

10550

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

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2014

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Vegetation Type

Forest and Woodland

Map Zone

17

Geographic Range

Subalpine forests the Great Basin (eastern California, Nevada, and Utah).

Biophysical Site Description

Dry-mesic fir forest are the matrix forests of the subalpine zone, with elevations ranging from 2,100-3,355m (7,000-11,000ft). Sites within this system are cold year-round, and precipitation is predominantly in the form of snow, which may persist until late summer. Snowpacks are deep and late-lying, and summers are cool. Frost is possible almost all summer and may be common in restricted topographic basins and benches.

Vegetation Description

Subalpine fir forests comprise a substantial part of this subalpine forest, accompanied by *Pinus albicaulis* and/or *Pinus flexilis*. The amount of *Pinus* in stands (and species occurrence) depends on moisture limitations, some stands can be quite droughty. *Populus tremuloides* stands are common on early seral moist sites. *Abies lasiocarpus* increases in importance or replaces *Picea engelmannii* with increasing distance from the regions of Montana and Idaho where maritime air masses influence the climate. Fire is an important disturbance factor, but fire regimes have a long return interval and so are often stand-replacing. *Abies lasiocarpus* can rapidly recolonize and dominate burned sites, or can succeed other species such as *Pinus albicaulis*, *P. flexilis* or *Populus tremuloides*. Old growth characteristics in *Abies lasiocarpa* forests will include treefall and windthrow gaps in the canopy, with large downed logs, rotting woody material, tree seedling establishment on logs or on mineral soils unearched in root balls, and snags.

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
ABLA	<i>Abies lasiocarpa</i>	Subalpine fir
PIAL	<i>Pinus albicaulis</i>	Whitebark pine
PIFL2	<i>Pinus flexilis</i>	Limber pine

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

Disturbance Description

Primarily long-interval (150-200yrs) stand replacement fires, with mixed severity fire (1,000yrs) occurring in open conditions. Disturbances also include insect/disease every 100-150yrs, and windthrow events that thin younger closed stands.

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	177	99		
Moderate (Mixed)	16077	1	1000	1000
Low (Surface)				
All Fires	175	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 10s and 100s of acres. There may be frequent small disturbances in the 10s of acres or less.

Adjacency or Identification Concerns

It is important not to confuse adjacent mountain sagebrush systems (Biophysical Setting [BpS] 1126 Inter-Mountain Basins Montane Sagebrush Steppe) with early development stages of this system. BpS 1156 may be imbedded in BpS 1055.

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 (BpS 1011 or 1061).

Issues or Problems

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	C	B	B	B	B	B	B
Tree	10-25	C	C	C	C	D	D	D	D	D	D
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

Description

Class A	34	Early Development 1 - All Structures
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
FEID	<i>Festuca idahoensis</i>	Idaho fescue	Lower
PSSP	<i>Psilostrophe sparsiflora</i>	Greenstem paperflower	Lower
ABLA	<i>Abies lasiocarpa</i>	Subalpine fir	Upper
PINUS	<i>Pinus</i>	Pine	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	24	Mid Development 1 - Closed
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
ABLA	<i>Abies lasiocarpa</i>	Subalpine fir	Upper
PIAL	<i>Pinus albicaulis</i>	Whitebark pine	Upper
PIFL2	<i>Pinus flexilis</i>	Limber pine	Upper

Description

Shade tolerant and mixed conifer saplings to poles. Fir dominates, some pine is present, but showing signs of light competition stress. 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	6	Mid Development 1 - Open
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
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ABLA	Abies lasiocarpa	Subalpine fir	Upper
PIAL	Pinus albicaulis	Whitebark pine	Middle
PIFL2	Pinus flexilis	Limber pine	Middle

Description

Primarily moderately tolerant saplings to poles (1-6.9in DBH) and <50% canopy cover of fir and pine that is intermediate or suppressed.

Maximum Tree Size Class

Medium 9-21"DBH

Class D 36 Late Development 1 - Closed

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
ABLA	Abies lasiocarpa	Subalpine fir	Upper
PIAL	Pinus albicaulis	Whitebark pine	Low-Mid
PIFL2	Pinus flexilis	Limber pine	Low-Mid

Description

Pole and larger diameter moderately to shade tolerant conifer species, in moderate to large size patches, all aspects. Fir dominates, pine is intermediate or suppressed/dying. This class will self-perpetuate if no disturbances cause a transition.

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	79
Mid1:CLS	40	Late1:CLS	79
Late1:CLS	80	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	0.007	143	Yes	0
Insects or Disease	Late1:CLS	Early1:ALL	0.01	100	Yes	0

References

Bradley, A.F., N.V. Noste and W.C. Fisher. 1992. Fire ecology of forests and woodlands in Utah. Ge. Tech. Rep. INT-287. Ogden, UT: USDA Forest Service, Intermountain Research Station. 128 pp.

DeVelice, R.L., J.A. Ludwig, W.H. Moir and F. Ronco, Jr. 1986. A Classification of Forest Habitat Types of Northern New Mexico and Southern Colorado. USDA Forest Service. Rocky Mountain Forest and Range Experiment Station. GTR RM-131.

Komarkova, V., R.A. Alexander and B.C. Johnston. 1988. Forest Vegetation of the Gunnison and Parts of the Uncompahgre National Forests: A Preliminary Habitat Type Classification. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station. GTR RM-163.

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

Veblen, T.T., K.S. Hadley, E.M. Nel, T. Kitzberger, M. Reid and R. Vellalba. 1994. Disturbance regime and disturbance interactions in a Rocky Mountain subalpine forest. Journal of Ecology 82: 125-135.