10980

California Montane Woodland and Chaparral

BpS Model/Description Version: Aug. 2020 Original Report Date: 8/2014

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| --- | --- | --- | --- |
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Vegetation Type

Shrubland

Map Zones

3

Geographic Range

Montane chaparral is located from the southern Cascades, through the Sierra Nevada, the Peninsular and Transverse Ranges, and into Baja, CA.

Biophysical Site Description

Montane chaparral primarily occurs at elevations where much of the precipitation arrives as snowfall (above 1,500m [4,500ft]). These locations are commonly on steep, exposed slopes with rocky or shallow soils, and south and west aspects in canyons, glaciated landscapes, recent volcanics, and other areas with low site productivity/shallow soils.

Vegetation Description

Shrubs will often have high densities. These can also be short duration chaparrals in previously forested areas that have experienced crown fires. Scattered trees tend to have an open canopy, or can be clustered over a usually continuous dense shrub layer. Trees can include *Pinus jeffreyi*, *Abies concolor*, *A. magnifica*, *Pinus monticola*, *P. lambertiana*, *P. coulteri*, *Cupressus forbesii*, *C. arizonica*, *C. arizonica ssp. nevadensis* (= *C. nevadensis*). Typical sclerophyllous chaparral shrubs include *Arctostaphylos nevadensis*, *A. patula*, *A. glandulosa*, *Ceanothus cordulatus*, *C. diversifolius*, *C. pinetorum*, and *Chrysolepis sempervirens* (=*Castanopsis sempervirens*). Some stands can be dominated by winter deciduous shrubs, such as *Prunus emarginata*, *P. virginiana*, *Ceanothus integerrimus*, *Holodiscus discolor*, HOLMIC, QUEGARB. Most chaparral species are fire-adapted, resprouting vigorously after burning or producing fire-resistant seeds. Occurrences of this system likely shift across montane forested landscapes with catastrophic fire events.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| ARPA6 | *Arctostaphylos patula* | Greenleaf manzanita |
| CECO | *Ceanothus cordulatus* | Whitethorn ceanothus |
| QUVA | *Quercus vacciniifolia* | Huckleberry oak |
| CEIN3 | *Ceanothus integerrimus* | Deerbrush |

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

Disturbance Description

Stand-replacing fires occur mostly in the shrub dominated stages. In the conifer-dominated late seral closed stage, surface fire is also important. Fire return interval is generally greater than that of the surrounding forested landscape (including the lower elevation California Mesic Chaparral – 031097) – perhaps double (Nagel and Taylor, in press) – due to the lack of flammability of many young shrub fields without a long history of fuel accumulation.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 93 | 37 |  |  |
| Moderate (Mixed) | 54 | 63 |  |  |
| Low (Surface) |  |  |  |  |
| 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

Montane chaparral typically originates following large stand-replacing fires in conifer forests. A variety of montane shrubs occupy the site and limit establishment and growth of conifers. If these shrublands burn again before succession to late seral closed forest, they can stay shrub dominated for long periods of time (centuries). Patch size can be quite large, especially in the northern part of the state.

Adjacency or Identification Concerns

This includes several types of montane shrublands on sites that are typically seral to conifers. Montane chaparral is usually embedded within mixed conifer, red fir, white fir, Jeffrey pine, and other conifer forests on sites that are prone to stand-replacing fire, or on otherwise disturbed or more open sites.

Issues or Problems

A recurring issue with this Biophysical Setting (BpS) and with 1034 (serpentine chaparral) is the recognition that these shrub-fields occur as a BpS on some pockets of the landscape, but also occur as a seral stage before conifer regeneration (red fir, white fir, mixed conifer, Jeffrey pine). The conifer models are generally modeled with a persistent shrub stage, while this and other models represent the parts of the landscape that are unlikely to ever develop a conifer overstory.

Sugihara and Sherlock created a four-box model. Shlisky edited the model to three boxes, removing the tree-dominated state. Safford then suggested combining these relatively data-poor shrub systems as one BpS.

