United States Department of Agriculture
NRCS Natural Resources Conservation Service

Ecological Site Description

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

ECOLOGICAL SITE DESCRIPTION

ECOLOGICAL SITE CHARACTERISTICS

Site Type: Rangeland

Site Name: Loamy Foothills

Quercus douglasii / / *Bromus - Avena fatua*
(blue oak / / brome - wild oat)

Site ID: R018XI007CA

Major Land Resource Area: 018 - Sierra Nevada Foothills

Physiographic Features

This ecological site can be found intermittently from Shasta County to Stanislaus County, covering more than 88,000 acres. This site occurs on hills with mound, intermound microrelief and on backslopes of hills (Pentz Series) and on terraces (Perkins Series). Slopes on this site range from 0 to 30 percent.

		Minimum	Maximum
Land Form:	(1) Hill		
	(2) Terrace		
Elevation (feet):		50	1700
Slope (percent):		0	30
Water Table Depth (inches):			
Flooding:			
Frequency:			
Duration:		None	None
Ponding:			
Depth (inches):			
Frequency:			
Duration:		None	None
Runoff Class:		Low	High

Aspect: No Influence on this site

Climatic Features

The climate has hot, dry summers and cool, moist winters. Mean annual precipitation is 10 to 35 inches. Average January temperature is 44 to 52 degrees F., average July temperature is 71 to 81 degrees F., and the mean annual temperature is 58 to 65 degrees F. The freeze-free season is 230 to 310 days. Most moisture falls as rain from October – May and is produced by winter storms that move into California from the Pacific Ocean in an easterly or southeasterly direction. Mean precipitation is presented as maximum precipitation in the table below.

Monthly precipitation and temperature averages are 1971-2000 means from the PRISM Group, Oregon Climate Service, Oregon State University, Corvallis, Oregon (Daly 2006). Frost free period obtained from map unit descriptions (Soil Data Mart). Mean monthly precipitation is reported in the Maximum precipitation row.

	Minimum	Maximum
Frost-free period (days):	230	310
Freeze-free period (days):	0	0
Mean annual precipitation (inches):	10.0	35.0

Monthly precipitation (inches) and temperature (°F):

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Precip. Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Precip. Max.	6.0	4.5	3.6	2.0	0.7	0.25	0.25	0.25	0.4	1.6	4.5	5.75
Temp. Min.	37.5	39.8	42.2	44.7	50.5	56.2	61.0	59.8	56.7	50.2	42.1	37.3
Temp. Max.	55.2	59.3	62.5	68.6	77.0	85.4	91.5	90.7	86.1	76.6	62.4	55.8

Climate Stations:

Influencing Water Features

Intermittent streams feeding into permanent higher order streams drain these sites. Small springs are common.

Wetland Description: System Subsystem Class

Representative Soil Features

This ecological site consists of shallow, well drained soils that formed in material weathered from weakly consolidated basic andesitic tuffaceous sediments (Pentz) and of very deep, well drained soils that formed in alluvium derived from mixed rock sources(Perkins).

Amador Area (CA628), California

PnC Pentz sandy loam, 2 to 16 percent slopes
PnC2 Pentz sandy loam, 9 to 16 percent slopes, eroded
PnD Pentz sandy loam, 16 to 31 percent slopes
PoE Pentz sandy loam, very shallow, 2 to 51 percent slopes
PpC Pentz gravelly sandy loam, 2 to 16 percent slopes
PrA Perkins loam, 0 to 3 percent slopes
PrC Perkins loam, 3 to 16 percent slopes

Sacramento County (CA067), California

188 Pentz-Lithic Xerorthents complex, 30 to 50 percent slopes

San Joaquin County (CA077), California

206 Pentz sandy loam, 2 to 15 percent slopes
207 Pentz sandy loam, 15 to 50 percent slopes
208 Pentz cobbly sandy loam, 5 to 8 percent slopes
209 Pentz-Bellota complex, 2 to 15 percent slopes
210 Pentz-Redding complex, 2 to 15 percent slopes

