II. 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 III. In this section, the importance and relationship between oak woodland habitat, and interconnecting dispersed or separated blocks of oak woodland habitat, are addressed. This relationship is key to selecting and mapping areas for oak woodland conservation in El Dorado County.

Oak woodlands and their natural resource values are discussed in more detail in Appendices G and H. Mapping of oak woodlands and conservation areas is presented in Section IV and Appendix J. 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.

A. Oak Woodlands

The term "oak woodland" refers to an oak stand with greater than 10 percent canopy cover or that may have historically supported greater than 10 percent canopy cover [Oak Woodlands Conservation Act (PRC 21083.4), Fish and Game Code 1361]. 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. Valley oak woodland, blue oak woodland, and blue oak-foothill pine have generated the most concern due to poor regeneration, removal of oak woodland, and fragmentation of habitat. The oak woodland types are described in greater detail in Appendix G under the Oak Woodland Habitats subsection.

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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. The components and structure of the oak woodlands contribute to the natural resource values discussed below and in Appendix H.

B. Natural Resource Values

Oak woodlands provide many natural resource values. These values extend to wildlife uses and ecosystem functions, which benefit humans. Conversion and fragmentation of oak woodlands result in outright loss of oak woodland or degradation of remaining oak woodlands.

In California, over 300 species of birds, mammals, reptiles, and amphibians, 5,000 insect species, and 2,000 plant species occur in oak woodlands (Giusti et al., 1996). Oak woodlands provide food in the form of acorns, leaves, roots, fungi, mistletoe, and insects. Cavity trees and downed woody material provide shelter, resting sites, and reproductive sites such as nests and dens.

Oak woodlands with more complex understories (e.g., tree understory, shrubs, herbaceous vegetation, downed woody material) provide habitat for a greater variety of species. Wildlife use pinenuts, berries, and seeds for food. Shrubs provide cover for more species. A diverse structure provides reproductive sites for diverse wildlife.

Oak woodlands contribute to the health of watersheds and help to maintain the quality of our water supplies. Oak woodlands improve soil structure, increase infiltration rates, reduce soil erosion and sedimentation, and enhance nutrient cycling and soil fertility. Appendix H provides a fuller description of natural resource values of oak woodlands.

Oak woodland functions most effectively and provides 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 woodland habitat is more block-shaped and less linear. Block shapes provide more interior, or core, habitat area relative to boundary, or edge, habitat area. The more linear and more irregularly shaped 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.

C. Fragmentation and Connectivity

Threats to oak woodland in California and in El Dorado County and the effects from loss of oak woodland are addressed in Appendices G and H, respectively. Fragmentation, as potentially the greatest threat to oak woodlands in the County, is presented here. 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.

El Dorado County has more acres of oak woodlands at risk for development than any other county in California (Gaman and Firman, 2006). Forty percent of the County's oak woodlands have been developed and another 40 percent may be developed by 2040 (Gaman and Firman, 2006). Impacts vary from complete removal of oak woodland to degradation of the quality of remaining oak woodland.

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. "… [A]reas 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.

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 less 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 the species.

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.

General Plan EIR p. 456 – "…only 4 percent of the existing oak canopy will actually be removed by, or converted to, development. However, the configuration of this development is of concern as full buildout could force as much as 40 percent of the County's existing wildland oak woodlands into marginal or urban habitats."

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 appear to exist at other sites (e.g., drainages from Slate Creek to Indian Creek).

D. Corridors

Corridors can be viewed as routes that connect habitat patches. Wildlife may move between patches using corridors. Corridors also may provide a means for plants, fungi, insects, and other organisms to move between patches. If species are lost from a habitat patch, then corridors provide the connectivity for organisms to recolonize that site from a connected site. (Hilty et al. 2006)

Length, width, and vegetative structure are important features of corridors that affect the number and composition of species that use a corridor. 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. Relatively intact native vegetation is an important component of corridors.

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Other considerations for corridors involve multiple uses and adjacent land uses. If recreation trails are part of a corridor, corridors must be much wider so species sensitive to high-intensity human use can use the corridor. Invasive species are more likely to be present with human use. Focal plant species might be damaged. Presence of domestic animals, whether from recreational or adjacent land uses, affects wildlife in corridors. Corridors adjacent to other natural vegetation will provide greater wildlife value than corridors passing through heavily modified landscapes.

For corridors approximately one-half mile long, mountain lions require a corridor width over 300 feet. As the length of the corridor increases, the width of the corridor needs to increase. Fewer native carnivore and bird species were detected in narrower corridors in oak woodlands in northern California (Hilty et al. 2006, Hilty 2001, and Hilty and Merenlender 2004). Hilty and Merenlender (2002) reported on the use of three types of riparian corridors adjacent to vineyards and connecting oak woodlands in Sonoma County. Significantly more species of native mammal predators were detected in corridors a minimum of 200 feet wide compared with corridors <200 feet wide or corridors with little natural vegetation (length of corridor not reported but presumed to be length of vineyard). Domestic carnivores such as house cats were more prevalent in the narrow corridors. Plants also have corridor requirements. If a corridor is too narrow, plant propagules may be lost to edge or other habitats where they cannot survive.