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: Very Stony Shallow Loam

Quercus douglasii - Pinus sabiniana / *Ceanothus cuneatus - Rhamnus ilicifolia* / *Bromus - Avena*
(blue oak - California foothill pine / buckbrush - hollyleaf redberry / brome - oat)

Site ID: R018XI003CA

Major Land Resource Area: 018 - Sierra Nevada Foothills

Physiographic Features

This ecological site extends along the Sierra Nevada foothills from Lassen National Forest and Shasta County to Butte County. It occurs in isolated units as far south as East Fresno County. In total it covers more than 370,000 acres with slopes that range from gentle to steep at elevations from 200 to 4000 feet.

Land Form: (1) Hill

	Minimum	Maximum
Elevation (feet):	200	4000
Slope (percent):	0	50
Water Table Depth (inches):		
Flooding:		
Frequency:		
Duration:	None	None
Ponding:		
Depth (inches):		
Frequency:		
Duration:	None	None
Runoff Class:	High	Very high

Aspect: No Influence on this site

Climatic Features

The average annual precipitation ranges from 16 to 40 inches and increases with elevation. Most moisture falls as rain from October to May and is produced by winter storms that move into California from the Pacific Ocean in an easterly or southeasterly direction. Mean temperatures range from 46 F in December & January to 80 F in July. Freezing temperatures may occur in winter and summer temperatures can exceed 100 F. Average monthly precipitation is presented in the maximum monthly precipitation row in the table below.

Precipitation and temperature 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).

	Minimum	Maximum
Frost-free period (days):	200	300
Freeze-free period (days):	0	0
Mean annual precipitation (inches):	16.0	40.0

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.	4.95	3.8	3.8	1.9	1.23	0.35	0.25	0.25	0.8	1.75	4.23	4.45
Temp. Min.	37.0	39.0	42.0	45.0	52.0	59.0	63.0	61.0	57.0	50.0	41.0	36.0
Temp. Max.	55.0	59.0	63.0	70.0	80.0	89.0	96.0	95.0	89.0	77.0	62.0	55.0

Climate Stations:

Influencing Water Features

Intermittent streams drain these sites following adequate rainfall. South facing slopes tend to dry sooner than north facing slopes.

Wetland Description: System Subsystem Class

Representative Soil Features

This site is characterized by rocky shallow loam soils developed from volcanic or tuff breccia (Toomes, Doemill-Jokerst, Supan). The depth to bedrock is usually about 10 to 22 inches. However the Supan part of the soil complexes are deeper with bedrock at 46-50 inches. Toomes and Supan series are well drained, but the Doemill and Jokerst may be poorly drained. Available water holding capacity is very low, at about 1.1-2.7 inches. Elevation ranges from 200 to 4000 feet.

CA089 TcE, TeD Toomes very rocky loam, Toomes very stony loam
CA103 TfD, TfE, TgD, TgE, ThE, TkB, TkD, TmD, TmE, TnD, TnE, ToE Toomes rocky, very rocky, extremely rocky, very rocky silt loams; Toomes-Supan rocky loams, rocky complex & extremely rocky complex.
CA007 614, 615 Doemill-Jokerst complex
CA007 616, 617 Jokerst-Doemill-Typic Haploxeralfs complex

CA007 620, 621 Doemill-Jokerst-Ultic Haploxeralfs, Thermic complex
Lassen NF TcEsc
Lassen NF Toomes very rocky loam
CA019 TnF Toomes extremely cobbly loam
CA099 HaB Toomes rocky loam

Predominant Parent Materials:
Kind: Residuum
Origin: Acidic volcanic breccia

Surface Texture:

Subsurface Texture Group:

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

Drainage Class: Excessively drained To Excessively drained
Permeability Class:

	Minimum	Maximum
Depth (inches):	4	20
Electrical Conductivity (mmhos/cm):		
Sodium Absorption Ratio:		
Calcium Carbonate Equivalent (percent):		
Soil Reaction (1:1 Water):		
Soil Reaction (0.01M CaCl2):		
Available Water Capacity (inches):	0.0	1.0

Plant Communities

Ecological Dynamics of the Site

Before European settlement, the historic plant community is assumed to have been a blue oak (Quercus douglasii) savanna that was often in a mosaic with the native grassland on the same soils. The understory of this site was dominated by native annual and perennial grasses and forbs. The reference state for this ecological site is similar to its pre-European state; however, density of shrubs and foothill pine (Pinus sabiniana) may be different due to fire suppression and annual grasses and forbs now dominate the understory.