Shasta County Area (CA607), California

PlA Perkins loam, 0 to 3 percent slopes
PmA Perkins gravelly loam, 0 to 3 percent slopes
PmB Perkins gravelly loam, 3 to 8 percent slopes
PmC Perkins gravelly loam, 8 to 15 percent slopes
PmD Perkins gravelly loam, 15 to 30 percent slopes
PnA Perkins gravelly loam, seeped, 0 to 3 percent slopes
PoA Perkins gravelly loam, moderately deep, 0 to 3 percent slopes
PoB Perkins gravelly loam, moderately deep, 3 to 8 percent slopes
16,090 1.6

Eastern Stanislaus Area (CA644), California
Map

PcB Pentz cobbly loam, very shallow, 0 to 8 percent slopes 24
PcD Pentz cobbly loam, very shallow, 8 to 30 percent slopes
PeB Pentz gravelly loam, 3 to 8 percent slopes
PeD Pentz gravelly loam, 8 to 30 percent slopes
PeF Pentz gravelly loam, 30 to 75 percent slopes
PfB Pentz loam, 3 to 8 percent slopes
PfD Pentz loam, 8 to 30 percent slopes
PfE Pentz loam, 30 to 45 percent slopes
PmB Pentz loam, moderately deep, 3 to 8 percent slopes
PmC Pentz loam, moderately deep, 8 to 15 percent slopes
PmC2 Pentz loam, moderately deep, 8 to 15 percent slopes, eroded
PmD Pentz loam, moderately deep, 15 to 30 percent slopes
PmD2 Pentz loam, moderately deep, 15 to 30 percent slopes, eroded
PoB Pentz sandy loam, 3 to 8 percent slopes

Tehama County (CA645), California

PkA Perkins gravelly loam, 0 to 3 percent slopes
PkB Perkins gravelly loam, 3 to 8 percent slopes
Pm Perkins-Kimball gravelly loams, 0 to 3 percent slopes

Predominant Parent Materials:
Kind: Residuum
Origin: Andesite

Surface Texture: (1) Very gravelly Loam

Subsurface Texture Group:

	Minimum	Maximum
Surface Fragments <=3" (% Cover):		
Surface Fragments > 3" (% Cover):		
Subsurface Fragments <=3" (% Volume):		
Subsurface Fragments > 3" (% Volume):		

Drainage Class: Well drained

Permeability Class: Moderate To Moderately rapid

	Minimum	Maximum
Depth (inches):	10	35
Electrical Conductivity (mmhos/cm):		
Sodium Absorption Ratio:		
Calcium Carbonate Equivalent (percent):	0	0
Soil Reaction (1:1 Water):		
Soil Reaction (0.01M CaCl2):		
Available Water Capacity (inches):	2.7	8.6

Plant Communities

Ecological Dynamics of the Site

Before European settlement, the historic plant community for this ecological site is presumed to have been a blue oak (Quercus douglasii) savanna with grassland intermixed in a mosaic. The understory and grasslands of this site were dominated by native annual and perennial grasses and forbs. The reference state for this ecological site is similar to its pre-European state but annual grasses and forbs now dominate the understory and grassland.

The reference state for this ecological site is a blue oak savanna intermixed with annual grassland in a mosaic. The grasslands and understory are dominated by annual grasses and forbs. Understory species and grassland patches are frequently dominated by soft chess brome (Bromus hordeaceus), ripgut brome (Bromus diandrus), annual ryegrass (Lolium perenne), and filaree (Erodium spp).

Blue oak occurs along the drier inland portions of the coast range (MLRA 15). Blue oak trees are long-lived and evolved under low severity understory fires that naturally occur at intervals of about 25 years (McClaran 1986). Many mature blue oaks range from 100 to 200 years old but some blue oaks have been aged at more than 400 years (McClaran 1986). Blue oak is adapted to fire by sprouting from the root crown but blue oak resprouting declines with age (Burns and Honkala 1990). Blue oak is a vigorous sprouter in some locations and not in others. Fire top-kills blue oak seedlings and saplings. Resprouts are vulnerable to grazing/browsing by wildlife and domestic livestock for the first few years after fire.

