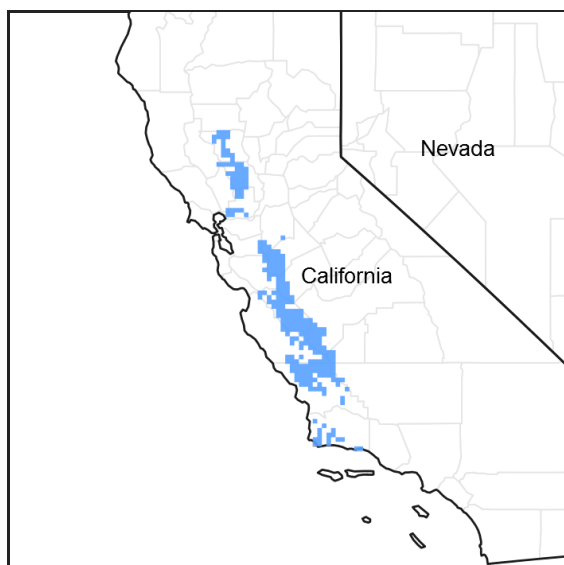


## **Ecological site R015XE001CA** **Clayey Hills 10-14" p.z.**

Accessed: 05/11/2025

### 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.

### Similar sites

R015XE001CA	<b>Clayey Hills 10-14" p.z.</b> Site formerly named "Clayey".
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**Table 1. Dominant plant species**

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>Avena fatua</i> (2) <i>Bromus hordeaceus</i> ssp. <i>hordeaceus</i>

### Physiographic features

This site occurs on moderately sloping to very steep hills and mountains. Elevations are 400 to 4480 feet. Slopes

range from 5 to 75 percent.

**Table 2. Representative physiographic features**

Landforms	(1) Hill (2) Mountain (3) Mountain slope
Flooding frequency	None
Ponding frequency	None
Elevation	400–4,480 ft
Slope	5–75%
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 9 to 24 inches with most falling as rain from November to March.

The average frost free period is 190 to 270 days. The growing season extends from December through April, but will vary with elevation and timing of rainfall.

**Table 3. Representative climatic features**

Frost-free period (average)	270 days
Freeze-free period (average)	365 days
Precipitation total (average)	24 in

## **Influencing water features**

There are no distinguishing wetland or riparian water features for this ecological site.

## **Soil features**

The soils that characterize this site are moderately deep to deep and well drained. They formed in weathered material derived from marine sandstone, marine shale, or basic igneous rock. Surface textures are clay, very stoney clay, loam or sandy loam over clay subsoil which may be gravelly or cobbly. These soils, with the exception of Honker, form large cracks upon drying. Available water capacity is low to high and the hazard of erosion is moderate to very high. Effective rooting depth is 20 to 60 inches.

Soils correlated to this ecological site include:

West Merced County Soil Survey Area-  
Altamont Variant (MU 753).

Asolt very stony clay (MU 751, 752).

Honker (MU 716, 719, 724, 725, 726, 727, 728, 734, 730).

Hytrop (MU 703, 753).

West Fresno County Soil Survey Area-  
Altamont (MU 712, 782, 783).

Altamont clay (MU 822).

Belgarra (MU 715, 717).

Climara clay (MU 728).

Climara (MU 733).  
Vaquero (MU 748, 782, 783).

Kings County Soil Survey Area-  
Altamont clay (MU 169, 170, 171).  
Vaquero clay (MU 169, 170, 171).

NW Kern County Soil Survey Area-  
Choice clay (MU 133).  
Altamont clay (MU 241, 242).  
Vaquero clay (MU 241, 242).

San Joaquin County Soil Survey Area-  
Alo (MU AVE, AVF).  
Honker (MU COF, COG, HVF, VAF, VAG).  
Vaquero (MU AVE, AVF, VZE).

**Table 4. Representative soil features**

Surface texture	(1) Clay (2) Very stony clay (3) Sandy loam
Family particle size	(1) Clayey
Drainage class	Well drained
Permeability class	Very slow
Soil depth	20–60 in
Available water capacity (0–40in)	5–6 in
Electrical conductivity (0–40in)	0–2 mmhos/cm
Sodium adsorption ratio (0–40in)	1–7
Soil reaction (1:1 water) (0–40in)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	2–5%

## 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 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. 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. The paper, "Identification of Vegetation State-and-transition Domains in California's Hardwood Rangelands" (Vayssieres 1998) offers a comprehensive look at the plant communities and transitions that occur on

this and other ecological sites within MLRA 15. As classified by Vayssieres (1998), State I and State II are found within this specific ecological site.

