

143.2 Californian Valley Grassland

David E. Brown

Arizona Game and Fish Department

The original nature and extent of Californian Valley grassland may never be known. Where not urbanized or under cultivation, it is now an annual grassland much disrupted by more than 200 years of grazing and other disturbances. Today more than 400 alien species account for from 50% to 90% of the vegetative cover (Heady, 1956; McNaughton, 1968). There is much speculation concerning the original vegetation, and while many authors believe the prehistoric vegetation was perennial, historic evidence is meager and the earliest references are to annual prairies (McNaughton, 1968). Because of grazing, much of the cover is herbaceous and largely composed of introduced annual forbs and weeds (Biswell, 1956). The structure and composition of the grassland varies annually and often presents a mosaic of floristic components, depending on the amount of precipitation received, soil habitats, and intensity of use.

Munz and Keck (1949) describe "Valley Grassland" and state that it occurs in California along the coast from San Luis Obispo County south, in the Great Central Valley, in the low, hot valleys of the inner coast Ranges, and in Antelope Valley, ascending to ca. 1,200 m in the Tehachapi Mountains in Kern County, and in eastern San Diego County. Californian Valley grassland is synonymous with Valley Grassland, which occurs southward into Baja California Norte to at least Valle de la Trinidad.

Jensen (1947), Biswell (1956), and Small (1974) map "grass" and "grassland" in California but do not describe or indicate it as occurring south of the Transverse Ranges. Other large scale maps of "California Steppe" (Küchler, 1964) and "Grassland in California" (McNaughton, 1968) include the interior of the Los Angeles basin and plain and the coastal mesas in Los Angeles and Orange counties. Wieslander (1932, 1934a, 1934b, 1934d, 1934e, 1937a, 1937b, 1938, 1940) mapped grasslands in Los Angeles, San Bernardino, Orange, and San Diego counties. Shreve (1937) correctly stated that "some grassland is present in Baja California between the Sierras Juarez and San Pedro Mártir and the Pacific Ocean."

Californian Valley grassland occurs, or occurred, in the Southwest from the Los Angeles Plain or parallel 34° southward in discontinuous coastal and intermountain hills and valleys to Valle de la Trinidad in Baja California Norte. Portions of the low interior valley around Riverside were grassland, as was most of the coastal mesa in Orange County on which Irving Ranch (Irving) is situated. Other remnant areas are found in valleys and on hillsides along the coasts of southern California and Baja California from Orange County to just south of Ensenada. Warner, Ramona, and Coahuila valleys in San Diego County, California, and Valle San Rafael and Valle del Rodeo in Baja California Norte, present higher interior valley examples of Californian Valley grassland.¹

¹The composition of certain grasslands within interior chaparral in west central Arizona (e.g., Burro, Bozarth, Goodwin, and Aquarius mesas) today shows affinity with these coastal communities. While classified as semidesert grassland of continental origin, these Arizona communities exist under a precipitation regime where the majority of the mean annual rainfall occurs from October through March. Summer precipitation is significant, however, and the grasses were, and in part remain, a mixture of perennial "continental" grasses and relict perennials of "Mediterranean" origin. Today these grasslands are often extensively populated by introduced annuals (e.g., species of *Bromus*, *Avena*, *Erodium*) and except on steep hillsides the only remaining perennial of consequence is *Tobosa* (*Hilaria mutica*).



Figure 76. *California Valley grassland. Disclimax community of annual forbs and grasses in Warner Valley, ca. 914 m elevation, San Diego County, California. Where not destroyed by cultivation or urbanization, the "California Prairies" are, as here, now composed largely of introduced forbs (e.g., *Erodium*) and annual grasses (e.g., *Bromus*). It is late winter (March) and the green carpet is putting on growth which will be accelerated in the coming months of April and May. Later, with the curing of the vegetation, the landscape will change to golden-brown.*



Figure 77. *A disclimax California Valley grassland on the northeast side of Guadalupe Island, 160 miles off the Pacific coast of Baja California Norte. Here as elsewhere the native California grassland flora has given way to aggressive adventive annuals; in this case and year (1979) Wild Oat (*Avena fatua*) is an important participant in the grassland.*

Table 15. Precipitation data from 13 stations within or adjacent to California Valley grassland.

