

10321

Mediterranean California Red Fir Forest -- Cascades

BpS Model/Description Version: Aug. 2020

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Vegetation Type

Forest and Woodland

Map Zone

6

Model Splits or Lumps

This Biophysical Setting (BpS) is split into multiple models; 10321 is the northern expression and lacks western white pine, but includes some 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

Occurs in the upper montane at high elevation. Elevation ranges from 5,900-7,900ft in northern California and 7,900-9,200ft in southern California. This type is more dominant in the southern Cascades of California and the northern Sierra Nevada. Fuels are relatively continuous.

Vegetation Description

Both *Abies magnifica* and *A. concolor* are present in the overstory in significant amounts. *Pinus jeffreyi*, *P. contorta*, and mixed conifer species can also be present in lesser amounts. *P. monticola* is sometimes present but usually contributes <5% of basal area. Tree cover generally exceeds 60%, with shrubs and herbs contributing <30% cover each. If shrub cover is higher, the shrubs are short or prostrate.

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
ABMA	<i>Abies magnifica</i>	California red fir
ABCO	<i>Abies concolor</i>	White fir
PIJE	<i>Pinus jeffreyi</i>	Jeffrey pine
PICO	<i>Pinus contorta</i>	Lodgepole pine

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

Disturbance Description

Windthrow causes tree-size gaps that release already established individuals in the understory. Primarily fire regime groups I and III. Most fires occur in the late season during tree dormancy. Fire complexity is moderate to high, and fire size averages approximately 400ac. It is very

difficult to determine the replacement fire return interval in this BpS. Replacement fire likely varies with slope position (upper slope > mid slope > lower slope), and landscapes with greater topographic variation are likely to experience more stand-replacement fire. A considerable range of values has been reported in the literature for mixed and surface fires (Taylor and Solem 2001; Taylor and Halpern 1991; Taylor 1993; Bekker and Taylor 2001).

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	151	23		
Moderate (Mixed)	177	19		
Low (Surface)	58	58		
All Fires	34	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

Fire size ranges from 30-1,800ac, with an average of 405ac (Bekker and Taylor 2001).

Adjacency or Identification Concerns

The lower elevation edge of this type mixes with mixed conifer (1027 and 1028), especially mixed conifer dominated by *Abies concolor*. The upper elevation mixes with red fir-white pine (R1RFP in the RA).

This BpS may be similar to the PNVG R#REFI for the Pacific Northwest model zone. R#REFI describes ecologically distinct Shasta red fir (*Abies magnifica* var. *shastensis*), which includes less surface fire than R1RFP or R1RFP.

If western white pine is present, use 10322.

This BpS does not have much old growth left in areas. Much of this BpS has been converted to lodgepole. This type used to be more prevalent historically (Provencher, pers. comm.).

Issues or Problems

The limitations of the modeling process (limited use of TSD, 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

Succession Classes

Mapping Rules

		Canopy Cover (%)
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Upper Layer Lifeform	Height (m)	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	C	B	B	B	B	B
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 16 Early Development 1 - All Structures

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
ABMA	<i>Abies magnifica</i>	California red fir	Upper
PIJE	<i>Pinus jeffreyi</i>	Jeffrey pine	Upper

Description

Re-generation of *Abies magnifica* and *A. concolor*, perhaps *Pinus jeffreyi* or *P. lambertiana* from seed, following a severe or stand-replacing fire. Shrub cover varies. PICO an important associate in the Cascade and Klamath mountains.

Maximum Tree Size Class

Sapling >4.5ft; <5" DBH

Class B 19 Mid Development 1 - Closed

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
ABMA	<i>Abies magnifica</i>	California red fir	None

Description

Symbol	Scientific Name	Common Name	Canopy Position
ABMA	<i>Abies magnifica</i>	California red fir	None
ABCO	<i>Abies concolor</i>	White fir	None
PIJE	<i>Pinus jeffreyi</i>	Jeffrey pine	None

Description

Mature *Abies magnifica*, *A. concolor*, *Pinus jeffreyi*, and other species. More than 40% canopy cover dominated by large *Abies magnifica* in pure to mixed stands.

Maximum Tree Size Class

Very Large >33" DBH

Model Parameters

Deterministic Transitions

From Class	Begins at (yr)	Succeeds to	After (years)
Early1:ALL	0	Mid1:CLS	49
Mid1:OPN	30	Late1:OPN	139
Mid1:CLS	50	Late1:CLS	119
Late1:CLS	120	Late1:CLS	999
Late1:OPN	140	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	0.005	200	Yes	0
Alternative Succession	Early1:ALL	Mid1:CLS	0.015	67	Yes	0
Replacement Fire	Early1:ALL	Early1:ALL	0.025	40	Yes	0
Alternative Succession	Mid1:OPN	Mid1:CLS	1	1	Yes	65
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	Early1:ALL	0.002	500	Yes	0
Mixed Fire	Mid1:OPN	Mid1:OPN	0.005	200	No	0
Surface Fire	Mid1:OPN	Mid1:OPN	0.03	33	No	0
Mixed Fire	Mid1:CLS	Mid1:CLS	0.0025	400	No	0
Mixed Fire	Mid1:CLS	Early1:ALL	0.0025	400	Yes	0
Mixed Fire	Mid1:CLS	Mid1:OPN	0.0033	303	Yes	0
Replacement Fire	Mid1:CLS	Early1:ALL	0.0041	244	Yes	0
Insects or Disease	Mid1:CLS	Mid1:OPN	0.006	167	Yes	0
Surface Fire	Mid1:CLS	Mid1:CLS	0.009	111	No	0
Alternative Succession	Late1:OPN	Late1:CLS	1	1	Yes	65
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	0.002	500	Yes	0
Mixed Fire	Late1:OPN	Late1:OPN	0.0045	222	No	0
Surface Fire	Late1:OPN	Late1:OPN	0.035	29	No	0

Mixed Fire	Late1:CLS	Late1:OPN	0.002	500	Yes	0
Mixed Fire	Late1:CLS	Late1:CLS	0.002	500	No	0
Insects or Disease	Late1:CLS	Late1:OPN	0.004	250	Yes	0
Mixed Fire	Late1:CLS	Early1:ALL	0.004	250	Yes	0
Replacement Fire	Late1:CLS	Early1:ALL	0.0041	244	Yes	0
Surface Fire	Late1:CLS	Late1:CLS	0.006	167	No	0

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