Los Angeles County Oak Woodlands Conservation Management Plan

MAY 2011

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LOS ANGELES COUNTY
OAK WOODLANDS CONSERVATION MANAGEMENT PLAN

MAY 2011

Prepared by

The
Los Angeles County Oak Woodlands
Habitat Conservation Strategic Alliance

For

The County of Los Angeles

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Cover photos by Rosi Dagit, Ty Garrison & Christy Cuba
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EXECUTIVE SUMMARY

The primary goal of the Los Angeles County Oak Woodlands Conservation Management Plan (OWCMP) is to develop a consistent policy for the management of oak woodlands that can be incorporated into the Los Angeles County General Plan and other relevant planning documents. Developing a comprehensive and cohesive strategy for dealing with loss and creating opportunities for recovering oak woodlands at a commensurate rate should be the focus of planning and community efforts. The Los Angeles County Oak Woodlands Conservation Management Plan provides the platform to accomplish the following goal:

"Oak Woodlands are preserved and restored so that they are conserved in perpetuity with no net loss of oak woodlands."

Oak woodland
R. Dagit

What will the oak woodlands of Los Angeles County look like in 50 years? What is the long term vision of the County for protecting, managing and restoring oak woodlands? How can these goals be incorporated into the County planning process in such a way that we:

- Provide incentives for voluntary conservation of oak woodlands on private property;
- Provide funding to willing landowners to purchase oak woodlands and/or conservation easements;
- Preserve oak woodlands through the County's land use planning and regulatory processes; and,
- Quantify the economic and environmental benefits of oak woodland preservation.

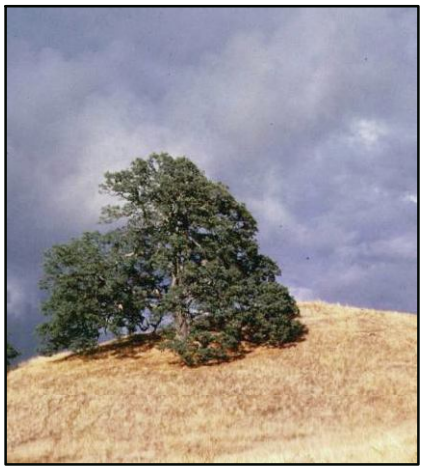
A secondary goal of the OWCMP is to meet the requirements of the California Oak Woodlands Conservation Act (AB 242). In order to be eligible for project funding under this bill, counties must create an Oak Woodlands Management Plan. Most county plans focus on the characteristics of their oak woodlands and use those characteristics, like distribution of species, to frame plan activities. However, Los Angeles County is far more urbanized than most other counties with oak management plans. Woodland characteristics are important in oak management, but the limited remaining

woodland area (about 45%) in Los Angeles County forces the focus of this plan more toward the woodland-to-suburb conversion, rather than solely the characteristics of the County's woodlands.

This plan includes two parts:

PART I presents a **voluntary** oak woodlands conservation strategy for Los Angeles County. This section contains the elements needed to meet the requirements of the California Oak Woodlands Conservation Act (AB 242) in order for the County to be eligible for oak woodlands project funding. The Los Angeles County Board of Supervisors can adopt a resolution to follow the guidelines in **Part I,** thereby making the County eligible to submit grant requests for conservation, preservation and/or restoration project funding from the state Oak Woodlands Conservation Fund.

PART II provides recommendations for planning and implementation elements of the OWCMP for incorporation into relevant County regulations and planning documents. Some of the recommendations involve only administrative changes, but others need more than administrative review to be fully adopted. Implementation of **Part II** will require that the Board of Supervisors consider directing the appropriate County departments to evaluate impacts of the proposed recommendations. Subsequently, those County departments will provide recommended actions that can proceed through the normal public review and hearing processes.



Engelmann oak
Tom Scott

The implementation strategy in **Part II** promotes three components that encompass a range of outcomes for oak woodland management actions:

(1) Preservation, where oak woodlands remain intact and functional;

(2) Conservation, where woodlands are integrated into land development; and,

(3) Mitigation, where loss of oak woodlands in one area is mitigated off-site through restoration, creation, or purchase for preservation in another area.

The Preservation and Mitigation categories are self-evident; woodlands are either preserved or lost. When oak woodlands must be sacrificed, off-site restoration, creation or purchase of woodlands is implemented. The third category, Conservation, covers oaks woodlands from backyards to community open space. It reflects the gradient of woodland resource quality already present in Los Angeles County suburbs and the urban-wildland interface. The goal is to maximize the values of oak woodlands in a human-dominated landscape, along with the recognition that these values must be matched against existing conditions, such as the growing population's need for housing, and the other demands for land use in Los Angeles County.

The outcomes for preservation, conservation, and mitigation can also be viewed as options for property owners. For example, some large land holders have a preservation strategy, agreeing to Habitat Conservation Plans in exchange for an unencumbered ability to develop other areas of their property. Small landowners with limited options for conservation or preservation may opt for the sacrifice/mitigation strategy, where they mitigate the loss of oaks during construction by contributing to the County Oak Forest Special Fund. Other landowners may conserve oaks woodlands by incorporating them into development plans or conservation easements, maximizing the amenity value of these woodlands in home sale prices.

Preservation is the preferred strategy. The key issue is developing a strategy that encourages self-selection by landowners into the appropriate strategy for the location, type, and quality of their oak woodlands. The measurable benchmark of the effectiveness of the OWCMP would be the acreage of woodlands preserved, conserved, or sacrificed and mitigated, relative to idealized (negotiated) goals for the proportions of Los Angeles County woodlands in each category. The plan advocates the development of a GIS system to track the woodland categories to ensure that adopted proportions are achieved as the County builds out.

Valley oak T. Garrison

"If you think in terms of a year, plant a seed;
if in terms of ten years, plant trees;
if in terms of 100 years, teach the people." ~ Confucius

ACKNOWLEDGEMENTS

The development of the Los Angeles County Oak Woodlands Conservation Management Plan evolved thanks to the following supporters:

Los Angeles County Board of Supervisors' grants ($50,000)

Supervisor Michael Antonovich

Supervisor Zev Yaroslavsky

The Eaton Canyon Nature Center kindly hosted many of our meetings. Thanks to Mickey Long and all the staff that made us welcome.

The Los Angeles County Fire Department Forestry Division and Department of Regional Planning staff provided essential assistance with developing all phases of the plan, especially the maps.

The Western Chapter of the International Society of Arboriculture provided opportunities to share this plan and solicit input at several meetings. Thanks to Rose Epperson and the local staff for all their enthusiastic assistance.

Land Design Consultants, Inc. (LDC) and SWCA Environmental Consultants graciously provided the use of their ftp sites, which made sharing information much easier.

The energy and impetus to develop and produce this plan was a direct result of the efforts of the Los Angeles County Oak Woodlands Habitat Conservation Strategic Alliance. This broad based coalition of concerned representatives of agencies, resources, planners, builders and consultants initiated this project in 2008 as a step towards establishing an equitable, consistent and well-considered plan to achieve the goals of oak woodlands resource protection and long-term stewardship. Everyone volunteered in one way or another, allowing us to develop this plan on an extremely tight budget. Those who actually contributed sections or provided substantive revisions to this draft of the plan are noted with an asterisk.

