USDA Natural Resources
Conservation Service

Ecological site R015XE026CA
Loamy Slopes 9-12" p.z.

Accessed: 05/13/2025

General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

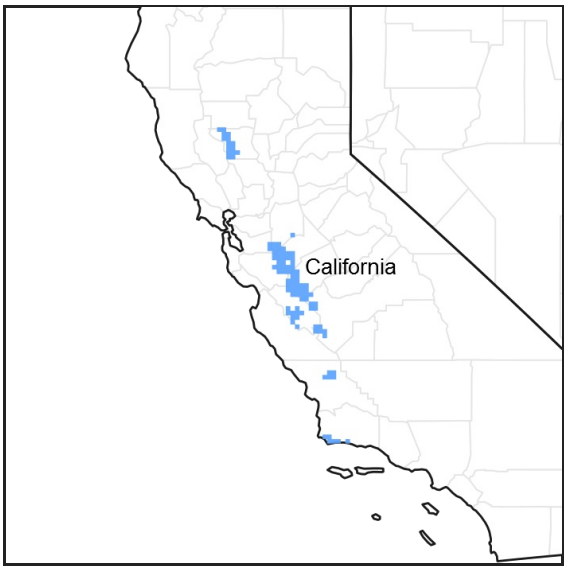

Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

Classification relationships

Kuchler: California Prairie 36.
CALVEG: Annual Grass 37.
WHR: Annual Grass ASG.

Associated sites

R015XE001CA	**Clayey Hills 10-14" p.z.** Lower slopes and elevations; no trees.
R015XE020CA	**Fine Loamy 9-13** Fewer trees and shrubs.

Similar sites

R015XE026CA	**Loamy Slopes 9-12" p.z.** Site formerly named "Loamy".

Table 1. Dominant plant species

Tree	(1) *Quercus douglasii*

Shrub	Not specified
Herbaceous	(1) *Bromus hordeaceus ssp. hordeaceus* (2) *Avena fatua*

Physiographic features

this site occurs on gently sloping to very steep mountains, mountain slopes and terraces. Elevations are 200 to 3800 feet. Predominant slopes are from 40 to 60%, but it can occur on lesser slopes as shallow as 12%.

Table 2. Representative physiographic features

Landforms	(1) Mountain (2) Mountain slope (3) Terrace
Flooding frequency	None
Ponding frequency	None
Elevation	61–1,158 m
Slope	40–65%
Ponding depth	0 cm
Water table depth	0 cm
Aspect	Aspect is not a significant factor

Climatic features

The climate on this site is characterized by mild cool winters (30 to 60 degrees F) and hot dry summers (70 to 100 degrees F). The average annual precipitation ranges from 10 to 24 inches, with most falling as rain from November to March. The average annual effective precipitation ranges from 9 to 12 inches depending upon the elevation.

No representative climate station has been selected for this ecological site.

Table 3. Representative climatic features

Frost-free period (average)	280 days
Freeze-free period (average)	0 days
Precipitation total (average)	610 mm

Influencing water features

There are no influencing water features for this ecological site.

Soil features

The soils that characterize this site are shallow to moderately deep and well drained. They formed in weathered material derived dominantly from sandstone, shale or volcanic tuff conglomerate. Surface textures are loam, cobbly loam, or clay loam over loam, clay loam, or clay subsoils which may be gravelly or cobbly.

This ecological site can be found on the following soil components:

Survey Mapunit Component
Area

CA011 312 SALTCANYON
CA011 313 SALTCANYON

CA011 316 HILLGATE
CA011 337 SALTCANYON
CA069 AsD Arguello
CA069 SdF2 Santa Lucia
CA069 SdG3 Santa Lucia
CA077 176 VALLECITOS
CA077 177 VALLECITOS
CA077 178 VALLECITOS
CA609 611ws Vallecitos
CA642 252 CHAQUA
CA642 253 CHAQUA
CA642 610 VALLECITOS
CA642 611 VALLECITOS
CA642 612 VALLECITOS
CA642 690 CONTRA COSTA
CA642 700 VALLECITOS
CA646 159wm CONTRA COSTA
CA646 610ws VALLECITOS
CA646 611ws VALLECITOS
CA647 102 CONOSTA
CA647 114 PECKHAM
CA647 115 PECKHAM
CA647 155 CONOSTA
CA647 156 CONOSTA
CA647 157 CONOSTA
CA647 158 CONOSTA
CA647 159 CONTRA COSTA
CA647 160 CONTRA COSTA
CA647 231 PECKHAM
CA647 232 PECKHAM
CA647 233 PECKHAM
CA647 252 CONTRA COSTA
CA653 739 DOMENGINE
CA653 865 CONOSTA
CA665 124 CHANAC
CA665 125 CHANAC
CA667 561 Chanac
CA667 562 Chanac

Table 4. Representative soil features

Surface texture	(1) Loam (2) Cobbly loam (3) Very gravelly clay loam
Family particle size	(1) Clayey
Drainage class	Well drained to somewhat excessively drained
Permeability class	Very slow to moderately slow
Soil depth	51–183 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	5.08–12.7 cm
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm

Sodium adsorption ratio (0-101.6cm)	0–2
Soil reaction (1:1 water) (0-101.6cm)	5.6–7.8
Subsurface fragment volume <=3" (Depth not specified)	8–18%
Subsurface fragment volume >3" (Depth not specified)	2–4%

Ecological dynamics

Through historical accounts and scattered remnants of native vegetation, it is believed that this ecological site has shifted from a native grassland/oak savannah to a non-native, annual grassland. The steeper slopes and shallow soils underlain with fractured bedrock have more blue oak (*Quercus douglasii*) and other trees, shrubs, perennial grasses and bulbs than the lesser slopes and deeper soils. This may be directly related to past management endeavors including oak harvesting for firewood and grazing management. North-facing slopes also tend to be more productive and have greater tree and shrub species diversity due to increased soil moisture availability longer into the growing season.

The non-native annual grassland community is highly resistant to change and has become the naturalized plant community. Although annual fluctuations in species composition and production occur, the dominant aspect of this ecological site is annual grasses and forbs with some shrubs. Annual variations are the result of climatic conditions, presence or absence of fire, and/or the previous years' management.

There is still some debate over what species constitute the historical climax plant community, and in what amounts those species occur. This site is currently in a rather low seral stage. At higher seral stages, native perennial bunchgrasses, shrubs (Ceanothus spp., Arctostaphylos spp., *Eriogonum fasciculatum*, *Cercis orbiculata*, etc) and scattered blue oak (*Q. douglasii*) and other trees such as California buckeye (*Aesculus californica*) become more prevalent.

A shift in the annual plant community due to overgrazing by livestock or wildlife is not easily documented. Species, such as filaree and annual clovers, will increase with certain weather and grazing conditions. Desirable forage species do not always decrease with short periods of heavy grazing nor do the undesirable increase. The amount of moisture, moisture distribution patterns, and temperature influence the makeup of the plant community as well as grazing pressure.

Managing annual rangeland to favor one species over another is difficult and unpredictable. The efforts to increase a species may be successful, but the effect may be short-lived due to a change in weather patterns.

State and transition model

Ecosystem states

1. Semi-woody Non-native Annual Grassland

State 1 submodel, plant communities

1.1. Semi-woody Non-native Annual Grassland

State 1
Semi-woody Non-native Annual Grassland

Community 1.1
Semi-woody Non-native Annual Grassland

This is the naturalized plant community. It is comprised mostly of non-native annual grasses with a small constituent of forbs, shrubs and trees. This community correlates with States II and III in the Vayssieres (1998) paper. There are annual fluctuations in species composition and production, mostly due to variable precipitation and temperature, presence/absence of fire, site-specific management, etc. Although it is believed by many that this plant community can transition into an open canopy (10-40%) oak savannah with an understory of annual grasses and forbs, this transition does not occur without substantial restoration inputs. Restoration efforts include hand-planting and watering of blue oak (*Quercus douglasii*) seedlings, and shrubs such as deerbrush (Ceanothus spp.), California redbud (*Cercis orbiculata*) and manzanita (Arctostaphylos spp.). Protection from browsing animals (deer, rabbit, ground squirrel, domestic livestock) is essential.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	942	1569	2197
Forb	336	560	785
Shrub/Vine	66	78	90
Tree	1	34	67
Total	**1345**	**2241**	**3139**

Table 6. Soil surface cover

Tree basal cover	5-10%
Shrub/vine/liana basal cover	5-15%
Grass/grasslike basal cover	55-60%
Forb basal cover	5-10%
Non-vascular plants	0%
Biological crusts	0%
Litter	20-25%
Surface fragments >0.25" and <=3"	1-8%
Surface fragments >3"	1-4%
Bedrock	0%
Water	0%
Bare ground	0%

