10970

California Mesic Chaparral

BpS Model/Description Version: Aug. 2020

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| **Modelers** |  | **Reviewers** |  |
| Mark Borchert | mborchert@fs.fed.us | Jennifer Gibson | Jennifer\_Gibson@nps.gov |
| None | None | Max Creasy | mcreasy@fs.fed.us |
| None | None | Hugh Safford & Dave Schmidt | hughsafford@fs.fed.us |

Vegetation Type

Shrubland

Map Zones

3, 6, 7

Geographic Range

This system occurs throughout Mediterranean California away from the coastal fog belt.

Biophysical Site Description

Commonly occurs in mesic site conditions (deep, well-drained soils) on north-facing slopes up to ~1,500m (4,550ft) in northern California and up to 1,830m (6,000ft) in southern California. Average rainfall 14-25in.

Vegetation Description

Chaparral is composed of woody, sclerophyllous shrubs that generally vary from 3-15ft in height. Shrub cover is usually dense and continuous, covering vast areas of land. Chaparral species tend to be fire-adapted by either resprouting vigorously or by producing fire-resistant seeds.

Common species include *Adenostoma fasciculatum*, *Quercus berberidifolia*, *Q. wislizeni* v. *fructescens*, *Ceanothus leucodermis*, *Cercocarpus montanus* v. *glaber*, *Fraxinus dipetala*, *Garrya* spp., *Lonicera*, *Prunus ilicifolia*, *Ribes* spp., *Sambucus* spp., *Umbellularia californica*, and *Aesculus californica*.

In central and southern California, xeric, high-insolation aspects typically support species such as chamise (ADFA), redshank (ADSP), obligate-seeding manzanitas, chaparral yucca (YUWH), redberry (Rhamnus spp.), sugar bush, and *Ceanothus* spp.

In more mesic, low-solar-insolation settings, common dominants are scrub oak (QUBE5), toyon (HEAR5), poison oak (TODI), coffeeberry (*Rhamnus* spp.), and *Prunus* spp. Scrub oak readily sprouts after fire. At the high end of the type (above ~4,000ft) resprouting manzanitas, shrub interior live oak (QUWI2), birchleaf mountain mahogany (CEMOG), and canyon live oak (QUCH2) are common associates.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| QUBE5 | *Quercus berberidifolia* | Scrub oak |
| QUWIF | *Quercus wislizeni var. frutescens* | Interior live oak |
| CELE2 | *Ceanothus leucodermis* | Chaparral whitethorn |
| CEMOG | *Cercocarpus montanus var. glaber* | Birchleaf mountain mahogany |
| ADFA | *Adenostoma fasciculatum* | Chamise |
| ADSP | *Adenostoma sparsifolium* | Redshank |
| HEAR5 | *Heteromeles arbutifolia* | Toyon |
| TODI | *Toxicodendron diversilobum* | Pacific poison oak |

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

Disturbance Description

Chaparral burns in high-intensity, stand-replacing crown fires that burn thousands of acres in a single event. However, there is a considerable range in the flammability of shrub species (e.g., chamise is "flashier" than manzanita). Large, stand-replacement events can interact with seed availability and, hence, influence post-fire successional pathways differently than for smaller, less severe fires. Mean fire return intervals (MFRIs) are highly variable across the state, depending on species composition and other factors. Sediment cores taken from the Santa Barbara Channel in central California dating from the 16th and 17th centuries indicate that large fires burned the Santa Ynez and Santa Lucia Mountain every 40-60yrs. Season of burning plays a large part in species composition. Occasionally, frost affects mortality and increases fuel buildup. In the last century, the high frequency of human ignitions has reduced the MFRI to 30-35yrs in southern California.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 55 | 100 |  |  |
| Moderate (Mixed) |  |  |  |  |
| Low (Surface) |  |  |  |  |
| All Fires | 55 | 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

Wildfires typically burn 1,000s and 10,000s of acres; a small percentage burn >100,000ac.

Adjacency or Identification Concerns

Below ponderosa and sugar pine forests on the western slopes of the Sierra Nevada and more southern mountains.

Issues or Problems

In this model, chaparral cover closes after 8yrs. Of course, it could be faster or slower depending on the site. One (Rapid Assessment [RA]) reviewer suggested adding another state to reflect a mid-closed state (B) following an early seral ephemeral state (A). Due to the coarse nature of the RA and difficulty mapping a mid- versus late-closed state for the RA, we are maintaining the existing two-box model but will consider a three-box model for future LANDFIRE modeling by mapping zone.

Native Uncharacteristic Conditions

Comments

Map zones (MZs) 03, 06, 07 were combined during 2015 Biophysical Setting (BpS) Review.

This model uses a 50-year fire return interval (FRI). This is the mid-point between 40 and 60 given by Byrne et al. This represents the average interval between large fires that appeared in the sediment cores. The interval may have been somewhat shorter if smaller fires (i.e., those that did not show up in the cores) had been included.

J. Gibson felt that even large, severe fires may not impact recovery of stands since many species resprout vigorously and other species are rather successful at establishment from soil seed bank reserves. Another reviewer commented that in MZ03, shrub species would likely include *Ceanothus integerrimus*, *C. cordulata*, *Arctostaphylos patula*, and *A. nevadensis*. One reviewer felt that the MFRI was a bit long.

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

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 14 Early Development 1 - Open

Upper Layer Lifeform: Shrub

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| LOSC2 | Lotus scoparius | Common deerweed | Lower |
| PHACE | Phacelia | Phacelia | Lower |
| CRYPT | Cryptantha | Cryptantha | Lower |
| EMMEN | Emmenanthe | Whisperingbells | Lower |

Description

Above-listed shrub seedlings and sprouts fill the stand vigorously, in addition to fire annuals, perennial geophytes, and short-lived perennials.

Herb species include common deerweed (*Lotus scoparius*), *Phacelia* spp., *cryptantha* spp., and *Emmenanthe* spp.

Class B 86 Late Development 1 - Closed

Upper Layer Lifeform: Tree

Upper-layer lifeform is not the dominant lifeform. Upper layer can be the emerging trees through the canopy of shrubs. The dominant shrub canopy closure is 70-100%. The sporadic tree canopy can be 0-50% closure, <~10m. Split these two classes on canopy closure of the shrub layer, rather than the tree layer.

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| ADFA | Adenostoma fasciculatum | Chamise | Middle |
| QUBE5 | Quercus berberidifolia | Scrub oak | Mid-Upper |
| CELE2 | Ceanothus leucodermis | Chaparral whitethorn | Middle |
| CEBE2 | Cerastium beeringianum | Bering chickweed | Lower |

Description

Resprouting shrubs, shrubs growing from seedlings. Herbs only in openings. Greater than 8yrs of age.

Species include chamise (*Adenostoma fasciculatum*), *Quercus berberidifolia*, *Cerastium beeringianum*, and *Ceanothus leucodermis*.

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:OPN | 0 | Late1:CLS | 8 |
| Late1:CLS | 9 | Late1:CLS | 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:OPN | Early1:OPN | 0.01 | 100 | Yes | 0 |
| Replacement Fire | Late1:CLS | Early1:OPN | 0.02 | 50 | Yes | 0 |

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