11310

California Northern Coastal Grassland

BpS Model/Description Version: Aug. 2020

|  |  |  |  |
| --- | --- | --- | --- |
| **Modelers** |  | **Reviewers** |  |
| Todd Keeler-Wolf | tkwolf@dfg.ca.gov | James Bartolome | jwbart@nature.berkeley.edu |
| John Foster | jfoster@tnc.org | Hugh Safford/Dave Schmidt | hughsafford@fs.fed.us |
| None | None | None | None |

Vegetation Type

Herbaceous

Map Zones

2, 3, 4

Geographic Range

From at least Coastal British Columbia south along the coast to San Luis Obispo County (Herst Ranch, Morro Bay) in narrow strips along the immediate coast. Some evidence suggests that this type ranged as far south as Los Angeles County, but these coastal grasslands were more likely part of the California Central Valley and Southern Coastal Grassland.

Biophysical Site Description

Coastal terraces, hills, and bluffs with relatively well-developed loamy soil immediately adjacent to the coast or occasionally farther inland where wind gaps exist in the coastal hills precluding the development of woodland or forest. In some cases, these grasslands develop on serpentine soils (e.g., Ring Mountain, Marin Co.) where chemical composition is unfavorable for woody species. Sites are also maintained in grassland by complex grazing and Native American use history. This includes likelihood of native grazers, such as elk, maintaining grasslands. Elevation range from sea level to 1,500ft. Native grasslands >1,500ft tend to have more warm summer non-coastal species and should probably be assigned to the California Central Valley and Southern Coastal Grassland.

Vegetation Description

Dominated by a complex of native perennial grasses and sedges. The species appear to vary depending on management and hydrology. Moister areas contain *Calamagrostis nutkaensis*, *Danthonia californica*, *Deschampsia cespitosa*, *Festuca rubra*, *F. idsahoensis* var. *roemeri*, and/or *Hordeum brachyantherum*. Although often overlooked, these areas also have important components in the *Juncaceae* and *Cyperaceae*, including *Carex tumulicola* (coast sedge), *C. obnupta*, *J. effusus*, *J. patens*, and *Juncus phaeocephalus* (brown-headed rush). Drier areas contain *Bromus carinatus*, *Elymus glaucus*, *Koeleria macrantha*, and/or *Nassella pulchra*. Many native herbs are also present, including *Sanicula arctopodoides*, *Iris douglasii*, *Trifolium variegatum*, *T. barbigerum*, *T. microdon*, *T. depauperatum*, and other clovers, *Perideridia gairdneri*, *Dichondra donelliana*, *Brodiaea elegans*, *Calandrinia ciliata*, *Camissonia ovata*, etc. Map zone (MZ) 04 was the only MZ to list *Delphinium californicum* as a Biophysical Setting (BpS) Dominant and Indicator Species.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| CANU | *Calamagrostis nutkaensis* | Pacific reedgrass |
| DACA3 | *Danthonia californica* | California oatgrass |
| DECA | *Delphinium californicum* | larkspur |
| FERU | *Fendlera rupicola* | Cliff fendlerbush |
| FEID | *Festuca idahoensis* | Idaho fescue |
| HOBR2 | *Hordeum brachyantherum* | Meadow barley |
| SAAR | *Sabatia arenicola* | Sand rose gentian |

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

Disturbance Description

This type and the northern California coastal scrub are often treated as an interrelated dynamic matrix because of the presumed relationship in seral state between grassland and scrub in central and northern coastal California. Fire was likely rare in pre-human California. At that time, coastal grasslands were likely maintained by soil conditions and weather conditions, including strong on-shore marine winds coupled with coastal terrace landforms, which developed relatively deep loamy soils conducive to grassland. Grasslands were also likely, at least locally, to be maintained by native ungulate grazers from the Pleistocene to the time of Native American occupation. More recently, Native American burning and clearing maintained many grasslands away from the immediate coast and away from coastal wind gaps in the coastal hills. Fire frequency in pre-European coastal grassland was relatively high near Native American villages to maintain bulb and other valuable plants. The fire regime depicted here is conceptual and derived from a melding of Native American and natural pre-European regimes.