The historic herbaceous understory layer of this ecological site is unknown, having been replaced by annual grasses and forbs of European origin during the European settlement of California (Burcham 1957, Bartolome 1987, Baker 1989). The tree and shrub layers remain intact and fire is a normal component of these plant communities that were maintained by the Native American population to provide food and fiber (Blackburn and Anderson 1993). Prior to European settlement fire frequency was approximately every 25 years (McClaran 1986). Fires were more frequent (5 to 15 years) following settlement before and after the gold rush (Pavlik 1991, Mensing 1992, Stephens 1997). The intentional use of fire by ranchers and others to reduce brush from 1850 to the 1950s contributed to this frequent fire interval. While prescribed burning continues today, foothill subdivision, urbanization and air quality concerns have reduced the use of fire as a management tool. Today fire frequency is more likely to be on the order of 25 to 50 years. Prescribed burning, mechanical and chemical brush control have been used to remove the shrub and tree layers but are infrequently used at the beginning of

the 21st century (Murphy and Crampton 1964, Murphy and Berry 1973).

Species composition and productivity of the annual dominated understory grasses and forbs vary greatly within and between years and is greatly influenced by the timing and amount of precipitation and the amount of residual dry matter (George et al. 2001a). Grass dominated years occur when rainfall is well-distributed or greater than normal. Filaree years occur in low rainfall years or when residual dry matter (Bartolome et al. 2002) is low. Drought, heavy grazing and fire result in filaree dominated understory. Following a fire filaree may dominate the site for up to three years (Parsons and Stohlgren 1989, McDougald et al 1991). The soils in this ecological site are usually shallow. Consequently, invasions of medusahead or starthistle may be less than on other soils in the MLRA.

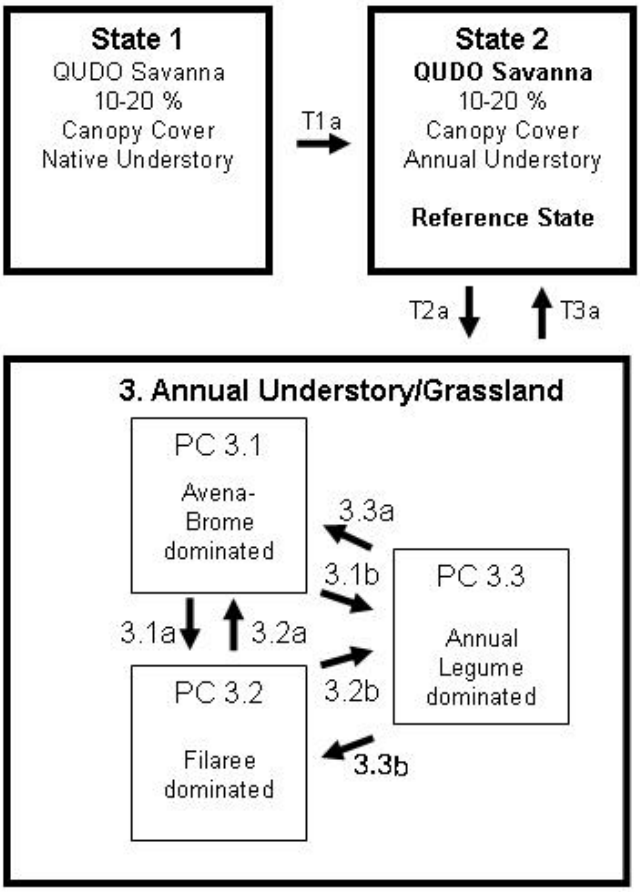
Oak Savanna Plant Community

The oak woodlands of California are a multi-layered mosaic of trees, shrubs and grass patches. In some locations these mosaics have been correlated with geological substrate (Cole 1980) and soil characteristics (Harrison et al. 1971). However, other researches have found each of these vegetation types on most soil depths, slopes, aspects and all geological substrates suggesting that disturbance (fire) and/or biological factors (competition, grazing and browsing) are important determinants of the patchy distribution of these vegetation types (Wells 1962, Callaway and Davis 1991) at a scale smaller than an ecological site or even a soil mapping unit. Given this mosaic of multi-layered vegetation types there is wide amplitude in expected species composition and amounts on the same soil series or association within an ecological site. Therefore, these sites were delineated more on the basis of soil characteristics and long-term understory production than on species composition. On this site the tree layer is dominated by blue oak.