Regular participants include:

Greg Ainsworth*, Certified Arborist, E.S.A.

Orchid Black*, Member of the Board of Directors, CNPS

Cy Carlberg*, Registered Consulting Arborist

Janet Cobb*, CA Oak Foundation

Dan Cooper*, Biologist

Christy Cuba*, Registered Consulting Arborist & Env. Planner, Land Design Consultants, Inc.

Rosi Dagit*, Certified Arborist, RCD of the Santa Monica Mountains

Joe Decryenaere*, Impact Sciences

Rose Epperson, President, Western Chapter, International Society of Arboriculture

Ty Garrison*, M.S., Biologist

Tamara Hanna, LA County Fire Department, Forestry Division

Scott Harris, CDFG

Mark Herwick, AICP*, LA County Regional Planning

Ron Hoffman*, Planning Consultant

Shirley Imsand*, PhD, LA County Regional Planning

Gary Knowlton, Arborist

Daryl Koutnik*, PhD., Impact Sciences

Rebecca Latta*, Senior Arborist, SWCA

Fred MacMurdo, Newhall Company and BIA representative

Stephanie Pincetl, PhD, UCLA Institute of the Environment

Lynne Plambeck, SCOPE

Teresa Proscewicz, Urban Forester, City of Glendale

Bill Romo*, Forester, LA County Fire Department, Forestry Division

Ben Saltsman*, Deputy of Planning, Supervisor Yaroslavsky

Sandy Sanchez, BIA representative

Holly Shroeder, BIA representative

Tom Scott*, PhD., Integrated Hardwood Range Management Program

Jan Scow*, Registered Consulting Arborist

Mike Takeshita, Forester, LA County Fire Department, Forestry Division

John Tiszler*, PhD. National Park Service, SMMNRA

John Todd*, Chief of Forestry, LA County Fire Department, Forestry Division

Canyon live oak seedling
C. Cuba

Many other interested arborists, planners, and community representatives participated in meetings along the way.

We are also grateful to the input of all the participants and presenters at the International Society of Consulting Arborists (ISA) meetings held in March and September 2009. The series of meetings that explored a variety of ways to evaluate the economic value of oak woodlands benefited from the expertise of:

- Dr. Ken Baerenklau, Associate Professor, UC Riverside
- Dr. Bowman Cutter, Associate Professor, Pomona College
- Dr. David Sunding, Professor, UC Berkeley

Ron Hoffman provided tremendous expertise in reviewing the document and recommending substantive alterations, which are reflected in this revision. We greatly benefited from his years of planning experience with Los Angeles County.

Student intern Dana Kittrelle of Pomona College provided valuable assistance with writing the incentives section of the plan and revising the economic values section.

Tom Gaman, Ron Cowan, and Greg McPherson provided valuable input on describing carbon sequestration and the CEQA process.

UC Riverside staff Cara Washington and Matthew Davis worked hard to assist Tom Scott in preparing the maps.

Christy Cuba did a phenomenal job editing, formatting, and combining the information submitted by the writers to make it cohesive.

Tom Scott and Rosi Dagit did their best to provide a clear, readable document.

We owe a great deal of thanks to Ted Swiecki, who graciously allowed us to use his work on the *YOLO County Oak Woodland Conservation and Enhancement Plan* as a road map and inspiration.

The tools provided by the Oak Woodland Impact Decision Matrix (Guisti et al 2008) were also invaluable.

Our patient and skilled webmaster, Alex Cabal, brought his expertise to the creation of the website and was instrumental in getting all of the plans and maps up for the public to access.

Last but not least, the staff of the Resource Conservation District of the Santa Monica Mountains provided invaluable administrative support.

Oaks in public recreation area R. Dagit

I. INTRODUCTION

I.1 WHY LOS ANGELES COUNTY NEEDS AN OAK WOODLANDS CONSERVATION MANAGEMENT PLAN

Los Angeles County (County) has a long history of concern for oak resources. It was one of the first counties in the state to enact an Oak Tree Ordinance in 1982 to regulate these resources in unincorporated areas of the County.

The County shares the issue of oak woodland loss with other urban areas in California. In 2001, the state legislature responded to this problem by creating a fund for oak woodlands conservation (AB 242). In 2004, the California Environmental Quality Act (CEQA) was amended through SB 1334 (Public Resources Code Section 21083.4) to specifically address the impacts and mitigation of land development in oak woodlands and recommends the development of oak plans to guide preservation activities. As of 2009, the Natural Resources Agency and California Air Resources Board now requires evaluation of the impacts of oak woodland conversion on greenhouse gas emission. A single large coast live oak can sequester over 9 tons of carbon dioxide in 50 years. Multiply this sequestration by the amount of oak woodlands and the importance of oaks in mitigating greenhouse gas emissions is potentially enormous.

The County Oak Tree Ordinance protects individual standing oak trees. It was not designed to manage oak woodlands and the values they provide to residents of the County (wildlife habitats, watershed, and soil protection). More importantly, by focusing on existing trees, the ordinance has no provisions to ensure that standing oaks will be replaced by new trees in the future.

Coast live oak woodland
T. Garrison

Reviews of the effectiveness of the existing ordinance indicate that more could be done to prevent the loss and degradation of both individual trees and oak woodland communities. Oaks under the protected size of eight inches in diameter at four and a half feet above grade are often cut down before they interfere with

land development. Individual oaks remain within housing or commercial areas, but often in a manner that reduces their value to communities and eliminates their connection to their natural hydrologic resources. Fragmentation of oak woodlands is the rule not the exception. Mitigation planting of small oak seedlings does not realistically replace the suite of ecosystem functions provided by each single mature tree. Without a coordinated oak woodlands vision, impacts from introduced pests such as the Gold spotted oak borer, diseases such as Sudden Oak Death, and potential climatic temperature changes which could threaten our oak woodlands cannot be effectively or efficiently managed.

Valley oaks
T. Garrison

Our hope is to encourage development and coordinated management that works with, rather than degrades oak woodland resources and to utilize economic incentives that demonstrate the value added when oak woodlands are conserved within the development process.

I.2 SCOPE AND PURPOSE OF THE LOS ANGELES COUNTY OAK WOODLANDS CONSERVATION MANGEMENT PLAN

The purpose of the Los Angeles County Oak Woodlands Conservation Management Plan (OWCMP) is to meet the requirements of the California Oak Woodlands Conservation Act (AB 242) and provide input into the Los Angeles County General Plan update. What will the oak woodlands of Los Angeles County look like in 50 years? What is the long term vision of the County for protecting, managing and restoring oak woodlands? How can these goals be incorporated into the County planning process in such a way that we:

- Provide incentives for voluntary conservation of oak woodlands on private property;
- Provide funding to willing landowners to purchase oak woodlands and/or conservation easements;
- Preserve oak woodlands through land use planning and regulatory processes; and,
- Quantify the economic and environmental benefits of oak woodland preservation.

The OWCMP provides Los Angeles County with a valuable tool to identify measurable goals for protecting existing oak woodlands and for implementing successful mitigation, monitoring and regeneration efforts. Conservation planning grounded in science-based information provides critical information. The OWCMP provides a framework for both policy level outreach, as well as voluntary property level implementation opportunities. To realize the benefits of this precautionary planning, Forman and Collinge (1997) determined that once more than 40% of the natural vegetation is altered or removed, it becomes more difficult to maintain biological diversity.

