11290

California Central Valley and Southern Coastal Grassland

BpS Model/Description Version: Aug. 2020

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

Herbaceous

Map Zones

4, 5

Geographic Range

From Shasta and Tehama counties at the northern end of the Sacramento Valley south on both sides of the valley (foothills of Southern Cascades and Inner North Coast Ranges) and throughout the upland portions of the Sacramento and San Joaquin Valleys to the central and outer coast Ranges, south and west to the Coast from Sonoma and Mendocino Counties south to San Diego County. Marginal stands are also in the western Mojave Desert in Antelope Valley.

Biophysical Site Description

This Biophysical Setting (BpS) generally occurs in the cis-montane region of California west of the deserts and adjacent to northern Baja California, Mexico in low to mid-elevations on hills, valley margins, and lower mountain slopes. Soils are variable, but frequently clay loam to fine sandy clay supports the *Nassella* bunchgrasses, while shallow loam and rocky clay loam supports the native annual variants with higher annual forb and grass component. Coastal sites in the central and southern coast are often windswept by coastal winds and may have shallower, better-drained soils than those with adjacent California Northern Coastal Grassland. Central Valley sites are often perched on mima mounds and other microsites, which separate them from wetter adjacent lowland conditions. Elevations range from 0-5,000ft, but most sites are between 50-1,500ft.

Vegetation Description

This system includes many perennial species of grasses and forbs including: *Nassella pulchra*, *Aristida* spp., *Achillea millefolium* var. *borealis* (=*Achillea borealis*), *Bloomeria crocea*, *Triteleia ixioides* (=*Brodiaea lutea*), *Chlorogalum pomeridianum*, *Elymus glaucus*, *Leymus triticoides*, *Festuca californica*, *Melica californica*, and *Poa secunda* (=*Poa scabrella*). Also included in harsher sites with shallower soils and drier and hotter summers are many annual species including: *Achyrachaena mollis*, *Agoseris heterophylla*, *Clarkia purpurea*, *Dodecatheon clevelandii*, *Castilleja attenuata* (=*Orthocarpus attenuatus*), *Vulpia microstachys*, *Plantago erecta*, *Holocarpha virgata*, *Lessengia* spp., *Calycadenia* spp., *Hemizonia* spp., *Lotus* spp., and *Trifolium* spp.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| NAPU4 | *Nassella pulchra* | Purple needlegrass |
| POSE | *Poa secunda* | Sandberg bluegrass |
| VUMI | *Vulpia microstachys* | Small fescue |
| NACE | *Nassella cernua* | Nodding tussockgrass |

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

Disturbance Description

This BpS has a variable disturbance regime. Much of the valley margin areas were characterized by frequent low-intensity surface fire with intervals of ~3-38yrs, the result of Native American burning (probably similar to adjacent oak woodland). Some northern coastal sites tended to have longer intervals between fire and were at least partially sustained by climatic conditions and soil conditions not conducive to colonization by woody species. Likewise, this was probably true in the shallow rocky upland soils of the Southern Cascades and parts of the Sierra foothills. Ignitions by Native Americans were likely to maintain many of the southern California coastal stands. These fires were probably frequent on the order of every 2-10yrs.

A reviewer noted that soil productivity can have a major effect on fire severity.

Another reviewer added the following discussion: this description is based on a myth initiated by Fredrick Clements that coastal California was covered by perennial bunch grasslands. The discussion should consider the prospect that California was covered by forblands that decompose and disarticulate more readily than grasses. Herbaceous vegetation is comprised of flash fuels and has annual growth flushes that also decompose at annual time scales. Hence, fire patterns are more easily influenced by Native American burning than woody assemblages with time-dependent fuel accumulation scaling in decades or longer. However, just because herb cover burns easily and frequently does not mean that annuals are dependent on anthropogenic burning practices (cf. Keeley 2002). In the past, most California forb fields, especially those in the Central Valley and southern California interior valleys and deserts, persisted without burning because forb species leave little fuel in summer. Forbs invariably respond to precipitation cues, not fire. Over Holocene time scales, fire occurrence was highly aperiodic in response to short-term fluctuations in productivity of subshrubs and flash fuels. Fire mosaic turnover is random and unrelated to previous fire history.