The understory is dominated by annual grasses and forbs of European origin. Ripgut brome is often more prevalent in the oak understory on this site than in the open grassland patches. Deep soils with higher water holding capacity are often dominated by wild oats and other tall annual grasses. As germination, seedling establishment and plant growth progress during the growing season, species composition changes depending primarily on the timing and amount of precipitation and temperature (George et al. 2001a). Consequently, understory and open grassland species composition varies seasonally and annually. Unlike many perennial dominated grasslands, kinds and amounts (weight or cover) of herbaceous species are not stable and annually predictable. Therefore, exact percentages by weight or ground cover are not reported as is done in more stable perennial dominated ecosystems. Instead several species are listed, several of which can be expected to dominate the composition in some years and be present in most years.

Total Annual Production and Growth Curve

Forage production and species composition is largely controlled by four factors: precipitation, temperature, soil characteristics and plant residue (George et al. 2001a). Precipitation and temperature control the timing and characteristics of four distinct phases of forage growth: break of season (germination and onset of growth), winter growth, rapid spring growth, and peak forage production. March and April are usually the months when 50 to 75 percent of the annual production occurs. The cold months of December and January often produce only 0 to 5 percent of the annual production. During cold weather seasonal and annual variation in production during each of these seasons contributes to the variable total annual production in the annual dominated understory and open grass patches.


State 1
QUDO Savanna
10-20 %
Canopy Cover
Native Understory
T1a
State 2
QUDO Savanna
10-20 %
Canopy Cover
Annual Understory
Reference State
T2a
T3a
3. Annual Understory/Grassland
PC 3.1
Avena-
Brome
dominated
3.3a
3.1b
PC 3.3
Annual
Legume
dominated
3.1a
3.2a
PC 3.2
Filaree
dominated
3.2b
3.3b

State 1: Historic State

State 1: This is the assumed historic plant state consisting of a blue oak savanna community (10 – 20 % canopy cover) with no shrubs similar to State 2. State 1 assumes that native annual and perennial grasses and forbs were common in the understory of the former blue oak savanna but there is no record of the species composition. Blue oaks are fire resistant and evolved under low-severity grassland fires. In State 1 fire was more frequent and was not suppressed as is commonly the case in State 2. While frequent fire helps to maintain savanna ecosystems, other factors such as low rainfall, shallow soils or past management practices may prevent development of a shrub layer or increased blue oak density.

T1a (State 1 to State 2): Invasion by exotic annual species, yearlong continuous grazing, drought, fire suppression and cultivation reduced or destroyed the native perennial grass and forb component of the historic climax plant community. Apparently an irreversible transition in a time frame relevant to management. Restoration of native perennial herbaceous vegetation is a recurring management objective that has been largely unsuccessful. Researchers, managers and citizens groups have been unsuccessful at reversing the loss of native perennial grasses. Competition from invasive annuals and long dry summers apparently are insurmountable. Annual grasses and forbs are more competitive for soil moisture than native perennials reducing oak seedling survival (Gordon, et al. 1989, Corbin and D'Antonio 2004).

State 2: Reference State

State 2: This reference state is a blue oak savanna community (10 – 20 % canopy cover) with no shrubs and an annual dominated understory (Allen Class: Blue Oak /grass Blue Oak-Understory Blue Oak/Grass). Despite the longer fire interval canopy cover has not increased greatly as occurs in higher elevation oak-woodland sites. Natural fires in State 1 would have been ignited by lightening, whereas anthropogenic fires were ignited most commonly by Native Americans. Fire in State 2 is often man-caused, but can be started by lightening as well, however the timing and frequency of the fire has probably changed from State 1 to State 2. Understory is generally dominated by annual grasses and forbs of Eurasian origin with dynamics similar to those in State 3.

T2a (State 2 to State 3 type conversion from woodland to grassland): Use of mechanical and chemical tree control and prescribed burning removes all trees resulting in a conversion from woodland to annual grassland. In some cases this transition may be irreversible without artificial regeneration of native woody species, especially if frequent fires and grazing suppress seedlings of woody species. Seeding and fertilization often accompanied tree control. Without nurse trees or shrubs acorn germination and establishment of new oak seedlings may be difficult.

