

10322

Mediterranean California Red Fir Forest -- Southern Sierra

BpS Model/Description Version: Aug. 2020

Modelers		Reviewers	
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None	None	None	None

Vegetation Type

Forest and Woodland

Map Zone

6

Model Splits or Lumps

This Biophysical Setting (BpS) is split into multiple models; 10322 is a relatively southern variant that includes significant western white pine and lacks white fir.

Geographic Range

Occurs from the vicinity of Crater Lake, Oregon, south through the Cascades and the Sierra Nevada into northern Kern County at Sunday Peak. An arm also extends south through the Coast Ranges to Snow Mountain in Lake County (Potter et al. 1992).

Biophysical Site Description

In the southern Sierra Nevada where this type is most dominant, it is found between 7,200ft and 9,800ft. At higher elevations and in the southern Sierra Nevada, fuels are relatively more discontinuous than northern locations because the terrain is broken up by natural breaks such as rock outcrops, lava reefs, wet meadows, etc. Fuels may be more continuous at the northern end of the range, where this vegetation type is found at lower elevations.

Vegetation Description

Abies magnifica is dominant, contributing ~75% of stand cover. *Pinus monticola* contributes 20% of the cover. *P. contorta* can contribute up to 20% cover. *Tsuga mertensiana* can be locally important on some northern exposures. *Abies concolor* is generally absent (<5% cover).

Vegetation often contains a considerable abundance of shrubs.

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
ABMA	<i>Abies magnifica</i>	California red fir
PIMO3	<i>Pinus monticola</i>	Western white pine
PICO	<i>Pinus contorta</i>	Lodgepole pine
TSME	<i>Tsuga mertensiana</i>	Mountain hemlock

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

Disturbance Description

This BpS is primarily in fire regime group III, but because of slow fuel accumulation rates it is possible to have 35- to 150-yr-frequency surface fire in some classes (lower frequency for BpS

as a whole). The discontinuous nature of the fuels limits extent of fires, and although fires may burn less often, they may burn at high severities. Larger and more frequent moderate-intensity fires occur, on average, every 60-70yrs. High-intensity crown fires are rare, occurring every few hundred years. Overall mean fire return interval is approximately 35-50yrs (Pitcher 1987; Taylor 2000; Bekker and Taylor 2001; Skinner 2000).

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	293	18		
Moderate (Mixed)	315	16		
Low (Surface)	78	66		
All Fires	51	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

None

Adjacency or Identification Concerns

Mixes at lower elevation with red fir-white pine (R1RFWF). White fir begins to contribute significantly to overstory cover in these lower elevation mixes.

Distinguished from 10321 by the co-dominance of western white pine. Another aspect that differentiates 10321 from 10322 is the more frequent occurrence of rock outcrops and/or high rock content in the soil.

This BpS has been logged in certain areas and, therefore, not as much exists currently as existed historically (Provencher, pers. comm.).

Issues or Problems

The limitations of the LANDFIRE modeling process (limited use of time-since-disturbance, five boxes, and inability to model climate variability) prevent our representing some of the nuances of this system. As a result, replacement fire appears to be too short, but the overall fire regime and landscape proportions are representative.

Native Uncharacteristic Conditions

Comments

None

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	A	A	A	A	A	A	A	A	A	A
Tree	10-25	C	C	C	C	B	B	B	B	B	B
Tree	25-50	D	D	D	D	E	E	E	E	E	E
Tree	>50	D	D	D	D	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	8	Early Development 1 - All Structures
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PIMO3	<i>Pinus monticola</i>	Western white pine	Upper
PICO	<i>Pinus contorta</i>	Lodgepole pine	Upper
ABMA	<i>Abies magnifica</i>	California red fir	Upper

Description

Regeneration of *Pinus monticola* and *P. contorta* from seed following a stand-replacing fire. *Abies magnifica* comes in over time. Shrub cover (e.g., *Arctostaphylos* spp., *Ceanothus velutinus*, *Chrysolepis sempervirens*) is an important component.

Maximum Tree Size Class

Sapling >4.5ft; <5" DBH

Class B	10	Mid Development 1 - Closed
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
ABMA	<i>Abies magnifica</i>	California red fir	Upper

PIMO3	<i>Pinus monticola</i>	Western white pine	Upper
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Description

More than 40% cover of mid-mature *Abies magnifica*, with various amounts of *Pinus monticola*. Usually minor amounts of shrubs and herbs, although *Arctostaphylos* spp. or *Chrysolepis sempervirens* can contribute to a dense understory.

