

11300

California Mesic Serpentine Grassland

BpS Model/Description Version: Aug. 2020

Modelers		Reviewers	
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None	None	None	None

Vegetation Type

Herbaceous

Map Zones

3, 4

Geographic Range

These grasslands are of very limited distribution in California within the Coast Ranges, Sierra Nevada, and Transverse Ranges.

Biophysical Site Description

These grasslands occur on deep alluvial or colluvial soils with serpentine-rich parent material. Not all serpentinite outcrops support distinct vegetation. Only those with very low Ca:Mg ratio impact biotic composition.

Vegetation Description

In this system, native bunchgrass dominates, though typically in less dense cover than other perennial bunchgrass types. Characteristic species include *Calamagrostis ophitidis*, *Eschscholzia californica*, *Vulpia microstachys* var. *ciliata* (= *Festuca grayi*), *Poa secunda* (= *Poa scabrella*), *Hemizonia congesta* ssp. *luzulifolia* (= *Hemizonia luzulifolia*), *Nassella cernua*, and *Nassella pulchra*.

Additional native species include *Lasthenia californica*, *Melica californica*. Mediterranean grasses and forbs are present but less prominent than in non-serpentine grasslands.

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
CAOP2	<i>Calamagrostis ophitidis</i>	Serpentine reedgrass
ESCA2	<i>Eschscholzia californica</i>	California poppy
VUMIC	<i>Vulpia microstachys</i> var. <i>ciliata</i>	Eastwood fescue
POSE	<i>Poa secunda</i>	Sandberg bluegrass
NACE	<i>Nassella cernua</i>	Nodding tussockgrass
NAPU4	<i>Nassella pulchra</i>	Purple tussockgrass

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

Disturbance Description

Productivity is lower in serpentine soils than in non-serpentine soils, so fuel loads take longer to reach enough continuity to carry a fire. On many serpentine sites, sufficient fuel to carry a fire never accumulates.

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	7	100	2	25
Moderate (Mixed)				
Low (Surface)				
All Fires	7	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

10s to 100s of ha. Limited by the extent of the patch of grass.

Adjacency or Identification Concerns

This Biophysical Setting (BpS) often occurs in a matrix of non-serpentine grassland and chaparral. Invasives are less prominent in serpentine soils than in neighboring non-serpentine soils perhaps due to a combination of soil seed bank volume in addition to the selection of natives being more tolerant of low-productivity soils.

Issues or Problems

Safford suggested to combine this type with the Coastal grassland type.

Native Uncharacteristic Conditions

Comments

Map zones (MZs) 03 and 04 were combined during 2015 BpS Review.

For LANDFIRE National, Foster built this model with a few input parameters from Hugh Safford.

A LANDFIRE National reviewer for MZs 03 and 06 suggested that this type be combined with the Coastal grassland type. MZ04 reviewer indicated that serpentine grasslands differ enough and have enough inherent conservation value that they should be kept separate. Furthermore, the fire regime on serpentine will differ substantially from other grasslands, making it valuable to keep as a separate model.

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	B	B	B	B	B	B
Herb	0.5-1.0	A	A	A	A	B	B	B	B	B	B
Herb	>1.0	A	A	A	A	B	B	B	B	B	B
Shrub	0-0.5	B	B	B	B	B	UN	UN	UN	UN	UN
Shrub	0.5-1.0	B	B	B	B	B	UN	UN	UN	UN	UN

Shrub	1.0-3.0	B	B	B	B	B	UN	UN	UN	UN	UN
Shrub	>3.0	B	B	B	B	B	UN	UN	UN	UN	UN
Tree	0-5	B	B	B	B	B	UN	UN	UN	UN	UN
Tree	5-10	B	B	B	B	B	UN	UN	UN	UN	UN
Tree	10-25	B	B	B	B	B	UN	UN	UN	UN	UN
Tree	25-50	B	B	B	B	B	UN	UN	UN	UN	UN
Tree	>50	B	B	B	B	B	UN	UN	UN	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 88 Early Development 1 - Open

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
POSE	Poa secunda	Sandberg bluegrass	Upper
CAOP2	Calamagrostis ophitidis	Serpentine reedgrass	Upper

Description

Following fire, there is an increase in forb cover, but forb diversity does not change much as a result of fire. Perennial grasses are a constant but not major cover.

Maximum Tree Size Class

None

Class B 12 Late Development 1 - Closed

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
CAOP2	Calamagrostis ophitidis	Serpentine reedgrass	Upper
POSE	Poa secunda	Sandberg bluegrass	Upper

Description

Grasses are mature, but fuel continuity may be patchy.

Maximum Tree Size Class

None

Model Parameters

Deterministic Transitions

From Class	Begins at (yr)	Succeeds to	After (years)
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Early1:OPN	0	Late1:CLS	10
Late1:CLS	11	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	0.125	8	Yes	0
Replacement Fire	Late1:CLS	Early1:OPN	0.333	3	Yes	0

References

Harrison, S., B.D. Inouye and H.D. Safford. 2003. Ecological heterogeneity in the effects of grazing and fire on grassland diversity. *Conservation Biology* 7(3) June 2003. 837-845.

NatureServe. 2007. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA. Data current as of 10 February 2007.

Safford, H. D., and Harrison, S. P. 2008. The effects of fire on serpentine vegetation and implications for management. Proceedings of the 2002 Fire Conference on Managing Fire and Fuels in the Remaining Wildlands and Open Spaces of the Southwestern United States. December 2-5, 2002, San Diego, CA. General Technical Report PSW-189. USDA-Forest Service, Pacific Southwest Research Station, Albany, CA, USA.

Safford, H.D. and Susan Harrison. 2004. Fire effects on plant diversity in serpentine vs. sandstone chaparral. *Ecology* 85(2) 2004. 539-548.