Native Uncharacteristic Conditions

Shrub canopy closure in Class A won't exceed 70%, but in later stages it could. Trees overtop the shrubs in classes B and C. The mid-open stands will have at least 10%, but not more than 50% canopy closure of trees. The range of canopy closure for trees in class C will exceed 20%, but less than 80%. Class C could also include canopy closure up to 80% of trees <25m. Shrub canopy closure for classes B and C is in the range of 40-90%. Tree canopy closure >80% would be uncharacteristic.

Comments

As modeled, it's possible that montane chaparral could be mapped as a BpS only in areas where it does not turn into forest through lack of fire and succession. In northern CA, one reviewer commented that this system would include *Prunus emarginata*, *Arctostaphylos patula*, and *Ceanothus velutinus*.

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 | UN | UN | UN |
| Shrub | 0.5-1.0 | A | A | A | A | A | A | A | UN | UN | UN |
| Shrub | 1.0-3.0 | A | A | A | A | A | A | A | UN | UN | UN |
| Shrub | >3.0 | A | A | A | A | A | A | A | UN | UN | UN |
| Tree | 0-5 | B | B | B | B | B | C | C | C | UN | UN |
| Tree | 5-10 | B | B | B | B | B | C | C | C | UN | UN |
| Tree | 10-25 | B | B | B | B | B | C | C | C | UN | UN |
| Tree | 25-50 | C | C | C | C | C | C | C | C | UN | UN |
| Tree | >50 | C | C | C | C | C | C | C | C | UN | UN |

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 26 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| ARPA6 | Arctostaphylos patula | Greenleaf manzanita | Low-Mid |
| CECO | Ceanothus cordulatus | Whitethorn ceanothus | Low-Mid |
| QUVA | Quercus vacciniifolia | Huckleberry oak | Middle |
| CEIN3 | Ceanothus integerrimus | Deerbrush | Low-Mid |

Description

Early succession, after large patches of stand replacement fire. Comprised of grass, shrubs, and few tree seedlings to saplings. *Prunus emarginata* is also common. Shrub cover can range up to 70% canopy closure.

*Maximum Tree Size Class*  
Pole 5-9" DBH

Class B 29 Mid Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PIPO | Pinus ponderosa | Ponderosa pine | Upper |
| PSME | Pseudotsuga menziesii | Douglas-fir | Upper |
| ABCO | Abies concolor | White fir | Mid-Upper |
| ABMA | Abies magnifica | California red fir | Mid-Upper |

Description

Open or closed shrublands with scattered pole to medium sized conifers. Jeffrey pine, ponderosa pine, white fir, red fir, sugar pine, Douglas-fir, incense cedar and lodgepole pine can occur. *Prunus emarginata* is also common. Above listed shrubs co-occur.

*Maximum Tree Size Class*  
Large 21-33"DBH

Class C 45 Late Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PIJE | Pinus jeffreyi | Jeffrey pine | Upper |
| PSME | Pseudotsuga menziesii | Douglas-fir | Upper |
| ABCO | Abies concolor | White fir | Mid-Upper |
| ABMA | Abies magnifica | California red fir | Mid-Upper |

Description

Open or closed shrublands with scattered large and very large sized conifers, and sometimes medium and small sized shade tolerant conifers. Tree cover >35% can occur in small to moderately sized patches on north aspects and lower slope positions. Jeffrey pine, ponderosa pine, white fir, red fir, sugar pine, Douglas-fir, incense cedar, and lodgepole pine can occur. *Prunus emarginata* is also common. Above listed shrubs are still present.

*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:OPN | 29 |
| Mid1:OPN | 30 | Late1:OPN | 79 |
| Late1:OPN | 80 | 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** |
| Replacement Fire | Early1:ALL | Early1:ALL | 0.013 | 77 | Yes | 0 |
| Replacement Fire | Mid1:OPN | Early1:ALL | 0.01 | 100 | Yes | 0 |
| Mixed Fire | Mid1:OPN | Mid1:OPN | 0.025 | 40 | No | 0 |
| Replacement Fire | Late1:OPN | Early1:ALL | 0.01 | 100 | Yes | 0 |
| Mixed Fire | Late1:OPN | Late1:OPN | 0.025 | 40 | No | 0 |

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