The reference state for this ecological site is a blue oak savanna mixed in a mosaic with annual dominated grassland patches. Wedgeleaf ceanothus (Ceanothus cuneatus) and hollyleaf redberry (Rhamnus ilicifolia) may be found on this ecological site. Understory species and grassland patches are frequently dominated by soft chess brome (Bromus hordeaceus), annual fescue (Vulpia myuros), red brome (Bromus rubens), wild oats (Avena fatua) and filaree (Erodium spp).

The shallow soil depth and low water holding capacity characteristic of this ecological site limits the vegetation type to a blue oak savanna or grassland. The shrub layer is sparse or not present. Consequently there is little potential for the shrub layer to develop into the tree layer creating the potential for crown fires associated with the woodlands that develop on other ecological sites along the Sierra Nevada foothills. However, there is the potential for grass fires. Frequent fire tends to result in vegetation states dominated by an annual grass or oak-annual grass community. Protection from fire and grazing may result in a very slow increase in shrubs and foothill pine contributing to increased fuel loads but not to the extent present on other ecological sites in MLRA 18.

Blue oak trees are long-lived species that 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 may decline 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. Foothill pine (Pinus sabiniana) is increasing in blue oak-foothill pine communities due to fire suppression and lack of blue oak regeneration (Borchart et al. 1991). Hollyleaf redberry resprouts following fire while wedgeleaf ceanothus germinates following fire. Frequent burning can remove the germinating species from the site.

The historic herbaceous understory layer of the plant community is not known, having been replaced by annual grasses and forbs of European origin during the colonization 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 managed by the Native American population to provide food and fiber (Blackburn and Anderson 1993). Prior to European settlement in the mid-1800s 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 have been used infrequently since the beginning of the 21st century (Murphy and Crampton 1964, Murphy and Berry 1973).

Species composition and productivity of the annual dominated grassland and 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).

Oak Woodland Plant Community

This ecological site is a mosaic of blue oak savanna and open annual dominated grassland. In some locations mosaics have been correlated with geological substrate (Cole 1980) and soil characteristics (Harrison et al. 1971). However, other researchers 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 1993) at a scale smaller than an ecological site or even a soil mapping unit (see photo above).

The understory and open grassland patches are dominated by annual grasses and forbs of European origin. As germination, seedling establishment and plant growth progress during the growing season, species composition changes depending primarily on residue levels and 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 in this ESD as is done in 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.

The tree layer is dominated by blue oak (Quercus douglasii), with some foothill pine (Pinus sabiniana). The shrub layer, when it is present, consists of isolated patches or individual plants of wedgeleaf ceanothus (Ceanothus cuneatus) and hollyleaf redberry (Rhamnus ilicifolia). The understory is dominated by annual grasses and forbs of European origin.

