# Appendix A

## Oak Woodland Management Plan
## Background and Support Information

# El Dorado County

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– Revised Public Review Draft –
Oak Woodland Management Plan Background and Support Information
Appendix A

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The Oak Woodland Management Plan (OWMP) Background and Support Information appendix (Appendix A) is based on current research. The OWMP has been intended to be an adaptive management plan; therefore, as research changes and new findings are made, the OWMP will be updated periodically to reflect current conclusions.

The planning area covered by the OWMP is that area bordered by the County's administrative boundary to the north, west, and south and ending at the 4,000-foot elevation to the east.

# 1. El Dorado County Oak Woodlands

## A. Introduction to Oak Woodlands

The term "oak woodland" is defined in the Oak Woodland Conservation Act (PRC §21083.4, Fish and Game Code §1361) as an oak stand with greater than ten percent canopy cover or that may have historically supported greater than ten percent canopy cover. The General Plan uses the term "oak woodland" interchangeably and in the same context as "oak canopy."

Oak woodlands are comprised of a variety of tree species. Non-oak tree species include foothill pine, knobcone pine, California buckeye, ponderosa pine, Douglas-fir, bigleaf maple, Pacific madrone, and Pacific dogwood. The shrub component can be sparse to dense depending on site conditions and management.

Five main oak woodland types are identified within the planning area: Blue Oak Woodland (BOW), Blue Oak-Foothill Pine (BOP), Valley Oak Woodland (VOW), Montane Hardwood (MHW), and Montane Hardwood-Conifer (MHC). A sixth type, Valley Foothill Riparian (VRI), has a limited distribution in the County. These types are part of the CWHR classification scheme (Mayer and Laudenslayer, 1988) and were analyzed in the General Plan EIR (EDAW, 2003). The oak woodland types are dominated by one or more of five main native oak tree species: blue oak (*Quercus douglasii*), valley oak (*Quercus lobata*), California black oak (*Quercus kelloggii*), interior live oak (*Quercus wislizeni*), and canyon live oak (*Quercus chrysolepis*).

Montane hardwood is the most represented oak woodland type throughout the planning area. Blue oak woodland, blue oak-foothill pine, and valley oak woodland tend to be more prevalent below 2,000 feet. Montane hardwood-conifer becomes more prevalent above 2,000 feet and transitions to conifer-dominated types.

## B. Oak Species

Several species of oak are native to El Dorado County. Table 1-1 lists native oak tree species that occur within the planning area of the OWMP. Tanbark oak (*Lithocarpus densiflorus*), which

occurs in the Georgetown area, produces acorns but is not considered a "true" oak (Pavlik et al., 1991; Oak Woodlands Conservation Act of 2001).

**Table 1-1**

**Native oak tree species that occur within the OWMP planning area of El Dorado County**

| Oak Tree Species | Common Name |
|---|---|
| *Quercus chrysolepis* | Canyon live oak, maul oak |
| *Quercus douglasii* | Blue oak |
| *Quercus garryana* | Oregon oak, Oregon white oak |
| *Quercus kelloggii* | California black oak |
| *Quercus lobata* | Valley oak |
| *Quercus wislizeni* | Interior live oak |
| *Quercus x morehus* | Oracle oak (hybrid of California black and interior live oaks) |

Shrub species of oak that occur in the planning area are scrub oak (*Quercus berberidifolia*), leather oak (*Quercus durata*), and Brewer oak (*Quercus garryana* var. *breweri*). Huckleberry oak (*Quercus vaccinifolia*) is widespread in El Dorado County above the planning area with limited distribution below 4000 feet.

The following tree species information is summarized from Stuart and Sawyer (2001), Pavlik et al. (1991), Bolsinger (1988), and Gaman and Firman (2006).

**Canyon live oak (*Quercus chrysolepis*).** Canyon live oak is an evergreen tree that ranges from 15 to 70 feet in height. Canyon live oak is shade and drought tolerant. It is found throughout much of California, except the Central Valley, Great Basin, and Sonoran Desert.

Canyon live oak grows on a variety of sites and with a variety of forms. Single-stemmed trees grow on better sites such as in moist forest canyons. Multi-stemmed trees grow on canyon walls, cliffs, and rocky sites; shrubby forms grow on the harshest sites. Repeated fires will convert canyon live oak to shrubs.

Wildlife use canyon live oak for roosting, nesting, foraging, and cover. Birds and mammals eat the acorns.

**Blue oak (*Quercus douglasii*).** Blue oak grows as a single-stemmed tree 20 to 60 feet tall. This deciduous tree can live up to 400 years. The leaf surfaces are bluish green. Blue oak is drought tolerant and shade intolerant.

Blue oak occurs naturally only in California. It grows in woodlands and valleys of California's foothills, especially bordering the interior valley. Blue oak has several adaptations for growing

on shallow soils in a hot, dry climate. Roots emerge from the acorns during the fall rains and grow rapidly. Leaves have a waxy, moisture-conserving coating. Blue oak drops its leaves in extremely hot and dry years. It is often associated with foothill pine (*Pinus sabiniana*), California buckeye (*Aesculus californicus*), interior live oak, Oregon white oak, and valley oak.

Blue oak provides critical winter range for deer and other wildlife. Its foliage is used for browse and many species consume its acorns.

**Oregon white oak (*Quercus garryana*).** Oregon white oak grows as a single-stemmed tree 25 to 90 feet tall. This deciduous tree is moderately shade tolerant but can be out-competed by conifers. It sprouts after being injured by fire or cutting.

Oregon white oak grows in the central and north Coast Range and in the foothills of the Sierra Nevada and Cascade Range. It is an uncommon species in El Dorado County; however, Stuart and Sawyer (2001) report that the largest Oregon white oak in California (over 120 feet in height and eight feet in diameter) grows in El Dorado County.

Wildlife and livestock browse its foliage. Many species of birds and mammals eat its acorns.

**California black oak (*Quercus kelloggii*).** California black oak grows as a single-stemmed tree 30 to 80 feet tall. On infertile sites, it can grow as a shrub.

California black oak is initially shade tolerant but becomes shade intolerant as it grows. It sprouts after being injured by fire or cutting. This deciduous tree can live 500 years. It is the primary commercial hardwood species in California.

California black oak is widely distributed within woodlands and coniferous forests. Stands dominated by California black oak occur infrequently within lower montane elevations. Oracle oak is a hybrid of California black oak and interior live oak that is found in El Dorado County.

Many wildlife species use California black oak for forage and cover and eat its acorns.

**Valley oak (*Quercus lobata*).** Valley oak is a single-stemmed, deciduous tree that grows 30 to 90 feet tall. It is the largest oak species in California and can live to be 400 to 600 years old. This deciduous tree is intermediate in its shade tolerance. It sprouts after being injured by fire or cutting.

Valley oak occurs only in California. It is found in valley and foothill woodlands in the Central Valley, Sierra Nevada foothills, and the Coast Ranges. Usually found on deep, alluvial soils, it can grow on shallow or stony soils if its roots can reach sufficient moisture. Its vertical root system taps into groundwater with some roots as deep as 80 feet. Although most common below 2,000 feet, it can range above 5,000 feet.

Valley oak provides important habitat for wildlife.

**Interior live oak (*Quercus wislizeni*).** Interior live oak is a single-stemmed tree that grows 30 to 75 feet tall. It is shade tolerant and drought sensitive. Its thick bark is resistant to fire. Trees sprout after fire. In areas with recurring fire, it forms shrubby thickets.

Interior live oak grows across the western half of California, including the Sierra Nevada foothills, usually where summers are hot and dry and winters cool and wet. In the Sierra Nevada, clumps of interior live oak may be concentrated around rock outcrops within blue oak woodland. With increasing elevation, particularly on north slopes, interior live oak becomes more prevalent and almost replaces blue oak.

Interior live oak provides important wildlife forage and habitat. Live oak leaves are less palatable to deer than are leaves of deciduous species such as blue oak.

## C. Oak Woodland Habitats

Several vegetation classification systems or oak woodland habitat descriptions exist but most have not been mapped for El Dorado County. Existing mapping of California Wildlife Habitat Relationship (CWHR) types from the CWHR Habitat Classification Scheme (Mayer and Laudenslayer, 1988) is readily available. The CWHR types were adopted for the OWMP, which is consistent with the General Plan EIR. Online updates of CWHR types are available from the California Department of Fish and Game website (http://www.dfg.ca.gov/whdab/html/wildlife_habitats.html).

Five CWHR woodland types that were identified in the General Plan EIR are described as oak woodland types for the intent of the OWMP. The CWHR types are Valley Oak Woodland (VOW), Blue Oak Woodland (BOW), Blue Oak-Foothill Pine (BOP), Montane Hardwood (MHW), and Montane Hardwood-Conifer (MHC). All types have at least 10 percent canopy cover of oak trees. A sixth type is Valley-Foothill Riparian (VRI), which may include Fremont cottonwood, willow, and valley oak as dominant tree species.

Both VOW and VRI were identified as sensitive habitats in the General Plan EIR based on a review of CNDDB and FRAP (EDAW, 2003). Valley oak forest and woodlands have been identified as high priority for CNDDB inventory (CDFG, 2003). VRI was not quantified from the FRAP mapping because it is difficult to distinguish using remote-sensing imagery (EDAW, 2003).

Other CWHR types that are not oak woodland types but occur within the planning area may contain greater than 10% oak tree canopy cover. These types include Ponderosa Pine (PPN), Douglas Fir (DFR), and Sierran Mixed Conifer (SMC). Because these types are dominated by conifers and not deemed oak woodland types, they are not considered in the OWMP. The following CWHR woodland types are addressed in the OWMP [descriptions follow the General Plan EIR (EDAW, 2003) and CDFG's California WHR System (http://www.dfg.ca.gov/whdab/html/wildlife_habitats.html) and are supplemented by the IHRMP website (http://danr.ucop.edu/ihrmp/wildhab.html )]:

**Blue oak woodland (BOW)** is usually associated with shallow, rocky, infertile, well-drained soils. Within the County, BOW usually occurs below 2,000 feet in elevation but can extend up to 3,000 feet. BOW commonly forms open savanna-like stands with little or no shrub understory on dry ridges and gentle slopes. The canopy becomes denser on better quality sites. The ground cover is comprised mainly of annual grasses. Shrubs are seldom extensive and often occur on rock outcrops. Shrub associates include California buckeye, poison-oak, hoary coffeeberry, and buckbrush. BOW usually intergrades with annual grasslands and valley oak woodlands at lower elevations and blue oak-foothill pine woodlands at higher elevations. In El Dorado County, BOW and blue oak-foothill pine woodlands tend to be intermixed.

Interior live oak, canyon live oak, California buckeye, and valley oak are common associates in blue oak woodland. Interior live oak and canyon live oak can be the dominant tree species where they may be considered as distinct habitats. Interior live oaks are often associated with river floodplains, low foothills, and upland slopes. In low-elevation foothill woodlands, interior live oaks occur as widely spaced trees or clumps that may be concentrated around rock outcrops. Interior live oak becomes a more significant part of the blue oak woodland canopy with increasing elevation, particularly on north-facing slopes. Canyon live oaks are found on low foothills, mountain canyons, upland slopes, and exposed ridges.

**Blue oak-foothill pine (BOP)** is typically found on well-drained soils rich in rock fragments, generally in hilly, dry terrain. Compared with BOW, BOP generally is found on steeper and dryer slopes with shallower soils. BOP merges with annual grasslands, blue oak woodlands, valley oak woodlands, and mixed chaparral (including the northern gabbroic chaparral). BOP is characterized by a mixture of hardwoods, conifers, and shrubs. Blue oak is usually most abundant with the taller foothill pine dominating the overstory. Foothill pine becomes more prevalent at higher elevations. Associated tree species include interior live oak and California buckeye. Interior live oak becomes more abundant on shallower soils, steeper slopes, and at higher elevations. Canyon live oaks are present on low foothills, mountain canyons, upland slopes, and exposed ridges.