We passed that threshold in Los Angeles County years ago.

Los Angeles County is in the process of comprehensively updating its General Plan. This planning document will assist the County to develop a sustainable vision of oak woodland resources protection and enhancement over the next 50 years that can be integrated into the General Plan update process. Development of that vision will establish a foundation to balance the regulatory elements of the Oak Tree Ordinance with incentives for actions such as voluntary conservation easements for oak woodlands.

Oak Savannah in grazing lands
T. Garrison

The time is right to incorporate the protection, enhancement, and restoration of oak woodlands into the overall planning process.

Los Angeles County needs an equitable way of estimating the value of oak woodland along the wildland-urban interface. Specifically, we need a credible system for calculating the value of oak woodlands and the costs associated with woodland removal or degradation. The Council for Tree and Landscape Appraisers (CTLA) and the International Society of Arboriculture (ISA) have developed a system to assign value to individual oaks in landscaping; however, there are no commonly accepted means of valuing oak woodlands along the wildland-urban interface. The products developed for this plan can be used to build consensus among stakeholder groups on oak woodland evaluations during environmental audits

and planning reviews, by focusing on mechanisms for calculating the values associated with oak woodlands.

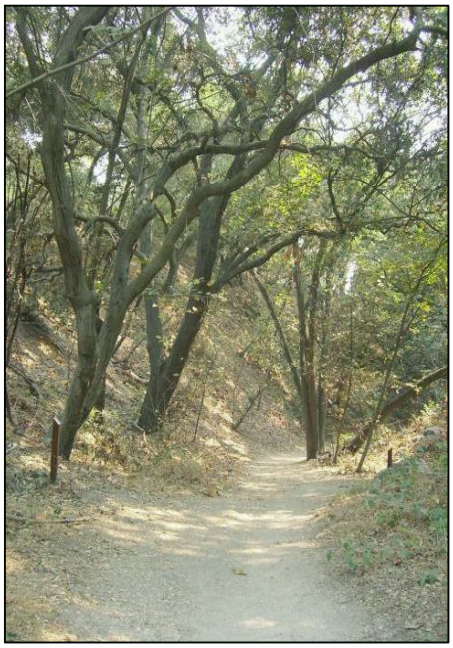
I.3 WHAT MAKES OAK WOODLANDS SO SPECIAL

Oak woodlands are much more than a collection of individual trees. As defined by the California Department of Fish and Game (Section 1360-1372), an oak woodland is an oak stand with greater than 10% canopy cover or that may have historically supported greater than 10% canopy cover. Associated with that canopy cover and connectivity, are over 300 vertebrate species and more than 5,000 invertebrates, not to mention hundreds of native understory plant species.

Entering oak woodlands, you experience the complex interconnections of the trees, plants, and animals that create a dynamic living system. While the Oak Tree Ordinance has succeeded somewhat in preserving individual historic oak trees, it has failed to protect the woodlands as a functional whole.

Oak woodlands provide essential ecosystem function services, at little to no cost. The canopies of oaks filter out air pollution, absorb carbon dioxide, and create islands of welcome shade and cooler temperatures. Hillsides covered with oaks provide erosion control through roots that hold the soil and foliage that diffuses rainfall, allowing it to percolate into the ground. Stream banks shaded by oaks slow down floodwaters and help filter out water pollutants.

Oak woodlands provide extensive recreational opportunities that are easily accessed by the huge urban population of Los Angeles County. The health benefits provided by access to trails that wind through the oaks are immeasurable. For many people, a walk through the oaks is a welcome stress relief. Real estate prices for homes in or near oak woodlands are consistently higher than those without oaks or other natural spaces.



Path through riparian oak woodland
C. Cuba

Oak woodlands are an iconic part of the visual landscape of Los Angeles County. The daily commute of millions is enhanced by views of oak studded hillsides along crowded freeways. Oaks and humans have a long history of inter-dependence. While few people today rely on acorns as a dietary staple, living in and among oak woodlands is clearly still important to many of us.

I.4 WHO WILL BENEFIT FROM THE OAK WOODLANDS CONSERVATION MANAGEMENT PLAN

Present and future residents of Los Angeles County directly benefit by living in and among oak woodlands. The County's Oak Tree Ordinance has already identified oaks as having "valuable historical, aesthetic and ecological resources". The ecological services provided by functional oak woodlands contribute millions of dollars worth of avoided costs to mitigate air pollution and water pollution. Incentives for preserving, rather than removing, oak woodlands make economic sense and help both the property owner and the community at large. Additionally, property owners will have more information on how to live harmoniously within oak woodlands. Both property owners and planners will have a framework for integrating oak woodland protection into the development process in a beneficial way.

I.5 EXISTING COUNTY REGULATIONS THAT IMPACT OAK WOODLANDS

I.5.1 General Plan

As of 2011, the County is in the process of revising and updating the General Plan. The 1980 Los Angeles County General Plan is still in effect and contains oak protection policies in the Land Use and Conservation and Open Space Elements. These Elements have policies requiring developments to preserve major natural features including major drainage courses, riparian vegetation, rock outcroppings, and stands of oaks and other native trees to the extent possible. Developments in hillside areas on slopes of 25% or greater should preserve distinct visual characteristics and natural resources such as oak trees. A minimum of 25% of a project site must be retained for open space for urban residential hillside developments and 70% open space for non-urban residential hillside developments.

The Land Use Element includes policies aimed towards preserving natural resources and includes the Hillside Management/Performance Review Procedure. Approvals of residential development proposals are contingent on a project's ability to preserve distinct visual characteristics or community assets, such as oak trees. Performance Review criteria assesses the quality of a project's design, which should preserve to the degree possible major natural features, including stands of oaks and other native trees.

Common king snake in oak woodland
T. Garrison

Additionally, the County has designated 61 Significant Ecological Areas (SEAs) which are ecologically important, or fragile land and water areas valuable as plant and animal communities. Many of the SEAs include examples of oak woodland habitat, in which the County seeks to minimize urbanization pressure. SEAs were defined and delineated in the 1976 Significant Ecological Areas Report prepared by consultants to the County. The SEAs were mapped on the Special Management Areas Policy May and adopted with the 1980 Los Angeles County General Plan. Proposed development proposals located within or adjacent to an SEA are reviewed by the County's SEA Technical Advisory Committee (SEATAC). These developments must be found to be highly compatible with the biological resources present within the SEA. SEATAC is comprised of seven members from the private and public sector, each with biological expertise. The purpose of the SEATAC review is to determine if the project's impacts on biological resources are adequately and accurately assessed, avoided or mitigated.

I.5.2 Local Plans

The (MALIBU) LOCAL COASTAL PLAN contains specific policies and definitions that need to be applied within the coastal zone. The LOCAL COASTAL PLAN is under revision in 2011, so the policies included below are subject to change as that document evolves.

At present, "Significant oak woodlands" are designated only in the (MALIBU) LOCAL COASTAL PLAN, (LCP) which guides planning decisions in the unincorporated Coastal Zone of the Santa Monica Mountains. A closed canopy has generally been understood to be an oak

woodland in the Coastal Zone, but this is not codified, and savannahs are equally noted as being significant. Many of the riparian areas with oak woodlands in the Santa Monica Mountains are designated as part of ESHAs (Environmentally Sensitive Habitat Areas). Exceptional undisturbed oak woodlands and savannahs are noted as important components of many SERAs (Sensitive Environmental Resource Areas) that are within "Significant Watersheds".