Loamy Foothills Ecological Site

State 2: Reference State Plant Species Composition:

Grass/Grasslike

Group	Group Name	Common Name	Scientific Name	Annual Production in Pounds Per Acre Low	High
2 - Native perennial cool season grass				0	0
		bulbous bluegrass	*Poa bulbosa*	0	0
8 - Non-native annual cool-season grass				0	0
		silver hairgrass	*Aira caryophyllea*	0	0
		wild oat	*Avena fatua*	0	0
		purple false brome	*Brachypodium distachyon*	0	0
		ripgut grass	*Bromus diandrus*	0	0
		soft brome	*Bromus hordeaceus*	0	0
		compact brome	*Bromus madritensis*	0	0
		little quakinggrass	*Briza minor*	0	0
		bristly dogstail grass	*Cynosurus echinatus*	0	0
		barley	*Hordeum*	0	0
		Italian ryegrass	*Lolium perenne ssp. multiflorum*	0	0
		medusahead	*Taeniatherum caput-medusae*	0	0
		fescue	*Vulpia*	0	0

Forb

Group	Group Name	Common Name	Scientific Name	Annual Production in Pounds Per Acre Low	High
12 - Native Annual Forb				0	0
		brodiaea	*Brodiaea*	0	0
		tarweed	*Hemizonia*	0	0
		trefoil	*Lotus*	0	0

14 - Non-native annual forb			0	0
	bristly dogstail grass	*Cynosurus echinatus*	0	0
	American wild carrot	*Daucus pusillus*	0	0
	stork's bill	*Erodium*	0	0
	bedstraw	*Galium*	0	0
	pepperweed	*Lepidium*	0	0
	burclover	*Medicago polymorpha*	0	0
	pincushionplant	*Navarretia*	0	0
	rose clover	*Trifolium hirtum*	0	0

Tree

Group	Group Name	Common Name	Scientific Name	Annual Production in Pounds Per Acre Low	High
24 - Native deciduous tree				0	0
		blue oak	*Quercus douglasii*	0	0

Annual Production by Plant Type:

Plant Type	Annual Production (lbs/AC) Low	Representative Value	High
Forb	240	500	700
Grass/Grasslike	960	2000	2800
Total:	1200	2500	3500

Structure and Cover:

Ground Cover (%)

Vegetative Cover						Non-Vegetative Cover					
Grass/ Grasslike	Forb	Shrub/ Vine	Tree	Non-Vascular Plants	Biological Crust	Litter	Surface Fragments > 1/4 & <= 3"	Surface Fragments > 3"	Bedrock	Water	Bare Ground
80 to 100	0 to 20					0 to 100					0 to 20

Structure of Canopy Cover (%)

	Grasses/Grasslike	Forbs	Shrubs/Vines	Trees
<=0.5 feet				
> 0.5 - < 1 feet	80 to 100	0 to 20		
< 1 - >= 2 feet				
> 2 - < 4.5 feet				
< 4.5 - >= 13 feet				
> 13 - < 40 feet				0 to 20

Plant Growth Curve:
Growth Curve Number: CA1501
Growth Curve Name: Annual rangeland (Normal Production Year)
Growth Curve Description: 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.

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

0	10	25	40	5	0	0	0	0	0	10	10

Plant Growth Curve:
Growth Curve Number: CA1502
Growth Curve Name: Annual rangeland (Favorable Production Year)
Growth Curve Description: Growth curve for a favorable production year resulting from the production year starting in October and extending through May. Growth curve is for oak-woodlands and associated annual grasslands.

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	10	20	30	25	0	0	0	0	5	5	5

Plant Growth Curve:
Growth Curve Number: CA1503
Growth Curve Name: Annual rangeland (Unfavorable Production Year)
Growth Curve Description: Growth curve for an unfavorable production year resulting from the production year starting in October and exgtending through May. Growth curve is for oak-woodlands and associated annual grasslands.

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	15	70	5	0	0	0	0	0	0	5	5

State 3: Annual Grassland

State 3: Annual grassland with species composition fluctuating in response to weather, grazing, fire and fertility. Plant community 3.1 (PC 3.1) is dominated by wild oats (Avena spp), soft chess brome (Bromus hordeaceus) and ripgut brome (B. diandrus). Plant community 3.2 (PC 3.2) is dominated by filaree (Erodium spp) or other decumbent species. Plant Community 3.3 (PC 3.3) is an annual grassland containing seeded annual legumes such as subterranean clover (Trifolium subterraneum) and rose clover (T. hirtum).

T3a (State 3 to State 2): Recovery from grassland conversions may take decades or may be irreversible depending on the intensity and type of brush control practices. Repeated fires and grazing help to maintain the grassland. Blue oaks and other woody plants may colonize adjacent open grasslands but seedlings are seldom found more than 30 m from existing tree canopy. Planting of blue oaks, weed control and protection of blue oak seedlings from animal damage can successfully restore blue oaks (McCreary 2001).

T3.1a (PC 3.1 to PC 3.2): Filaree increases in response to low litter levels. Litter levels reduced by poor growing conditions, fire or heavy grazing. Long periods of inadequate rainfall within the growing season reduce grasses.

T3.2a (PC 3.2 to PC 3.1): Annual grasses increase in filaree patches. Light to moderate grazing increases litter. Mulching effect of litter favors annual grass seedlings. Annual grasses shade filaree and other forb seedlings. Nitrogen fertilization favors increase in grasses.

T3.1b (PC 3.1 to PC 3.3): Seed annual legumes. Sulfur and/or phosphorus fertilization are required to maintain productive subterranean clover stands. Rose clover increases and spreads without fertilization. Close grazing helps to maintain legume composition.

T3.2b (PC 3.2 to PC 3.3): Seed annual legumes. Sulfur and/or phosphorus fertilization are required to maintain productive subterranean clover stands. Rose clover increases and spreads without fertilization. Close grazing helps to maintain legume composition.

T3.3a (PC 3.3 to PC 3.1): Grasses increase with improved soil fertility and light grazing

T3.3b (PC 3.3 to PC 3.2): With loss of fertility and close grazing annual legumes are replaced by filaree.

State 3: Annual Grassland Plant Species Composition:

Grass/Grasslike

Group	Group Name	Common Name	Scientific Name	Annual Production in Pounds Per Acre Low	High
2 - Native Perennial Cool Season Grass				0	0
		bulbous bluegrass	*Poa bulbosa*	0	0
8 - Non-native annual grass				0	0
		silver hairgrass	*Aira caryophyllea*	0	0
		wild oat	*Avena fatua*	0	0
		purple false brome	*Brachypodium distachyon*	0	0
		ripgut grass	*Bromus diandrus*	0	0
		soft brome	*Bromus hordeaceus*	0	0
		compact brome	*Bromus madritensis*	0	0
		little quakinggrass	*Briza minor*	0	0
		bristly dogstail grass	*Cynosurus echinatus*	0	0
		barley	*Hordeum*	0	0
		Italian ryegrass	*Lolium perenne ssp. multiflorum*	0	0
		medusahead	*Taeniatherum caput-medusae*	0	0
		fescue	*Vulpia*	0	0

Forb

Group	Group Name	Common Name	Scientific Name	Annual Production in Pounds Per Acre Low	High
12 - Native Annual Forb				0	0
		brodiaea	*Brodiaea*	0	0
		tarweed	*Hemizonia*	0	0
		trefoil	*Lotus*	0	0
14 - Non-native annual forb				0	0
		Italian thistle	*Carduus pycnocephalus*	0	0
		Maltese star-thistle	*Centaurea melitensis*	0	0
		stork's bill	*Erodium*	0	0
		bedstraw	*Galium*	0	0
		pepperweed	*Lepidium*	0	0
		pincushionplant	*Navarretia*	0	0
		rose clover	*Trifolium hirtum*	0	0

Annual Production by Plant Type:

Plant Type	Annual Production (lbs/AC) Low	Representative Value	High
Forb	240	500	700
Grass/Grasslike	960	2000	2800
Total:	1200	2500	3500

Structure and Cover:

Ground Cover (%)

Vegetative Cover						Non-Vegetative Cover					
				Non-			Surface Fragments	Surface			

Grass/ Grasslike	Forb	Shrub/ Vine	Tree	Vascular Plants	Biological Crust	Litter	> 1/4 & <= 3"	Fragments > 3"	Bedrock	Water	Bare Ground
80 to 100	0 to 20					0 to 100					0 to 20

Plant Growth Curve:
Growth Curve Number: CA1501
Growth Curve Name: Annual rangeland (Normal Production Year)
Growth Curve Description: 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.