Another reviewer indicated that there is not a preponderance of evidence to support the theory of either a forb-dominated or perennial bunchgrass-dominated system. There is tremendous variability in the cover of grasses and forbs on any given site. This reviewer also agreed that annuals are not dependent on anthropogenic burning. Reviewer stated that he had observed significant declines in standing biomass of perennials and almost complete disintegration of annual thatch. This decline in standing biomass and thatch results in habitat characteristics similar to those found following fire (which favor annuals and will not carry fire). Additionally, poor/shallow soils generally support open annual-dominated communities regardless of disturbance regime, which prior to non-native annual grass invasion would have had a hard time carrying fire. However, at least in the systems as they exist today, fire does influence forb density and cover. With the widespread invasion of non-native annual grasses and in *Nassella* *pulchra* grasslands, fire does remove thatch and biomass, resulting in greater forb cover. This would have occurred historically in perennial grass-dominated sites, sites with grassland shrubs (*Ericamaria* spp.), and sites with annual thatch accumulation.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 4 | 100 | 2 | 38 |
| Moderate (Mixed) |  |  |  |  |
| Low (Surface) |  |  |  |  |
| All Fires | 4 | 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

It is debatable whether lightning was an important ignition source or whether most of this grassland was either maintained by natural soil and climatic conditions or by Native American burning. Along the south coast, Keeley (2002) strongly suggests the latter. Small Native American fires probably prevailed in areas where this type formed matrices with adjacent woody vegetation, while occasional large fires occurred in more extensive stands and where it occurs adjacent to open oak woodlands with herbaceous understories. A reviewer felt that the average fire size should be 500ac, not 10 as stated below in the Historical Fire Size field.

Adjacency or Identification Concerns

As treated, this grassland may occur adjacent to California North Coastal Grassland in the vicinity of Sonoma, Marin counties south to San Luis Obispo County. This type is usually on an upper slope position relative to the latter grassland along the immediate coast. In the interior, this grassland intergrades with open oak woodland and may form small patches within it. In the central valley, this grassland interdigitates on a very fine scale with Northern California Claypan Vernal Pool and North Pacific Hardpan Vernal Pool, while on the south coast it may do the same with South Coastal California Vernal Pool.

Issues or Problems

Highly variable, includes strictly perennial dominance to strictly annual dominance. Includes stands in coastal fog zone to stands in very xeric inner foothill and desert margin settings. Fire regime likely varied widely, little of this type exists today, mostly invaded by non-native grasses. Few reference sites, fire frequency in all California grasslands is much higher today due to anthropogenic causes.

Cover and height breaks for this system are difficult to define because they are largely driven by annual rainfall at any given site and can therefore vary considerably from year to year.

Native Uncharacteristic Conditions

Comments

Map zones (MZs) 04 and 05 were combined during 2015 BpS Review.

For LANDFIRE National, Zach Principe (zprincipe@tnc.org), Hugh Safford (hughsafford@fs.fed.us), and Dave Schmidt also reviewed this type for MZs 04 and 05.

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 | B | B | B | B | B | B | B | B | B | B |
| Herb | >1.0 | B | B | B | B | 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 66 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| NAPU4 | Nassella pulchra | Purple needlegrass | Upper |
| POSE | Poa secunda | Sandberg bluegrass | Upper |
| VUMI | Vulpia microstachys | Small fescue | Upper |
| PLER | Plantago eriopoda | Redwool plantain | Upper |

Description

There should really only be two classes because most stands recover very quickly from fire, although recovery is dependent on rainfall. With average or above-average precipitation, recovery could be <3yrs, but with below-average precipitation, recovery will take closer to 3yrs. Class A, immediately post-fire, has lots of decadent grass and few forbs, whereas Class B has less grass and more forbs and geophytes. A reviewer noted that for perennial grasslands and most grass/forblands today that are heavily invaded by non-native annual grasses, the opposite can be true: after a fire, forbs increase but grasses increase more slowly with time since fire.

This class is typified by resprouting perennial bunchgrasses and an increased proportion of annual grasses and herbs infilling between the expanding perennial grasses. There is also usually a post-fire response by geophytes where more bulb species flower and fruit immediately after the fire. Typical canopy cover is between 50-100%.

*Maximum Tree Size Class*  
None

Class B 34 Mid Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |

Description

This class is characterized by the increase of perennial bunchgrasses to their maximum extent with minor inclusions of annual species due to bioturbation and microtopographic variation. The species composition varies in a complex way from stand to stand, and to list species as indicators would be naïve and fruitless, as we really don't know enough yet to do so. There is a whole range of settings from annual-dominated stands to perennial-dominated stands, and the annuals and perennials vary across the wide geographic range from the central valley to the southern coastal hills. Replacement fire occurs.

*Maximum Tree Size Class*  
None

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:ALL | 0 | Mid1:CLS | 3 |
| Mid1:CLS | 4 | Mid1: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:ALL | Early1:ALL | 0.2 | 5 | Yes | 0 |
| Replacement Fire | Mid1:CLS | Early1:ALL | 0.4 | 3 | Yes | 0 |

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