Station	Elevation (in m)	Mean monthly precipitation in mm												Total	Total April thru Sept.	Percent of total
		J	F	M	A	M	J	J	A	S	O	N	D			
Warner Springs, CA 33°17' 116°38'	969	66	80	64	44	6	2	13	26	9	19	32	79	427	100	23
Irvine Ranch, CA 33°44' 117°47'	36	61	73	52	27	6	2	0	1	5	12	31	70	340	42	12
Santa Ana, CA 33°45' 117°52'	35	70	81	60	29	7	1	1	1	5	13	34	81	384	44	12
Pomona, CA 34°04' 117°49'	261	89	94	77	35	7	2	0	2	6	18	38	94	462	52	11
Elsinore, CA ¹ 33°40' 117°20'	396	55	71	50	18	3	1	0	3	8	14	24	69	318	34	11
Whittier, CA 33°58' 118°02'	94	69	80	62	28	4	1	—	2	6	12	30	80	375	41	11
Downey, CA 33°56' 118°08'	35	72	81	60	26	3.3	1	0	1	7	12	32	81	377	39	10
Escondido, CA 33°07' 117°05'	201	71	84	68	33	8	3	0	5	6	22	35	92	426	54	13
Corona, CA ¹ 33°52' 117°34'	216	59	72	52	22	18	1	—	2	5	14	28	68	328	47	14
Yorba Linda, CA 33°54' 117°49'	123	70	81	66	28	6	1	—	2	7	15	45	—	395	45	11
Ensenada, BCN 31°53' 116°37'	24	60	54	41	24	6	2	2	2	5	12	24	47	279	41	15
Valle Trinidad BCN 31°20' 115°47'	899	26	34	24	13	1	1	13	25	13	14	25	40	229	66	29
El Alamo, BCN 31°36' 116°06'	1,149	38	26	32	23	3	0	11	16	9	6	26	39	230	62	27

¹Mapped as coastal scrub; at edge of Californian Valley grassland.

Californian Valley grassland occurs from ca. 30 m near the coast to over 1,100 m in the interior valleys. Its usual contact near the coast and on lower elevation hillsides is with coastal scrub. At higher elevations in the interior valleys it is adjacent to coastal (hard) chaparral on hillsides or, with decreasing frequency southward, encinal woodlands. Where perennial or near-perennial streams drain the valleys, a narrow band of riparian deciduous forest or woodland may be present.

Climate is warm-temperate Mediterranean, characterized by mild, moderately wet winters and warm to hot summer drought. The growing season is from 7 to 11 months with 205 to 325 frost free days (Munz and Keck, 1949). Summer temperatures frequently exceed 41°C (Biswell, 1956) and, while winter temperatures rarely drop below -4°C (Bakker, 1971), winter frosts may be heavy. Precipitation can be expected to begin in late fall (October-November) and end in April or early May with two-thirds or more falling in the December-March period.

While a total mean annual precipitation of 150 mm to 500 mm is reported for grassland in California (Munz and Keck, 1949; Biswell, 1956; Small, 1974), data for Californian Valley grasslands south of the Transverse Ranges indicate an average annual precipitation of 230 mm to 460 mm. Also, late summer precipitation may contribute more to the totals in the higher interior valleys than previously reported. Mean annual and monthly precipitation for 13 representative

stations for which a sufficient number of years of records are available, and which are approximate to or in grassland in southern California and Baja California Norte, are given in Table 15.

Vegetation, particularly under grazing, is herbaceous and greens soon after the first rains (Fig. 76). Growth in early fall may be considerable if conditions are favorable (Biswell, 1956). With the advent of first freezing temperatures, usually in December, growth is arrested. While the landscape remains green, growth is slow until the advent of warmer weather in early spring. Rapid development then begins, and if the winter rains were bountiful the observer may be greeted by a spectacular display of annual flowers. This may be especially so in the so-called "vernal pools" which are hardpan depressions or sinks within the grassland mosaic (Holland and Jain, 1977). Both flowering forbs and grasses mature and dry by late April or early May with some of the perennials remaining green slightly longer. From then until the commencement of the fall rains the landscape is a golden brown broken by the green of an occasional evergreen oak—Coast Live Oak (*Quercus agrifolia*) or Interior Live Oak (*Q. engelmannii*). Cacti, and stem and leaf succulents are essentially lacking.

As previously noted, there is disagreement regarding the prehistoric composition of Californian valley grassland. Clements (1934), Munz and Keck (1949, 1950), Twisselman (1956), Bakker (1971), Ornduff (1974), Heady (1977), and others, give the opinion that the original grasslands were

probably dominated by perennial bunchgrasses, particularly species of *Stipa*, *Poa*, and *Festuca*. Investigations cited by Biswell (1956), White (1967), and McNaughton (1968) seem to support the opinion that much of the grassland in California may have been composed of native annual grasses before the advent of civilized man and his livestock. White (1967) investigated an area protected from grazing for 27 years and found that while the composition of annuals was significantly different (71% being native) from adjacent grazed areas (20% native), the standing crop of the perennial Purple Needlegrass (*Stipa pulchra*) was no more abundant on the reservation than in comparable areas subject to moderate grazing. He concluded that the climax vegetation was annual grassland, at least under present environmental conditions, and that grazing favored the replacement of native annual species by exotic annuals.

