10321

Mediterranean California Red Fir Forest -- Cascades

BpS Model/Description Version: Aug. 2020

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| --- | --- | --- | --- |
| **Modelers** |  | **Reviewers** |  |
| Hugh Safford | hughsafford@fs.fed.us | None | None |
| Joe Sherlock | jsherlock@fs.fed.us | None | None |
| 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; 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 | *Abies magnifica* | California red fir |
| ABCO | *Abies concolor* | White fir |
| PIJE | *Pinus jeffreyi* | Jeffrey pine |
| PICO | *Pinus contorta* | 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 (R1RFWP 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 R1RFWF or R1RFWP.

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**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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 | 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 | Abies magnifica | California red fir | Upper |
| PIJE | Pinus jeffreyi | 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 | Abies magnifica | California red fir | None |

Description

Mid-mature *Abies magnifica* with various amounts of other species. Shrub cover varies. More than 40% cover by *Abies magnifica*, *A. concolor*,or *Pinus jeffreyi* saplings, poles, and small trees. PICO an important associate in the Cascade and Klamath mountains.

*Maximum Tree Size Class*  
Medium 9-21" DBH

Class C 17 Mid Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| ABMA | Abies magnifica | California red fir | None |
| ABCO | Abies concolor | White fir | None |
| PIJE | Pinus jeffreyi | Jeffrey pine | None |

Description

Scattered, mid-mature *Abies magnifica*, with various amounts of other species. Shrub cover varies. More than 40% cover by *Abies magnifica*, *A. concolor*,or *Pinus jeffreyi*.

*Maximum Tree Size Class*  
Medium 9-21" DBH

Class D 27 Late Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| ABMA | Abies magnifica | California red fir | None |
| ABCO | Abies concolor | White fir | None |
| PIJE | Pinus jeffreyi | Jeffrey pine | None |

Description

Scattered mature *Abies magnifica*, *Abies concolor*, *Pinus jeffreyi*, and other species. More than 40% *Abies magnifica*, *A. concolor*,or *Pinus jeffreyi*.

*Maximum Tree Size Class*  
Very Large >33" DBH

Class E 21 Late Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| ABMA | Abies magnifica | California red fir | None |
| ABCO | Abies concolor | White fir | None |
| PIJE | Pinus jeffreyi | 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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