and limber pine in the Great Basin.

If aspen is present in large patches or if conifers are not coming in after ~30yrs, the BpS is probably misclassified, and one of the pure aspen types should be examined (BpS 1011 Rocky Mountain Aspen Forest and Woodland or BpS 1061 Intermountain Basins Aspen-Mixed Conifer Forest and Woodland). Sites with a larger grand fir component and more mesic sites might be better classified as BpS 1052 as this system has less frequent fire due to cooler moister conditions.

BpS is often transitional between non-forested areas or between *Pinus ponderosa* woodlands (at lower elevations) and spruce-fir at higher elevations.

Issues or Problems

Douglas-fir is rare to absent in Nevada and the west desert of Utah. The current model was clearly developed for dry Douglas-fir forests. It needs to be determined whether forests dominated by limber pine and white fir will exhibit the same fire regimes.

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	A	A	A	A	A	A	A	A
Tree	5-10	C	C	C	B	B	B	B	B	B	B
Tree	10-25	D	D	D	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 22

Early Development 1 - All Structures

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
CARU	<i>Calamagrostis rubescens</i>	Pinegrass	Low-Mid
CAGA3	<i>Carex garberi</i>	Elk sedge	Low-Mid
PSME	<i>Pseudotsuga menziesii</i>	Douglas-fir	Upper
PIPO	<i>Pinus ponderosa</i>	Ponderosa pine	Upper

Description

Grass/forb/shrub/tree seedlings.

Maximum Tree Size Class

Seedling <4.5ft

Class B	7
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Mid Development 1 - Closed

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PSEUD7	<i>Pseudotsuga</i>	Douglas-fir	Upper
ABCO	<i>Abies concolor</i>	White fir	Upper
PIPO	<i>Pinus ponderosa</i>	Ponderosa pine	Upper
PICO	<i>Pinus contorta</i>	Lodgepole pine	Upper

Description

Closed stand with trees, poles, saplings, grass, and scattered shrub, 75-100% PIPO, PSME, white fir, and limber pine.

Maximum Tree Size Class

Pole 5-9" DBH

Class C	12
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Mid Development 1 - Open

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PIPO	<i>Pinus ponderosa</i>	Ponderosa pine	Upper
PSEUD7	<i>Pseudotsuga</i>	Douglas-fir	Upper
PIFL2	<i>Pinus flexilis</i>	Limber pine	Upper
ABCO	<i>Abies concolor</i>	White fir	Upper

Open trees (poles and saplings) of Douglas-fir (if present in the area) and occasional ponderosa pine with grass and scattered shrubs.

Pole 5-9" DBH

Indicator Species

Open large tree/grass and scattered shrubs; Douglas-fir with occasional ponderosa pine.

Large 21-33" DBH

Indicator Species

Closed large trees of Douglas-fir, white fir, limber pine, and occasional lodgepole pine, scattered shrubs.

Large 21-33" DBH

Deterministic Transitions

From Class	Begins at (yr)	Succeeds to	After (years)
Early1:ALL	0	Mid1:CLS	34
Mid1:OPN	35	Late1:OPN	104
Mid1:CLS	35	Late1:CLS	104
Late1:OPN	105	Late1:OPN	999

Late1:CLS	105	Late1:CLS	999
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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
Mixed Fire	Early1:ALL	Early1:ALL	0.01	100	No	0
Replacement Fire	Early1:ALL	Early1:ALL	0.04	25	Yes	0
Alternative Succession	Mid1:OPN	Late1:CLS	1	1	Yes	68
Wind or Weather or Stress	Mid1:OPN	Early1:ALL	0.001	1000	Yes	0
Replacement Fire	Mid1:OPN	Early1:ALL	0.0025	400	Yes	0
Competition or Maintenance	Mid1:OPN	Mid1:OPN	0.005	200	No	0
Insects or Disease	Mid1:OPN	Mid1:OPN	0.01	100	No	0
Mixed Fire	Mid1:OPN	Mid1:OPN	0.013	77	No	0
Surface Fire	Mid1:OPN	Mid1:OPN	0.1	10	No	0
Wind or Weather or Stress	Mid1:CLS	Early1:ALL	0.004	250	Yes	0
Replacement Fire	Mid1:CLS	Early1:ALL	0.007	143	Yes	0
Insects or Disease	Mid1:CLS	Mid1:OPN	0.01	100	Yes	0
Competition or Maintenance	Mid1:CLS	Mid1:CLS	0.01	100	No	0
Mixed Fire	Mid1:CLS	Mid1:OPN	0.0222	45	Yes	0
Alternative Succession	Late1:OPN	Late1:CLS	1	1	Yes	70
Competition or Maintenance	Late1:OPN	Late1:OPN	0.001	1000	No	0
Wind or Weather or Stress	Late1:OPN	Early1:ALL	0.001	1000	Yes	0
Replacement Fire	Late1:OPN	Early1:ALL	0.002	500	Yes	0
Insects or Disease	Late1:OPN	Late1:OPN	0.01	100	No	0
Mixed Fire	Late1:OPN	Late1:OPN	0.013	77	No	0
Surface Fire	Late1:OPN	Late1:OPN	0.1	10	No	0
Wind or Weather or Stress	Late1:CLS	Early1:ALL	0.004	250	Yes	0
Replacement Fire	Late1:CLS	Early1:ALL	0.007	143	Yes	0

Competition or Maintenance	Late1:CLS	Late1:CLS	0.01	100	No	0
Insects or Disease	Late1:CLS	Mid1:OPN	0.0125	80	Yes	0
Insects or Disease	Late1:CLS	Late1:OPN	0.0125	80	Yes	0
Surface Fire	Late1:CLS	Late1:CLS	0.02	50	No	0
Mixed Fire	Late1:CLS	Late1:OPN	0.0222	45	Yes	0

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