The shrub component is typically composed of several species that tend to clump and are interspersed with annual grasses. Shrub species include buckbrush, whiteleaf manzanita, hoary coffeeberry, poison-oak, redbud, and yerba-santa. Shrubs are less prevalent at lower elevations.

**Montane hardwood (MHW)** has a relative overstory cover by hardwoods of at least 50% and a relative overstory cover by conifers of less than 25%. Canopy cover ranges from dense to open. The poorly developed shrub layer contains snowberry, wood rose, currant, manzanita, and poison-oak. The herbaceous layer is sparse. At lower elevations MHW merges with mixed chaparral. Tree associates are foothill pine, knobcone pine, tanoak, Pacific madrone, and California laurel. At middle elevations MHW merges with montane hardwood-conifer or Douglas-fir. Middle and higher elevation associates are canyon live oak, Douglas-fir, California black oak, and mixed conifer. Steep, rocky south slopes of major river canyons often support MHW, particularly canyon live oak and scattered Douglas-fir. MHW occurs on soils that are rocky, alluvial, coarse-textured, poorly developed, and well-drained.

**Montane hardwood-conifer (MHC)** has a relative overstory cover by hardwoods of at least 50% and a relative overstory cover by conifers of at least 25%. MHC is transitional between dense coniferous forests of upper elevations and montane hardwood, mixed chaparral, or open woodlands and savannahs. MHC often occurs as a closed forest. MHC typically supports relatively little understory except in ecotones or following a disturbance such as fire or logging. Common associates include California black oak, bigleaf maple, white alder, dogwood, Douglas-fir, incense-cedar, and ponderosa pine.

MHC includes vegetation associated with both coniferous and hardwood habitats. Habitat composition is generally defined as including a minimum of one-third coniferous trees and one-third broad-leaved trees. Typically, conifers dominate the upper canopy, and broad-leaved trees form a sub-canopy. In the northern Sierra Nevada, MHC is found between 1,000 and 4,000 feet elevation.

**Valley oak woodland (VOW)** is best developed on deep, well-drained alluvial soils and is usually found below 2,000 feet. VOW varies from savanna-like stands to forest-like stands with partially closed canopies. Denser stands typically grow in valley soils along natural drainages. Canopies in VOW are dominated almost exclusively by valley oak. In the foothills, VOW intergrades with blue oak or blue oak-foothill pine woodlands. Near major stream courses, VOW may intergrade with valley-foothill riparian woodland and be associated with Fremont cottonwood and willow. The shrub understory includes poison-oak, blue elderberry, California wild grape, toyon, coffeeberry, and California blackberry.

VOW provides food, cover, reproductive sites and corridors for numerous wildlife species. Wildlife commonly found in VOW includes gopher snake, acorn woodpecker, oak titmouse, white-breasted nuthatch, California quail, and western gray squirrel. Valley oak woodland is listed as a high-priority community for inventory by the CNDDB and a sensitive habitat by El Dorado County (EDAW, 2003).

**Valley foothill riparian (VRI)** is best developed on deep alluvial soils with a high water table. VRI is associated with low velocity flows, floodplains, gentle topography, and a substrate of coarse, gravelly or rocky soils. VRI is found in the lower foothills, below 2,000 feet. Valley oak or cottonwood can be the dominant species with white alder, box elder, and Oregon ash as subcanopy trees. Canopy cover ranges from 20 to 80 percent. Valley oak-dominated riparian systems may require more than 75 years to reach maturity. VRI was not mapped in El Dorado County because remote sensing imagery could not distinguish it (EDAW, 2003).

VRI provides food, water, migration and dispersal corridors, and escape, nesting, and thermal cover for many wildlife species. As well as bird and mammal species, amphibians and reptiles utilize VRI.

1. Current Distribution

Table 1-2 displays the acreage of each oak woodland type within the planning area. The majority of blue oak woodland, blue oak-foothill pine, and valley oak woodland within El Dorado County occurs below 2,000 feet (Figure IV-1 of Appendix A). Valley oak woodland tends to be found on well-developed soils (Pavlik et al., 1991). Blue oak savanna with few or no

shrubs occurs in the low foothills often on low hillocks and exposed, south-facing slopes. Blue oak savanna grades into blue oak woodland on sites with more rainfall or north-facing slopes. Blue oak woodland supports a more complex community (Pavlik et al., 1991). Montane hardwood is spread throughout the planning area, extending from the annual grasslands in the west to the forested types in the east. Montane hardwood-conifer is most prevalent east of Highway 49.

**Table 1-2**
**Acreage of oak woodland in El Dorado County based on 2002 FRAP mapping**

| Oak Woodland CWHR Type | CWHR Type | Acreage |
|---|---|---|
| Blue oak woodland | BOW | 42,400 |
| Blue oak-foothill pine woodland | BOP | 12,900 |
| Montane hardwood | MHW | 155,900 |
| Montane hardwood-conifer | MHC | 34,200 |
| Valley oak woodland | VOW | 3,400 |
| Total | | 248,000 |

2. Historic Distribution

The historic distribution of oak woodland within El Dorado County is not known. Likely the distribution in 1848 is similar to the current distribution but the structure of oak woodland has been altered through mining, grazing, and development. In community centers such as occur along the Highway 50 corridor, oak woodland has been lost or greatly degraded due to urban development. The understory has been modified in grazing lands and some oak woodland likely was converted to grassland. At the lower elevations of timberland, small areas of oak woodland were converted to conifer plantations.

Statewide the primary cause of woodland conversion between 1945 and the early 1970s was rangeland improvement; since the early 1970s, the primary cause has been urban and suburban expansion (Bolsinger, 1988). Valley oaks have been lost over the last 150 years to agricultural and residential development in prime lowland real estate (Pavlik et al., 1991).

3. Existing Threats

Several elements threaten oak woodlands statewide and in El Dorado County. The two main processes influencing oak woodlands are land clearing for subdivisions and intensive agriculture and the continued parcelization of large continuous woodland ownerships to exurban development (Giusti et al., 2004). Threats to oak woodlands in the Sierra Nevada foothills include development, fragmentation, agricultural development, livestock grazing, low regeneration, and wood cutting (WCB). Additional threats identified for the Sierra Nevada

above the foothills include high fire risk and water control. Residential development and intensive agricultural conversion, primarily to vineyards, are the primary threats to oak woodlands in the Sierra Nevada.

Impacts vary from complete removal of oak woodland to degradation of the quality of remaining oak woodland due to fragmentation. Fragmentation refers to the breaking up of contiguous land into smaller pieces that are separated by varying distances. Fragmentation results in the degradation of habitat and ecosystem values.

Saving and Greenwood (2002) modeled projected development of El Dorado County under the proposed 1996 General Plan. They concluded that 4 percent of oak woodland land cover would be physically lost to development but 40 percent of "rural" oak woodland would be converted to marginal or urban habitat. "…areas that once functioned under a more natural state and presumably provided functional habitat for species are degraded, either due to proximity to urban land uses or by isolation from larger patches of contiguous natural vegetation." They determined that rural residential development impacts habitat quality through fragmentation more than it impacts the extent (i.e., area) of habitat.

Clearing for fire protection that occurs with development also leads to the degradation of oak woodlands (Harris and Kocher, 2002). The thinning of trees and removal of understory shrubs and trees result in a loss of species and of structural diversity.

4. Status of Natural Regeneration and Growth Trends

Regeneration is the net effect of individuals added to a population through recruitment and individuals lost through mortality. Successful recruitment depends on several factors: acorn crop, conditions for germination, survival of seedlings, and survival of saplings to mature stages.

Bolsinger (1988) reported on regeneration in oak woodlands as indicated by seedlings and saplings in sample plots across California. Seedlings and saplings were in great abundance in canyon live oak stands and in moderate amounts in interior live oak, California black oak, and Oregon white oak stands. Regeneration was sparse in blue oak stands and almost nonexistent in valley oak stands (although valley oak regeneration was found in stands dominated by other species). The shortage of saplings for oak species (especially blue oak and valley oak), in the long-term, could lead to the gradual loss of oak stands as mature oaks are lost to natural mortality (Standiford and McCreary, 1996).

Specific to blue oak, Swiecki et al. (1997) support the concept of advance regeneration. Blue oak seedlings persist for extended periods (up to 15 years) in the understory. Sapling recruitment occurs under appropriate conditions such as an opening in the canopy. In their study, they found a positive correlation between gaps in the canopy and sapling recruitment.

Several factors have been implicated in poor oak regeneration (Giusti et al., 2005; Siegel and DeSante, 1999; McCreary, 2001; Pavlik et al., 1991). These factors include:

- grazing by livestock (depending on timing and intensity)
- browsing by deer
- fire suppression
- yearly burning
- conversion of native perennial understory to annual grasses that deplete soil moisture early before oak seedlings can compete and that compete for light and nutrients
- absence of appropriate climatic conditions
- global warming
- heavy vehicle use
- rodent herbivory (rodent populations have increased as their predators have declined)
- predation by turkey
- past management history

The factor or combination of factors affecting oak regeneration likely varies by geographic region and by local conditions.

Some writings indicate that poor regeneration dates back 100 to 150 years. Deciduous oak regeneration was locally abundant prior to 1900 (Standiford et al., 1996). Few areas are known where successful recruitment of blue oaks has occurred since the late 1800s (CWHR). Most surviving stands of valley oak woodland appear to be 100 to 300 years old (CWHR).

Growth Trends

In general, blue oak woodland and blue oak-foothill pine woodland grow at slower rates than valley oak woodland or montane hardwood (IHRMP). Low regeneration in the blue oak habitat types has created concern. The effectiveness of tree planting to mitigate habitat loss in blue oak woodlands was modeled from data derived from a 10-year-old blue oak plantation (Standiford, McCreary, and Frost, 2002). Stand attributes for every 10-year interval was modeled using blue oak age and stand structure data. The model varied tree density and management intensity. With high intensity management and a planting density of 200 trees per acre, oak canopy cover could reach the minimum requirement for oak woodland (i.e., 10 percent canopy cover) after 10 years (depending on site conditions).

The study raised questions regarding the adequacy of planted stands for mitigating the loss of mature oak woodlands. After 50 years (a young age for oak woodland), the same stand would reach only 17 percent canopy cover. The wildlife species composition would shift from species that utilize acorns, cavities, and downed wood associated with mature oak woodlands to species associated with open grasslands.

# 2. Natural Resource Values of Oak Woodlands

The purpose of this section is to introduce the reader to the ecosystem values of oak woodlands. Economic and social values are described in Section 3. Mapping of oak woodlands and priority conservation areas is presented in Section 4.

## A. Natural Resource Values to Wildlife

Oak woodlands provide many natural resource values. Oak woodlands provide habitat for native wildlife, plants, and insects, some of which have special-status. Oak woodlands contribute to nutrient cycling, soil quality and erosion control, water quality, and watershed health. Humans benefit from these ecosystem functions of oak woodlands and from the aesthetic and open space values of oak woodlands, which provide many recreational opportunities in El Dorado County. Conversion and fragmentation of oak woodlands result in direct loss of oak woodland or an indirect loss through degradation of remaining oak woodlands.

Oak woodlands provide many values to wildlife including food, cover, and breeding sites. Acorns are an important food source for mule deer, western gray squirrels, acorn woodpeckers, band-tailed pigeons, scrub jays, and many other vertebrate species as well as invertebrate species (Giusti et al., 1996; USDA Forest Service, 2001; Tietje et al., 2005). Mule deer migrations are influenced by acorn production (Garrison, 1992). Acorn woodpeckers are dependent not only on acorns as a food source but also on trees where they can store acorns in holes (i.e., granaries). Other animals depend on leaves and roots. Oak trees also are sources of fungi, mistletoe, and insects for rodent and bird species. Oak woodlands also provide food in the form of herbaceous plants in the ecosystem.