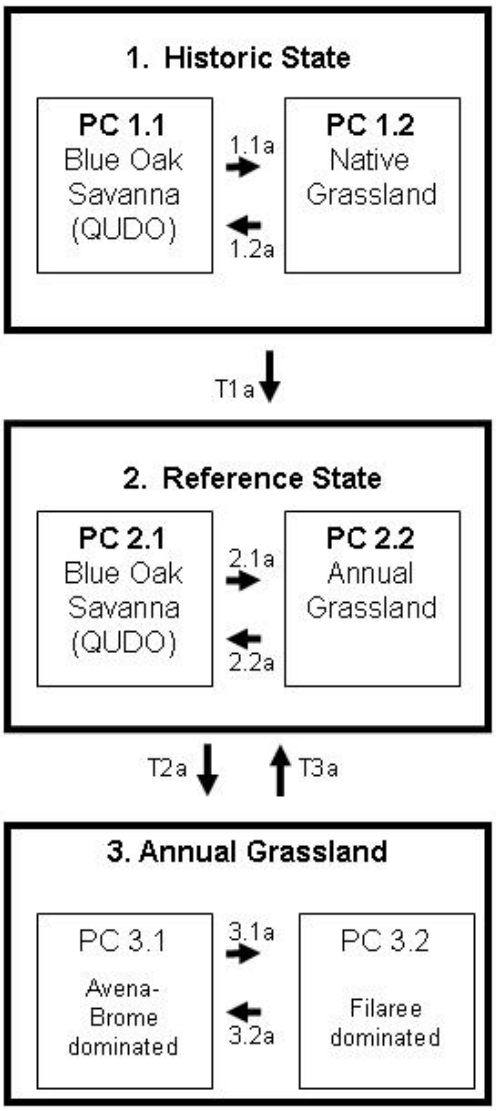
Total Annual Production and Growth Curve

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. Typically annual forage production for normal, favorable and unfavorable years is 640-960 lb/a, 800-1200 lb/a, and 400-600 lb/a years, respectively. The Toomes soil series is the main series in this ecological site. At its shallowest normal productivity may be as low as 400 lb/a. Deeper variants may have a normal productivity of about 800 lb/a. The Supan series occurs in a complex with the Toomes series and may have normal productivities of 1800 lb/a. The Supan series is also included in the gravelly loam ecological site.

This ecological site commonly supports a blue oak dominated savanna of less than 30 percent canopy cover. In this savanna type understory production may be greater under the trees than in the open (George et al. 1996). On most of this site, the sparse tree canopy would not reduce understory productivity.

Production curves are examples of monthly forage production for normal (800 lb/a), favorable (1000 lb/a), and unfavorable (500 lb/a) years. Annual plant growth begins with germination following the first fall rains (George et al. 2001a). Germination commonly begins within one week of receiving 0.5 to 1.0 inch of rainfall. This normally occurs late in October or early November but can be later. Temperatures commonly turn cold in mid-November and germination slows.

Fall herbaceous production will be greater during years when early rains are followed by continuing rainfall. Delayed onset of cold weather following a germinating rain also contributes to higher fall production but this sequence of events is rare. Early rains followed by an extended dry period can result in loss of most of the initial wave of germination and poor fall production. This is known as a “false break” and will be followed by a second germination wave when adequate rainfall resumes. The onset of rapid spring growth coincides with warming spring temperatures commonly in mid-February. The rapid spring growth period continues until soil moisture is depleted following the end of the rainy season. Spring production increases as the period from mid-February to soil moisture depletion increases.



Very Stony Shallow Loam State and Transition Model

State 1: Historic State

State 1: The assumed historic state is a mosaic of blue oak savanna and grassland similar to that in State 2. State 1 assumes that native annual and perennial grasses and forbs were common in the tree understory and the open grassland patches but there is no record of the species composition. In State 1, fire was more frequent and was not suppressed as is commonly the case in State 2. Under a more frequent fire regime, the shrub community may have been reduced compared to State 2. Additionally, foothill pine was probably less prevalent in State 1.

1.1a - similar to 2.1a with a native grass and forb understory and grassland.

1.2a – similar to 2.2a with a native grass and forb understory and grassland.

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 assumed historic plant community (Burcham 1957, Bartolome 1987, Baker 1989). Apparently this is 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: The reference state is a mosaic of blue oak savanna and annual grassland. Fire suppression has resulted in longer intervals between fires. 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 lightning as well, however the timing and frequency of fire has probably changed from State 1 to State 2. Allen Class: Blue Oak-Foothill Pine/Grass, Blue Oak-Foothill Pine/Wedgeleaf Ceanothus/Grass or Blue Oak/Grass.

Plant community 2.1 (PC 2.1): Savanna dominated by blue oak (Quercus douglasii) with an annual grass understory.

Plant community 2.2 (PC 2.2): Annual grasslands intermixed with blue oak savanna are often dominated by soft chess brome (Bromus hordeaceus), and red brome (B. rubens), wild oats (Avena fatua) and annual ryegrass (Lolium multiflorum).

Plant community 2.1 (PC 2.1): Savanna dominated by blue oak (Quercus douglasii) with an annual grass understory.

Plant community 2.2 (PC 2.2): Annual grasslands intermixed with blue oak savanna are often dominated by soft chess brome (Bromus hordeaceus), and red brome (B. rubens), wild oats (Avena fatua) and annual ryegrass (Lolium multiflorum).

2.1a (PC 2.1 to State PC 2.2): This ecological site often occurs as a mosaic of blue oak savanna and annual grassland patches. The grassland patches may be natural or the result of past tree removal. The annual grassland patches could slowly encroach into the blue oak savanna if blue oaks die and natural regeneration does not occur. Mature stands of blue oaks may have a reduced capacity to resprout. Where oaks are not naturally regenerating and blue oak stands are mature, conversion to grassland could gradually occur as blue oaks die. Larger scale disturbances could result in a type conversion as described in T2a.

2.2a (PC 2.2 to State PC 2.1): Annual grasslands are rarely converted directly to oak-woodland by natural processes (Callaway and Davis 2993) but can be converted using artificial regeneration practices as described in R3b (McCreary 2001). Transition from grassland to oak-woodland is difficult for several reasons. Lack of shade

from overstory trees and shrubs reduces survival of seedlings to the sapling stage. Annual grasses often deplete soil moisture at rapid rates, suppressing oak seedling survival (Gordon 2989).

T2a (State 2 to State 3 - Type conversion from woodland/shrubland to grassland): Use of mechanical and chemical tree and shrub control and prescribed burning remove all trees and shrubs 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 and shrub control. At low canopy covers fire or natural mortality could remove woody species and conditions for resprouting or acorn germination and seedling establishment may be unfavorable. Catastrophic fire in a mature blue oak stand that lacks the capacity to regenerate could also result in rapid conversion to annual grassland. Firewood cutting can also contribute to this transition. Oak removal on steep unstable slopes often leads to erosion and mass wasting during high rainfall years. Removal of trees leads to loss of soil fertility.

Very Stony Shallow Loam 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
8 - Non-native cool season annual grass				0	0
		wild oat	*Avena fatua*	0	0
		soft brome	*Bromus hordeaceus*	0	0
		red brome	*Bromus rubens*	0	0
		rat-tail fescue	*Vulpia myuros*	0	0

Forb

Group	Group Name	Common Name	Scientific Name	Annual Production in Pounds Per Acre Low	High

12 - Native annual forb			0	0
		Micropus californicus (Syn)	0	0
	dotseed plantain	*Plantago erecta*	0	0
14 - Non-native forb			0	0
	stork's bill	*Erodium*	0	0
	clover	*Trifolium*	0	0

Shrub/Vine

Group	Group Name	Common Name	Scientific Name	Annual Production in Pounds Per Acre Low	High
17 - Native shrub				0	0
		buckbrush	*Ceanothus cuneatus*	0	0
		hollyleaf redberry	*Rhamnus ilicifolia*	0	0

Tree

Group	Group Name	Common Name	Scientific Name	Annual Production in Pounds Per Acre Low	High
23 - Native coniferous tree				0	0
		California foothill pine	*Pinus sabiniana*	0	0
24 - Native deciduous tree				0	0
		blue oak	*Quercus douglasii*	0	0

Annual Production by Plant Type:

	Annual Production (lbs/AC)		
Plant Type	Low	Representative Value	High
Forb	100	160	200
Grass/Grasslike	400	640	800
Total:	500	800	1000

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 5	0 to 50			80 to 100					0 to 20

Structure of Canopy Cover (%)

	Grasses/Grasslike	Forbs	Shrubs/Vines	Trees
<=0.5 feet		0 to 20		
> 0.5 - < 1 feet	80 to 100			
< 1 - >= 2 feet				
> 2 - < 4.5 feet				
< 4.5 - >= 13 feet			0 to 5	
> 13 - < 40 feet				0 to 50

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 brome (Bromus hordeaceus) and red brome (B. diandrus). Plant community 3.2 (PC 3.2) is dominated by filaree (Erodium spp) or other decumbent species.