## State and transition model

### Ecosystem states

1. Non-native Annual Grassland
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### State 1 submodel, plant communities

1.1. Non-native Annual Grassland
----------------------------------

## State 1 Non-native Annual Grassland

### Community 1.1 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. This community correlates with State I 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 (10-20%) 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 cuneatus*) 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 (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	960	2240	2880
Forb	240	560	720
<b>Total</b>	<b>1200</b>	<b>2800</b>	<b>3600</b>

Table 6. Soil surface cover

Tree basal cover	0%
Shrub/vine/liana basal cover	0%
Grass/grasslike basal cover	60-65%
Forb basal cover	5-15%
Non-vascular plants	0%
Biological crusts	0%
Litter	30-35%
Surface fragments >0.25" and <=3"	0%

Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

Table 7. Canopy structure (% cover)

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	—	—	70-80%	—
>0.5 <= 1	—	—	5-10%	5-10%
>1 <= 2	—	—	—	—
>2 <= 4.5	—	1-2%	—	—
>4.5 <= 13	—	—	—	—
>13 <= 40	—	—	—	—
>40 <= 80	—	—	—	—
>80 <= 120	—	—	—	—
>120	—	—	—	—

Figure 3. Plant community growth curve (percent production by month). CA1501, Annual rangeland (Normal Production Year). Growth curve for a normal (average) production year resulting from the production year starting in November and extending into early May. Growth curve is for oak-woodlands and associated annual grasslands..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	10	25	40	5	0	0	0	0	0	10	10

Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1				960–2880	
	wild oat	AVFA	<i>Avena fatua</i>	144–1440	–
	soft brome	BRHOH	<i>Bromus hordeaceus ssp. hordeaceus</i>	96–1152	–
	red brome	BRRU2	<i>Bromus rubens</i>	48–96	–
	annual fescue	VUMY	<i>Vulpia myuros</i>	48–96	–
	purple needlegrass	NAPU4	<i>Nassella pulchra</i>	1–48	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	1–48	–
	hare barley	HOMUL	<i>Hordeum murinum ssp. leporinum</i>	1–29	–
<b>Forb</b>					
2				240–720	
	stork's bill	ERODI	<i>Erodium</i>	12–72	–
	burclover	MEPO3	<i>Medicago polymorpha</i>	1–72	–
	clover	TRIFO	<i>Trifolium</i>	1–36	–
	American vetch	VIAM	<i>Vicia americana</i>	1–2	–
	pepperweed	LEPID	<i>Lepidium</i>	1–2	–
	fiddleneck	AMSIN	<i>Amsinckia</i>	1–2	–
	milkvetch	ASTRA	<i>Astragalus</i>	1–2	–
	dove weed	CRSE11	<i>Croton setigerus</i>	1–2	–
<b>Shrub/Vine</b>					
3				1–2	
	coastal sagebrush	ARCA11	<i>Artemisia californica</i>	1	–
	coyotebrush	BAPI	<i>Baccharis pilularis</i>	1	–
	Eastern Mojave buckwheat	ERFA2	<i>Eriogonum fasciculatum</i>	1	–
	goldenbush	ERICA2	<i>Ericameria</i>	1	–

## 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 700 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 = 2.7 AUM/ac (0.4 ac/AUM).

Normal years = 1.9 AUM/ac (0.5 ac/AUM).

Unfavorable years = 0.4 AUM/ac (2.5 ac/AUM).

More than 30% slopes:

Favorable years = 2.5 AUM/ac (0.4 ac/AUM).

Normal years = 1.7 AUM/ac (0.6 ac/AUM).

Unfavorable years = 0.2 AUM/ac (5.0 ac/AUM).

Production amounts by year-type:

Favorable years = 3600 lbs/acre

Normal years = 2800 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:  $AUM/AC = [(3600-800)(0.75)]/791 \text{ lbs/month for one AU} = 2.7 AUM/AC$   
 $AC/AUM = (1.0 AU)/(2.7 AUM/AC) = 0.4 AC/AUM$

> 30% slopes:  $AUM/AC = [(3600-1000)(0.75)]/791 \text{ lbs/month for one AU} = 2.5 AUM/AC$   
 $AC/AUM = (1.0 AU)/(2.5 AUM/AC) = 0.4 AC/AUM$

## Hydrological functions

Runoff rate is medium to very rapid.

The hydrologic group for all soils in this ecological site is D. The hydrologic conditions and runoff curves for all the soils are:

Good = 81.

Fair = 84.

Poor = 89.

## Recreational uses

This site provides limited hunting, 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 (*Amsinckia* 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 moderate to severe. Slopes greater than 50% are considered severe.
2. Reseeding limitation is moderate to severe. Lower elevations in years of below normal rainfall, and on all slopes greater than 30%.
3. Fire - unless fire is used for weed control and vegetation manipulation, fire is not recommended. Fire is also not recommended on steeper slopes (>50%).
4. Water development limitations are slight to moderate.
5. Wet season trampling limitations are moderate to severe for all soils except Honker.
6. Erosion hazard limitations are moderate to severe. Slopes greater than 50% are considered severe.

## Type locality

Location 1: Merced County, CA	
Township/Range/Section	T9 S R7 E S34
General legal description	3,600 feet south and 2,100 feet east of the SW corner of Section 34, T9S, R7E in 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](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:**

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

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

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

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

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

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

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

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

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

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

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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:

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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):**

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

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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:**

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17. **Perennial plant reproductive capability:**

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