The SANTA MONICA MOUNTAINS NORTH AREA PLAN was adopted in 2000 as a component of the General Plan. The plan covers the unincorporated County area of the Santa Monica Mountains, west of the City of Los Angeles, north of the coastal zone boundary and west to the boundary of Ventura County. The plan was developed in cooperation with the local adjacent cities and the National Park Service to guide development within the Santa Monica Mountains National Recreation Area, which covers the same geographic boundaries. The guiding principle of the plan is to '*let the land dictate the type and intensity of use*'. The overall goal is to maximize preservation of the natural environment and ensure that development is compatible with both existing local communities and integrated into a wide range of public and private recreational opportunities. The guiding principle for the Conservation and Open Space Element is that '*resource protection has priority over development.*' The specific goals and policies outlined in this element all recognize the important role oak woodlands play in this region, and emphasize preserving large unbroken blocks of natural open space, wildlife linkages and protecting watershed integrity.

Preservation during grading
C. Cuba

I.5.3 Zoning Ordinances

I.5.3.a - Oak Tree Ordinance (22.56, Part 16)

The Los Angeles County Oak Tree Ordinance was established in 1982 through an amendment to the Los Angeles County Code Title 22 Planning and Zoning to recognize

oak trees as significant historical, aesthetic, and ecological resources. The goal of the permit was to create favorable conditions for the preservation and propagation of this unique and threatened plant. The Los Angeles County Oak Tree Ordinance applies to all unincorporated areas of the County and is reproduced in **Appendix 6.**

Under the existing Los Angeles County Oak Tree Ordinance, a person shall not cut, destroy, remove, relocate, inflict damage, or encroach into the protected zone of any tree of the oak tree genus, which is eight (8) or more inches in diameter four and one-half feet above mean natural grade, or in the case of oaks with multiple trunks, a combined diameter of twelve inches or more of the two largest trunks, without first obtaining a permit. Heritage oaks are identified as 36 inches or greater diameter at breast height, or trees having significant historical or cultural importance. The County's Oak Tree Ordinance protects and requires compensation for loss of individual oak trees, but does not incorporate consideration the value of oak woodlands as habitat. Historically, the policy of Los Angeles County has been to consider impacts to oak trees as a biological impact under CEQA and to require mitigation to offset losses to oak habitat in addition to the requirement of individual tree replacement mandated by the Oak Tree Ordinance.

I.5.3.b Brushing Ordinance (12.28)

With some significant exceptions, the Brushing Ordinance requires a permit to remove or destroy natural vegetation on slopes of 8% or greater and requires details of precautionary measures to prevent erosion. Conditions may be attached to the permit that include vegetation removal methods, time of year when work may be performed, erosion control devices and replanting requirements.

I.5.4 Fire Code Requirements That Impact Oak Woodlands

There are two programs that are involved in creating defensible space which may impact oak woodland resources. They are the Brush Clearance Program (which is reactive and applies to existing structures) and the Fuel Modification Program (which is proactive and applies to new structures and/or significant remodels [greater than 50% square footage addition]).

Additionally, the Fire Department can provide a permit for removing hazardous oak trees or limbs by issuing an Emergency Oak Tree Permit. The following are the sections of the Los Angeles County Fire Code that apply to fuel modification and brush clearance around structures**.**

I.5.4.a Structures (317.2) Fuel Modification Plan In Fire Hazard Severity Zones (317.2.1)

A fuel modification plan, a landscape plan, and an irrigation plan prepared by a registered landscape architect, landscape designer, landscape contractor, or an individual with expertise acceptable to the Forestry Division of the Fire Department shall be submitted with any application for a subdivision of land or prior to any new construction, remodeling, modification, or reconstruction of a structure where such remodeling, modification, or reconstruction increases the square footage of the existing structure by 50 percent or more within any 12-month period and where the structure or subdivision is located within areas designated as a Very High Fire Hazard Severity Zone in Chapter 7A of the Los Angeles County Building Code and Chapter 47 of this code. Every fuel modification plan, landscape plan, and irrigation plan shall also be reviewed and approved by the Forestry Division of the Fire Department for reasonable fire safety. After such final plan has been approved by the Forestry Division of the Fire Department, a signed copy of the Covenant and Agreement shall be recorded at the registrar-recorder/county clerk's office.

I.5.4.b Appeals (317.2.1.1)

Any person who disagrees with any decision related to fuel modification plans may file a written appeal with the chief of the Forestry Division. The chief of the Forestry Division will adjudicate all policy interpretations relevant to fuel modification plan requirements and serve as the final authority in the appeals process.

Engelmann oak on edge of development
C. Cuba

I.5.4.c Clearances (317.2.2)

Any person owning, leasing, controlling, operating, or maintaining any building, structure, or apiary upon or adjoining any mountainous, or forest or brush-covered land or land covered with flammable growth, and any person owning, leasing, or controlling any land adjacent to such structures, shall at all times: 1) Place or store firewood, manure, compost, and other combustible materials a minimum of 30 feet from any building, structure, or apiary. 2) Maintain around and adjacent to such building, structure, or apiary an effective fire protection or firebreak made by removing and clearing away, for a distance of not less than 30 feet on each side thereof, all flammable vegetation or other combustible growth. This includes ornamental plants and trees known to be flammable, including but not limited to: Acacia, Cedar, Cypress, Eucalyptus, Juniper, Pine, and Pampas Grass.

Valley oaks in development
C. Cuba

EXCEPTIONS:

1) Ornamental plants and trees that are individually planted, spaced, and maintained in such a manner that they do not form a means of transmitting fire from native growth to the structure.

2) Cultivated ground cover such as green grass, ivy, succulents, or similar plants provided that they are maintained in a condition that does not form a means of transmitting fire from native growth to the structure.

3) When the fire code official or commissioner finds that because of extra hazardous conditions, a firebreak of only 30 feet around such building, structure, or apiary is not sufficient to provide reasonable fire safety, the person owning, leasing, controlling, operating, or maintaining the building, structure, or apiary shall maintain around or adjacent to any building, structure, or apiary an additional fire protection or firebreak made by removing all brush, flammable vegetation, or combustible growth located from 30 to 100 feet from such building, structure, or apiary, as may be required by the fire code official or commissioner. Grass and other vegetation located more than 30 feet from such

building structure, or apiary and less than 18 inches in height above the ground, may be maintained where necessary to stabilize the soil and prevent erosion.

4) That portion of any tree which extends within 10 feet of the outlet of any chimney shall be removed.

5) Maintain any tree adjacent to or overhanging any building, structure, or apiary free of dead wood.

6) Maintain the roof of any building, structure or apiary free of leaves, needles, or other dead vegetative growth.

I.5.4.d Extra Hazard (317.2.3)

The governing body finds that in many cases because of extra hazardous situations, a firebreak around buildings, structures, or apiaries of only 30 feet is not sufficient and that a firebreak of 50 feet or more may be necessary. If the fire code official or commissioner finds that because of the location of any building, structure, or apiary and because of other conditions, a 30-foot firebreak around such building, structure, or apiary as required by Section 317.2.2 is not sufficient, the fire code official or commissioner may notify all owners of property affected that they must clear all flammable vegetation and other combustible growth or reduce the amount of fuel content for a distance greater than 30 feet, but not to exceed 200 feet.