Cavity trees provide shelter and breeding sites for birds. Deciduous oaks, such as blue oak, black oak, and valley oak, are particularly important as cavity trees (Tietje et al., 2005). Evergreen trees are important for secondary cavity nesters. Snags provide perching and basking sites as well as roosts. Downed woody material from limbs to logs provides resting and reproductive cover for reptiles, amphibians, and birds. Oak woodlands with more complex understories (e.g., tree understory, shrubs, herbaceous vegetation, downed woody material) provide habitat for a greater variety of species, including ground-nesting birds. A diverse structure provides reproductive sites for diverse wildlife communities.

Oaks and other trees influence stream conditions, such as water temperature and flow, which in turn influence the presence and health of fish populations (Tietje et al., 2005). Oaks provide structure through deposition of coarse woody debris in streams and help reduce sedimentation. Some streams that flow through oak woodlands in the Sierra Nevada foothills are identified as special habitat in the California Natural Diversity Database (CNDDB); refer to Table 2-1.

El Dorado County supports resident and migratory populations of mule deer (EDAW, 2003). The preservation of deer migration corridors has been a concern of the California Department of Fish and Game (CDFG) as urbanized areas expand in the foothills. As a result, CDFG has mapped critical habitat and deer migration patterns for three deer herds (EDAW, 2003). Critical

winter range occurs primarily below 4,000 feet. Critical summer range, holding areas, and fawning areas occur primarily above 4,000 feet (i.e., outside the OWMP planning area). Connectivity between the critical winter range and other areas is essential for the long-term health of deer populations.

Connectivity touches on larger values of oak woodlands. In addition to needing sufficient space to provide for food, shelter, and social structures, wildlife need connectivity of habitats. Oak woodlands are one type of corridor that can be utilized by wildlife. Corridors are essential for dispersal of young animals, migration routes, and gene flow. Corridors allow dispersers (including plants, fungi, insects, and other organisms) from one area to recolonize another area that may have experienced local extirpations (e.g., from a catastrophic wildfire). All organisms within a community cannot use the same corridors equally. Species with limited mobility will not be able to utilize long corridors. For species sensitive to edge effects, corridors must be wide enough to retain core habitat. Relative intact native vegetation is an important component of corridors. (Hilty et al. 2006).

Oak woodlands function most effectively and provide the greatest habitat value in large contiguous expanses. Both size and configuration are important. Larger areas of oak woodland (especially with greater connectivity) tend to support more species. The rate of local extinction increases with smaller patch size; however, species also are lost from larger (250 acres) fragments (Hilty et al., 2006). The species composition within California oak woodland changes from large to small areas and with decreasing distance from urban settings. Merenlender and Heise (1999) reported that the percent of neotropical birds was significantly higher in undeveloped oak woodlands of 500 acres or more in California than in ranchettes (10-40 acres) and suburban lots (0.5-2.5 acres).

## B. Special-Status Species

A query of the CNDDB identified 38 special-status species and three unique natural communities in the planning area (Table 2-1). Eight of the 10 vertebrate species in Table 2-1 are associated with oak woodland habitats (Garrison, 1996). Fifteen of the 17 plant species occur in oak woodland habitats (Shaffer, 1996; CNPS, 2006).

| Table 2-1: Special-status species and habitats in the OWMP planning area. | | |
|---|---|---|
| **In Oak Types** | **Scientific Name** | **Common Name** |
| | **Birds** | |
| x | Accipiter gentilis | northern goshawk |
| | Agelaius tricolor | tricolored blackbird |
| x | Haliaeetus leucocephalus | bald eagle |
| | **Amphibians** | |
| x | Rana aurora draytonii | California red-legged frog |
| x | Rana boylii | foothill yellow-legged frog |
| | | |
| | **Reptiles** | |
| x | Emys (=Clemmys) marmorata marmorata | northwestern pond turtle |
| x | Phrynosoma coronatum (frontale population) | Coast (California) horned lizard |
| | **Mammals** | |
| x | Lasionycteris noctivagans | silver-haired bat |
| x | Myotis yumanensis | Yuma myotis |
| | **Invertebrates** | |
| | Ammonitella yatesi | tight coin (=Yates' snail) |
| | Andrena blennospermatis | |
| | Andrena subapasta | |
| | Banksula californica | |
| | Branchinecta lynchi | vernal pool fairy shrimp |
| x | Cosumnoperla hypocrena | A Spring Stonefly |
| x | Desmocerus californicus dimorphus | valley elderberry longhorn beetle |
| | Monadenia mormonum buttoni | Button's Sierra sideband (snail) |
| | Nebria darlingtoni | South Forks ground beetle |
| x | Orobittacus obscurus | gold rush hanging scorpionfly |
| | Rhyacophila spinata | spiny rhyacophilan caddisfly |
| | **Plants** | |
| x | Allium jepsonii | Jepson's onion |
| x | Arctostaphylos nissenana | Nissenan manzanita |
| x | Balsamorhiza macrolepis var. macrolepis | big-scale balsamroot |
| | Calochortus clavatus var. avius | Pleasant Valley mariposa lily |
| x | Calystegia stebbinsii | Stebbins's morning-glory |
| x | Ceanothus roderickii | Pine Hill ceanothus |
| x | Chlorogalum grandiflorum | Red Hills soaproot |
| x | Clarkia biloba ssp. brandegeeae | Brandegee's clarkia |
| x | Fremontodendron decumbens | Pine Hill flannelbush |
| x | Fritillaria eastwoodiae | Butte County fritillary |
| x | Galium californicum ssp. sierrae | El Dorado bedstraw |
| | Helianthemum suffrutescens | Bisbee Peak rush-rose |
| x | Horkelia parryi | Parry's horkelia |
| x | Packera layneae | Layne's ragwort |
| x | Phacelia stebbinsii | Stebbins's phacelia |
| x | Viburnum ellipticum | oval-leaved viburnum |
| x | Wyethia reticulata | El Dorado County mule ears |
| | **Habitat** | |
| x | Central Valley Drainage Hardhead/Squawfish Stream | Central Valley Drainage Hardhead/Squawfish Stream |
| x | Central Valley Drainage Resident Rainbow Trout Stream | Central Valley Drainage Resident Rainbow Trout Stream |
| x | Sacramento-San Joaquin Foothill/Valley Ephemeral Stream | Sacramento-San Joaquin Foothill/Valley Ephemeral Stream |

The California red-legged frog (CRLF) is federally listed as a threatened species. In 2006 the U.S. Fish and Wildlife Service issued new critical habitat designations for the CRLF. One critical habitat unit for CRLF occurs in El Dorado County. This unit surrounds Spivey Pond, one of five known breeding populations of CRLF in the Sierra Nevada. The 8,388-acre critical habitat unit supports montane hardwood and montane hardwood-conifer as well as smaller areas of other oak woodlands.

## C. Recreation and Open Space

A major incentive for people to move into the Sierra Nevada foothills is the open space. As the population has grown, so has the desire to maintain areas of open space for recreational purposes or aesthetic values. El Dorado County supports an expanding network of trails for hikers, bicyclists, and equestrians. These lands designated for recreation (e.g., Cronan Ranch Regional Trails Park) help to maintain large expanses of oak woodland. The benefits of supporting oak woodland habitat and providing wildlife habitat are enhanced when recreational areas connect with other open space, such as under agricultural and natural resources land use designations.

A partial list of areas in the OWMP study area that provide recreational and/or open space values are described below. This list is not exhaustive, but helps to identify potential opportunities to maintain large expanses of oak woodland and to provide connectivity among the woodlands.

The Cronan Ranch Regional Trails Park, east of Coloma, is managed by the Bureau of Land Management. Plans exist to connect this area with the South Fork American River corridor trail that will run from Greenwood Creek to Salmon Falls. This park contains oak woodlands.

The Folsom Lake State Recreation Area provides trails, camping, and open space around Folsom Lake.

The Auburn State Recreation Area provides trails through oak woodland habitats near the confluence of the north and middle forks of the American River and in Cool. Corridors are maintained along the north and middle forks of the American River.

Marshall Gold Discovery State Historic Park in Coloma has the Monroe Ridge and Monument trails and other open space in oak woodland habitats near the South Fork of the American River.

The Sacramento-Placerville Transportation Corridor (SPTC), as discussed in Section XIII, includes 28 miles of the corridor within El Dorado County, much of which passes through oak woodland.

The El Dorado Trail is jointly owned by the City of Placerville and El Dorado County. It winds through oak woodland habitats from Placerville to Camino. The El Dorado Trail eventually will connect the SPTC and the National Pony Express Trail Route. Potential may exist to

expand the sections through oak woodlands to enhance oak woodland conservation and to meet the need for trails

Lands along Weber Creek that are part of the El Dorado Irrigation District's (District) Texas Hill properties contain large expanses of oaks. Potential partnering between the District and the County could meet water storage needs and oak conservation goals.

The Dave Moore Nature Area provides a small recreation area with oak woodland habitat along the South Fork of the American River.

The Red Shack Trail passes through a 131-acre property supporting oak woodland habitat to reach the South Fork of the American River.

The Bureau of Land Management (BLM) manages over 3,100 acres in the Pine Hill Preserve network that serves to protect rare plants that occur on gabbroic soils (http://www.pinehillpreserve.org/index.htm). The Pine Hill Preserve consists of five separate units in northern gabbroic mixed chaparral and oak woodland.

The Upper Cosumnes River Project Area encompasses 1,200 acres in conservation easements and 280 acres in fee to protect riparian habitat throughout the Upper Cosumnes River Basin (American River Conservancy, 2006). This project protects oak woodlands in open space and provides connectivity with adjacent public lands.

Peavine Point Research Natural Area on the Eldorado National Forest encompasses 1,098 acres about two miles northeast of Pollock Pines at an elevation range of 2,080 to 3,854 feet (USDA Forest Service, undated). Although the primary target element for designating this site as a research natural area is old-growth ponderosa pine, the secondary target element is black oak, which dominates the middle canopy.

Maintaining and expanding open space is not a panacea for encroaching development and the effects from loss of oak woodland habitat and fragmentation. Human activities within open space affect biological values. The introduction of nonnative species, wildlife harassment by pets, and trampling of vegetation are examples of factors that impair biodiversity values (Hilty et al., 2006). Open space that provides for human activities should be used as one component of a comprehensive approach to preserving oak woodland habitats in the County.

## D. Health and Function of Local Watersheds

Oak woodlands contribute to the health of watersheds in several ways. Organic debris from oaks is important for soil building and maintenance of water quality (USDA Forest Service, 2001). Oak woodlands contribute organic matter to the soil and thereby provide soil cover and nutrients to enhance soil fertility, as well as reducing bulk density. Soil structure, increased infiltration rates, and reduction of soil erosion and sedimentation are functions present in oak woodlands, which can contribute to better water quality.

In a study of blue oak stands, soil quality and fertility were enhanced beneath oak canopies as compared to adjacent grassland (Dahlgren et al., 2003). Oak woodlands remove more water from the soil profile than do grasslands and this water is released through evapotranspiration. Because the loss of water through evapotranspiration reduces the leaching intensity beneath oak woodland canopy, more nutrients are retained within the soil and fewer nutrients are leached into streams and creeks.

A Watershed Assessment was completed for the South Fork of the American River (Georgetown Divide Resource Conservation District, 2004). A water quality risk was assigned to each sub-basin in the watershed. Eleven sub-basins in the OWMP planning area received the two highest ratings for risk; sub-basins outside the planning area had lower risk. High risk was associated with high density of roads, structures, and impervious cover in the lower reaches of the watershed, which is in the OWMP planning area and where most urban development has occurred. This risk assessment highlights the importance of maintaining the functions of oak woodlands to protect watersheds.

## E. Soil and Water Retention

Leaves and other organic matter on the ground in oak woodlands absorb water from precipitation and reduce evaporation from the soil (USDA Forest Service, 2001). Organic matter from oak woodlands reduces bulk density and improves soil structure (Dahlgren et al., 2003). The improved soil structure increases infiltration rates and reduces soil erosion and sedimentation. When litter and organic matter are burned in wildfires, infiltration can be reduced and runoff increased (McCreary, 2004). Giusti et al. (2004) stated that soil erosion "is often the most glaring impact" from removal of oak woodland vegetation.

