10580

Sierra Nevada Subalpine Lodgepole Pine Forest and Woodland

BpS Model/Description Version: Aug. 2020

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| **Modelers** |  | **Reviewers** |  |
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| 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 | *Pinus contorta* | Lodgepole pine |
| ARNE | *Arctostaphylos nevadensis* | Pinemat manzanita |
| CECO | *Ceanothus cordulatus* | Whitethorn ceanothus |
| CELE3 | *Cercocarpus ledifolius* | Curl-leaf mountain mahogany |
| CHSE11 | *Chrysolepis sempervirens* | Bush chinquapin |
| PHBR4 | *Phyllodoce breweri* | Purple mountainheath |
| RIMO2 | *Ribes montigenum* | 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 between fires (Parker 1986; Keeley 1980; Potter 1998). Somewhat similar wet lodgepole types in the Klamath Mountains and Oregon have a fire return interval (FRI) range of 70-100yrs. Season of fire is generally late summer to early fall. Stand-replacement fire occurs at long intervals, resulting in low stand complexity. Mixed-severity fire occurs when fuel conditions remain moist and result in mixed-age stands. Very infrequently, surface fires can occur.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 156 | 23 | 37 | 764 |
| Moderate (Mixed) | 51 | 69 |  |  |
| Low (Surface) | 459 | 8 |  |  |
| All Fires | 35 | 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 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).

Adjacency or Identification Concerns

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.

Issues or Problems

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.

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 | 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 |

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