I.6 OAK WOODLANDS CONSERVATION MANAGEMENT PLAN ADOPTION PROCESS

This plan was coordinated by the Resource Conservation District of the Santa Monica Mountains in association with the Los Angeles County Oak Woodlands Habitat Conservation Strategic Alliance. This coalition included public and private sector planners, biologists, arborists, building industry and land owner representatives, County staff, and representatives of the Los Angeles County Board of Supervisors. The Plan also benefited from public comments received at five community meetings and through written communications during a nearly eight-month public comment period.

In order for the final version of the Plan to meet the requirements of the Oak Woodlands Conservation Act (FGS 1360-1372), the Los Angeles County Board of Supervisors must ultimately

adopt a resolution approving the Plan. Although this plan, which is not an amendment to, or an element of the General Plan, does not require a public hearing or a recommendation by the Regional Planning Commission prior to approval by the Board, an informational presentation was made to the Regional Planning Commission on 17 March 2010 and the Commission submitted a letter to the Board of Supervisors commending the development of the plan on 14 April 2010.

Hybrid oak leaves
(Q. lobata x Q. john tuckeri)
C. Cuba

The adoption of this plan could be done in two steps:

I.6.1 Step 1

Adoption of **Part 1** of the plan, which meets the requirements of the Oak Woodlands Conservation Act such that Los Angeles County could qualify for funds from the Oak Woodlands Conservation Fund managed by the Wildlife Conservation Board. In broad terms, this resolution will need to certify that:

1) The County agrees to offer private landowners the opportunity to voluntarily participate in the Oak Woodlands Conservation Program;
2) The Plan describes the status of oak woodlands in Los Angeles County's jurisdiction;
3) The County recognizes the economic value of oak woodlands to landowners and the community at large;
4) The County recognizes the natural resource values of oak woodlands;
5) The County recognizes that the loss of oak woodlands has serious effects on wildlife habitat, retention of soil and water and that planning decisions for oak woodlands should take into account potential effects of fragmentation of oak woodlands;
6) The County expresses support for landowners that participate in the Oak Woodlands Conservation Program and agrees, pursuant to Section 1366 (f) of the Oak Woodlands Conservation Act, to review and submit grant requests to the Wildlife Conservation Board or to the County Oak Forest Special Fund for individual proposals that are determined to be consistent with the County Oak Woodlands Conservation Management Plan;

7) The County supports and encourages education and outreach efforts designed to demonstrate the economic, social and ecological values associated with oak woodlands; and,
8) The County commits to reviewing and updating as necessary, the Oak Woodlands Conservation Management Plan.

I.6.2 Step 2

The Board of Supervisors could direct appropriate County staff to review and report back on the planning and implementation recommendations offered in **Part 2.**

Part 2 contains planning and implementation recommendations that were developed to assist the County in revising, augmenting and expanding policies that could be incorporated into the relevant codes. Some of these actions require only administrative changes, but others will benefit from and/or require full public review and further development to comply with County standards.

I.7 How You Can Make a Difference

Mixed oak woodland
C. Cuba

There are many local organizations, public agencies and others involved in the effort to conserve and restore oak woodlands throughout the state of California. This plan reflects an effort to incorporate their recommendations and further their efforts to promote long-term stewardship of oak woodlands within Los Angeles County. It is critical that all concerned stakeholders continue to provide input, so that implementation of the plan is clear, functional and ultimately effective.

II. GOALS OF THE OAK WOODLANDS CONSERVATION MANAGEMENT PLAN

The Los Angeles County Oak Woodlands Conservation Management Plan strives to accomplish the following purpose:

"Oak Woodlands are preserved and restored

so that they are conserved in perpetuity with no net loss of existing oak woodlands."

This overarching purpose can be further broken down into the following goals:

GOAL PROTECT EXISTING OAK WOODLAND ECOSYSTEMS

- Create a voluntary system, including landowner incentives, for protection, conservation and restoration of oak woodlands.
- Define a vision for long-term sustainability of oak woodlands such that functional ecosystems on multiple scales (parcel, watershed, regional) are maintained or enhanced over the next 50 years.
- Comprehensively map all oak woodlands. The map would include a prioritization of relatively intact oak woodlands for preservation and those that are most at risk of degradation, therefore, requiring special protection.
- Preserve viable oak woodlands that include a diversity of age structure of oak trees, especially large old oaks, and represent the diversity of oak woodland types. Viability should be measured by the presence of landscape variables (e.g. patch size, shape, connectivity) that adequately support the desired populations of oak dependant species;
- Prevent further net loss of oaks woodlands.

GOAL RECOVER DEGRADED OR LOST OAK WOODLAND ECOSYSTEMS

- Prioritize restoration and recovery of valley oak and Engelmann, and other oak species that are now uncommon due to fragmentation and development.

- Use the best state-of-the-science information to guide integrated restoration planning efforts.
- Coordinate the restoration of oak woodlands with adjacent or connected ecosystem restorations, such as the replacement of non-native annual grasses with native perennial grasses, riparian restoration plans, etc.

GOAL MAINTAIN THE BENEFITS PROVIDED BY OAK WOODLAND ECOSYSTEMS

- Properly identify the costs to the community when existing oak woodlands are lost to development or conversion to other activities.
- Accurately identify cumulative impacts associated with loss of oak woodlands.
- Manage oak woodlands in such a way as to protect or restore natural ecosystem processes, including fire regimes, hydrologic regimes, oak regeneration and understory components of oak woodland systems.
- Provide funding and technical assistance for oak woodland recovery efforts that achieve multiple benefits.
- Recognize the many public health benefits provided by oak woodlands, such as improved air quality, opportunities for active and passive recreation, aesthetic value.
- Retain biodiversity of oak woodland communities in order to provide adaptability to climate changes.

Coast Live Oak Woodland
R. Dagit

GOAL DEVELOP LAND USE REGULATIONS AND PROCEDURES THAT CONSERVE OAK WOODLAND ECOSYSTEMS

- Develop and provide incentives for voluntary oak woodland conservation.
- Provide a tool to assess the economic benefits of oak woodlands

- Develop a strategy for prioritizing and protecting significant oak woodlands conservation areas.
- Provide clear, consistent, and equitable guidelines for development that rewards oak woodlands preservation by expediting those projects that integrate development into oak woodlands in a sustainable way.
- Link mitigation at the project level to the long-term conservation plan goals.
- Provide guidelines for development of land use and infrastructure planning strategies that are consistent with oak woodlands conservation and restoration efforts.
- Incorporate existing oak woodlands into thoughtfully designed and appropriately scaled developments.

GOAL **COORDINATE CONSERVATION, PLANNING AND RESTORATION EFFORTS**

- Balance the need to provide housing and other societal necessities with the preservation of oak woodlands.
- Identify Priority Oak Woodlands Conservation Areas adjacent to or within contiguous oak woodlands habitat where focused restoration and voluntary conservation will decrease fragmentation and increase self-sustaining habitat areas.
- Maximize the total amount and connectivity of oak canopy cover incorporating species appropriate cover levels that will promote habitat diversity, and provide maximum ecosystem function benefits.
- Identify strategies for evaluating oak woodlands impacts that meet the current CEQA compliance requirements.
- Coordinate oak woodlands conservation, planning and restoration efforts with the Los Angeles County General Plan, the Santa Monica Mountains National Recreation Area General Management Plan, the Angeles National Forest Land Management Plan, and all applicable local and state conservation plans.