## F. Reduction of Fuel Loads

Fire in oak woodland habitats was used by Native Americans and then by ranchers until the 1950s (Standiford and Adams, 1996). In a fire history study near Diamond Springs in El Dorado County, Stephens (1997) determined that the mean fire interval in blue oak woodland from 1850 to 1952 was approximately 8 years. Fires have largely been suppressed since the early part of the 1900s (McCreary, 2004).

Oak woodlands are not only adapted to fire, but fire is critical to their ecology (Standiford and Adams, 1996). Mature oaks are resistant to low-intensity ground fires; seedlings and saplings resprout after being top-killed by fire. Germination of some plant species within oak woodland is stimulated by fire. Oak recruitment events in Sierra Nevada have been associated with fire.

Because fires have been suppressed, fuels have accumulated in some oak woodlands. The increase in fuel loadings increases the risk of high-intensity fires. Consequences of higher intensity fires include increased run-off and erosion, increased sedimentation into streams, reduction in water quality, loss of wildlife habitat and loss of oak woodlands that had been

resilient under an earlier low-intensity fire regime (Standiford and Adams, 1996; McCreary, 2004).

The California Department of Forestry and Fire Protection administers a Vegetation Management Program to assist with fuels management. The use of prescribed fire is complicated by development in oak woodlands, air quality considerations, increased hazard from greater fuel accumulations, and liability for escaped fires.

## G. Effects from Loss of Oak Woodlands

Loss of oak woodlands affects many natural resource values. The loss of oak woodlands affects wildlife habitat, plant species diversity, soils, and the function of watersheds. Not only is habitat lost when oak woodlands are removed, but fragmentation of the remaining oak woodlands diminishes the quality of the remaining habitat (Saving and Greenwood, 2002; Scott, 1996).

### 1. Wildlife Habitat

Loss of oak woodlands affects wildlife habitat both directly and indirectly. When oak woodlands are removed, food (e.g., acorns, insects, and fungi), cover, cavities, and nesting sites are removed, reducing the overall amount of available habitat. Downed woody debris and snags that provide shelter also are removed.

Indirect effects from loss of woodlands may be more subtle. Remaining habitat may be small and lack some of the components that wildlife requires. Barriers may be established that prevent wildlife from safely accessing and utilizing all habitat that they need (e.g., water sources or breeding areas). Isolated, small patches may not support the metapopulations or metacommunities necessary for long-term viability.

### 2. Fragmentation

- Fragmentation is the breaking up of contiguous land into smaller pieces that are separated by varying distances. Degradation of habitat and ecosystem values increases with increasing fragmentation.

Oak woodlands function most effectively and provide the greatest habitat value in large contiguous expanses. Both size and configuration are important. Larger fragments (especially with greater connectivity) tend to support more species. The rate of local extinction increases with smaller patch size; however, species also are lost from larger (250 acres) fragments (Hilty et al., 2006). The species composition within California oak woodland changes from large to small areas and with decreasing distance from urban settings. Merenlender and Heise (1999) reported that the percent of neotropical birds was significantly higher in undeveloped oak woodlands in California than at ranchettes (10-40 acres) and suburban lots (0.5-2.5 acres).

Natural resource values are maximized when the interior or core area is greater in relation to the edge. Round shapes have greater core to edge area; more irregularly shaped areas or linear areas have greater edge to core area. Edge effects are least significant when the edge transitions to other natural vegetation and is most intense when the edge transitions to an altered landscape such as development. As edge habitat increases, oak woodland is more subject to invasion by exotic species such as invasive weeds and domestic animals.

Giusti et al. (2004) identified two main processes influencing oak woodlands in California: 1) land clearing for subdivisions and intensive agriculture and 2) the parcelization of large continuous woodland ownerships for exurban development. Impacts vary from complete removal of oak woodland to degradation of the quality of remaining oak woodland.

Rural residential development, which erodes habitat quality, has been a particular concern in several studies such as Saving and Greenwood (2002) and Merenlender and Heise (1999). The majority of oak woodland habitats in El Dorado County are privately owned rural lands (Marose, 1997). Marose (1997) projected fragmentation of oak woodland during full build-out of the 1996 general plan, predicting that remaining oak woodland would consist of smaller fragments with greater distance among them. Large contiguous habitat and connectivity would be lost.

High-intensity land uses (up to and including low-density residential) result in fragmentation and loss of the majority of the existing habitat; medium-intensity land uses (including rural residential) result in removal and fragmentation but to a lesser extent (EDAW, 2003). With medium-intensity land uses, some habitats would continue to be viable but the quality of the habitat would be diminished and biological diversity would be reduced. With increasing fragmentation, fragments may become too small to support viable populations of species.

When oak woodlands are converted to urban landscapes, some woodlands remain because of oak protection ordinances or because they occur on steep slopes or drainages (Scott, 1996). When oak woodlands are imbedded within other land uses, their biological values decline as adjoining habitats are lost. Barriers such as housing alter wildlife movement between stands and then populations decline.

In El Dorado County, Highway 50 presents a major barrier to north-south wildlife dispersal (EDAW, 2003; Saving and Greenwood, 2002). The Oak Woodland Technical Advisory Committee that was formed in the County in 1996 "concluded that connectivity of woodlands from north to south was an important value to preserve and that it was at risk from future development" (Georgetown Divide Resource Conservation District, 2004). The Weber Creek drainage is the only north-south corridor allowing passage of wildlife across the Highway 50 corridor and needs to be maintained as an important existing corridor. Opportunities to establish additional north-south corridors across Highway 50 may exist at other sites (e.g., drainages from Slate Creek to Indian Creek).

The Saving and Greenwood study identified the need to maintain large contiguous areas of oak woodland that function under a more natural state. The study also emphasized the need for a program that focuses on critical areas of connectivity such as habitat corridors. The General Plan

EIR (EDAW, 2003) discussed the importance of preserving connectivity in the form of riparian corridors, canyon bottoms, and ridgelines and also by maintaining a landscape that contains a network of multiple pathways for wildlife movement.

3. Retention of Soil and Water

A study in the northern Sierra Nevada foothills examined changes to soil quality following blue oak removal (Camping et al., 2002). Significant reduction in carbon, nitrogen, and other nutrients occurred within 5 to 15 years. Nutrient concentrations in streams increase for 3 to 4 years following vegetation conversion (Larsen et al., 2005).

Sediment concentrations also increase in streams following vegetation conversion (Larsen et al., 2005). In the Sierra Nevada foothills, conversion of 90 percent of an oak-dominated watershed to grassland led to an almost two-fold increase in sedimentation. Loss of vegetation from development also reduces the retention of soils and water. Increased surface runoff leads to increased water velocity and erosion (Larsen et al., 2005). Rates of sedimentation and non-point source pollution increase with increased run-off.

# 3. Economic Value of Oak Woodlands

This section summarizes research regarding the economic values of oak woodlands.

The natural resources values of Section 2 underlie the economic values described in this section. Therefore, community economics will be affected as the extent and quality of the resource diminishes. If agri-tourism and recreation are to continue to contribute to El Dorado County's economic development, the underlying resources that support those industries must be maintained.

Oak woodlands in El Dorado County provide economic value to landowners and the community at large. In addition to providing a source for firewood and other wood products, oak woodlands support important economic activities such as grazing and recreation, enhance land values, and play a critical role in the healthy functioning of aquatic and terrestrial ecosystems throughout the County. Economic values associated with these functions are described below.

## A. Support of Important Economic Activities

Agriculture and recreation-based tourism are important industries in El Dorado County. According to the 2005 El Dorado and Alpine Counties Agricultural Crop and Livestock Report produced by the Agricultural Commissioner, the impact of agriculture on El Dorado County's economy was estimated at $434 million in 2005. According to the California Department of Conservation (2002), much of the area on the west slope – 183,944 acres or 16% of the county – is categorized as grazing land. Oak woodlands provide shade, forage, and sources of water for

livestock. The economic value of pasture and rangeland (crops only, not including the value of livestock) was about $3.6 million in 2005 (El Dorado County Department of Agriculture 2005).

In addition to agricultural operations, oak woodlands support many recreation activities in El Dorado County. With more than 25% of its lands under Forest Service jurisdiction, El Dorado County provides substantial recreation opportunities. The extensive public land, as well as privately owned orchards, wineries, recreation facilities, and timberlands, combine to create a major scenic and recreational attraction for tourism in the County. The scenic beauty of the County's oak woodlands is an important part of the attraction. In addition, deer and other game species that depend on oak woodland habitat contribute to recreational hunting opportunities on public lands and through hunting leases on private lands, which in turn generate revenues for land owners that help keep many ranches viable.

Oak woodlands also support other recreation activities such as camping, fishing, hiking, bird-watching and equestrian activities that contribute to a high quality of life for residents and attract visitors. Businesses that depend on and directly benefit from recreation-based tourism include recreation services, lodging, food services, restaurants, service stations, and retail trade. Tax revenues generated by recreation activities and agri-tourism help support governmental operations in El Dorado County.

### B. Contribute to Land Value

Property values are a function of location, improvements, and other amenities. Numerous studies have shown that the presence of oak woodlands enhance land values by providing shade (energy conservation) and wind break benefits, absorbing sound, serving as a land use buffer, providing erosion control and contributing to aesthetic beauty. Oak woodland plans for Tehama County and San Luis Obispo County cite a study in Southern California that shows that parcels containing native oaks have at least 20 percent higher property value than parcels without trees (Standiford and Scott 2001). In addition, properties located closer to open space preserves benefit from higher property value. Standiford (1999) also shows that oak trees can offer higher real estate market yields over bare land. Individual oak trees of large size and landmark status have been found to contribute to the value of parcels (Standiford 1999). Increases in property values also contribute to increases in property tax revenues for a county.

### C. Contribute to Ecosystem Functions

As discussed in Section 2 (Natural Resource Values of Oak Woodlands), oak woodlands contribute to the healthy functioning of both aquatic and terrestrial ecosystems. Important ecosystem functions to which oak woodlands contribute include providing habitat, maintaining water quality and supporting water supplies, and providing other watershed services such as improving soil structure, increasing infiltration rates, reducing soil erosion and sedimentation, and enhancing nutrient cycling and soil fertility. Although placing a monetary value on these services is challenging and imprecise, recent research has made strides in better understanding the importance and value of these services to society.

One study recently conducted by the Spatial Informatics Group (Troy and Wilson 2006) on the value of services provided by oak woodlands suggests that the habitat value of oak woodlands is about $117 per acre. This value reflects society's willingness to pay for maintaining oak woodland habitat that supports healthy populations of species that depend on oak woodlands. Although monetary values for other ecosystem functions, such as watershed services, to which oak woodlands contribute are not available, the value of the services, including infiltration and control of erosion and sedimentation (in terms of the avoided cost to society of having to duplicate these services by alternative means such as water treatment), is certainly substantial.

Lastly, the role of oak woodlands in contributing to climate effects should be acknowledged. Two studies (Birdsey 1992 and Tol 2005) examined the contribution that oak woodlands make to regulating carbon dioxide, a key contributor of harmful greenhouse gases. According to these studies, the carbon sequestration services that oak woodlands provide are valued at between $33 and $83 per acre of oak woodlands.

# 4. Mapping of Oak Woodlands

To establish an effective oak woodland program that fulfills the 2004 General Plan policies for mitigation (Policy 7.4.4.4) and conservation (Policy 7.4.2.8) purposes, locations need to be identified that meet the Goals and Objectives presented in the OWMP. Areas for conservation easements need to possess the oak woodland habitat characteristics summarized in Section 2 (Natural Resource Values of Oak Woodlands). Furthermore, to develop an in-lieu fee, the potential locations of conservation lands need to be known to estimate the costs of acquisition.

