

10970

California Mesic Chaparral

BpS Model/Description Version: Aug. 2020

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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. *frutescens*, *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
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QUBE5	<i>Quercus berberidifolia</i>	Scrub oak
QUWIF	<i>Quercus wislizeni</i> var. <i>frutescens</i>	Interior live oak
CELE2	<i>Ceanothus leucodermis</i>	Chaparral whitethorn
CEMOG	<i>Cercocarpus montanus</i> var. <i>glaber</i>	Birchleaf mountain mahogany
ADFA	<i>Adenostoma fasciculatum</i>	Chamise
ADSP	<i>Adenostoma sparsifolium</i>	Redshank
HEAR5	<i>Heteromeles arbutifolia</i>	Toyon
TODI	<i>Toxicodendron diversilobum</i>	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	<i>Lotus scoparius</i>	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
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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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