



## Ecological Site Description

# UNITED STATES DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE

## ECOLOGICAL SITE DESCRIPTION

### ECOLOGICAL SITE CHARACTERISTICS

**Site Type:** Rangeland

**Site Name:** Granitic

*Quercus douglasii* - *Quercus wislizeni* / *Ceanothus cuneatus* - *Arctostaphylos viscida* / *Bromus diandrus* - *Avena fatua*

(blue oak - interior live oak / buckbrush - sticky whiteleaf manzanita / ripgut grass - wild oat)

**Site ID:** R018XI002CA

**Major Land Resource Area:** 018 - Sierra Nevada Foothills

### Physiographic Features

This ecological site extends from southern Mariposa County to Tulare County covering 757,102 acres of gently sloping to steep foothills along the west slope of the Sierra Nevada Mountains.

|                                    |           |                |                |
|------------------------------------|-----------|----------------|----------------|
| <u>Land Form:</u>                  | (1) Hill  |                |                |
|                                    | (2) Swale |                |                |
|                                    |           | <u>Minimum</u> | <u>Maximum</u> |
| <u>Elevation (feet):</u>           |           | 400            | 3500           |
| <u>Slope (percent):</u>            |           | 0              | 50             |
| <u>Water Table Depth (inches):</u> |           |                |                |
| <u>Flooding:</u>                   |           |                |                |
| Frequency:                         |           |                |                |
| Duration:                          |           | None           | None           |
| <u>Ponding:</u>                    |           |                |                |
| Depth (inches):                    |           |                |                |
| Frequency:                         |           |                |                |
| Duration:                          |           | None           | None           |

Runoff Class:Aspect: No Influence on this site**Climatic Features**

The average annual precipitation ranges from 18 to 30 inches and increases with elevation. Most moisture falls as rain from October – May and is produced by winter storm that move into California from the Pacific Ocean in an easterly or southeasterly direction. Mean temperatures range from 46 F in January to 79 F in July. Freezing temperatures may occur in winter and summer temperatures can exceed 100 F.

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).

Mean monthly precipitation is reported in the maximum precipitation row of the table below.

|   | <u>Minimum</u> |            | <u>Maximum</u> |            |            |            |            |            |            |            |            |            |
|---|----------------|------------|----------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| <u>Frost-free period (days):</u>                            | 150            |            | 260            |            |            |            |            |            |            |            |            |            |
| <u>Freeze-free period (days):</u>                           | 0              |            | 0              |            |            |            |            |            |            |            |            |            |
| <u>Mean annual precipitation (inches):</u>                  | 18.0           |            | 30.0           |            |            |            |            |            |            |            |            |            |
| <u>Monthly precipitation (inches) and temperature (°F):</u> |                |            |                |            |            |            |            |            |            |            |            |            |
|   | <u>Jan</u>     | <u>Feb</u> | <u>Mar</u>     | <u>Apr</u> | <u>May</u> | <u>Jun</u> | <u>Jul</u> | <u>Aug</u> | <u>Sep</u> | <u>Oct</u> | <u>Nov</u> | <u>Dec</u> |
| 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.  | 3.5            | 3.2        | 3.2            | 1.9        | 0.4        | 0.25       | 0.25       | 0.25       | 0.25       | 0.9        | 2.7        | 2.9        |
| Temp. Min.  | 36.4           | 39.1       | 41.3           | 43.7       | 49.8       | 56.5       | 62.1       | 61.4       | 57.3       | 49.4       | 40.6       | 35.3       |
| Temp. Max.  | 55.0           | 60.0       | 63.9           | 71.1       | 80.8       | 90.0       | 96.6       | 95.5       | 89.6       | 78.8       | 64.1       | 55.7       |

Climate Stations:**Influencing Water Features**

Intermittent streams drain these sites following adequate rainfall. Small and large plot runoff studies have demonstrated nearly complete infiltration of water applied as rain at rates that exceed normal rain fall intensities. South facing slopes tend to dry sooner than north facing slopes. Associated swales are seasonal wetlands. It commonly takes 9 to 12 inches of rainfall before the streams start to flow, often in January. Once the watershed is saturated a storm event will result in increased flow that subsides in a short time after the storm ends.

Wetland Description: System                      Subsystem                      Class

**Representative Soil Features**

The soils for this ecological site are sandy loams, coarse sandy loams or rocky coarse sandy loams derived from granodiorite (Ahwahnee), granite (Auberry) and residuum weathered from granite (Vista and Tollhouse). The depth to granitic bedrock is about 24 to 40 inches. These soils are well drained. Available water holding capacity is 3.5 to 7 inches. Permeability is moderate to moderately rapid. The organic matter is moderate to low. Rock outcrops cover 2 to 25 percent of the surface area increasing with slope and elevation (Butler and Jones 1974). The Ahwahnee series occurs throughout the elevation range. The Vista Series generally occur between 1000 to 2250 foot elevation and the Auberry Series occurs between 2250 and 3000 feet.