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.

3.1a (PC 3A to 3B): 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.

3.2a (PC 3B to 3A): 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.

State 3: Annual Grassland Plant Species Composition:

Grass/Grasslike

Group	Group Name	Common Name	Scientific Name	Annual Production in Pounds Per Acre Low	High
8 - Non-native cool season annual grass				0	0

	wild oat	*Avena fatua*	0	0
	soft brome	*Bromus hordeaceus*	0	0
	red brome	*Bromus rubens*	0	0
	rat-tail fescue	*Vulpia myuros*	0	0

Forb

Group	Group Name	Common Name	Scientific Name	Annual Production in Pounds Per Acre Low	High
12	Native annual forb			0	0
			Micropus californicus (Syn)	0	0
		dotseed plantain	*Plantago erecta*	0	0
14	Non-native annual forb			0	0
		stork's bill	*Erodium*	0	0
		clover	*Trifolium*	0	0

Annual Production by Plant Type:

Plant Type	Annual Production (lbs/AC) Low	Representative Value	High
Forb	100	160	200
Grass/Grasslike	400	640	800
Total:	500	800	1000

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					80 to 100					0 to 20

Structure of Canopy Cover (%)

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

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 annual dominated understory of this plant community is used by domestic livestock and wildlife throughout the year. Currently and historically use has been primarily by cow-calf operations but stocker cattle are also grass fed on these plant communities. While sheep use may have been greater in the past it is currently limited. The main problem for livestock production on this site is lack of natural water sources during most of the year.

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 is listed in Appendix A (Sampson and Jespersen 1963).R

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. In dry years these intermittent streams may not flow at all. Most of this site is steep resulting in moderate to rapid runoff.

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.

Other Products:
Native Americans have historically used and managed the blue oak woodlands for food and fiber.

Other Information:
Revegetation/Restoration of Disturbed Areas

Oak Restoration:

Most of this range site is too rocky and steep to be a good candidate for restoration of blue oaks.

Native Grass Restoration:

Most of this range site is too rocky and steep to be a good candidate for restoration of native perennial grasses.

Annual Legumes and Annual Grasses:

This site is too unproductive and too stony to be a good candidate for annual legume or annual grass seedings.

Poisonous/Non-native Plants

Poisonous Plants:

The very shallow soils of this ecological site probably support fewer poisonous plants than other ecological sites. Pyrrolizidine alkaloids in fiddleneck (Amsinkia spp.) can cause liver damage in livestock. Acorns and oak leaves taken in excess may be toxic. Livestock poisoning is a result of hungry animals being concentrated on toxic plants.

Invasive Species:

The understory and grassland vegetation on this site is dominated by non-native annuals that invaded during the colonization of California. The species composition of the pre-colonization community is unknown. Because of the poor water holding capacity of this site, it has not been subject to invasions by medusahead (Taenantherum caput-medusae), goatgrass (Aegilops triuncialis), and yellow starthistle (Centaurea solstitialis) that have occurred on other ecological sites.

Supporting Information

Associated Sites:

Site Name	Site ID	Site Narrative

Similar Sites:

Site Name	Site ID	Site Narrative
VERY STONY SHALLOW LOAM	R018XD099CA	RO18XI003CA replaces R018XD099CA

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

Inventory Data References:

Type Locality:

Relationship to Other Established Classifications:
This blue oak dominated site may include the following Allen-Diaz Classes: 1) Blue Oak/Grass, 2) Blue Oak-Understory Blue Oak/Grass, 3)Blue Oak/Wedgeleaf Ceanothus/Grass (Allen Diaz et al. 1989). This site includes Blue Oak Woodland (BOW) and Blue Oak-Foothill Pine (BOP) of 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, Craig Thomsen, Craig Schriefer	4/12/2004		

Reference Sheet

Author(s)/participant(s):

Contact for lead author:

Date: **MLRA:** 018X **Ecological Site:** Very Stony Shallow Loam R018XI003CA 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: