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: Shallow Loam

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

Site ID: R018XI005CA

Major Land Resource Area: 018 - Sierra Nevada Foothills

Physiographic Features

Land Form: (1) Hill

	Minimum	Maximum
Elevation (feet):	300	2000
Slope (percent):	0	75
Water Table Depth (inches):		
Flooding:		
Frequency:		
Duration:	None	None
Ponding:		
Depth (inches):		
Frequency:		
Duration:	None	None
Runoff Class:	Low	Medium
Aspect:	No Influence on this site	

Climatic Features

The average annual precipitation ranges from 8 to 18 inches and increases with elevation. 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 temperatures range from 45 F in January to 78 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	280
Freeze-free period (days):	0	0
Mean annual precipitation (inches):	8.0	18.0

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.	2.5	2.5	2.25	1.5	0.25	0.25	0.25	0.25	0.25	0.75	2.25	2.5
Temp. Min.	36.0	39.0	41.0	43.0	50.0	56.0	61.0	60.0	56.0	48.0	40.0	35.0
Temp. Max.	54.0	60.0	64.0	71.0	81.0	89.0	96.0	94.0	90.0	79.0	54.0	54.0

Climate Stations:

Influencing Water Features

Intermittent streams feeding into permanent higher order streams drain these sites.

Wetland Description:	System	Subsystem	Class

Representative Soil Features

This ecological site includes only the Daulton soil series which developed from dark colored schist and slate at an elevation of 300 to 2000 feet. This loam soil has a depth of 10 to 20 inches with a very low water holding capacity (about 2.7 inches). These soils are well drained.

Merced (CA648)

CA648 DaB, DaD2 Daulton rocky silt loam

Mariposa (CA649)

CA649 DaE Daulton loam

Madera (CA651)

CA651 DbD, DcB, DcE Daulton loam, Daulton rocky fine sandy loam

Predominant Parent Materials:

Kind: Residuum
Origin: Schist

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: Well drained To Well drained

Permeability Class:

	Minimum	Maximum
Depth (inches):	17	21
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):	1.2	2.7

Plant Communities

Ecological Dynamics of the Site

Before European settlement, the historic plant community for this ecological site was a blue oak (Quercus douglasii) savanna with no shrub layer. 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 but the native understory has largely been replaced by annual grasses and forbs of European origin. Understory species include soft chess brome (Bromus hordeaceus), ripgut brome (Bromus diandrus), wild oats (Avena fatua), filaree (Erodium spp), rose clover (Trifolium hirtum), and Fiddleneck (Amsinkia spp). Typically there are no shrubs in the understory of this ecological site. Frequent fire in the past may have removed the shrub layer from this ecological site or it may be naturally devoid of shrubs. Grazing and browsing may slow recovery of blue oak seedlings and saplings following fire (Johnson and Fitzhugh 1990).

Blue oak is a 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 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. Young trees are vulnerable to fire. Trunks of mature trees may receive minor damage from cool grass fires but are severely damaged by hotter fires. Resprouts are vulnerable to grazing/browsing by wildlife and domestic livestock for the first few years after fire.

The species composition of 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 layer remains 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 and weeds 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 tree layer but is 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). Shallow soil has probably prevented the successful establishment of medusahead, yellow star thistle and other invasive species. However, experts have suggested that medusahead and other invasive species may gradually adapt to new sites (Rice et al 2006).

Oak Savanna Plant Community

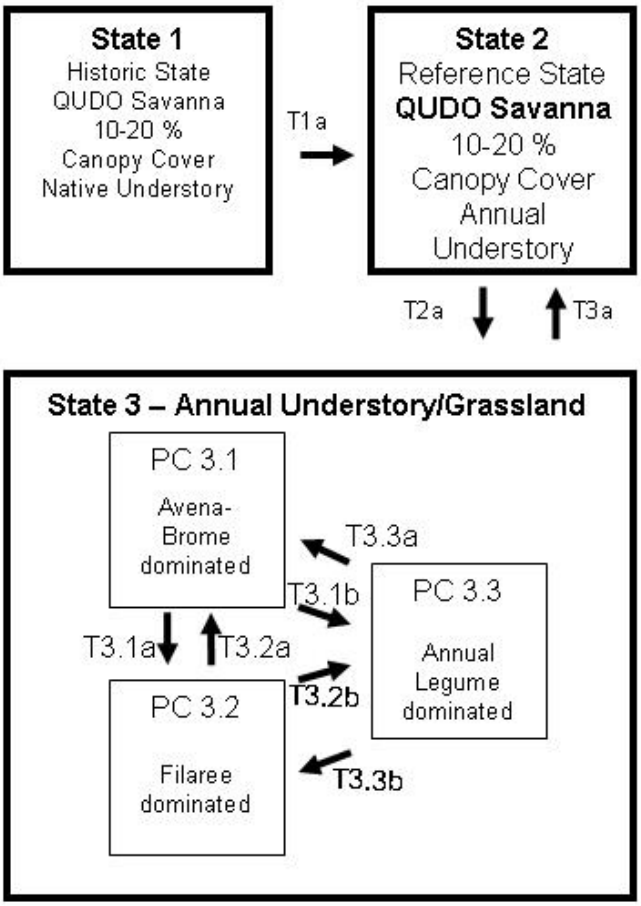
The tree layer is composed of blue oaks and there is no shrub layer. The understory is dominated by annual grasses and forbs of European origin. As germination, seedling establishment and plant growth progress during the growing season, species composition changes depending primarily on the timing and 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 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. Annual forage production for normal, favorable and unfavorable years is 2000 lb/a, 2500 lb/a, and 900 lb/a years, respectively.