- Coordinate the Oak Woodlands Conservation Management Plan with other relevant County Plans and encourage cities within the County to adopt comparable protection standards.
- Coordinate effective responses to identify, document, and reduce the impact of potential threats to long term oak woodlands survival posed by introduced pests, diseases or in response to climate change.

GOAL **COMPLY WITH THE REQUIREMENTS OF THE CALIFORNIA OAK WOODLANDS CONSERVATION ACT**

The Oak Woodlands Conservation Management Plan also addresses the requirements of SB 1334 (2004), which amended the Public Resources Code to require each county to determine whether a project may result in conversion of oak woodlands that constitutes a significant impact on the environment. This determination is made during review of individual projects as required by the California Environmental Quality Act (CEQA). If it is determined that oak woodland conversion exceeds the threshold for significant impact, then the County is required to implement one or more of the following mitigation alternatives:

- Conserve oak woodlands;
- Plant an appropriate number of replacement trees and maintain those trees for seven years;
- Contribute to the Oak Woodlands Conservation Fund, or;
- Meet other mitigation requirements required by the County.

When a project includes one or more of these mitigation elements, the project is deemed in compliance with CEQA as it relates to oak woodlands. This Plan identifies a range of mitigation alternatives that conform to these requirements.

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PART I

VOLUNTARY OAK WOODLANDS CONSERVATION STRATEGY FOR LOS ANGELES COUNTY

Regenerating oak woodland C. Cuba

III. SCOPE AND PURPOSE OF PART I

The goal of the Los Angeles County OWCMP is to develop a consistent policy for the management of oak woodlands. Developing a comprehensive and cohesive strategy for dealing with loss and creating opportunities for recovering oak woodlands at a commensurate rate should be the focus of planning and community efforts.

In order to be eligible for project funding under California Assembly Bill 242 (2001), counties must create an Oak Woodlands Management Plan. Most county plans focus on the characteristics of their oak woodlands, and use characteristics like distribution of species to frame plan activities. Los Angeles County however, is far more urbanized than other counties with oak management plans. Woodland characteristics are important in oak management, but the limited remaining woodland area (approximately 45%) forces the County to focus more on the woodland-to-suburb conversion, rather than solely the characteristics of the woodlands.

PART 1 contains the **voluntary** elements needed to meet these requirements.

III.1 DEFINITION OF AN OAK AND AN OAK WOODLAND

III.1.1 Definition of an Oak Tree

All native trees of the genus *Quercus* (listed in Table 1) that meet size and location requirements are protected by the Los Angeles County Oak Tree Ordinance. This includes small shrubby oaks typically clustered on slopes, as well as individual large oaks that are naturally widely distributed across the landscape. Under California state law, oaks greater than 5" diameter at breast height (DBH) are also protected (PRC 21083.4(a)).

III.1.2 Definition of an Oak Woodland

According to the California Department of Fish and Game (Section 1361), "Oak woodlands" are defined as an oak stand with greater than 10 percent canopy cover, or that may have historically supported greater than 10 percent canopy cover." Currently the County uses this definition when evaluating planning impacts in most areas (with the exception of within the Malibu Local Coastal Plan zone) and this definition is also used for, and by, this OWCMP.

Separately, an oak stand is defined in this document as a group of similar trees growing in a contiguous pattern, having sufficiently diverse age-class distribution, composition and structure, and growing on a site of sufficiently uniform quality that it is distinguishable as a unit. Stands are a basic physical unit of vegetation in the landscape and do not have a set size (Keeler-Wolf et al 2006).

Valley oak
T. Garrison

Spatial relationships vary between oak species and oak woodland types, ranging from the more scattered hillsides of valley oak savannah, to the dense north facing hills with unbroken canopy of coast live oak, to the stands of scrub oak surrounded by chaparral. The variation in stand characteristics reflects the diversity of oak species found in Los Angeles County and is important when determining overall functionality. In general, stand size and biodiversity are closely related, with greater complexity of habitat capable of supporting more species, especially those with larger home ranges, generally found in larger oak stands. Small stands are more vulnerable to disease, changes in local climate and water tables, and typically have a more limited genetic variability. However, even stands that do not meet the definition of an oak woodland may provide important biotic resources that are worthy of protection, especially if they are adjacent to other woodlands or provides linkages between habitats.

Rarely do parcel boundaries coincide with the extent of oak woodlands and their associated habitat elements. This makes for challenging land use planning that incorporates the "landscape level context" of the oak woodland. This concept has been described by T.J. Swiecki (Yolo County 2007) as follows:

"…if you want to manage the oak woodland resource at the county level, you have to start by ignoring property lines and look at the overall pattern of vegetation on the landscape. Each parcel is an artificial overlay over this natural distribution, so by starting with the landscape level picture, you can determine the relative importance of the patches of woodland that happened to fall within a given parcel or project area."

Another important consideration in evaluating the sustainability of oak woodlands is tree density - the number of trees per unit area. Stands that are dense and overstocked with trees that are competing for suitable light, nutrients and water are on one end of the continuum. The trees in these stands are often weak and highly susceptible to disease and insect infestations. Conversely, low density stands where individual trees are spread far apart typically have low reproduction rates and may not be sustainable. Due to the variety and complexity of oak woodland associations in Los Angeles County, evaluation of tree density condition needs to be considered on a site specific basis.

For the purposes of this document:

- **Any oak stand consisting of any of the oak associations documented herein that has greater than 10 percent canopy cover shall be considered an oak woodland, and,**
- **Any oak stand consisting of any of the oak associations documented herein which can be shown to historically have had a greater than 10 percent canopy cover shall also be considered an oak woodland.**

The Oak Tree Ordinance (OTO) requires applicants to document oak trees within 200 feet of a proposed development. Under CEQA, the cumulative biological impacts analysis requires an applicant to analyze the overall impacts of a project in light of the resource as a whole in the surrounding area. This would capture the woodland resources on adjacent parcels where the core oak woodland has more than 10% canopy coverage.

III.1.3 When Could a Single Oak Tree be Considered Part of an Oak Woodland?

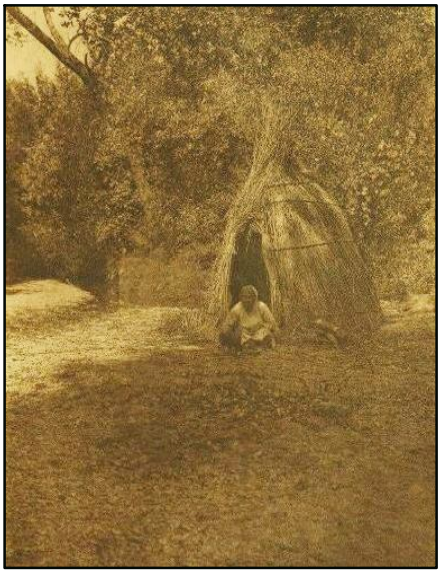
Typically a single oak separated by development and distance from other oaks would be considered under the OTO, but this also depends on proximity and species. For example, valley oaks are commonly distributed widely with native or exotic grasslands interspersed between trees. However, the sphere of influence of the individual tree frequently extends beyond its protected zone in the dispersal of acorns and recruitment of seedlings that intermingle with the grassland or chaparral surrounding. Therefore, mature valley oak trees that are 200 feet apart

may be considered part of a functional savannah type woodland because they have a natural distribution with fully functional woodland processes (Sork, et al 2008).

On the other hand, one or more oaks along a busy street, or within a parking lot surrounded by pavement and with no associated oak woodland species, would generally not be considered an oak woodland unless it could be shown that they are functioning as such by supporting associated oak woodland species. While these isolated trees might be protected by the existing Oak Tree Ordinance, they would not be considered "oak woodland" as defined here. These special cases would be evaluated by both a biologist on the ground, as well as by trained planning staff.

III.2 HISTORIC EXTENT OF OAK WOODLANDS IN LOS ANGELES COUNTY

Oaks and humans have a long, interrelated and interdependent history in Los Angeles County. Understanding the nature of this relationship provides important context to our efforts to protect, preserve and restore oak woodlands in Los Angeles County. For over 25,000 years, oaks have played an important role in the landscape we know as Los Angeles County. Oak woodlands were key elements of a moist plant complex, more similar to current conditions in the Monterey region.



Woman grinding acorns
Source: www.FirstPeople.com

Then, as now, oaks were a keystone species in a complex ecosystem. Today there are over 5,000 insects, 80 species of reptiles and amphibians, 100 species of birds, and over 60 mammals that all rely on oaks for their survival (Pavlik et al. 1991*). The diversity supported by oak woodlands is a major reason why Los Angeles County hosts 20% of all species listed as federally endangered.*

The first human inhabitants of Los Angeles were the early Tongva-Gabrielino, Chumash and Fernandeno/Tataviam Tribe, with the Tongva-Gabrielino group most widespread in central

Los Angeles. Since at least 7,000 BC, the local Native Americans selected village sites near water and oaks. Oaks provided food, medicine, shelter and were actively managed to favor maximum acorn production (Blackburn and Anderson 1993). Low intensity fires were regularly used to clear the understory and remove competition.

With the coming of the Europeans, agriculture and grazing thousands of cattle and sheep transformed the landscape. As with the Native Americans, development was concentrated near water and oaks, both considered essential to survival. As more and more oaks were removed to provide firewood and create more grazing space, the water table began to drop. Remaining springs were channelized into "zanjas", further impacting the local hydrology (Gumprecht 1999). Predators were removed, and the consequences of increased rodent and livestock consumption of acorns, along with increased spread of annual grasses limited regeneration. Soils were compacted by the livestock and seedlings were eaten or trampled by many hooves.

By the mid-1800's much of the economy of Los Angeles was based on leather production, using oaks as fuel, and a source of tannins. **Figure 1 – 1886 Map of Timber and Forests of Los Angeles County** on page 34 illustrates the general distribution of oaks at that time. The other main impact came from widespread clearing to create vineyards and orchards. The population explosion began. The pattern of individual tree preservation was established, and the fragmented habitat we see today was fully developed by 1920. Oaks provided the main fuel source for the boom and bust economy that characterized the development of Los Angeles until fossil fuels and electricity became available after 1910 (Forrest et al. 1981). By 1935, the majority of oaks that were easily accessed had been harvested. **Figure 2 – Los Angeles County 1935 Historical Map of Oak Woodlands** is included on page 35, and is commonly referred to as the 1935 Wieslander Map.

A second growth pattern that began in fragmented areas of the canyons, on steep slopes and along less developed stream corridors was documented. The building boom continued as Los Angeles became the center of pre- and post-World War II manufacturing. Environmental awareness grew along with the developments. By 1970, the California Environmental Quality Act (CEQA) was enacted. This law required full disclosure of any proposed project impacts, required avoidance or reduction of impacts, and most importantly solicited public participation in the planning process.

As awareness of the impacts of losing oak woodlands grew, the County responded by developing one of the first Oak Tree Ordinances in the state in 1982. This well-intentioned effort has increased public awareness about the special role oaks have in our ecosystem. However, it has limitations. By focusing on protection of only individual mature oak trees, the Oak Tree Ordinance (OTO) does not promote regeneration/recruitment, ignores intrinsic benefits, and often leads to fragmentation and isolation. Under the OTO, there is no cumulative impact assessment required to demonstrate how the loss of individual trees impacts the whole woodland. Statistics provided later in this document indicate the OTO alone has not been very successful at protecting oak woodland resources in nearly 30 years of implementation.

The OTO protects aging trees, not communities, and fails to assess benefits provided by oak woodlands in mitigating the effects of fire, flood, erosion, air pollution, water pollution, and loss of species diversity. When oak woodlands are removed, the cost of building the necessary infrastructure to provide a similar level of service once provided by the woodlands is passed on to the community in perpetuity. Additional information on the history and extent of oak woodlands in Los Angeles County may be found in **Appendix 3**.