Percent Production by Month

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

Plant Growth Curve:
Growth Curve Number: CA1502
Growth Curve Name: Annual rangeland (Favorable Production Year)
Growth Curve Description: Growth curve for a favorable production year resulting from the production year starting in October and extending through May. Growth curve is for oak-woodlands and associated annual grasslands.

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	10	20	30	25	0	0	0	0	5	5	5

Plant Growth Curve:
Growth Curve Number: CA1503
Growth Curve Name: Annual rangeland (Unfavorable Production Year)
Growth Curve Description: Growth curve for an unfavorable production year resulting from the production year starting in October and exgtending through May. Growth curve is for oak-woodlands and associated annual grasslands.

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	15	70	5	0	0	0	0	0	0	5	5

Ecological Site Interpretations

Animal Community:
Wildlife

Of the 632 terrestrial vertebrates (amphibians, reptiles, birds, and mammals) native to California, over 300 species use oak woodlands for food, cover and reproduction, including at lest 120 species of mammals, 147 species of birds and approximately 60 species of amphibians and reptiles (Tietje et al. 2005). Common species on this site include California quail (Callipepla californicus), Beechey ground squirrels (Spermophilus beecheyi), Botta pocket gopher (Thomomys bottae mewa), Audubon cottontail (Sylvilagus audubonii vallicola), and deer (Odocoileus spp). The rich rodent and lagomorph population is an important food source for common predators including: bobcat (Lynx rufus californicus), coyote (Canis latrans) and the Pacific rattlesnake (Crotalus viridis oreganus). The value of this site for food or cover changes seasonally with the vegetation. In habitat planning each plant community and each species needs must be considered individually and collectively.

Deer, rodents and rabbits browses blue oak contributing to poor regeneration. Acorns are eaten by at least a dozen species of songbirds, several upland game birds, rodents, black-tailed deer, feral and domestic pig, and all other classes of livestock (Adams et al. 1992, Duncan and Clawson 1980, Sampson and Jespersen 1963). Acorns are a critical food source for deer, which migrate from high-elevation dry summer ranges to blue oak woodland for fall and winter forage (Burns and Honkala 1990). Studies in the central Sierra Nevada foothills showed that blue oak woodland is utilized by 92 species of birds, 60 of which nest there (Block and Morrison 1990). The California Wildlife Habitat Database (Mayer and Laudenslayer 1988), maintained by California Department of Fish and Game, can provide extensive information on wildlife species that may occur in the habitat type on this site.

Grazing and Browsing

The plant communities on this site are suitable for grazing by all classes of livestock at any season. However, forage quality declines below the nutritional needs of many kinds and classes of livestock during the 6 to 8 month dry season. Matching the nutrient demands of livestock with the nutrients supplied by range forage is a balancing act for a considerable portion of each year(George et al. 2001b). The quality of range forage varies with plant species, season, location, and range improvement practices. Range forage is optimal for livestock growth and production for only a short period of the year. Early in the growing season, forage may be of high nutrient content, but high water content in the forage may result in rapid passage through the rumen and incomplete nutrient extraction. The browse value of common oak woodland species can be found in Sampson and Jespersen 1963.

Plant Preference by Animal Kind:

Hydrology Functions:
The watersheds associated with these sites are predominantly drained by intermittent streams that only flow during the wet season. These intermittent streams feed into higher order permanent streams.

Recreational Uses:
Bird watching, hunting, camping, horseback riding, all terrain vehicle riding, and hiking in spring and near developed reservoirs are common recreational pursuits

Wood Products:
Firewood cutting of blue oak, once prevalent, has decreased with increased public awareness of poor blue oak regeneration. Cutting of interior live oak for fire wood is common.

Other Products:
Native Americans have historically used and managed the blue oak woodlands for food and fiber. This ecological site is in the heart of California’s historic Mother Lode. Mining for gold has occurred in the past. Remnants of historic mining activity can be found on this ecological site including abandon mines.

Other Information:
Oak Restoration:

Natural regeneration of blue oaks may be limited because they are weak resprouters on some dry sites and because of a number of factors that limit seed germination, seedling establishment and survival to the tree stage. Competition for soil moisture from the understory annual plants, acorn and seedling damage by rodents, livestock grazing and changed fire regimes are important factors that can reduce blue oak regeneration. Interior live oak regeneration is generally not a problem because it is a strong resprouter. McCreary (2001) provides an extensive review of oak regeneration problems and practices on California’s oak woodlands.

Native Grass Restoration:

Bulbous blue grass occurs on this site. Like most of the annual rangelands restoration of native grasses is rarely

successful. California scientists have tried to restore native grasses to annual rangelands for more than 50 years but have not found any dependable native grass restoration practices that can be recommended. Therefore native grass restoration should not be a management goal on this site.

Annual Legumes and Annual Grasses:

Improved forage production and quality can be achieved by seeding annual legumes (rose clover and subterranean clover and annual grasses such as annual ryegrass. Annual legume production is improve by the application of sulfur and phosphorus fertilizers.

Poisonous/Non-native Plants

Poisonous Plants:
There are several poisonous plants on this ecological site. Pyrrolizidine alkaloids in fiddleneck (Amsinkia spp.) can cause liver damage in livestock. Yellow starthistle (Centaurea solstitialis) is poisonous to horses. Acorns and oak leaves taken in excess may be toxic. Livestock poisoning is often a result of hungry animals being concentrated on toxic plants.
Several poisonous plants may be present on this ecological site although cattle losses to poisonous plants are rare. Livestock poisoning is often a result of hungry animals being concentrated on toxic plants.

Supporting Information

Associated Sites:

Site Name	Site ID	Site Narrative

Similar Sites:

Site Name	Site ID	Site Narrative

State Correlation:
This site has been correlated with the following states:
CA

Inventory Data References:
LFDAVIS1 40.3885000 122.3685700
Mancuso-Coloma 38.7997778 120.9978333
MDTuteur01 38.2555916 122.2102443
TWcarnegie8 37.6393500 121.5872830
BFebmud2 38.2470518 120.9902808
BFamador1 38.2972036 120.9156357

Type Locality:

Relationship to Other Established Classifications:
This blue oak dominated site may include the following Allen-Diaz Classes: 1) Blue Oak/Grass or 2) Blue Oak-Understory Blue Oak/Grass (Allen Diaz et al. 1989). This site is classified as a Blue Oak Woodland (BOW) in the California Wildlife Habitat Relationships System. The Society for Range Management Cover Type for this site is Blue Oak Woodland.

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Site Description Approval:

Author	Date	Approval	Date
Melvin George, Bill Frost, Theresa Becchetti, Morgan Doran and Larry Forero	5/25/2004	Kendra Moseley	5/1/2008

Reference Sheet

Author(s)/participant(s):

Contact for lead author:

Date: **MLRA:** 018X **Ecological Site:** Loamy Foothills R018XI007CA This *must* be verified based on soils and climate (see Ecological Site Description). Current plant community cannot be used to identify the ecological site.

Composition (indicators 10 and 12) based on: Annual Production, Foliar Cover, Biomass

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Indicators. For each indicator, describe the potential for the site. Where possible, (1) use numbers, (2) include expected range of values for above- and below-average years for **each** community and natural disturbance regimes within the reference state, when appropriate and (3) cite data. Continue descriptions on separate sheet.

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, standing dead, 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 and strength of structure, and A-horizon color and thickness):**

10. **Effect on plant community 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 weight using symbols: >>, >, = to indicate much greater than, greater than, and equal to) with dominants and sub-dominants and "others" on separate lines:**
    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 (inches):**

15. **Expected annual production (this is TOTAL above-ground production, not just forage 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 indicator, we are describing what in NOT expected in the reference state for the ecological site:**

17. **Perennial plant reproductive capability:**