This ecological site commonly supports a blue oak dominated savanna of less than 30 percent canopy cover. In this savanna type understory production is usually greater under the trees than out in the open (George et al. 1996). However, as tree canopy cover increases beyond 50 percent herbage production may decrease.

Production curves are examples of monthly forage production for normal (2000 lb/a), favorable (2500 lb/a), and unfavorable (900 lb/a) years. Annual plant growth begins with germination following the first fall rains (George et al. 2001a). Germination commonly begins within 1 week of receiving 0.5 to 1.0 inch of rainfall. This normally occurs late in October or early November. Temperatures commonly turn cold in mid-November. The longer the period between germination and the onset of cold temperatures the greater is fall herbage production. Early rains followed by an extended dry period can result in loss of most of the initial wave of germination. 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. The longer the period from mid-February to soil moisture depletion, the greater is spring production.



Shallow Loam State and Transition Model

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.

Shallow Loamy 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 annual grass			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
		barley	*Hordeum*	0	0
		fescue	*Vulpia*	0	0

Forb

Group	Group Name	Common Name	Scientific Name	Annual Production in Pounds Per Acre Low	High
14	Non-native annual forbs			0	0
		fiddleneck	*Amsinckia*	0	0
		clarkia	*Clarkia*	0	0
		stork's bill	*Erodium*	0	0
		geranium	*Geranium*	0	0
		smooth cat's ear	*Hypochaeris glabra*	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:

	Annual Production (lbs/AC)		
Plant Type	Low	Representative Value	High
Forb	180	400	500
Grass/Grasslike	720	1600	2000
Total:	900	2000	2500

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			
< 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
8	Non-native annuall grass			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
		barley	*Hordeum*	0	0
		fescue	*Vulpia*	0	0

Forb

Group	Group Name	Common Name	Scientific Name	Annual Production in Pounds Per Acre Low	High
14 - Non-native annual forb				0	0
		fiddleneck	*Amsinckia*	0	0
		clarkia	*Clarkia*	0	0
		stork's bill	*Erodium*	0	0
		geranium	*Geranium*	0	0
		smooth cat's ear	*Hypochaeris glabra*	0	0
		rose clover	*Trifolium hirtum*	0	0

Annual Production by Plant Type:

Plant Type	Annual Production (lbs/AC) Low	Representative Value	High
Forb	180	400	500
Grass/Grasslike	720	1600	2000
Total:	900	2000	2500

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 browse 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 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. It takes several inches of rainfall to saturate the watershed and cause intermittent streams to flow. Consequently, streamflow may not begin until January. In dry years these intermittent streams may not flow at all (George et al. 2002, 2004). Most of this site has gentle to moderate slopes resulting in low to moderate runoff.

Recreational Uses:

Bird watching, hunting, horseback riding, all terrain vehicle riding, and hiking in spring and near developed reservoirs are common recreational pursuits. Stock ponds containing warm water fishes are used for recreational purposes.

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. Although south of the Mother Lode, some mining for gold has occurred in the past.

Other Information:

Revegetation/Restoration Of Disturbed Areas

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. McCreary (2001) provides an extensive review of oak regeneration problems and practices on California’s oak woodlands.

Native Grass Restoration:

The soils on these shallow loam soils generally have insufficient rainfall, depth, and water holding capacity to be good candidates for native grass restoration. Perennial grasses native to this site tend to be sensitive to grazing, further reducing the potential for restoration.

Annual Legumes And Annual Grasses:

Seeding of annual legumes(annual medics, rose clover and subterranean clover) can improve forage production and quality if accompanied by fertilizer application. These soils may be sulfur and/or phosphorous deficient. Legume seedings are very responsive to addition of sulfur and phosphorus fertilizer. Non-legumes respond to application of nitrogen and sulfur. The high cost of seeding and fertilization has reduced the use of these

practices.

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. Mexican whorled milkweed contains several glucosidic substances called cardenolides that are toxic to range animals. Klamath weed may occur on this site. Acorns and oak leaves taken in excess may be toxic. Oleander, an ornamental frequently used in foothill landscapes is very toxic to humans and animals and should be kept away from pasture fence lines. Livestock poisoning is a result of hungry animals being concentrated on toxic plants.

Invasive Species:

The understory 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 and yellow starthistle that have occurred on other ecological sites. However, limited invasions of medusahead have occurred in the area since the 1980s. Bull thistle and Italian thistle may also invade this site.

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:
R24DDmariposa0518 37.3438889 120.1341111
R25DDmariposa0518 37.3438056 120.1346944
R26DDmariposa0518 37.3701389 120.1441111
R27DDmariposa0518 37.3699167 120.1439167

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.

Other References:
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Site Description Approval:

Author	Date	Approval	Date
Melvin George, Neil McDougald, and Dennis Dudley	5/7/2004		

Reference Sheet

Author(s)/participant(s):

Contact for lead author:

Date: **MLRA:** 018X **Ecological Site:** Shallow Loam R018XI005CA 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):

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10. Effect on plant community 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 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:

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

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

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

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17. Perennial plant reproductive capability:
