

10560

Rocky Mountain Subalpine Mesic-Wet Spruce-Fir Forest and Woodland

BpS Model/Description Version: Aug. 2020

Update: 3/18

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Vegetation Type

Forest and Woodland

Map Zones

16, 23

Geographic Range

Utah, Colorado, northern New Mexico and parts of Arizona.

Biophysical Site Description

Elevations typically range from 8,500-11,000ft in the subalpine zone on gentle to moderately steep terrain (e.g., 10-60% slope). These forests are found on gentle to very steep mountain slopes, high-elevation ridge tops and upper slopes, plateau like surfaces, basins, alluvial terraces, well-drained benches and inactive stream terraces. Drier sites may include lodgepole pine, and moister sites include Engelmann spruce and/or subalpine fir or blue spruce. Occurrences are typically found in locations with cold-air drainage or ponding, or where snowpacks linger late into the summer, such as north-facing slopes and high-elevation ravines. They can extend down in elevation below the subalpine zone in places where cold-air ponding occurs; northerly and easterly aspects predominate.

Vegetation Description

The overstory is typically dominated by Engelmann spruce and/or subalpine fir. Other tree species may include lodgepole pine, aspen, limber pine, bristlecone pine and Douglas-fir (lodgepole pine does not occur south of 38 degrees, 30 minutes [approximate]). Common understory species include *Ribes* spp, *Pachistima myrsinites* and *Arnica* spp. Mesic understory shrubs include *Rhododendron albiflorum*, *Amelanchier alnifolia*, *Rubus parviflorus*, *Ledum glandulosum*, *Phyllodoce empetrifloris*, and *Salix* spp. Herbaceous species include *Actaea rubra*, *Maianthemum stellatum*, *Cornus canadensis*, *Erigeron eximius*, *Saxifraga bronchialis*, *Luzula glabrata* var. *hitchcockii* or *Calamagrostis canadensis*.

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
PIEN	<i>Picea engelmannii</i>	Engelmann spruce
ABLA	<i>Abies lasiocarpa</i>	Subalpine fir
PICO	<i>Pinus contorta</i>	Lodgepole pine
RIBES	<i>Ribes</i>	Currant

PAMY	<i>Paxistima myrsinites</i>	Oregon boxleaf
MARE11	<i>Mahonia repens</i>	Creeping barberry
ARNIC	<i>Arnica</i>	Arnica

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

Disturbance Description

Fire Regime is primarily long-interval (e.g., 200-500yr) stand replacement fires, with mixed severity fire (e.g., 1,000yr) occurring in open conditions. Disturbances also include insect/disease and windthrow events than thin younger closed stands.

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	217	97	200	300
Moderate (Mixed)	6935	3		
Low (Surface)				
All Fires	211	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

Patch sizes vary but are mostly in the 100s of acres, with rare very large patches (disturbances) in the thousands of acres. There may be frequent small disturbances in the 10s of acres or less.

Adjacency or Identification Concerns

Generally higher elevation than Rocky Mountain Subalpine Dry-Mesic Spruce Fir Forest and Woodland, but may also be interspersed with it in more mesic microsites. The Rocky Mountain Subalpine Dry-Mesic Spruce Fir Forest and Woodland (1055) is more common than Rocky Mountain Subalpine Mesic Spruce Fir Forest and Woodland.

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 aspen types should be examined (Rocky Mountain Aspen Forest and Woodland [1011]).

Lodgepole pine does not occur in this BpS south of 38 degrees, 30 minutes (approximate).

Issues or Problems

Modelers were not convinced that enough of this BpS exists in MZ16 to be mappable. The dry-mesic spruce-fir is more common and shares the same successional dynamics.

Native Uncharacteristic Conditions

Comments

MZs 16 and 23 were combined during 2015 BpS Review.

Additional author is Beth Corbin, ecorbin@fs.fed.us.

In zones 16 and 23 BpS 10560 and 10550 have the same state-and-transition model, but the descriptions are different.

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	C	B	B	B	B	B	B
Tree	10-25	C	C	C	C	B	B	B	B	B	B
Tree	25-50	C	C	C	C	D	D	D	D	D	D
Tree	>50	C	C	C	C	D	D	D	D	D	D

Succession class letters A-E are described in the Succession Class Description section. Some classes use a leaf form 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 21 Early Development 1 - All Structures

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
BRMA4	Bromus marginatus	Mountain brome	Lower
PIEN	Picea engelmannii	Engelmann spruce	Upper
ABLA	Abies lasiocarpa	Subalpine fir	Upper

Description

Early succession after moderately-long to long interval replacement fires. Within 40yrs, conifers will replace herbaceous vegetation and shrubs. Occasionally, a lack of seed source of conifer may maintain this condition (modeled as competition/maintenance).

Maximum Tree Size Class

Sapling >4.5ft; <5"DBH

Class B 28 Mid Development 1 - Closed

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PIEN	Picea engelmannii	Engelmann spruce	Upper

ABLA	<i>Abies lasiocarpa</i>	Subalpine fir	Upper
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Description

Shade tolerant- and mixed conifer saplings to poles. Spruce and fir dominate and canopy is dense. Dog-hair conditions in this state may maintain the mid-development closed condition.

Maximum Tree Size Class

Medium 9-21"DBH

Class C	14	Mid Development 1 - Open
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PIEN	<i>Picea engelmannii</i>	Engelmann spruce	None
ABLA	<i>Abies lasiocarpa</i>	Subalpine fir	None

Description

Primarily moderately tolerant saplings to poles (1-6.9" DBH) spruce and fir. Mixed severity fires may occur on small portions of this class and maintain the mid-development open condition.

Maximum Tree Size Class

Medium 9-21"DBH

Class D	37	Late Development 1 - Closed
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PIEN	<i>Picea engelmannii</i>	Engelmann spruce	Upper
ABLA	<i>Abies lasiocarpa</i>	Subalpine fir	Upper

Description

Pole and larger diameter moderately to shade tolerant conifer species, in moderate to large size patches, all aspects. Spruce and fir dominate.

Maximum Tree Size Class

Large 21-33"DBH

Model Parameters

Deterministic Transitions

From Class	Begins at (yr)	Succeeds to	After (years)
Early1:ALL	0	Mid1:CLS	39
Mid1:OPN	40	Late1:CLS	129
Mid1:CLS	40	Late1:CLS	129
Late1:CLS	130	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
Competition or Maintenance	Early1:ALL	Early1:ALL	0.002	500	No	0
Replacement Fire	Early1:ALL	Early1:ALL	0.005	200	Yes	0
Mixed Fire	Mid1:OPN	Mid1:OPN	0.001	1000	No	0
Replacement Fire	Mid1:OPN	Early1:ALL	0.005	200	Yes	0
Competition or Maintenance	Mid1:CLS	Mid1:CLS	0.001	1000	No	0
Replacement Fire	Mid1:CLS	Early1:ALL	0.005	200	Yes	0
Insects or Disease	Mid1:CLS	Mid1:OPN	0.007	143	Yes	0
Wind or Weather or Stress	Late1:CLS	Late1:CLS	0.001	1000	No	0
Replacement Fire	Late1:CLS	Early1:ALL	0.004	250	Yes	0
Insects or Disease	Late1:CLS	Early1:ALL	0.004	250	Yes	0

References

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