Table 7. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	–	–	55-60%	1-3%
>0.15 <= 0.3	–	–	1-5%	3-5%
>0.3 <= 0.6	–	–	–	–
>0.6 <= 1.4	–	1-10%	–	–
>1.4 <= 4	–	–	–	–
>4 <= 12	1-10%	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1				942–2197	
	soft brome	BRHOH	*Bromus hordeaceus ssp. hordeaceus*	188–879	–
	wild oat	AVFA	*Avena fatua*	47–659	–
	annual fescue	VUMY	*Vulpia myuros*	47–439	–
	red brome	BRRU2	*Bromus rubens*	1–439	–
	purple needlegrass	NAPU4	*Nassella pulchra*	1–110	–
	bluegrass	POA	*Poa*	1–11	–
	medusahead	TACA8	*Taeniatherum caput-medusae*	1–11	–
	little barley	HOPU	*Hordeum pusillum*	1–11	–
	California melicgrass	MECA2	*Melica californica*	1–11	–
Forb					
2				336–785	
	stork's bill	ERODI	*Erodium*	34–157	–
	burclover	MEPO3	*Medicago polymorpha*	1–78	–
	clover	TRIFO	*Trifolium*	1–39	–
	lupine	LUPIN	*Lupinus*	1–24	–
	wavyleaf soap plant	CHPO3	*Chlorogalum pomeridianum*	1–4	–
	brodiaea	BRODI	*Brodiaea*	1–3	–
	American vetch	VIAM	*Vicia americana*	1–2	–
	cryptantha	CRYPT	*Cryptantha*	1–2	–
	shootingstar	DODEC	*Dodecatheon*	1–2	–
	fiddleneck	AMSIN	*Amsinckia*	1–2	–
	milkvetch	ASTRA	*Astragalus*	1–2	–
	smooth cat's ear	HYGL2	*Hypochaeris glabra*	1–2	–
	California goldfields	LACA7	*Lasthenia californica*	1–2	–
	pepperweed	LEPID	*Lepidium*	1–2	–
Shrub/Vine					
3				67–157	
	Eastern Mojave buckwheat	ERFA2	*Eriogonum fasciculatum*	1–4	–
	narrowleaf goldenbush	ERLI6	*Ericameria linearifolia*	1–4	–
	snakeweed	GUTIE	*Gutierrezia*	1–4	–
Tree					
4				1–67	
	blue oak	QUDO	*Quercus douglasii*	1–67	–

Animal community

This site, which is predominantly annual grasses and herbaceous plants with some perennials, lacks diversity and therefore only supports a limited variety of animals. Most of the wildlife associated with this ecological site feed on the plants or seeds they produce, such as rodents or small seed or insect-eating birds. These small animals are in turn prey for many predators. If the site is closely associated with other habitat types such as riparian, chaparral or

oak woodland, its value increases considerably.

The lack of water and brush for cover inhibits the presence of wildlife considerably. Mammals which feed on grass, forbs and seed may exist on this site. Honker, Hytop, Altamont variant, and Asolt soils commonly occur in complex with woodland soils, increasing the utilization of this site for wildlife such as deer and wild pigs.

The clayey soils make this site less suitable for burrowing animals. Also, steep slopes on this site restrict ponding of water during the winter (rainy) season, which also limits the values of this site, as opposed to flatter slopes.

This is a productive site for livestock grazing, sometimes providing the key forage areas among shallow, less productive sites. Along with the high production of desirable grasses there are also highly nutritious forbs such as burclover and species of clover. Grazing is limited mainly by steep slopes and lack of water. Salt placement and water developments will increase livestock distribution and promote uniform grazing.

Managing this site to leave 800 to 1,000 pounds of mulch per acre provides protection from erosion on slopes of less than 30 percent and encourages germination of the most desirable annual grasses such as soft chess. On slopes of more than 30 percent, 1000 to 1200 pounds of mulch per acre is recommended.

A shift in the annual plant community due to overgrazing by livestock or wildlife is not easily documented. Species such as filaree and annual clovers, will increase with certain weather and grazing conditions. Desirable forage species do not always decrease with short periods of heavy grazing nor do the undesirable increase. The amount of moisture, moisture distribution patterns, and temperature influence the makeup of the plant community as well as grazing pressure.

Managing annual rangeland to favor one species over another is difficult and unpredictable. The efforts to increase a species may be successful, but the effect may be short-lived due to a change in weather patterns.

The following is a general guide to initial stocking rates. Before making specific recommendations, an on-site evaluation must be made.

Less than 30% slopes:
Favorable years = 1.8 AUM/ac (0.55 ac/AUM).
Normal years = 1.1 AUM/ac (0.90 ac/AUM).
Unfavorable years = 0.38 AUM/ac (2.6 ac/AUM).

More than 30% slopes:
Favorable years = 1.7 AUM/ac (0.58 ac/AUM).
Normal years = 0.95 AUM/ac (1.05 ac/AUM).
Unfavorable years = 0.19 AUM/ac (5.3 ac/AUM).

Production amounts by year-type:
Favorable years = 2800 lbs/acre
Normal years = 2000 lbs/acre
Unfavorable years = 1200 lbs/acre

Using the July 2000 CA-NRCS Prescribed Grazing Specification for Annual Rangelands: On slopes 30% or less, stocking rate is derived from total production pounds minus 800 pounds for mulch and 25% harvest efficiency. On slopes over 30%, stocking rate is derived from total production pounds minus 1000 pounds for mulch and 25% harvest efficiency. Refer to the NRCS National Range and Pasture Handbook for a list of Animal Unit Equivalents. Sample Calculations using Favorable Year production amounts:

< 30% slopes: AUM/AC = [(2800-800)(0.75)]/791 lbs/month for one AU = 1.8 AUM/AC
AC/AUM = (1.0 AU)/(1.8 AUM/AC) = 0.55 AC/AUM

> 30% slopes: AUM/AC = [(2800-1000)(0.75)]/791 lbs/month for one AU = 1.7 AUM/AC
AC/AUM = (1.0 AU)/(1.7 AUM/AC) = 0.58 AC/AUM

Hydrological functions

Runoff rate is slow to rapid.

The hydrologic groups, hydrologic conditions and runoff curves for each soil series are:

Conosta, Contra Costa, Peckham-- Group C:
Good = 75.
Fair = 79.
Poor = 86.

Domengine, Millsholm, Vallecitos -- Group D:
Good = 81.
Fair = 84.
Poor = 89.

Recreational uses

This site provides limited hunting (access limitations), some hiking and photography (springtime flower blooms).

Wood products

No wood products occur on this ecological site.

Other products

Noxious plants:
Noxious and poisonous plants occur only in minor extent and usually are not a problem in livestock management. These plants will increase, however, with repeated severe grazing disturbance: Fiddleneck (Amsinkia spp.) and locoweed (Astragalus spp.).

Threatened and Endangered Plants and Animals:
Planners will refer to state and federal lists of endangered species. Management recommendations will address impacts on endangered species and their critical habitats. Refer to Endangered Species Policy and the California NRCS Endangered Species Handbook.

Other information

The following constraints need to be considered in planning the use and management of the rangeland resources:

1. Topography limitations are slight to severe. Slopes greater than 50% are considered severe.

2. Reseeding limitation is moderate to severe. Severe conditions include: lower elevations in years of below normal rainfall, low available water capacity, shallow soil depth, and all slopes greater than 30%.

3. Fire - Not recommended on this ecological site due to high fine fuel amounts, complex slopes, and erosion hazard potential of bare soil.

4. Water development limitations are moderate.

5. Wet season trampling limitations are moderate to severe for all soils.

6. Erosion hazard limitations are slight to severe. Slopes greater than 50% are considered severe. Refer to the individual mapunit and soil component ratings in each soil survey area.

Type locality

Location 1: Merced County, CA	
Township/Range/Section	T10 S R7 E S27
General legal description	Near center of Section 27, T10S, R7E (Merced County).

Other references

Vayssieres, M. P. and Richard E. Plant. 1998. Identification of Vegetation State-and-transition Domains in California's Hardwood Rangelands. Fire and Resource Assessment Program. California Dept of Forestry and Fire Protection. Sacramento, CA. http://frap.cdf.ca.gov/publications/state_and_trans2.pdf

Contributors

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Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

2. **Presence of water flow patterns:**

3. **Number and height of erosional pedestals or terracettes:**

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

5. **Number of gullies and erosion associated with gullies:**

6. **Extent of wind scoured, blowouts and/or depositional areas:**

7. **Amount of litter movement (describe size and distance expected to travel):**

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant:

    Sub-dominant:

    Other:

    Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

14. **Average percent litter cover (%) and depth (in):**

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

17. **Perennial plant reproductive capability:**