Fire Frequency

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

Most stands are <100ac except perhaps on large points and promontories such as Pt. Reyes, Pt. Arena, etc., where combinations of terrace development with strong marine winds conspire to make ideal conditions. Large coastal grasslands exist in central California, but many of these are more correctly assigned to BpS 1129 or degraded annual non-native grassland.

Adjacency or Identification Concerns

In the south, this grassland interfingers with other grassland (BpS 1129) and also with coastal scrubs 1092 and 1128. In the north, this type interfingers with forests and woodlands (BpS 1014, 1015).

Issues or Problems

Uncertain of the relative role of Native American burning and natural disturbance by grazing, browsing, suppression of woody colonization by maritime winds, climate, and soil texture factors. Coastal scrub (both northern and southern) have been cleared extensively to make way for non-native grasslands in the last 150yrs. It is unclear how much of this non-native grassland would have been northern California coastal grassland versus central valley and south coastal grassland, but we are assuming that the north coastal grassland was more restricted originally.

Native Uncharacteristic Conditions

In the drier transitions to the California Central Valley and Southern Coastal Grassland, from Santa Cruz county south, there are often many annual herbs such as *Hemizonia*, *Holocarpha*, etc., which blend the distinction between the northern California coastal grassland and the California Central Valley and Southern Coastal Grassland.

Comments

MZs 02, 03, and 04 were combined during 2015 BpS Review.

For LANDFIRE National, Foster built the VDDT model with input from Mark Stromberg.

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 | B | B | B | B | B |
| Herb | 0.5-1.0 | A | A | B | B | B | B | B | B | B | B |
| Herb | >1.0 | A | A | B | B | B | B | B | B | B | B |
| Shrub | 0-0.5 | C | C | C | C | C | C | C | C | C | C |
| Shrub | 0.5-1.0 | C | C | C | C | C | C | C | C | C | C |
| Shrub | 1.0-3.0 | C | C | C | C | C | C | C | C | C | C |
| Shrub | >3.0 | C | C | C | C | C | C | C | C | C | C |
| Tree | 0-5 | C | C | C | C | C | UN | UN | UN | UN | UN |
| Tree | 5-10 | C | C | C | C | C | UN | UN | UN | UN | UN |
| Tree | 10-25 | C | C | C | C | C | UN | UN | UN | UN | UN |
| Tree | 25-50 | C | C | C | C | C | UN | UN | UN | UN | UN |
| Tree | >50 | C | C | C | C | C | 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 51 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| DACA3 | Danthonia californica | California oatgrass | Upper |
| DECA | Delphinium californicum | California larkspur | Upper |
| FERU | Fendlera rupicola | Cliff fendlerbush | Upper |

Description

Early post-fire seral with resprouts of perennial grasses and annual forbs.

The species listed in the indicator species boxes are not good indicators since the species composition of this type varies extensively from north to south along the coast and from coast to inland along a temperature and moisture gradient.

*Maximum Tree Size Class*  
None

Class B 41 Mid Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| DECA | Delphinium californicum | California larkspur | Upper |
| DACA3 | Danthonia californica | California oatgrass | Upper |
| FERU | Fendlera rupicola | Cliff fendlerbush | Upper |
| IRDO | Iris douglasiana | Douglas iris | Upper |

Description

Mature stands of bunchgrasses with smaller interstices of native annual and perennial forbs.

*Maximum Tree Size Class*  
None

Class C 8 Late Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| BAPI | Baccharis pilularis | Coyotebrush | Upper |
| RUUR | Rubus ursinus | California blackberry | Middle |
| DACA3 | Danthonia californica | California oatgrass | None |

Description

Mature stands with invading shrubs from the north coastal scrub, including *Baccharis pilularis*, *Rubus ursinus*, *Lupinus arboreus*, etc. Shrub cover is usually <10% but clearly evident.

*Maximum Tree Size Class*  
None

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:ALL | 0 | Mid1:CLS | 1 |
| Mid1:CLS | 2 | Mid1:CLS | 999 |
| Late1:OPN | 6 | 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** |
| Native Grazing | Early1:ALL | Early1:ALL | 0.1 | 10 | Yes | 0 |
| Replacement Fire | Early1:ALL | Early1:ALL | 0.5 | 2 | Yes | 0 |
| Alternative Succession | Mid1:CLS | Late1:OPN | 1 | 1 | Yes | 5 |
| Native Grazing | Mid1:CLS | Early1:ALL | 0.03 | 33 | Yes | 0 |
| Replacement Fire | Mid1:CLS | Early1:ALL | 0.4 | 3 | Yes | 0 |
| Native Grazing | Late1:OPN | Early1:ALL | 0.02 | 50 | Yes | 0 |
| Replacement Fire | Late1:OPN | Early1:ALL | 0.4 | 3 | Yes | 0 |

References

Bartolome, J.W., S.E. Klukkert and W.J. Barry. 1986. Opal phytoliths as evidence for displacement of native Californian grassland. Madroño 33: 217-222.

Callaway, R.M. and F.W. Davis. 1993. Vegetation dynamics, fire, and the physical environment in coastal central California. Ecology 74: 1567-1578.

Elliot, H.W.I. and J.D. Wehausen. 1974. Vegetational succession on coastal rangeland of Point Reyes peninsula. Madroño 22: 231-238.

Fiedler, P.L. and R.A. Leidy. 1987. Plant communities of Ring Mountain Preserve, Marin County, California. Madrono 34(3): 173-192.

Greenlee, J.M. and J.H. Langenheim. 1990. Historic fire regime and their relation to vegetation patterns in the Monterey bay area of California. American Midland Naturalist 124: 239-253.

Hamilton, J.G. 1998. Changing perceptions of the pre-European California grasslands. Madrono 44: 311-333.

Harrison, S. 1999. Native and alien species diversity at the local and regional scales in a grazed California grassland. Oecologia 121: 99-106.

Harrison, S., K. Rice and J. Maron. 2001. Habitat patchiness promotes invasion by alien grasses on serpentine soil. Biological Conservation 100: 45-53.

Heady, H.F., J.W. Bartolome, M.D. Pitt, G.D. Savelle,and M.C. Stroud. 1992. California

Prairie. In: Coupland, R.T., ed. Natural grasslands: Introduction and Western Hemisphere. Amsterdam: Elsevier. 313-335.

Holland, V.L., and D.J. Keil. 1995. California Vegetation. Dubuque, IA: Kendall/Hunt Publishing Company.

Huenneke, L.F. 1989. Distribution and regional patterns of California grasslands. In: Huenneke, L.F. and H.A. Mooney, eds. Grassland structure and function: California annual grassland. Dordrecht, The Netherlands: Kluwer Academic Press. 1-12.

Keeley, J.E. 1989. The California Valley Grassland. In: Schoenherr, A.A., ed. Endangered Plant Communities of Southern California. Fullerton, CA: Southern California Botanists, California State University. 2-23.

McBride, J.R. 1974. Plant succession in the Berkeley Hills, California. Madroño 22: 317-329.

McBride, J. and H.F. Heady. 1968. Invasion of grassland by Baccharis pilularis D.C. Journal of

Range Management 21: 106-108.

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

Schiffman, P.M. 2000. Mammal burrowing, erratic rainfall and the annual lifestyle in the California prairie: is it time for a paradigm shift? In: Keeley, J., M. Baer-Keeley and C.J. Fotheringham, eds. Interface Between Ecology and Land Development in California. USGS Open-File Report 00-62. Los Angeles, CA: Occidental College. 153-160.

Stromberg, M.R. and J.R. Griffin. 1996. Long-term patterns in coastal California grasslands in relation to cultivation, gophers, and grazing. Ecological Applications 6:1189-1211.

Stromberg, M.R., P. Kephart and V. Yadon. 2002. Composition, invasability, and diversity in coastal California grasslands. Madroño 48: 236-252.