

10580

Sierra Nevada Subalpine Lodgepole Pine Forest and Woodland

BpS Model/Description Version: Aug. 2020

Modelers		Reviewers	
Anthony Caprio	tony_caprio@nps.gov	None	None
None	None	None	None
None	None	None	None

Vegetation Type

Forest and Woodland

Map Zone

12

Geographic Range

Cold, wet lodgepole pine is distributed in the upper montane of the central and southern portions of the Sierra Nevada. Stands are typically located at elevations ranging from ~2,000m-3,200m (Potter 1994).

Biophysical Site Description

Wet, cold lodgepole pine occurs on upper montane sites, usually on gently rolling lower slopes and drainage bottoms (Potter 1994, 1998). Stands are typically in broken terrain, and thus few large contiguous areas of this type exist. Climate is Mediterranean with wet winters (Nov.-Apr.) and dry summers, although summer thunderstorms occur sporadically. Sites are moist and more productive than dry, cool subalpine lodgepole. Fuels are composed of a matrix of herbaceous vegetation and pine debris.

Vegetation Description

The understory is diverse with graminoids and forbs (cover >50%). Tree cover is generally moderate to dense. At lower elevations, there is an increasing dominance of red fir and western white pine. Lodgepole can be seral to these species and at higher elevations mountain hemlock.

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
PICO	<i>Pinus contorta</i>	Lodgepole pine
ARNE	<i>Arctostaphylos nevadensis</i>	Pinemat manzanita
CECO	<i>Ceanothus cordulatus</i>	Whitethorn ceanothus
CELE3	<i>Cercocarpus ledifolius</i>	Curl-leaf mountain mahogany
CHSE11	<i>Chrysolepis sempervirens</i>	Bush chinquapin
PHBR4	<i>Phyllodoce breweri</i>	Purple mountainheath
RIMO2	<i>Ribes montigenum</i>	Gooseberry currant

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

Disturbance Description

Disturbance patterns have been poorly studied in Sierra lodgepole pine. Sierra lodgepole has been described as not being a fire type (Barbour and Minnich 2000) or as having long intervals

Fire Frequency

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.

Fire size from small (few hectares) to 100s of hectares. Disturbance scale in areas with long to short FRI is variable. Most fires are small (<1ha), but the less common large fires affect large areas (10s to 100s ha).

Red fir or white fir types may occur downslope of this type in the Oregon and northern California Cascades. Mountain hemlock or fell fields can occur upslope.

Limited information about disturbance is available. Available information from limited geographical range of sites. Divergent fire occurrence patterns ranging from moderate frequency to very long FRI in vegetation type. Differences may be related to ignition and fire spread probabilities or lack of data. Information applied to this type in most reviews was derived from studies in the Klamath Mountains rather than the Sierra.

Comments

Mapping Rules

[illegible]

Tree	0-5	A	A	A	A	A	A	A	A	A	A
Tree	5-10	C	C	C	C	C	B	B	B	B	B
Tree	10-25	D	D	D	D	D	E	E	E	E	E
Tree	25-50	D	D	D	D	D	E	E	E	E	E
Tree	>50	D	D	D	D	D	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	6	Early Development 1 - All Structures
----------------	----------	---

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PICO	Pinus contorta	Lodgepole pine	Middle

Description

Lodgepole pine regeneration following stand-replacing fire (severe understory fire or canopy fire). Moderate density to doghair thickets.

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
PICO	Pinus contorta	Lodgepole pine	Upper

Description

Mid-maturity lodgepole pine undergoing intrinsic stand thinning. Considerable surface fuel from tree mortality from previous fire.

Maximum Tree Size Class

Medium 9-21"DBH

Class C	6	Mid Development 1 - Open
----------------	----------	---------------------------------

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PICO	Pinus contorta	Lodgepole pine	Upper

Description

Mid-maturity lodgepole pine where surface fire or other disturbance has opened the stand.

Maximum Tree Size Class

Medium 9-21"DBH

Class D	5	Late Development 1 - Open
----------------	----------	----------------------------------

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PICO	Pinus contorta	Lodgepole pine	Upper

Description

Areas that have experienced one or more low-severity understory fires that had reduced stand density or old stands that have not experienced fire but have been thinned by other processes (tree falls, etc.). Stands are uneven-aged.

Maximum Tree Size Class

Large 21-33" DBH

Class E	55	Late Development 1 - Closed
----------------	-----------	------------------------------------

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PICO	Pinus contorta	Lodgepole pine	Upper

Description

Old stands where fire has had minimal influence.

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	9
Mid1:CLS	10	Late1:CLS	49
Mid1:OPN	15	Late1:OPN	69
Late1:CLS	50	Late1:CLS	480
Late1:OPN	70	Late1:CLS	119

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	0.001	1000	Yes	0
Mixed Fire	Early1:ALL	Early1:ALL	0.033	30	No	0
Alternative Succession	Mid1:OPN	Mid1:CLS	1	1	Yes	15
Wind or Weather or Stress	Mid1:OPN	Early1:ALL	0.001	1000	Yes	0
Insects or Disease	Mid1:OPN	Early1:ALL	0.001	1000	Yes	0
Replacement Fire	Mid1:OPN	Early1:ALL	0.004	250	Yes	0
Surface Fire	Mid1:OPN	Mid1:OPN	0.02	50	No	0
Mixed Fire	Mid1:OPN	Mid1:OPN	0.033	30	No	0
Insects or Disease	Mid1:CLS	Mid1:CLS	0.0005	2000	No	0

Insects or Disease	Mid1:CLS	Early1:ALL	0.0005	2000	Yes	0
Insects or Disease	Mid1:CLS	Mid1:OPN	0.001	1000	Yes	0
Replacement Fire	Mid1:CLS	Early1:ALL	0.007	143	Yes	0
Mixed Fire	Mid1:CLS	Mid1:OPN	0.01	100	Yes	0
Wind or Weather or Stress	Late1:OPN	Late1:OPN	0.001	1000	No	0
Insects or Disease	Late1:OPN	Early1:ALL	0.001	1000	Yes	0
Replacement Fire	Late1:OPN	Early1:ALL	0.004	250	Yes	0
Surface Fire	Late1:OPN	Late1:OPN	0.02	50	No	0
Mixed Fire	Late1:OPN	Late1:OPN	0.033	30	No	0
Wind or Weather or Stress	Late1:CLS	Late1:OPN	0.001	1000	Yes	0
Insects or Disease	Late1:CLS	Late1:OPN	0.001	1000	Yes	0
Insects or Disease	Late1:CLS	Early1:ALL	0.001	1000	Yes	0
Replacement Fire	Late1:CLS	Early1:ALL	0.007	143	Yes	0
Mixed Fire	Late1:CLS	Late1:CLS	0.02	50	No	0

References

Agee, J.K. 1990. The historical role of fire in Pacific Northwest forests. In: J.D. Walstad, S.R. Radosovich, D.V. Sandberg, eds. Natural and prescribed fire in Pacific Northwest forests. Corvallis: Oregon State University Press: 25-38.

Agee, J.K. 1993. Fire Ecology of Pacific Northwest Forests. Island Press, Washington, DC. 494 pp.

Husari, S.J. and K.S. Hawk. 1994. The role of past and present disturbance in California ecosystems. Draft Region 5 Ecosystem Management Guidebook, Vol. 2, Appendices I–C. San Francisco: U.S. Forest Service, Pacific Southwest Region.

Keeley, J.E. 1980. Reproductive cycles and fire regimes. Pages 231-277 in: H.A. Mooney, T.M. Bonnicksen, N.L. Christensen, J.E. Lotan and W.A. Reiners, tech coord. Proceedings of the Conference: Fire Regimes and Ecosystem Properties. Dec. 11- 15, 1978, Honolulu, Hawaii. USDA Forest Service, GTR- WO-26, 594 pp.

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

Potter, D. 1994. Guide to Forested Communities of the Upper Montane in the Central and Southern Sierra Nevada. R5-ECOL-TP-003.

Potter, D.A. 1998. Forested communities of the upper montane in the central and southern Sierra Nevada. Gen. Tech. Rep. PSW-GTR-169. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture; 319 pp.

Parker, A.J. 1986. Persistence of lodgepole pine forests in the central Sierra Nevada. *Ecology* 67: 1560–67.

Parker, A.J. 1988. Stand structure in subalpine forests of Yosemite National Park, California. *For. Sci.* 34: 1047-1058.

Taylor, A.H. and M.N. Solem. 2001. Fire regimes and stand dynamics in an upper montane forest landscape in the southern Cascades, Caribou Wilderness, California. *J. Torrey Bot. Soc.* 128: 350-361.