Because Purple Needle-grass tends to become established after burning, this perennial species may have occupied extensive areas before the advent of fire suppression and the removal of potential fuel by grazing (Biswell, 1956). The absence of large numbers of large, grass-consuming herbivores before domestic livestock were introduced (Tule Elk, *Cervus elaphus nannodes*, were not present south of the San Joaquin Valley), and periodic burning by the aborigines certainly would have permitted this possibility. Biswell (1956) reports that grazing also favored an increase in rodent populations to the detriment of perennial native forbs such as Blue Dick (*Dichelostemma pulchellum*). For a particularly good treatment and discussion of Californian Valley grassland, see Bakker's (1971) discussion of "California's Kansas."

Examination of adobes from known-age structures, including missions, have provided valuable insights into the chronology of alien arrivals (Burcham, 1957). Most of the early adventives were the most valuable from a forage standpoint and include Wild Oats, Bur-clover, and Filaree. The most recent introductions, such as Halogeton and Goat Grass, tend to be noxious. The most successful invaders of California grasslands came from Spain and include species of *Avena*, *Bromus*, *Erodium*, and *Medicago*. An excellent discussion of the progressive invasion of open, unstable (annual) grasslands is given by Naveh (1967).

Table 16 gives a short list of the most frequent or characteristic annual and perennial plants of Californian Valley grassland and is from Twisselman (1956), Biswell (1956), Heady (1956), and to a lesser extent from Small (1974). Intensive field investigation of grassland south of the Transverse Ranges are apparently lacking so that the listing in Table 1 is based on collections from elsewhere in southern and central California. Alien species are indicated by an asterisk; most of these are annuals.

As is the case with the native grassland itself, almost all of the larger influent vertebrates have been destroyed and replaced. These include the California Grizzly Bear, Pronghorn Antelope, and California Condor (*Gymnogyps cali-*

Table 16. Some common grasses and forbs of Californian Valley grassland. Introduced taxa are indicated by asterisk.

Annual Grasses and Forbs	
<i>Bromus mollis</i>	*Soft Chess
<i>Bromus rubens</i>	*Red Brome
<i>Bromus rigidus</i>	*Ripgut Grass
<i>Avena barbata</i>	*Slender Oat
<i>Avena fatua</i>	*Wild Oat
<i>Hordeum</i> spp.	*foxtails
<i>Festuca confusa</i>	Hairy-leaved Fescue
<i>Festuca dertonensis</i>	*Sixweeks Fescue
<i>Festuca megalura</i>	Foxtail Fescue
<i>Lolium multiflorum</i>	*Italian Ryegrass
<i>Medicago hispida</i>	*Bur Clover
<i>Eschscholtzia californica</i>	California Poppy
<i>Brassica</i> spp.	*wild mustards
<i>Lepidium</i> spp.	peppergrasses
<i>Orthocarpus</i> spp.	owlclovers
<i>Nemophila menziesii</i>	Baby Blue-eyes
<i>Erodium cicutarium</i>	*Red-stem Filaree
<i>Erodium botrys</i>	*Broadleaf Filaree
<i>Trifolium</i> spp.	annual clovers
<i>Lotus americanus</i>	Spanish Clover
<i>Lupinus bicolor</i>	Ground Lupine
<i>Hemizonia</i> spp.	tarweeds
<i>Layia platyglossa</i>	Tidytips
<i>Eriogonum</i> spp.	buckwheats
<i>Astragalus</i> spp.	locoweeds
<i>Malva parviflora</i>	*Cheeseweed
Perennial Grasses and Forbs	
<i>Stipa pulchra</i>	Purple Needlegrass
<i>Stipa speciosa</i>	Desert Needlegrass
<i>Elymus triticoides</i>	Creeping Wildrye
<i>Melica californica</i>	Melic Grass
<i>Poa scabrella</i>	Pine Bluegrass
<i>Ranunculus californicus</i>	California Buttercup
<i>Solidago californica</i>	California Goldenrod
<i>Brodiaea capitata</i>	Blue Dick
<i>Calochortus</i> spp.	mariposa lilies

fornianus). The list of vertebrates associated with Californian Valley grassland is relatively short and none of these species is restricted in its distribution to this biotic community, the depauperate grassland fauna being continental in origin. Only two animals could be considered endemic to California grasslands, the Tule Elk and the Yellow Billed Magpie (*Pica nuttalli*), neither of which extends south of the Transverse Ranges.

Because few examples of Californian Valley grassland are in public ownership, it will continue to deteriorate and shrink in extent. Representative areas south of the Transverse Ranges are particularly limited and, with continued rapid urbanization, these examples may be restricted to islands and the interior valleys of Baja California in the foreseeable future (Fig. 77).