Maximum Tree Size Class

Pole 5-9" DBH

Class C	20	Mid Development 1 - Open
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
ABMA	<i>Abies magnifica</i>	California red fir	Upper
PIMO3	<i>Pinus monticola</i>	Western white pine	Upper

Description

Less than 40% cover of mid-mature *Abies magnifica*, with various amounts of *Pinus monticola*. Usually minor amounts of shrubs and herbs, although *Arctostaphylos* spp. or *Chrysolepis sempervirens* can contribute to a dense understory.

Maximum Tree Size Class

Pole 5-9" DBH

Class D	45	Late Development 1 - Open
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
ABMA	<i>Abies magnifica</i>	California red fir	Upper
PIMO3	<i>Pinus monticola</i>	Western white pine	Upper
PICO	<i>Pinus contorta</i>	Lodgepole pine	Upper
TSME	<i>Tsuga mertensiana</i>	Mountain hemlock	Upper

Description

Less than 40% cover of mature *Abies magnifica* and *Pinus monticola*, with a shrub cover of *Arctostaphylos nevadensis* and *Chrysolepis sempervirens*.

Maximum Tree Size Class

Medium 9-21" DBH

Class E	17	Late Development 1 - Closed
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
ABMA	<i>Abies magnifica</i>	California red fir	Upper
PIMO3	<i>Pinus monticola</i>	Western white pine	Upper
PICO	<i>Pinus contorta</i>	Lodgepole pine	Upper
TSME	<i>Tsuga mertensiana</i>	Mountain hemlock	Upper

Description

More than 40% cover of mature *Abies magnifica* and *Pinus monticola*, with some *P. contorta* occurring in the understory.

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:CLS	54
Mid1:OPN	55	Late1:OPN	159
Mid1:CLS	55	Late1:CLS	139
Late1:CLS	140	Late1:CLS	999
Late1:OPN	160	Late1:OPN	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
Alternative Succession	Early1:ALL	Mid1:OPN	0.015	67	Yes	0
Alternative Succession	Early1:ALL	Mid1:CLS	0.015	67	Yes	0
Replacement Fire	Early1:ALL	Early1:ALL	0.0167	60	Yes	0
Alternative Succession	Mid1:OPN	Mid1:CLS	1	1	Yes	100
Mixed Fire	Mid1:OPN	Early1:ALL	0.0005	2000	Yes	0
Insects or Disease	Mid1:OPN	Mid1:OPN	0.002	500	No	0
Replacement Fire	Mid1:OPN	Early1:ALL	0.002	500	Yes	0
Mixed Fire	Mid1:OPN	Mid1:OPN	0.0025	400	No	0
Surface Fire	Mid1:OPN	Mid1:OPN	0.015	67	No	0
Mixed Fire	Mid1:CLS	Mid1:OPN	0.0018	556	Yes	0

Mixed Fire	Mid1:CLS	Early1:ALL	0.0018	556	Yes	0
Surface Fire	Mid1:CLS	Mid1:OPN	0.0035	286	Yes	0
Surface Fire	Mid1:CLS	Mid1:CLS	0.0035	286	No	0
Replacement Fire	Mid1:CLS	Early1:ALL	0.0035	286	Yes	0
Insects or Disease	Mid1:CLS	Mid1:OPN	0.008	125	Yes	0
Alternative Succession	Late1:OPN	Late1:CLS	1	1	Yes	100
Mixed Fire	Late1:OPN	Early1:ALL	0.0005	2000	Yes	0
Insects or Disease	Late1:OPN	Late1:OPN	0.001	1000	No	0
Replacement Fire	Late1:OPN	Early1:ALL	0.0015	667	Yes	0
Mixed Fire	Late1:OPN	Late1:OPN	0.003	333	No	0
Surface Fire	Late1:OPN	Late1:OPN	0.018	56	No	0
Mixed Fire	Late1:CLS	Late1:OPN	0.0017	588	Yes	0
Mixed Fire	Late1:CLS	Early1:ALL	0.0017	588	Yes	0
Surface Fire	Late1:CLS	Late1:OPN	0.0034	294	Yes	0
Surface Fire	Late1:CLS	Late1:CLS	0.0034	294	No	0
Replacement Fire	Late1:CLS	Early1:ALL	0.0034	294	Yes	0
Insects or Disease	Late1:CLS	Late1:OPN	0.004	250	Yes	0

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