CA651 AaC, AaD, AbB, AbD, AbE, AcD, AcE, AcF, Ahwahnee and Auberry coarse sandy loams,  
 CA651 AdB, AdC, AdD, AeB, AeD, AeE, ArD and ArF Ahwahnee and Vista coarse sandy loams  
 CA654 AcC, AcB, AcD, AcE, Ahwahnee coarse sandy loam,  
 CA654 AdD, AdE, AdF, AeD, AeF Ahwahnee very rocky coarse sandy loam  
 CA654 AhD, AhE, Ahwahnee-Sierra coarse sandy loam  
 CA654 AkF Ahwahnee-Tollhouse Rock land complex 45 to 70 percent slope (Auberry component).  
 CA654 AvD, AvE, AvF, AwF Auberry very rocky coarse sandy loam  
 CA654 AuB, AuB2, AuC, AuC2, AuD, AuD2, AuE, AuF Auberry coarse sandy loam  
 CA654 AxD, AxE, AxF, AyF Auberry-Sierra coarse sandy loam  
 CA654 AzF Auberry-Tollhouse Rock land complex 30 to 70 percent slope (Auberry component)  
 CA649 AbE Ahwahnee-Auberry sandy loams  
 CA649 AcE, AdG, AcE Ahwahnee-Auberry rocky sandy loams  
 CA649 AeD, Auberry sandy loam  
 CA649 AfD, AfE2, AgE, AgG2 Auberry rocky sandy loam  
 CA660 100, 101, 102, 103 Auberry sandy loam  
 CA660 104 Auberry rock outcrop complex 9 to 50 percent slopes  
 CA660 165, 166, 167 Vista coarse sandy loam  
 CA660 168 Vista-rock outcrop complex, 9 to 50 percent slopes

Sierra N.F. 101, 102, 103 Ahwahnee Family  
 Sierra N.F. 105, 106, 107, 108, 109, 110 Auberry Family

Predominant Parent Materials:

Kind: Residuum  
 Origin: Granodiorite

Surface Texture: (1) Sandy loam

Subsurface Texture Group: Loamy

|  | <u>Minimum</u> | <u>Maximum</u> |
|--|----------------|----------------|
|--|----------------|----------------|

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: Moderate To Moderately rapid

|  | <u>Minimum</u> | <u>Maximum</u> |
|--|----------------|----------------|
|--|----------------|----------------|

Depth (inches):

24

40

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):

3.5

7.0

**Plant Communities**

**Ecological Dynamics of the Site**

Before European settlement, the natural plant community for this ecological site ranged from a blue oak (*Quercus douglasii*) savanna with little or no shrub layer to a woodland with wedgeleaf ceanothus (*Ceanothus cuneatus*), and whiteleaf manzanita (*Arctostaphylos manzanita*) dominating the shrub layer. The understory of

this site was dominated by native annual and perennial grasses and forbs. On this site, the savanna or woodland is frequently intermixed in a mosaic with open grasslands. The reference state for this ecological site is similar to its pre-European state; however, density of shrubs and foothill pine may be different due to fire suppression and annual grasses and forbs now dominate the understory.

The reference state for this ecological site ranges from a blue oak savanna at lower elevations to a blue oak-interior live oak-foothill pine woodland with a shrub layer that is dominated by ceanothus and manzanita at higher elevations. Annual grass patches (non woody) are interspersed in a mosaic with the savanna and woodland patches. Other woody species that can be found throughout this ecological site include; poison oak (*Toxicodendron diversiloba*), birchleaf mountain mahogany (*Cercocarpus betuloides*), and coffee berry (*Rhamnus californica*). Understory species and grassland patches are frequently dominated by soft chess brome (*Bromus hordeaceus*), ripgut brome (*Bromus diandrus*), annual fescue (*Vulpia myuros*), filaree (*Erodium* spp), popcorn flower (*Plagiobothrys novofulvus*), Fiddleneck (*Amsinkia* spp) and tarweed (*Hemizonia* spp).

Competition between the species that germinate or resprout following fire or other disturbances, mediated by weather and soil moisture conditions, greatly influence the vegetation states present in the oak-woodlands. On some soils, geological substrates, and aspects; tree, shrub and grass patches are all possible vegetations states. Shrub canopy tends to occur on north and east aspects. Shallow soils, coarse and rocky soils and southern aspects sometimes limit vegetation to shrub dominated states. Frequent fire tends to result in vegetation states dominated by an oak-annual grass community. Protection from fire and grazing results in a gradual increase in shrubs and foothill pine (*Pinus sabiniana*) contributing to increased fuel loads. As the shrub canopy reaches into the tree canopy the potential for crown fires increases. Protection from browsing reduces hedging allowing the oak canopy to reach the ground layer increasing the chances for ground fires to become crown fires. Crown fires can top-kill oak trees. While interior live oak (*Q. wislizenii*) will resprout vigorously, blue oak may not resprout in some locations resulting in a post fire interior live oak dominated site. Grazing and browsing may slow recovery of woody plants following fire (Johnson and Fitzhugh 1990).

Blue oak, interior live oak and foothill pine are widely distributed along the Sierra Nevada foothills (MLRA 18). Blue oak and interior live 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 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. Trunks and crowns of interior live oak are extremely sensitive to fire. However, it is a strong resprouting species that will usually survive even when the above ground vegetation is consumed by fire. 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. Frequent burning may kill interior live oaks. Protection from fire has decreased fire frequency allowing shrubs to extend into the oak canopy providing a ladder for fire. Resprouts are vulnerable to grazing/browsing by wildlife and domestic livestock for the first few years after fire. Foothill pine is increasing in blue oak-foothill pine communities due to fire suppression and lack of blue oak regeneration (Borchart et al. 1991).

The shrub layer is a mixture of species that resprout from the roots and crown or are stimulated to germinate by fire. Ceanothus and manzanita are prolific seed producers. These long-lived seeds accumulate in the soil and litter until they are stimulated to germinate by the heat of a fire. Frequent burning can remove these species from the site. Birchleaf mountain mahogany (*Cercocarpus betuloides*) and poison oak (*Rhus diversiloba*) are top-killed by fire but resprout from the root crown following a 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). Due to the low clay content of the soils on this site, medusahead and yellow starthistle invasions have generally not been a problem. However, in recent years medusahead has become established in isolated populations on this site. Some experts have suggested that medusahead and other invasive species may gradually adapt to new sites (Rice et al 2006).

### Oak Woodland 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.

The tree layer is dominated by blue oak, interior live oak and foothill pine. The shrub layer, when present, may include wedgeleaf ceanothus, whiteleaf manzanita and birchleaf mountain mahogany. At the lower elevations this site tends to be an oak savanna. With increasing elevation and slope the interior live oak and shrub component increases.

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. Patches on shallow soils are often dominated by filaree or other low growing forbs. Deep soils with higher water holding capacity are often dominated by wild oats and other tall annual grasses. The native forb, tarweed, occurs in patches adjacent to swales and is more dense in years with late spring rains.

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.

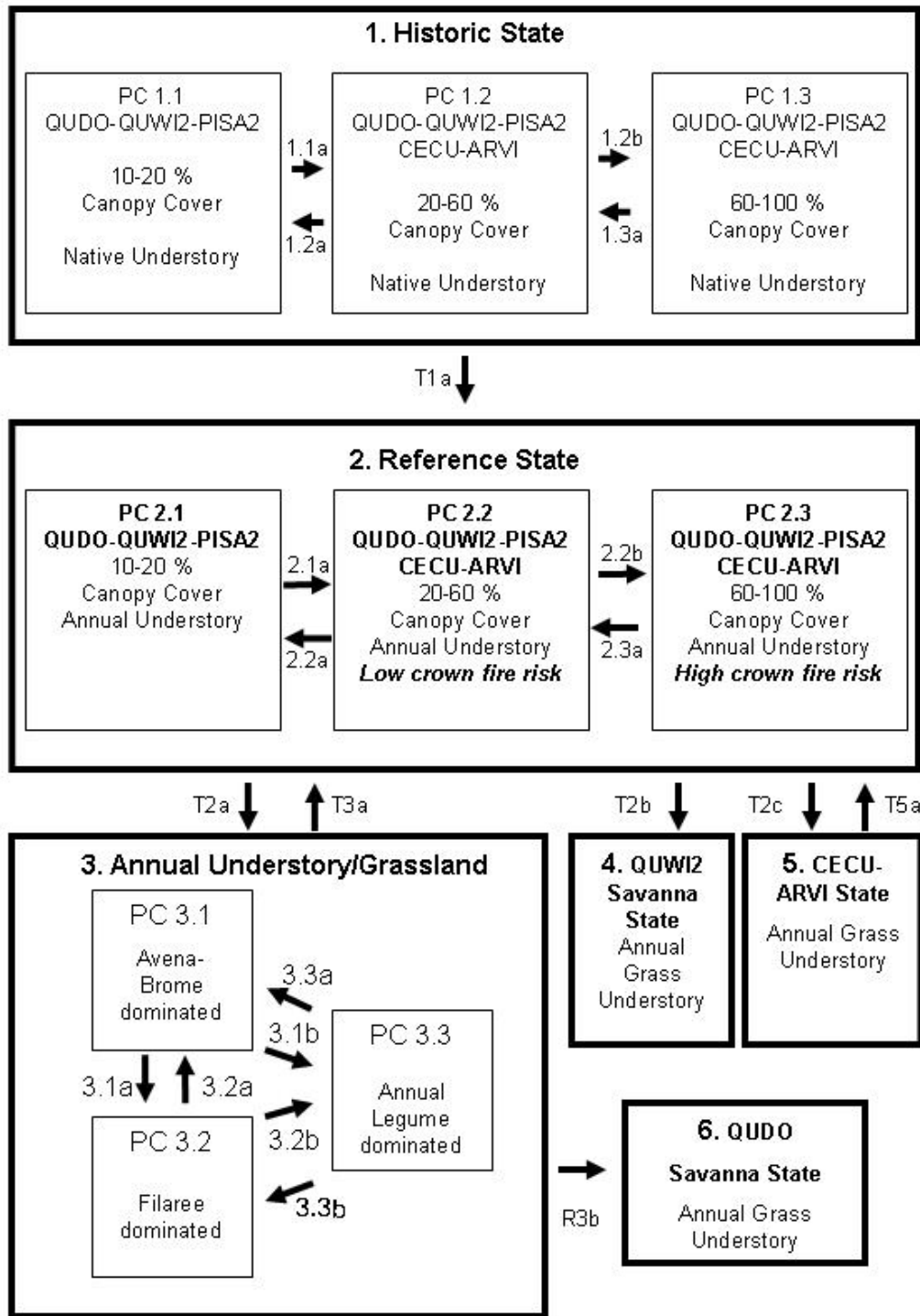
Swales (seasonal riparian areas) can be found in depressions and along stream channels throughout this ecological site. These swales will often stay green longer, due to water availability further into the growing season from the deeper soils with higher clay content. Several sedges, rushes, legumes and forbs occur on swales along with several annual grasses. Swale productivity is also greater than the surrounding upland soils.

### Total Annual Production and Growth Curve

Understory and open grassland production on this site is lower than more northerly ecological sites because average annual precipitation is lower. Course soil texture, shallow soils and prevalent rock outcrops also contribute to lower annual production. 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 2200-2500 lb/a, 3500 lb/a, and 1000 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 and shrub canopy cover increases beyond 50 percent herbage production may decrease.

Production curves are examples of monthly forage production for normal (2300 lb/a), favorable (3500 lb/a), and unfavorable (1000 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.



Granitic State and Transition Model

**State 1: Historic State**

State 1: This is the assumed historic plant state consisting of long lived tree and shrub species similar to those in State 2. State 1 assumes that native annual and perennial grasses and forbs were common in the understory of the tree and shrub layer of these former oak-woodland ecosystems but there is no record of the species composition. As in State 2 a continuum of plant communities (PC 1.1, 1.2, and 1.3) resulted from increasing canopy cover following fire. 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, this community may never have reached the higher canopy covers that occur in State 2. Additionally, foothill pine was probably less prevalent in State 1.

T1.1a (PC 1.1 to PC1.2): Under natural fire frequencies shrub and tree canopy cover increases toward State PC 1.2 following fire.

T1.2a (PC 1.2 to PC 1.1): Natural fire frequencies estimated to be 25 years maintains an oak savanna with few shrubs and a herbaceous understory.

T1.2b (PC 1.2 to PC 1.3): Prolonged periods without fire result in increased shrub and tree canopy cover to the point where the savanna is classified as woodland. Increasing ladder fuels increase the chances of a high intensity crown fire. Under a 25 year fire interval this state may not have been reached in the pre-European plant community.

T1.3a (PC 1.3 to PC 1.1 or 1.2): Burning woodlands with dense shrub and tree layers results in removal of most shrub and understory tree canopy. In extreme cases this transition could return from PC 1.3 to PC 1.1.

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 climax 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

**State 2: Reference State - Plant Communities 2.1, 2.2 & 2.3**

State 2: This reference state is characterized by a continuum of plant communities that can be sparse in canopy cover to dense in canopy cover depending on the frequency of fire. Fire suppression has resulted in longer intervals between fires resulting in fewer ground fires and more intense crown fires. Natural fires in State 1 would have been ignited by lightning, 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 the fire has probably changed from State 1 to State 2.

Plant community 2.1 (PC 2.1) is a savanna community (Allen Class: Blue Oak-Interior Live Oak/Grass) of 10 to 20 percent canopy cover of blue oak and interior live oak with an annual grass dominated understory and few or no shrubs. Blue oaks are fire resistant and evolved under low-severity grassland fires. Interior live oak is sensitive to fire but resprouts vigorously following most fires. Foothill pine is sensitive to moderate or intense fires but its overall cover is increasing throughout the site more than likely due to fire suppression. Ceanothus species and many manzanitas have seeds that require fire to germinate; therefore these species may dominate immediately following a fire.

Plant community 2.2 (PC 2.2) ranges from 20 – 60 percent canopy cover resulting from an increase in manzanita, ceanothus and other shrubs, foothill pine and increased oak canopy (Allen Class: Blue Oak-Foothill Pine/Whiteleaf Manzanita/Grass or Blue Oak-Foothill Pine/Wedgeleaf Ceanothus/Grass). Mountain mahogany may also increase at upper elevations.

Plant community 2.3 (PC 2.3) is a woodland community (Allen Class: Blue Oak-Foothill Pine/Whiteleaf



Manzanita/Grass or Blue Oak-Foothill Pine/Wedgeleaf Ceanothus/Grass) resulting from continued increases in canopy cover (60 – 100 %) due to infrequent fire. Fire hazard is usually high in this plant community because of the high fuel loads that can lead to high crown fire risk. The understory of these plant communities is generally dominated by annual grasses and forbs of Eurasian origin. Understory productivity decreases as canopy cover increases above 50%. The understory species composition and dynamics in this state is similar to that for State 3 with ripgut brome and foxtail barley often prevalent under the oak canopy and soft brome and filaree more common in the open patches.

T2.1a (PC 2.1 to PC 2.2): Under natural fire frequencies shrub and tree canopy cover increases toward PC 1B following fire.

T2.2a (PC 2.2 to PC 2.1): Natural fire frequencies estimated to be 25 years maintains an oak savanna with a few shrubs and an herbaceous understory. More frequent burning can result in a savanna free of shrubs and understory trees. Application of mechanical and/or chemical brush control practices can result in a similar transition.

T2.2b (PC 2.2 to PC 2.3): Prolonged periods without fire result in increased shrub and tree canopy cover to the point where the savanna is classified as woodland. Increasing ladder fuels increase the chances of a high intensity crown fire.

T2.3a (PC 2.3 to PC 2.1 or 2.2): Burning woodlands with dense shrub layers results in removal of most shrub and understory tree canopy. In extreme cases this transition could return from PC 2.3 to PC 2.1. Implementation of mechanical or chemical brush control practices can result in a similar transition.

T2a (State 2 to State 3 - Type conversion from woodland 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 and/or acorn germination and seedling establishment may be unfavorable.

T2b (State 2 to State 4): Intense fire, wood cutting or vegetation management kills blue oaks and they do not resprout due to old age (Burns and Honkala 1990) or site conditions (DeLasaux and Pillsbury 1987, Haggerty 1991). Interior live oaks are top killed but resprout vigorously. With fire protection shrubs gradually increase producing a state similar to State 2 but without blue oak.



Granitic Ecological Site

State 2: Reference State - Plant Communities 2.1, 2.2 & 2.3 Plant Species Composition:

| Grass/Grasslike |                                      |                       |                                  | Annual Production in Pounds Per Acre |      |
|-----------------|--------------------------------------|-----------------------|----------------------------------|--------------------------------------|------|
| Group           | Group Name                           | Common Name           | Scientific Name                  | Low                                  | High |
| 2 -             | Native cool season grasslike (swale) | toad rush             | <i>Juncus bufonius</i>           | 0                                    | 0    |
|                 |                                      | questionable rush     | <i>Juncus dubius</i>             | 0                                    | 0    |
| 8 -             | Non-native Annual Grass              | wild oat              | <i>Avena fatua</i>               | 0                                    | 0    |
|                 |                                      | ripgut grass          | <i>Bromus diandrus</i>           | 0                                    | 0    |
|                 |                                      | soft brome            | <i>Bromus hordeaceus</i>         | 0                                    | 0    |
|                 |                                      | fescue                | <i>Vulpia</i>                    | 0                                    | 0    |
| Forb            |                                      |                       |                                  | Annual Production in Pounds Per Acre |      |
| Group           | Group Name                           | Common Name           | Scientific Name                  | Low                                  | High |
| 12 -            | Native forb                          | fiddleneck            | <i>Amsinckia</i>                 | 0                                    | 0    |
|                 |                                      | tarweed               | <i>Hemizonia</i>                 | 0                                    | 0    |
|                 |                                      | rusty popcornflower   | <i>Plagiobothrys nothofulvus</i> | 0                                    | 0    |
| 14 -            | Non-native forb                      | longbeak stork's bill | <i>Erodium botrys</i>            | 0                                    | 0    |
|                 |                                      | redstem stork's bill  | <i>Erodium cicutarium</i>        | 0                                    | 0    |
| Shrub/Vine      |                                      |                       |                                  | Annual Production in Pounds Per Acre |      |

| Group | Group Name   | Common Name         | Scientific Name                     | Low | High |
|-------|--------------|---------------------|-------------------------------------|-----|------|
| 17    | Native Shrub |                     |                                     | 0   | 0    |
|       |              | whiteleaf manzanita | <i>Arctostaphylos manzanita</i>     | 0   | 0    |
|       |              |                     | <i>Cercocarpus betuloides (Syn)</i> | 0   | 0    |
|       |              | buckbrush           | <i>Ceanothus cuneatus</i>           | 0   | 0    |
|       |              |                     | <i>Rhus diversiloba (Syn)</i>       | 0   | 0    |

**Tree**

Annual Production  
in Pounds Per Acre

| Group | Group Name                | Common Name              | Scientific Name          | Low | High |
|-------|---------------------------|--------------------------|--------------------------|-----|------|
| 23    | Native coniferous tree    |                          |                          | 0   | 0    |
|       |                           | California foothill pine | <i>Pinus sabiniana</i>   | 0   | 0    |
| 24    | Native deciduous tree     |                          |                          | 0   | 0    |
|       |                           | blue oak                 | <i>Quercus douglasii</i> | 0   | 0    |
| 25    | Native non-deciduous tree |                          |                          | 0   | 0    |
|       |                           | interior live oak        | <i>Quercus wislizeni</i> | 0   | 0    |

Annual Production by Plant Type:

| Plant Type      | Annual Production (lbs/AC) |                      |             |
|-----------------|----------------------------|----------------------|-------------|
|                 | Low                        | Representative Value | High        |
| Forb            | 200                        | 460                  | 700         |
| Grass/Grasslike | 800                        | 1840                 | 2800        |
| <b>Total:</b>   | <b>1000</b>                | <b>2300</b>          | <b>3500</b> |

Structure and Cover:

Ground Cover (%)

| Vegetative Cover    |         |                |      |                            |                     | Non-Vegetative Cover |   |                              |         |       |                |
|---------------------|---------|----------------|------|----------------------------|---------------------|----------------------|---|------------------------------|---------|-------|----------------|
| Grass/<br>Grasslike | Forb    | Shrub/<br>Vine | Tree | Non-<br>Vascular<br>Plants | Biological<br>Crust | Litter               | Surface<br>Fragments<br>≥ 1/4 &<br>≤ 3" | Surface<br>Fragments<br>≥ 3" | Bedrock | Water | Bare<br>Ground |
| 80 to<br>100        | 0 to 20 |                |      |                            |                     | 0 to<br>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 |                   |         | 0 to 50      |         |
| > 13 - < 40 feet  |                   |         |              | 0 to 60 |

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

| <u>Jan</u> | <u>Feb</u> | <u>Mar</u> | <u>Apr</u> | <u>May</u> | <u>Jun</u> | <u>Jul</u> | <u>Aug</u> | <u>Sep</u> | <u>Oct</u> | <u>Nov</u> | <u>Dec</u> |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 0          | 10         | 25         | 40         | 5          | 0          | 0          | 0          | 0          | 0          | 10         | 10         |

Plant Growth Curve:Growth Curve Number: CA1502Growth 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

| <u>Jan</u> | <u>Feb</u> | <u>Mar</u> | <u>Apr</u> | <u>May</u> | <u>Jun</u> | <u>Jul</u> | <u>Aug</u> | <u>Sep</u> | <u>Oct</u> | <u>Nov</u> | <u>Dec</u> |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 0          | 10         | 20         | 30         | 25         | 0          | 0          | 0          | 0          | 5          | 5          | 5          |

Plant Growth Curve:Growth Curve Number: CA1503Growth 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 extending through May. Growth curve is for oak-woodlands and associated annual grasslands.Percent Production by Month

| <u>Jan</u> | <u>Feb</u> | <u>Mar</u> | <u>Apr</u> | <u>May</u> | <u>Jun</u> | <u>Jul</u> | <u>Aug</u> | <u>Sep</u> | <u>Oct</u> | <u>Nov</u> | <u>Dec</u> |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 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 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*). Soil quality, especially fertility, declines following tree removal.

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.

R3b (State 3 to State 6): Planting, 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 & 3.2b (PC 3.1 or PC 3.2 to 3.3): 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:

| <b>Grass/Grasslike</b> |  |                          |                                     | <b>Annual Production in Pounds Per Acre</b> |             |
|------------------------|--|--------------------------|-------------------------------------|---|-------------|
| <u>Group</u>           | <u>Group Name</u>                              | <u>Common Name</u>       | <u>Scientific Name</u>              | <u>Low</u>                                  | <u>High</u> |
| 2 -                    | Native perennial cool season grasslike (swale) |                          |                                     | 0   | 0           |
|                        |  | toad rush                | <i>Juncus bufonius</i>              | 0   | 0           |
|                        |  | questionable rush        | <i>Juncus dubius</i>                | 0   | 0           |
| 8 -                    | Non-native cool season annual grass            |                          |                                     | 0   | 0           |
|                        |  | wild oat                 | <i>Avena fatua</i>                  | 0   | 0           |
|                        |  | ripgut grass             | <i>Bromus diandrus</i>              | 0   | 0           |
|                        |  | soft brome               | <i>Bromus hordeaceus</i>            | 0   | 0           |
|                        |  | fescue                   | <i>Vulpia</i>                       | 0   | 0           |
| <b>Forb</b>            |  |                          |                                     | <b>Annual Production in Pounds Per Acre</b> |             |
| <u>Group</u>           | <u>Group Name</u>                              | <u>Common Name</u>       | <u>Scientific Name</u>              | <u>Low</u>                                  | <u>High</u> |
| 12 -                   | Native forbs                                   |                          |                                     | 0   | 0           |
|                        |  | fiddleneck               | <i>Amsinckia</i>                    | 0   | 0           |
|                        |  | tarweed                  | <i>Hemizonia</i>                    | 0   | 0           |
|                        |  | rusty popcornflower      | <i>Plagiobothrys nothofulvus</i>    | 0   | 0           |
| 14 -                   | Non-native annual forbs                        |                          |                                     | 0   | 0           |
|                        |  | longbeak stork's bill    | <i>Erodium botrys</i>               | 0   | 0           |
|                        |  | redstem stork's bill     | <i>Erodium cicutarium</i>           | 0   | 0           |
| <b>Shrub/Vine</b>      |  |                          |                                     | <b>Annual Production in Pounds Per Acre</b> |             |
| <u>Group</u>           | <u>Group Name</u>                              | <u>Common Name</u>       | <u>Scientific Name</u>              | <u>Low</u>                                  | <u>High</u> |
| 17 -                   | Native shrub                                   |                          |                                     | 0   | 0           |
|                        |  | whiteleaf manzanita      | <i>Arctostaphylos manzanita</i>     | 0   | 0           |
|                        |  |                          | <i>Cercocarpus betuloides (Syn)</i> | 0   | 0           |
|                        |  | buckbrush                | <i>Ceanothus cuneatus</i>           | 0   | 0           |
|                        |  | Pacific poison oak       | <i>Toxicodendron diversilobum</i>   | 0   | 0           |
| <b>Tree</b>            |  |                          |                                     | <b>Annual Production in Pounds Per Acre</b> |             |
| <u>Group</u>           | <u>Group Name</u>                              | <u>Common Name</u>       | <u>Scientific Name</u>              | <u>Low</u>                                  | <u>High</u> |
| 23 -                   | Native coniferous tree                         |                          |                                     | 0   | 0           |
|                        |  | California foothill pine | <i>Pinus sabiniana</i>              | 0   | 0           |
| 24 -                   | Native deciduous tree                          |                          |                                     | 0   | 0           |
|                        |  | blue oak                 | <i>Quercus douglasii</i>            | 0   | 0           |
| 25 -                   | Native non-deciduous tree                      |                          |                                     | 0   | 0           |
|                        |  | interior live oak        | <i>Quercus wislizeni</i>            | 0   | 0           |

Annual Production by Plant Type:

| <u>Plant Type</u> | <u>Annual Production (lbs/AC)</u> |                             |             |
|-------------------|-----------------------------------|-----------------------------|-------------|
|                   | <u>Low</u>                        | <u>Representative Value</u> | <u>High</u> |
| Forb              | 200                               | 460                         | 700         |
| Grass/Grasslike   | 800                               | 1840                        | 2800        |

Total: 1000 2300 3500

**Structure and Cover:**

**Ground Cover (%)**

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

|            |            |            |            |            |            |            |            |            |            |            |            |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| <u>Jan</u> | <u>Feb</u> | <u>Mar</u> | <u>Apr</u> | <u>May</u> | <u>Jun</u> | <u>Jul</u> | <u>Aug</u> | <u>Sep</u> | <u>Oct</u> | <u>Nov</u> | <u>Dec</u> |
| 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**

|            |            |            |            |            |            |            |            |            |            |            |            |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| <u>Jan</u> | <u>Feb</u> | <u>Mar</u> | <u>Apr</u> | <u>May</u> | <u>Jun</u> | <u>Jul</u> | <u>Aug</u> | <u>Sep</u> | <u>Oct</u> | <u>Nov</u> | <u>Dec</u> |
| 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 extending through May. Growth curve is for oak-woodlands and associated annual grasslands.

**Percent Production by Month**

|            |            |            |            |            |            |            |            |            |            |            |            |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| <u>Jan</u> | <u>Feb</u> | <u>Mar</u> | <u>Apr</u> | <u>May</u> | <u>Jun</u> | <u>Jul</u> | <u>Aug</u> | <u>Sep</u> | <u>Oct</u> | <u>Nov</u> | <u>Dec</u> |
| 0          | 15         | 70         | 5          | 0          | 0          | 0          | 0          | 0          | 0          | 5          | 5          |

**State 4: Interior Live Oak Savanna**

State 4: Live oak savanna. Live Oak dominated savanna. Allen Class: Live Oak/Grass

**State 5: Ceanothus/Manzanita State**

State 5: Ceanothus and/or manzanita chaparral.

T5a (State 5 to 2): On deeper soils with better moisture holding capacity interior live oak and/or blue oak regenerate from acorns that germinate under canopy of shrubs (Callaway and D'Antonio 1991, Muick 1997). This is a slow successional process.

**State 6: Restored Blue Oak Savanna**

State 6: Artificially revegetated blue oak woodland with an annual grass understory. This state is similar to State 2 without interior live oak and shrubs. Interior live oak and shrubs may naturally reestablish over a period of several decades. Allen Class: Blue Oak/Grass or Blue Oak-Understory Blue Oak/Grass.

**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 least 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 are reported 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. Typically it takes about 9 to 12 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).

These loamy granitic soils have a very high infiltration rate generating surface run-off and surface erosion only under high intensity storms that occur one to three times annually lasting short periods during storm events. High intensity rainfall is usually produced by western storms. Northern storms are colder and less likely to generate high intensity storms. During high intensity storms surface runoff may concentrate in cattle trails and roads resulting in rill erosion that may develop into small gullies. Limited stream channel erosion occurs during run-off events. Most sediment, being coarse in particle size, moves along the channel bottom as bedload with suspended sediment being barely measurable (George et al. 2004).

#### Recreational Uses:

Bird watching, hunting, camping, 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. 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. Although south of the Mother Lode, some mining for gold has occurred in the past. Copper mines and quarries for granite and gravel currently operate on this site or have operated in the recent past.

#### Other Information:

##### Poisonous/Non-native Plants

##### Poisonous Plants:

There are several poisonous plants on this ecological site. Pyrrolizidine alkaloids in fiddleneck (*Amsinckia* 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 on this sites in since the 1980s. Bull thistle and Italian thistle may also invade this site.

## **Supporting Information**

### Associated Sites:

| <u>Site Name</u> | <u>Site ID</u> | <u>Site Narrative</u> |
|------------------|----------------|-----------------------|
|------------------|----------------|-----------------------|

### Similar Sites:

| <u>Site Name</u> | <u>Site ID</u> | <u>Site Narrative</u> |
|------------------|----------------|-----------------------|
|------------------|----------------|-----------------------|

### State Correlation:

This site has been correlated with the following states:

CA

### Inventory Data References:

SJER-1 37.0899444 119.7342222  
 SJER-2 37.0900000 119.7355833  
 SJER-3 37.0886667 119.7335556  
 SJER-4 37.0875278 119.7331944  
 SJER-5 37.0864722 119.7395833  
 SJER-6 37.0841944 119.7441111  
 W17 37.1897500 119.5527222  
 W18 37.1844444 119.5410000  
 MR10 37.0710556 119.7354444  
 MR7 37.0713333 119.7161944  
 MR8 37.0728889 119.7156111  
 MR9 37.0739444 119.7170556  
 R21 37.2747500 119.7918056  
 R22 37.2747778 119.7915000  
 SJER-12 37.0790000 119.7202778  
 SJER-13 37.1216667 119.7461389  
 SJER-14 37.1272778 119.7564444  
 SJER-28 37.0905278 119.7145833  
 SJER-29 37.0904722 119.7145556  
 SJER-30 37.0857778 119.7164167

### Type Locality:

#### Relationship to Other Established Classifications:

This blue oak dominated site may include the following Oak Woodland Classes (Allen-Diaz et al. 1989): 1) Blue Oak-Interior Live Oak/Grass, 2) Blue Oak-Foothill Pine/Whiteleaf Manzanita/Grass, 3) or Blue Oak-Foothill Pine/Wedgeleaf Ceanothus/Grass, 4)Blue Oak/Grass or 5) Blue Oak-Understory Blue Oak/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:

| <u>Author</u>   | <u>Date</u> | <u>Approval</u> | <u>Date</u> |
|---|-------------|-----------------|-------------|
| Melvin George, Neil<br>McDougald, Dennis<br>Dudley, Jim Sullins and<br>Bill Frost | 5/14/2004   | Kendra Moseley  | 11/1/2007   |

## Reference Sheet

**Author(s)/participant(s):**

**Contact for lead author:**

**Date:**            **MLRA:** 018X            **Ecological Site:** Granitic R018XI002CA    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

**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.

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

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

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

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

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

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

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

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

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**9. Soil surface structure and SOM content (include type 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 is NOT expected in the reference state for the ecological site:**

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**17. Perennial plant reproductive capability:**

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