From the goals and objectives listed in the OWMP, the OWMP analyzed oak woodland habitats by:

1) using the best geographic information on oak woodlands that is currently available for the entire planning area;

2) considering oak woodland habitat evaluation criteria based on the adopted 2004 General Plan policies; and

3) completing a mapping process that is objective, replicable, and supportable for the intended purpose of identifying oak woodlands that will receive priority for the mitigation and conservation purposes of this OWMP.

The County mapping process concluded by identifying the Priority Conservation Areas (PCAs) shown in Figure 1 of the OWMP. The mapping was conducted in two general phases:

- Phase 1 (Identifying Oak Woodland Resources) – Considering all oak woodland types in the study area, resource and habitat mapping criteria were considered, selected, and then applied. Large expanses of oak woodlands greater than or equal to (≥) 500 acres were identified; and

- Phase 2 (Prioritizing Conservation Areas) – Using parcel size information from the Phase I results, and land use designations from the 2004 General Plan, the large expanses were narrowed to those lands where: 1) oak woodland habitats would not likely undergo substantial fragmentation, and 2) oak woodland conservation would be largely consistent with the 2004 General Plan land use designations. These large expanses were classified as PCAs.

Figure 1 of the OWMP was the result of dozens of mapping exercises and criteria. Overall, the approach was to start with the resource (oak woodlands) and then identify which areas would be most consistent with the policies and land use designations of the 2004 General Plan. The mapping was based on Geographic Information System (GIS) data available from State and County sources in the ESRI ArcMap environment. The data, processes, and many of the intermediate maps that led to Figure 1 are described below.

## A. Mapping/OWMP Study Boundary

The OWMP addresses the same study area (unincorporated areas of western El Dorado County below 4,000 feet elevation) and same categories (California Fire and Resource Assessment Program, or FRAP) of oak woodlands as were addressed in the 2004 General Plan EIR. The 2004 General Plan EIR identifies five main oak woodland types, which were included in the initial inventory and mapping of oak woodlands for the OWMP. A sixth woodland type is Valley-Foothill Riparian which may include Fremont cottonwood, willow and valley oak. Valley-Foothill Riparian habitats in which valley oaks are the dominant tree species are considered oak woodlands under the OWMP. Both Valley Oak Woodland and Valley Foothill Riparian) are designated as "sensitive habitats". "Sensitive habitats" were identified through a review of the California Natural Diversity Database (CNDDB) (California Department of Fish and Game 2002) and land cover data (California Department of Forestry FRAP 2002). Approximately 3,400 acres of the Valley Oak type and none of the Valley Foothill Riparian type appears on FRAP mapping for El Dorado County.

The County boundary shapefile was acquired from El Dorado County GIS (Surveyors Office). Elevation data was acquired from the USGS 30m Digital Elevation Model that was also supplied by the County GIS department. The County polygon was then clipped with the 4000-foot contour to produce the OWMP boundary layer.

## B. Mapping Databases

The existing vegetation coverage is a mosaic of the USDA Forest Service (USFS) Remote Sensing Lab's (RSL) existing vegetation data (CALVEG) Tiles 19, 20, and 21. Information on the data can be found at: http://www.fs.fed.us/r5/rsl/clearinghouse/gettiles.shtml. This data was chosen as it has the highest resolution of any existing vegetation data that covered the entire OWMP study area. The tiles were merged and then clipped with the OWMP boundary layer to create vegetation coverage of the entire OWMP area.

Community Centers, Rural Regions, parcels, land use, and street centerlines are taken from the El Dorado County GIS department. The USFS boundary is from the USFS Pacific Southwest Region GIS Clearinghouse. The water bodies and hydrology layer is from the California Spatial Information Library (CaSIL).

## C. Oak Woodlands Resources

The mapping for the OWMP concentrates on the five largest categories of oak woodlands as mapped by FRAP. The categories and rounded acreages for each are detailed in Table 4-1. Figure IV-1 in this section (FRAP CWHR Oak Woodland Types Map) illustrates the distribution of oak woodlands in El Dorado County. The oak woodlands shown in Figure IV-1 are based on 2002 data and are the same oak woodlands analyzed in the 2004 General Plan EIR.

**Table 4-1**
**Oak Woodlands in OWMP Study Area**

| Oak Woodland Category | Abbreviation | Acreage | (%) of Oak Woodland |
|---|---|---|---|
| Blue Oak Woodland | BOW | 42,400 | (17) |
| Blue Oak-Foothill Pine | BOP | 12,900 | (5) |
| Montane Hardwood Woodland | MHW | 155,900 | (63) |
| Montane Hardwood-Conifer Woodland | MHC | 34,200 | (14) |
| Valley Oak Woodland | VOW | 3,400 | (1) |
| **Total Oak Woodland in Study Area** | | **248,800** | **(100)** |

Figure IV-1 (FRAP CWHR Oak Woodland Types) displays a selection of the mosaic vegetation data that were determined to be "Oak Woodlands". This was achieved by a simple selection from RSL vegetation data where WHRTYPE = Blue Oak Pine (BOP), Blue Oak Woodland (BOW), Valley Oak Woodland (VOW), Montane Hardwood (MHW), and Montane Hardwood Conifer (MHC). Valley Foothill Riparian is not included as it does not appear in the data set for this region. The selected polygons were then exported as a new "Oak Woodlands" layer. Acreages were calculated and summarized for all CWHR types.

## D. Large Expanses of Oak Woodland

Initial Mapping of Large Expanses of Oak Woodland was created by dissolving the Oak Woodlands layer that removed boundaries between contiguous polygons. An acreage calculation was applied to the new aggregate polygons and a selection of all polygons >= 500 acres was made. This selection was then exported to "Large Expanse of Oak Woodland" layer. The map displays this layer over a background of all "Oak Woodlands".

Large expanses of oak woodlands identification was a first step towards a resource-based approach to begin identifying areas that could be considered a priority for conservation or mitigation. Total acreage of the large expanses is 219,494.

## E. Priority Conservation Areas

As discussed in Section 2.A, oak woodland functions most effectively and provides the greatest habitat value in large contiguous expanses. In order to select the most effective areas to target for acquisition of oak woodland conservation easements from willing sellers, Priority Conservation Areas (PCAs) were developed.

After the final round of mapping, it was determined that PCAs are designed to be large expanses of oak woodland greater than 500 acres and coincident with parcels greater than 40 acres. The General Plan concentrates land development within the Community Regions and Rural Centers (CR/RC) where oak woodland impacts and fragmentation are most likely, so potential PCA designations were removed from these areas, as well as from land uses designated for commercial and industrial development. Additional oak woodlands were removed as potential PCAs where the 2004 General Plan designates Low Density Residential (LDR) land use.

The following subsections discuss the technical mapping that occurred to determine the final maps.

## F. Initial Mapping of Priority Conservation Areas

Early modeling of oak woodland corridors represented an early attempt to create a Priority Conservation Areas (PCA) map. That mapping effort further reduced large expanse areas and modeled narrowly defined oak woodland habitat plus all other BOP and BOW. All other BOP and BOW were included at this point to provide those CWHR types an increased conservation emphasis due to their reported low rate of regeneration. This version of the model qualifies all areas with a score >= 10. The scoring criteria are as follows:

-Areas of Large Expanses of Oak Woodland = 5 pts

-Areas of ‘undeveloped land’ (defined as having a USECDTYPE value of “VAC” in the County parcel database) = 5 pts.

-Parcel Size: see Table 4-2 below.

-Land Use Designation: see Table 4-3 below.

| Table 4-2: Parcel Size | |
|---|---|
| **Parcel Size (Acres)** | **Score (pts.)** |
| < 5 | 1 |
| ≥ 5 < 10 | 2 |
| ≥ 10 < 20 | 3 |
| ≥ 20 < 40 | 4 |
| ≥ 40 | 5 |

| Table 4-3: Land Use Designation | | |
|---|---|---|
| **Land Use Code** | **Description** | **Score** |
| AL | Agricultural Lands | 5 |
| AP | Adopted Plan | 1 |
| C | Commercial | 1 |
| HDR | High Density Residential (1-2/ac) | 1 |
| I | Industrial | 1 |
| LDR | Low Density Residential (5-10 acres) | 2 |
| MDR | Medium Density Residential (1-5 acres) | 1 |
| MFR | Multi-Family Residential (5 units/ac) | 1 |
| NR | Natural Resources | 5 |
| OS | Open Space | 5 |
| PF | Public Facilities | 1 |
| RD | Research and Development | 1 |
| RR | Rural Residential (10-160 acres) | 4 |
| TR | Tourist Recreational | 1 |

The layers were converted to a raster format with a cell size of 100 feet. The cell values were then recalculated to reflect their model scores. All layers were then added together using raster math to create a model output with possible scores of 2 to 20. Any cell with a value greater to or equal to 10 was qualified. Any BOW or BOP polygons that did not already have a score >= 10 were then added back in to create the PCA layer.

To calculate the PCA acreage under County jurisdiction, State and Federal lands (in the Government Ownership (1997) shapefile obtained from CaSIL) were then clipped from the PCA layer and the calculation was performed. Then, all of the State and Federal lands were removed from the map to assess their importance in identifying PCAs.

As the mapping progressed, an increasing effort was made to narrow PCAs to those areas that are most consistent with the 2004 General Plan land use designations. Because the General Plan concentrates land development within the Community Regions and Rural Centers (CR/RC) where oak woodland impacts and fragmentation are most likely, potential PCA designations were removed from these areas. The distribution of PCAs with the CR/RC removed was then reviewed. For public discussion and planning consideration, the IBC layer was added to this map to assess the geographic relationship of IBCs to PCAs.

## G. Narrowing of Priority Conservation Areas

A map titled "Revised Priority Conservation Areas (without Corridors) without Commercial or Industrial Lands" displayed a later iteration of the large expanses of oak woodland habitat model. This version included Large Expanses, undeveloped parcels with oak woodlands that are 10 acres or larger and all VOW, but it excluded "commercial" and "industrial" designated lands in the County's land use database, and State and Federal lands. Because there was no scoring, this model was created not by raster math as the previous model, but instead by simply clipping from the Large Expanses layer any areas that did not qualify and then adding back in all VOW.

A later map titled "Revised Priority Conservation Areas (without Corridors) – Parcels 40 Acres and Larger" identified PCAs as any large expanses of oak woodland on undeveloped parcels 40+ acres in size, plus all VOW, and excludes CR/RC, and all State and Federal lands. This was displayed over a backdrop of all CWHR oak woodland types. This map was also created by clipping selected layers against the Large Expanses layer.

A map (El Dorado County Oak Woodland Habitat) was developed by County staff and presented at the June 25, 2007 Board of Supervisors workshop on the status of the OWMP mapping. The map represented the prior map described, with additional PCAs removed where the 2004 General Plan designates Low Density Residential land use.

For the final map, Figure 1 in the OWMP, some data clean-up and further analysis was needed to link the PCAs. PCAs are designed to be large expanses of oak woodland greater than 500 acres and coincident with parcels greater than 40 acres. However, the above 'filtering' left many smaller fragments of oak woodland areas. Acreage calculations were therefore made on each remaining block of oak woodland and the blocks were grouped by size class. Isolated fragments less than 10 acres were removed from subsequent analysis. Areas greater than or equal to 500 acres were selected to be the final proposed "Priority Conservation Areas" for the Public Review Draft OWMP.

## H. Oak Woodlands in Priority Conservation Areas

Figure 1 in the OWMP titled "El Dorado County Oak Woodland Priority Conservation Areas" illustrates those PCAs where Conservation Fund In-Lieu Fee mitigation will be targeted for oak woodland conservation easements from willing sellers. The estimated acreages of oak woodland types within the PCAs are shown below in Table 4-4.

**Table 4 -4:**
**Oak Woodlands in OWMP-Recommended PCAs**

| Oak Woodland Type | Priority Conservation Areas (Acres) |
|---|---|
| BOW | 11,000 |
| BOP | 1,600 |
| MHW | 24,300 |
| MHC | 2,900 |
| VOW | 300 |
| **Total Oak Woodland Area** | **40,100** |

Placeholder for Figure IV-1 FRAP Map

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## 5. Thresholds of Significance for the Loss of Oak Woodlands

Upon receipt of an application for a permit or other discretionary approval, the County is required to determine whether the project would potentially have a significant effect on the environment. If the County determines that the project could potentially have a significant effect, the County is required to conduct a review of the proposed project, pursuant to the California Environmental Quality Act. This review will include potential effects to the oak woodland resources as addressed in this plan. Once the extent and severity of the impacts are determined, the mitigation standards of PRC §21083.4 and Policy 7.4.4.4 Option A and /or Option B will be applied as described in the OWMP. With respect to oaks and oak woodlands, compliance with the OWMP will constitute mitigation.

## 6. Mitigation for the Loss of Oak Woodlands

El Dorado County's 2004 General Plan and EIR identify mitigation standards and requirements for projects that remove oak woodlands. The OWMP provides a comprehensive approach for project-level oak woodland mitigation and simultaneously considers 'landscape level' conservation goals. Subsequent to adoption of the County's General Plan, statewide requirements for evaluation and mitigation of impacts to oak woodlands have also been established. The OWMP reviews both the State- and County-level requirements for oak woodland mitigation standards.

The effectiveness of plantings for mitigation is limited, as demonstrated in a study that used data from 10-year-old plantings to model the development of blue oak stand structure attributes over 50 years (Standiford et al., 2002). After 50 years, trees in planted stands were still small and the wildlife habitat quality was not equivalent to that of mature oak woodland. This study emphasizes the need for a comprehensive approach to mitigation and the necessity to not rely solely on replacement of oak woodlands for mitigation. However, replanted stands of oak trees may have more intrinsic habitat value than fragmented or no oak woodland plantings. PRC §21083.4 requires that only 50 percent of mitigation be in the form of replanting. Option A of the county General Plan Policy 7.4.4.4 complies with state law as 50 percent of the mitigation is in retention of oak canopy, and 50 percent is replacement planting.

Detailed mitigation standards for implementation of Policy 7.4.4.4 (Option A and/or Option B) are outlined in Section 2 of the OWMP. The methodology for the Conservation Fund In-Lieu Fee is detailed in Appendix B.

# 7. Resources

"Guidelines for Maintenance, Restoration, and Rehabilitation of Oak Woodlands and How to Grow California Oaks" (Appendix E; McCreary 1995) may be helpful in developing a tree replacement plan.

The UC Cooperative Extension can provide information to assist revegetation and restoration activities. Appendix F (Resources) provides contact information for this and other sources of information.

Wildland fire in the urban interface and urban intermix can produce catastrophic dangers to the public, firefighters, and to the vegetated landscape, which includes oak woodlands. California State Law requires landowners to maintain defensible space around a building or structure. PRC §4291 requires 100 feet of defensible space (or to the property line, whichever is nearer) around all buildings and structures. Fire inspection officials under PRC §4119 and Title 14 CCR 1299 are given the authority to enforce PRC §4291. This authority allows fire inspection officials to enforce defensible space measures that involve vegetation modification and removal.

Fire Safe Plans (PRC §4290) address emergency access, signing and building numbering, emergency water standards, and fuel modification standards. These plans are documents written by a registered professional forester that address basic wildland fire protection standards of the California Board of Forestry and Fire Protection in relation to a proposed project or parcel split. The authority for these regulations is found within PRC §4290 and Title 14 CCR 1270-1276. These regulations have been adopted with amendments by El Dorado County. The Fire Safe Plans are reviewed and approved by the local fire district where the project is being planned as well as by CAL FIRE. Often, the Fire Safe Plan incorporates the requirements of defensible space measures of PRC §4291 while also making recommendations for vegetation modification outside of the 100 foot defensible space zone. The fuel modification standards outside the realm of PRC §4291 are required to ensure the safety of emergency fire equipment and evacuating civilians during a wildland fire, in addition to providing a point of attack or defense for firefighters during a wildland fire. Fire Safe Plans reduce the threat of wildfire to county oak woodlands.

Information from CAL FIRE regarding Defensible Space (PRC §4291) and Fire Safe Plans (PRC §4290) can be obtained from the CDF website listed in Appendix F. Defensible space information and fire safety planning resource information is also available through these resources:

- Guidelines for defensible space (State Board of Forestry and Fire Protection, 2006);
- A Homeowner's Guide to Fire Safe Landscaping (http://californiaagriculture.ucop.edu/0701JFM/pdfs/OakAge.pdf );
- Wildfire protection plan guidebook (Katelman, et al., 2007); and
- Fire Safe Council of El Dorado County website (http://www.edcfiresafe.org).

# 8. Monitoring and Reporting

Two types of monitoring and reporting will be required under this plan:

1. The status of replacement plantings in satisfaction of Policy 7.4.4.4 Option A mitigation requirements, and
2. An annual report to the Board of Supervisors concerning the status of oak woodland conservation activities, as a component of the INRMP identified in Policy 7.4.2.8.

## A. Replacement Plantings under Option A

Project specific monitoring and reporting requirements for replacement plantings under Option A will be outlined in project specific Mitigation Plans developed pursuant to Section 2.C of the OWMP. The Mitigation Plan will include quantifiable success criteria for the replacement plantings, and will require periodic reports which will compare the success of the replacement plantings to the success criteria. Generally, the Mitigation Plan will provide for the following reports:

1. A summary report prepared by a qualified professional upon completion of the replanting activity. The primary purpose of this report shall be to confirm that the replanting has been completed in compliance with the Mitigation Plan.

2. A final report at the end of the seventh year following completion of the replanting to address whether the success criteria have been met.

A qualified professional is one of the following:

**Certified Arborist** is a person certified by the International Society of Arboriculture (ISA), American Society of Consulting Arborists (ASCA), or other recognized professional organization of arborists that provides professional advice and licenses professionals to do physical work on trees.

**Certified Rangeland Manager** is a person licensed by the State of California through the California State Board of Forestry. Certified Rangeland Managers apply scientific principles to the art and science of managing rangelands and are recognized by the California Section, Society for Range Management as meeting the education, experience, and ethical standards for professional rangeland managers (University of California Agriculture and Natural Resources website).

**Qualified Biologist** is a person who meets qualifications as determined by the Director of Development Services. A qualified biologist has a BA/BS or advanced degree in biological sciences or other degree specializing in the natural sciences, professional or academic experience as a biological field investigator, taxonomic experience and knowledge of plant and animal ecology, familiarity with plants and animals of the area including species of concern, and

familiarity with the appropriate county, state and federal policies and protocols related to special-status species and biological surveys (El Dorado County, 2006).

**Registered Professional Forester (RPF)** is a person licensed by the State of California to perform professional services that require the application of forestry principles and techniques to the management of forested landscapes. RPFs have an understanding of forest growth, development, and regeneration; forest health; wildfire; soils, geology, and hydrology; wildlife and fisheries biology, and other forest resources (California Licensed Foresters Association website).

Projects that utilize replanting for mitigation require a recorded covenant. A covenant (e.g., conservation easement or deed restriction or agreement) will be recorded on each property by the County, project applicant, or landowner prior to the final permit issuance. The record will address the following:

- Mitigation measures to be implemented, including, for example:
  - Location and amount of acreage to be conserved and/or replaced
  - Numbers, types, and spacing of saplings, seedlings, and/or acorns to be planted per acre
- Aerial photograph or parcel map with mitigation area delineated. If more than one type of mitigation (e.g., conservation or replacement) will occur, then the area of each type of mitigation will be delineated
- A schedule describing the type and duration of maintenance (e.g., weed control, irrigation)
- Required protection measures (e.g., tree shelters, fencing)
- Best management practices
- Contingency measures such as guidelines for replanting or other activities if criteria are not met (e.g., survivorship of planted trees is less than 90%)
- Contact person(s) responsible for mitigation area monitoring activities
- Schedule for reporting requirements and duration
- Reporting to the County
- Party that is financially responsible for mitigation
- Transfer of responsibilities with property should ownership change
- Mitigation fee with escalation schedule if landowner chooses to discontinue mitigation (e.g., switch from Option A to Option B)
- Compliance/enforcement measures, which may include “stop” work orders, revocation of project approval, and/or performance bonds
- Permission for a County representative to enter the property with at least 10 days advance notice to monitor the mitigation.

Additional reporting requirements may be identified in the project-specific Mitigation Plan. The Mitigation Plan may incorporate a checklist to be used to simplify the reporting requirements of this section. Reports will be completed by the property owner or the agent of the property owner who has performed the work, and will be delivered to the County Planning Department.

If success criteria are not met, additional replacement plantings will be required to compensate for the difference between the goal met and that not met. (Note: Natural regeneration of oaks that occurs within planted sites is included in measures of canopy cover and may be compensated one-per-one for planted oaks that did not survive.) Reporting requirements will restart subsequent to the additional replacement plantings. The applicant will have the option, subject to the County's approval, of contributing to the County Conservation mitigation fund instead of replanting.

### B. Annual Reports to the Board of Supervisors

Annual reports on the status of oak woodland conservation activities will be prepared and delivered to the Board of Supervisors. These reports should provide information concerning 1) Conservation Fund fees collected; 2) oak woodlands protected through Conservation Fund In-Lieu fee expenditures; 3) oak canopy replacement area planted as mitigation under Option A; and 4) oak canopy removed by new development. This information should be reported both for the current reporting period as well as the cumulative totals since beginning implementation of the 2004 General Plan.

Upon completion of the INRMP, the reporting requirements under General Plan Policy 7.4.2.8 will change to focus on monitoring impacts to and protection of important habitats (as those are defined through the INRMP process). The Board of Supervisors may elect to continue this separate reporting on oak woodland conservation activities apart from reports relating to identified important habitat under Policy 7.4.2.8.

### C. Adaptive Management

The success of the OWMP in meeting goals and objectives of the 2004 General Plan will be measured through the Monitoring and Reporting program. The County will implement adaptive management by: 1) revising guidelines for projects as necessary, and 2) revising the OWMP and the mitigation fee. If the Goals of the OWMP are not being met, then the County will review and revise the Plan as necessary.

This OWMP comprises the first phase (the oak woodland portion) of the INRMP. During development of the INRMP, if revisions to this OWMP are determined to be necessary, those revisions may be incorporated into the INRMP.

## 9. Administration of Oak Woodland Conservation Program

Following the Board of Supervisors' adoption of this plan, the County will implement the components of the OWMP. The major components of the administration program will include:

1) A County maintained database for the separate accounting of oak woodland

conservation grants and Option B fees, and the separate tracking of acreages of oak woodland impacts and conservation/preservation and restoration for annual review and reporting by the County. This database will be used to track the monitoring and reporting information described in Section 8; and

2) One or more entities approved by the Board of Supervisors to assist in the management, maintenance, monitoring or restoration of oak woodlands acquired for any purpose authorized under this OWMP. In this context, oak woodlands are considered "acquired" if the lands are acquired in fee, or subject to conservation easements, notices of restrictions, land management agreements or similar limitations for the purpose of oak woodland conservation.

## 10. Education and Outreach

This OWMP has been developed considering extensive public input. Many public meetings, workshops and hearings were held over the period beginning in mid-2006 and ending with the adoption of this plan.

One component of this OWMP provides for the voluntary conservation or management of oak woodlands within working landscapes. The sale of conservation easements on properties identified as Priority Conservation Areas (PCAs) is entirely voluntary and depends upon the availability of a pool of willing sellers.

An education and outreach program to inform landowners of the opportunities for oak woodland conservation will be essential to the success of the OWMP. The education and outreach program should identify the economic, aesthetic, agricultural and natural resource/biological values of oak woodland conservation.

The County will maintain, and make available to the public, a list of sources of information and other resources concerning oak woodland conservation, replanting and successful maintenance of oak woodlands as part of working landscapes. A partial listing is provided in Appendix F.

## 11. Partnering to Achieve Goals of the OWMP

This section identifies specific opportunities for the County to partner with others to achieve the Goals of this OWMP. To the extent that partnerships can be established, the County's residents will benefit both in the conservation achieved and in the reduced costs for OWMP actions. No partnerships will be sought for activities related to mitigation; such costs will be solely the responsibility of the landowners or developers responsible for oak woodland impacts. Partnering opportunities may include governmental agencies, public utilities, non-profit organizations or private entities.

This plan identifies oak woodland acquisition (PCAs) areas that fulfill the purposes described in the OWMP. One of the purposes is to provide a landscape-level planning document for the long-term conservation of oak woodlands for reasons other than mitigation for development. These include joint planning efforts with non-profit organizations, resource agencies, and other land management agencies (e.g., Placer and Amador counties, Wildlife Conservation Board, and land trusts) that are seeking to coordinate regional-level oak woodland conservation. Joint efforts by the County with these organizations and willing landowners can increase and help to maximize the value of available funds for broader-scale goals that will meet many other conservation goals and policies of the 2004 General Plan.

As a part of an application for grant funding for certain activities, such as acquisition of conservation easements, some programs may require the County to certify that the proposed project is consistent with this OWMP. One such program includes grant funding for conservation easement acquisitions available under the Oak Woodlands Conservation Program. To qualify for funding consideration by the Wildlife Conservation Board (WCB), the County agrees, pursuant to Section 1366 (f) of the Fish and Game Code, to certify that individual proposals are consistent with the County's OWMP. In order to facilitate and expedite, where feasible, such grant funding applications, the County will develop an OWMP Consistency Certification process. This process will include an application form and may contain a list of criteria or examples of projects which would be consistent or inconsistent with this OWMP.

Examples of projects which would be consistent and therefore encouraged would include acquisition of conservation easements from willing sellers which enhance connectivity of PCAs to one another or to existing protected lands, or which provide or preserve wildlife corridors across major roadways, i.e. the Weber Creek crossing at Highway 50.

Projects which would be inconsistent with this OWMP might include acquisition of conservation easements or other interests in land which would interfere with the provision of public infrastructure such as major roads or other transportation projects, water storage and transmission lines, wastewater treatment facilities, schools sites and sites designated as locations for higher density residential land uses which have the potential to provide housing affordable to lower and moderate income households.

The WCB's criteria are as follows:

"To qualify for funding consideration for a restoration, enhancement, purchase of an oak conservation easement or long-term agreement, projects must meet one or more of the following criteria, must contain an appropriate management plan to assure project goals are maintained and the oak stand must have greater than 10 percent canopy:

- ✓ The project is of sufficient size to provide superior wildlife values.
- ✓ The project area contains a diverse size-class structure of oak woodlands and/or a diversity of oak species that will promote the sustainability and perpetuation of oak woodlands.

- ✓ The property is adjacent to other protected areas or will promote the sustainability and perpetuation of oak woodlands.

- ✓ The property is adjacent to other protected areas or will contribute toward ease of wildlife movement across ownerships.

- ✓ The project contributes toward regional or community goals, provides scenic open-space, protects historic or archeological values, or contains unique geologic features.

- ✓ The property is a working landscape. The landowners have implemented or agree to implement stewardship practices that recognize and incorporate the ecological requirements of oak woodlands and associated habitats, thus promoting the economic and resource sustainability of the farming and ranching operation.

- ✓ The property removes or reduces the threat of habitat conversion from oak woodlands to some other use.

- ✓ The project has the potential to serve as a stewardship model for other landowners."

Much of the following information was taken from various websites. Those marked with an asterisk (*) represent the highest priority opportunities.

### A. Governmental Partners

1. Wildlife Conservation Board (WCB)*
   http://www.wcb.ca.gov/Pages/wcb_brief_overview.htm

The WCB is a separate and independent Board with authority and funding to carry out an acquisition and development program for wildlife conservation. The WCB's three main functions are land acquisition, habitat restoration, and development of wildlife oriented public access facilities. These activities are carried out under the following eight programs: Land Acquisition Program, Public Access Program, Habitat Enhancement and Restoration Program, Inland Wetlands Conservation Program, California Riparian Habitat Conservation Program, Natural Heritage Preservation Tax Credit Program, Oak Woodlands Conservation Program, and The Rangeland, Grazing Land and Grassland Protection Program.

2. Georgetown Divide Resource Conservation District (RCD) and El Dorado County RCD*
   http://carcd.org/wisp/georgetown/index.htm

The Georgetown Divide RCD was organized to address resource management problems and promote sound management of natural resources in El Dorado County. It works with landowners on a voluntary basis to promote good stewardship. The RCD is continuously

looking to develop partnerships that lead to good resource management and has studied the South Fork of the American River basin and the Upper Cosumnes River basin. The District's work could be a major source of data for implementation of the OWMP, particularly in the conservation of woodlands in and adjacent to riparian areas.

3. Natural Resources Conservation Service (NRCS)
   http://www.nrcs.usda.gov/partners/

The NRCS is the federal agency that works hand-in-hand with the American people to conserve natural resources on private lands. Formerly the Soil Conservation Service, NRCS brings 60 years of scientific and technical expertise to the Partnership.

Locally, the El Dorado County and Georgetown Divide Resource Conservation Districts are co-located with the NRCS and are normally the point of contact.

4. California Department of Forestry and Fire Protection (CDF/CAL FIRE)*
   http://www.fire.ca.gov/rsrc-mgt.php

The Resource Management Program within CDF has a goal of maintaining the sustainability of natural resources. Several programs under the Resource Management Program can help to protect oak woodlands. The Vegetation Management Program (VMP) is a cost-sharing program that focuses on the use of prescribed fire, and mechanical means, for addressing fire fuel hazards. The VMP allows private landowners to enter into a contract with CDF to use prescribed fire to accomplish a combination of fire protection and resource management goals. The Forest Legacy Program (FLP) is a voluntary program to protect working forests, including oak woodlands. The FLP promotes the use of conservation easements to maintain traditional forest benefits as timber production, wildlife habitat, watershed protection and/or open space. The California Forest Improvement Program (CFIP) is a forestry incentive program whose purpose includes the protection, maintenance, and enhancement of forest resources. The CFIP is a cost-share program that can fund preparation management plans, RPF supervision, and oak tree planting, thinning, and pruning activities. While meeting its responsibilities under The Forest Practice Act, CDF is actively involved in timberlands that contain much of the County's Black Oak population. In addition, CAL FIRE's responsibility includes fire prevention enforcement of PRC §4290 (Fire Safe Plans) and PRC §4291 (Defensible Space).

5. Bureau of Land Management (BLM)
   http://www.blm.gov/ca/folsom/

The BLM has a long history of collaborating with communities to manage public lands for multiple uses in three broad categories: commercial activities, recreation, and conservation.

The Folsom Field Office is directly responsible for approximately 230,000 acres of Public Land scattered throughout fourteen Central California counties from Yuba County (in the north), to Mariposa County (in the south). Most of the acreage, with the exception of Cosumnes River

Preserve in southern Sacramento County, is within the historic Mother Lode region of the Sierra Nevada Range.

The Folsom Field Office has completed a Sierra Draft Resource Management Plan (RMP) that will guide the management of all public lands under the jurisdiction of the Folsom Field Office for years to come. The RMP contains goals, objectives, and land-use allocations, as well as specific rules and regulations for different activities. It is literally that office's "blueprint for action."

The BLM lands along the major rivers and streams of El Dorado County will be critical in developing/maintaining large areas of oak woodlands and the needed linkages. Conservation of blue oak woodland is an objective in the draft RMP.

6. United States Department of Agriculture, Forest Service
   http://www.fs.fed.us/r5/eldorado/

The Eldorado National Forest (ENF) extends into the eastern boundary of the OWMP planning area. Black oaks are emphasized in the Forest Management Plan as important components of the ecosystem. Opportunities to develop cooperative efforts with the ENF may exist.

7. University of California Cooperative Extension (UCCE)*
   http://ceeldorado.ucdavis.edu/

The Natural Resources Program provides research and education in areas specific to forestry, water and air quality, watershed resources, wildlife, land use issues and range, and oak woodlands management.

The Program's goal is to promote sound management and conservation of the region's natural resources, through research, educational activities, and good working relationships with a broad range of people. The main clientele for this position are private landowners; resource management professionals working on private, State, and Federal lands; and other groups such as users of public lands, conservation organizations, and the agriculture and forest products industries.

The extension service is frequently the source of many of the articles and publications about oak woodlands. Bill Frost, our County Director, has been a major contributor to the scientific knowledge about oaks in our area.

8. City of Placerville
   http://ci.placerville.ca.us/

The City of Placerville General Plan identifies the retention of tree canopy, which includes oaks, as important. The City currently is contemplating a comprehensive plan for Hangtown Creek, which is a major tributary of Weber Creek. Placerville and the County share land management

planning responsibilities for very critical oak woodland along Weber Creek and several other major tributaries of the South Fork of the American River.

9. County of Placer Community Development Resource Agency
   http://www.placer.ca.gov

Placer County, adjacent to El Dorado County along our northern county line, has two programs designed to address natural plant communities, which include oak woodlands.

Placer Legacy is a countywide, science-based open space and habitat protection program. Placer Legacy will result in a comprehensive open space plan for Placer County that preserves the diversity of plant and animal communities in the County and addresses a variety of other open space needs, from agriculture and recreation to urban edges and public safety. Placer Legacy will help maintain the County's high quality of life and promote economic vitality. It is totally voluntary - only willing buyers and willing sellers participate. It is based on the existing County General Plan and community plans, so it doesn't require land-use or zoning changes. It is non-regulatory - no new regulations are adopted to meet the objectives of the program.

The Placer County Conservation Plan is intended to address the impacts associated primarily with unincorporated growth in west Placer and growth associated with the buildout of Lincoln's updated General Plan. Development in western Placer County will require the preservation of approximately 54,300 acres of land between now and 2050.

Opportunities may exist to collaborate to create Priority Conservation Areas across administrative county lines, and to share information that affects oak woodlands in the Sierra foothill region.

10. Amador County
    http://www.co.amador.ca.us/depts/amadorgeneralplan/

Amador County is updating its general plan. Opportunities may exist to collaborate to create Priority Conservation Areas across administrative county lines, and to share information that affects oak woodlands in the Sierra foothill region.

11. El Dorado Hills Community Service District
    http://www.edhcsd.org/

The El Dorado Hills Community Service District has an extensive network of greenbelts. Opportunities may exist to plant small areas of oaks and to conduct fuels treatment activities within the greenbelts.

12. Cameron Park Community Service District
    http://www.cameronpark.org/

Several of the largest preserves in El Dorado County exist within or adjacent to the Cameron Park Community Service District boundary. The preserves support a mixture of chaparral and woodland types. Some opportunities for oak planting or enhancement of existing stands may exist.

13. El Dorado County Agriculture Department*
    http://www.co.el-dorado.ca.us/ag/programs.html

The Agriculture Department's mission is to protect, enhance and promote the preservation of agriculture and the environment while sustaining the public health, safety and welfare of all citizens, and to provide consumer and marketplace protections through the fair and equitable enforcement of laws and regulations.

Through other General Plan objectives and policies, the Department can help identify ways to maintain or to establish links between oak stands in agricultural areas.

14. El Dorado County General Services – Airports, Parks and Grounds Division*
    http://www.co.el-dorado.ca.us/parks/index.html

The General Services Department, through the Airports, Parks and Grounds Division, manages the River Management Plan on the South Fork of the American River. The Plan overlaps important oak woodland corridors along the river. The Department is responsible for the development of regional parks and smaller parks within the County. An objective of the 2004 General Plan includes acquisition and development of regional parks. Opportunities to establish major regional parks may be combined with conservation of major oak woodlands. A new Master Plan for Parks and Recreation should be started in 2007. This new plan should identify the needs and possibly some locations for regional parks.

The Airports, Parks and Grounds Division is currently charged with managing the portion of the Sacramento-Placerville Transportation Corridor (SPTC) that is within the County. The SPTC was purchased by El Dorado County, the County of Sacramento, the Sacramento Regional Transit District, and the City of Folsom under a joint powers agreement in 1996. This agreement covers a 53-mile corridor of the old Southern Pacific Railroad and stretches from 65$^{th}$ Street in Sacramento to approximately Ray Lawyer Drive/Forni Road in Placerville. Twenty-eight miles of the corridor within El Dorado County ranges in width from 66 feet to 200 feet. Along the corridor are excellent examples of oak types in the County. This corridor offers a great core area that could be widened to 500 feet as feasible and expanded to enhance oak woodland conservation and also help meet the critical needs for regional parks.

15. El Dorado County Department of Transportation*
    http://www.co.el-dorado.ca.us/DOT/index.html

General Plan Circulation Element assigns to the Department of Transportation (DOT) the responsibility of coordinating the planning and implementation of roadway improvements to ensure safe movement of people and goods, and to maintain adequate levels of service. The

County CIP Program sets forth the plan for delivery of these projects. DOT understands its role as stewards of the environment and intends to be held to the same reasonable standards as other development projects. DOT is seeking compatible opportunities and solutions for preservation and protection of trees and their habitat that will, at the same time, not unreasonably interfere with the use of the streets, street facilities, utilities, or public safety.

16. Sierra Nevada Conservancy*
    http://www.sierranevadaconservancy.ca.gov/

The Sierra Nevada Conservancy (SNC) was established as a new State agency in 2004 to initiate, encourage, and support efforts that improve the environmental, economic, and social well-being of the Sierra Nevada Region, its communities, and the citizens of California (PRC Sections 333000 et. Seq.). Proposition 84, the Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coast Protection Bond Act of 2006, includes $54 million for the SNC to distribute to eligible organizations for the protection and restoration of rivers, lakes and streams, their watersheds and associated land, water, and other natural resources. The SNC offers grants for acquisition and/or site improvement/restoration projects under two programs, the Competitive Grant program and the Strategic Opportunity Grant (SOG) program.

## B. Public Utility Partners

1. El Dorado Irrigation District (EID)*

   http://www.eid.org/about_EID/district.html

EID has expressed interest in participating with the County as a partner in oak woodland conservation. EID has several small parcels through the planning area that could help in the perpetuation of oaks. EID also has lands along Weber Creek (roughly between Big Cut Road and Cedar Ravine or "Texas Hill") that has potential for water storage in the future. The Texas Hill properties contain large expanses of oaks. Potential partnering between EID and the County could meet EID's water storage needs and oak conservation goals.

2. Georgetown Divide Public Utility District

Currently no opportunities for partnerships have been identified.

3. Sacramento Municipal Utility District (SMUD)
   http://www.smud.org/

In 2006, SMUD and El Dorado County reached an agreement on the Upper American River Project (UARP). The South Fork of the American River is the key component of the UARP. In addition, SMUD has reached agreements with the County, Federal and State agencies, and private interests regarding the operation of the UARP. Details of the agreements are still being developed, but opportunities may exist for conserving or enhancing oak woodlands.

4. Pacific Gas and Electric (PG&E)
   http://www.pge.com/

Currently no opportunities for partnerships have been identified.

### C. Private Partners

The General Plan anticipates citizen involvement in the development and implementation of the OWMP. Section 10 (Education and Outreach) discusses public involvement in the OWMP's preparation to date. Public participation will continue to be encouraged at the County Planning Commission, Agricultural Commission, and Board of Supervisors' workshops and hearings as the plan is finalized for adoption. Currently, no opportunities for specific partnerships have been identified, but opportunities exist for private acquisition and management of oak resources. Oak nurseries and management of oak woodlands within planned communities are examples. In addition, it is expected that advisory committees will be established as needed.

The El Dorado County Association of Realtors might be a starting point for exploring opportunities and mechanisms to establish a privately managed clearinghouse of landowners potentially interested in selling conservation easements to others (public and private) seeking oak woodland mitigation or conservation lands. Similar to other environmental programs (e.g., air quality trading credits), oak woodlands within the PCAs could be categorically organized and offered on the open market as opportunities for oak woodland mitigation or other conservation programs.

### D. Non-profit Partners

The implementation of the oak woodland management plan will require land use easements. Section 9 (Administration of the Oak Woodland Conservation Program) identifies potential roles of non-profit organizations. Land trusts and conservancies are expected to play key roles in assisting the County with the goals, objectives, and implementation of various components of the OWMP.

## 12. Consistency with the General Plan and State Law

This OWMP fulfills 2004 General Plan Measure CO-P, and as such replaces the Policy 7.4.4.4 Interim Interpretative Guidelines. The OWMP also comprises the oak woodland portion of the INRMP required by Policy 7.4.2.8 and Measure CO-M.

### A. OWMP as the First Component of the INRMP

Preparation of this OWMP has been consistent with the requirements of the INRMP. The OWMP:

- Includes the initial inventory and mapping of oak woodland resources throughout the County (Figure IV-1);
- Inventories and identifies large expanses of native oak woodland vegetation as Priority Conservation Areas (PCAs);
- Concentrates conservation efforts on PCAs that connect to one another or to existing protected (state and federal) lands through a system of regulatory constraints, such as the IBC overlay, riparian corridors, or open space/natural resource lands;
- Describes a strategy for protecting contiguous blocks of PCAs through coordinated acquisition of conservation easements and management of acquired lands;
- Provides for mitigation assistance through Policies 7.4.4.4, Option A and the Option B fee, and provides flexibility to allow combinations of these Options where appropriate;
- Will identify habitat acquisition opportunities involving willing sellers through the education and outreach program, and through partnering with other organizations;
- Identifies alternatives for management of lands acquired and for restoration activities on those lands, where appropriate;
- Incorporates a monitoring program for lands acquired through this OWMP;
- Establishes reporting requirements for restoration activities as well as the progress of county-wide oak woodlands conservation;
- Was developed with significant opportunities for public participation throughout the process; and
- Will ensure a source of funding to the County's conservation fund for impacts to oaks and oak woodlands resulting from implementation of the 2004 General Plan.

## B. Consistency with Measure CO-P

The OWMP partially satisfies the requirements of Measure CO-P, which provides for the development of an Oak Resources Management Plan.

## C. Compliance with Fish & Game Code Section 1366(a)

This Oak Woodland Management Plan is adopted pursuant to the requirements of California Fish and Game Section 1366(a). The OWMP, together with applicable General Plan policies, meets or exceeds the requirements of state law relative to conservation of oaks and oak woodlands.

## D. Compliance with PRC 21083.4

The OWMP, together with applicable General Plan policies, meets or exceeds the requirements of state law PRC 21083.4 relative to conservation of oaks and oak woodlands.

## E. Effect of Future Amendments to General Plan

Nothing contained in this Oak Woodland Management Plan would preclude an amendment to the County's General Plan, however future General Plan amendments may require a modification of this OWMP.

# 13. List of Preparers

The OWMP was prepared under the direction of El Dorado County Planning Services. Early development of the plan was under the direction of Steven Hust, Principal Planner, with the assistance of Monique Wilber, Senior Planner, and the County staff TAC. In July 2007, development of the plan became the responsibility of Peter Maurer, Principal Planner, also with the assistance of Monique Wilber.

The OWMP TAC was made up of the following individuals:

Greg Fuz, Director of Development Services
El Dorado County Development Services Department

Larry Appel, Deputy Director of Planning Services
El Dorado County Planning Services

Steven Hust, Principal Planner
El Dorado County Planning Services

Peter Maurer, Principal Planner
El Dorado County Planning Services

Monique Wilber, Senior Planner
El Dorado County Planning Services

Bill Stephans, Agricultural Commissioner
El Dorado County Agriculture Department

Bill Frost, County Director/Natural Resources Advisor
University of California Cooperative Extension

Janet Postlewait, Principal Planner
El Dorado County Department of Transportation

Geney Terry, GIS Analyst II
El Dorado County Surveyor's Office

Table 13-1 identifies the EN2 Resources, Inc., Pacific Municipal Consultants, Inc., and TCW Economics consultant team staff who prepared the OWMP.

| Table 13-1:List of Preparers | | |
|---|---|---|
| **Name, Title, and Firm** | **Education** | **Role on Project** |
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| Susan Durham<br>Ecologist<br>EN2 Resources, Inc. | A.B., Zoology, U.C. Berkeley<br><br>Post Bacc., Natural Resources, Humboldt State University | Senior Associate |
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| Thomas Wegge<br>Natural Resources Economist<br>TCW Economics | M.S., Environmental Economics, CSU Fullerton<br><br>B.A., Urban Studies, University of Southern California | Task Director |
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# 14. Acronyms

| | |
|---|---|
| **AL** | Agricultural Lands |
| **AP** | Adopted Plan |
| **ASCA** | American Society of Consulting Arborists |
| **BLM** | Bureau of Land Management |
| **BLS** | Bureau of Labor Statistics |
| **BMPs** | Best Management Practices |
| **BOP** | Blue Oak-Foothill Pine |
| **BOW** | Blue Oak Woodland |
| **C** | Commercial |
| **CALVEG** | Classification and Assessment with Landsat of Visible Ecological Groupings |
| **CDF** | California Department of Forestry and Fire Protection |
| **CDFG** | California Department of Fish and Game |
| **CEQA** | California Environmental Quality Act |
| **CFIP** | California Forest Improvement Program |
| **CNDDB** | California Natural Diversity Database |
| **COWCP** | California Oak Woodlands Conservation Program |
| **CR** | Community Regions |
| **CWHR** | California Wildlife Habitat Relationship |
| **DBH** | Diameter at Breast Height |
| **DEIR** | Draft Environmental Impact Report |
| **DOT** | Department of Transportation |
| **EID** | El Dorado Irrigation District |
| **EIR** | Environmental Impact Report |
| **ENF** | Eldorado National Forest |
| **FLP** | Forest Legacy Program |
| **FRAP** | Fire and Resource Assessment Program |
| **GIS** | Geographic Information System |
| **HDR** | High Density Residential |
| **I** | Industrial |
| **IBC** | Important Biological Corridor |
| **IHRMP** | Integrated Hardwood Range Management Program |
| **INRMP** | Integrated Natural Resources Management Plan |
| **IRS** | Internal Revenue Service |
| **ISA** | International Society of Arboriculture |
| **LDR** | Low Density Residential |
| **MDR** | Medium Density Residential |
| **MFR** | Multifamily Residential |
| **MHC** | Montane Hardwood-Conifer |
| **MHW** | Montane Hardwood |
| **MLS** | Metro Listing Service |
| **NR** | Natural Resources |

| | |
|---|---|
| **NRCS** | Natural Resources Conservation Service |
| **OS** | Open Space |
| **OWMP** | Oak Woodland Management Plan |
| **PAR** | Property Analysis Record |
| **PCA** | Priority Conservation Area |
| **PF** | Public Facility |
| **PG&E** | Pacific Gas and Electric |
| **PRC** | Public Resources Code |
| **RC** | Rural Centers |
| **RCD** | Resource Conservation District |
| **RD** | Research and Development |
| **RMP** | Resource Management Plan |
| **RPF** | Registered Professional Forester |
| **RPZ** | Root Protection Zone |
| **RR** | Rural Residential |
| **SMC** | Sierran Mixed Conifer |
| **SNC** | Sierra Nevada Conservancy |
| **SMUD** | Sacramento Municipal Utility District |
| **SPTC** | Sacramento-Placerville Transportation Corridor |
| **TAC** | Technical Advisory Committee |
| **TR** | Tourist Recreational |
| **UARP** | Upper American River Project |
| **UCCE** | University of California Cooperative Extension |
| **USDA** | United States Department of Agriculture |
| **USDI** | United States Department of the Interior |
| **USFS** | USDA Forest Service |
| **VMP** | Vegetation Management Plan |
| **VOW** | Valley Oak Woodland |
| **VRI** | Valley-Foothill Riparian |
| **WCB** | Wildlife Conservation Board |
| **WHR** | Wildlife Habitat Relationship |

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