FIGURE 1 – 1886 MAP OF TIMBER AND FORESTS OF SOUTHERN CALIFORNIA

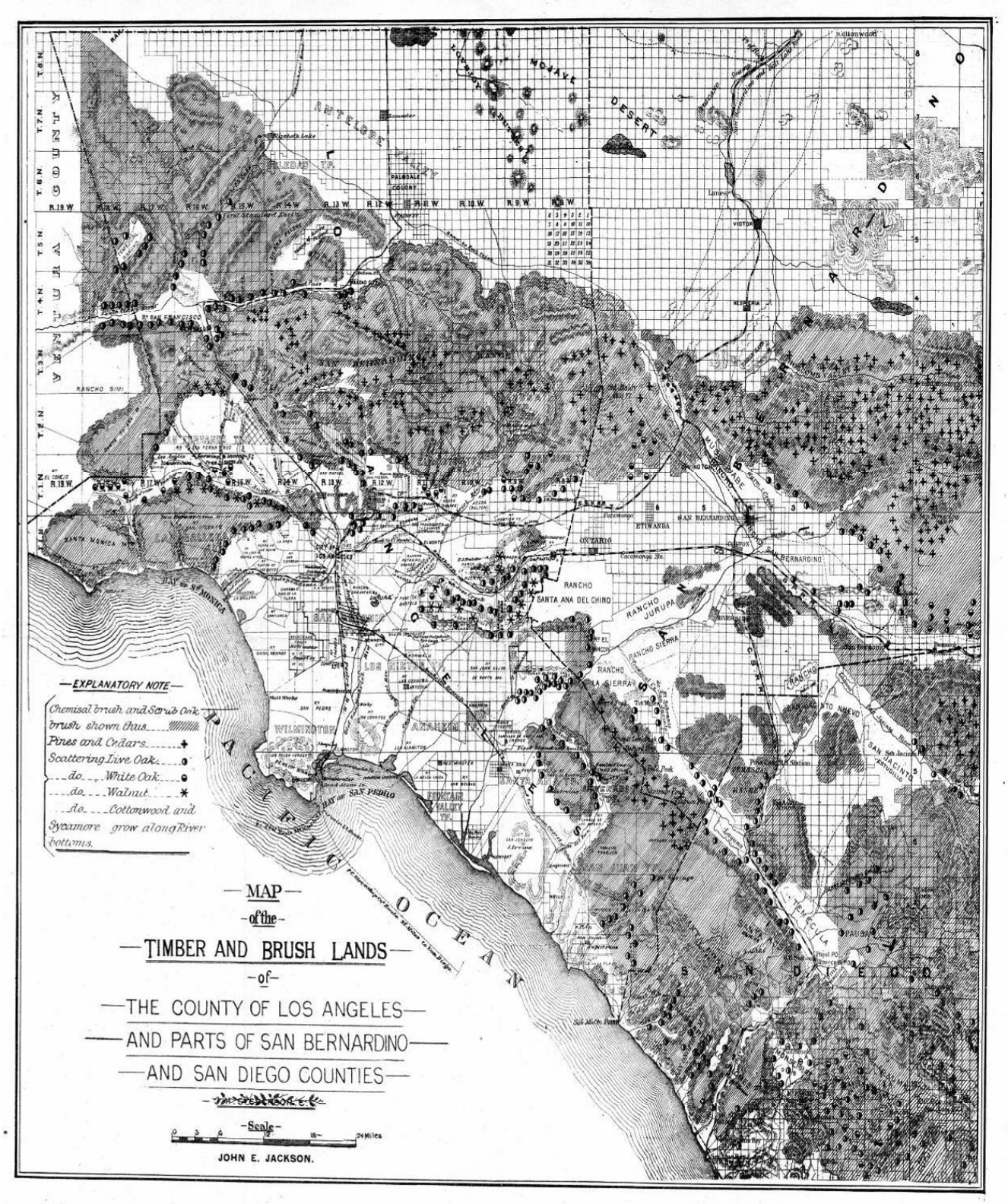
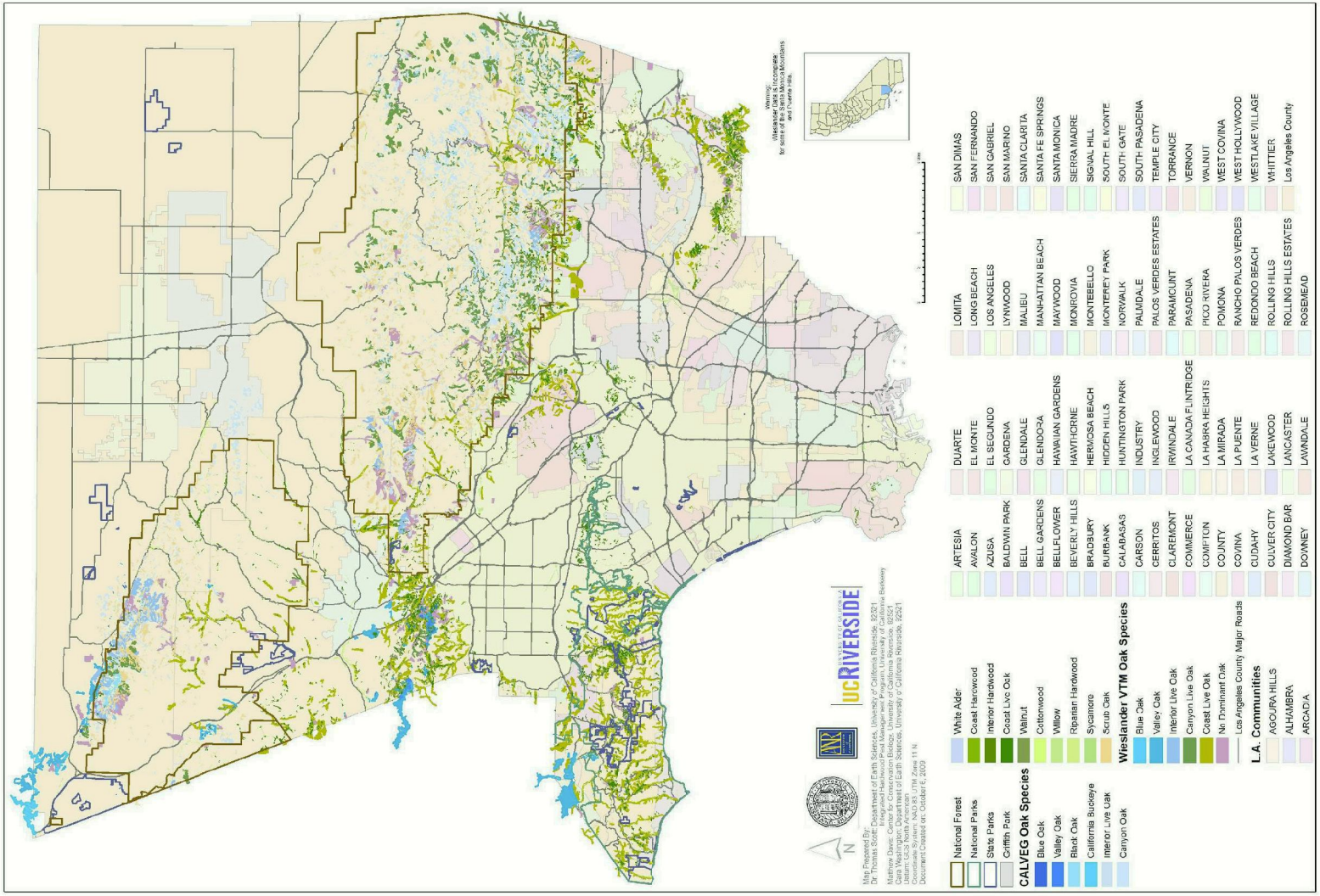


FIGURE 2 - LOS ANGELES COUNTY 1935 HISTORICAL MAP OF OAK WOODLANDS



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III.3 EXISTING OAK WOODLANDS IN LOS ANGELES COUNTY

The geology, climate, and biogeography of Los Angeles County are exceedingly complex, even by the standards of other counties in California. This complexity is reflected in the broad array of oak species (17) in the County, and the even more complex range of conditions where these species occur. County lands range from sea level to 10,000 feet; receive from five (5) to 50 inches of precipitation/year, and; encompass almost all the biomes found in the United States – from coast to mountain to desert. Hence, the range of management options needed to conserve oaks in Los Angeles County must be both flexible and broad to account for the wide range of conditions and idiosyncrasies of the County's oak woodlands. Detailed descriptions of each of the oak species called out in this section are included in **Appendix 4** of this document.

The *Jepson Manual of Higher Plants of California* (Hickman 1993) recognizes five major physiographic-biologic subdivisions in Los Angeles County. There are two provinces, the Southwestern Region of the California Floristic Province and in the north-east, the Mojave Region of the Desert Province. The Southwestern Region is represented by three sub-regions having distinct topographic, climatic and plant-community characteristics: South Coast (Coastal Basins and Valleys), Peninsula Ranges (Chino and Puente Hills), and the Transverse Ranges. The Transverse Ranges sub-region is further divided into two districts representing localized physiographic and biotic variations: the San Gabriel Mountains and the Western Transverse Ranges, the latter including the Santa Monica, Santa Susana and Liebre Mountains (west end of San Gabriel Mountains).

The result of this physical and environmental diversity is high biologic diversity. In addition, a new species has been recently recognized in the county (Roberts 1995) and two hybrids occur not recognized in Jepson (Boyd 1999). Oak communities are similarly diverse, with at least 13 alliances (regional community types) and numerous associations (local community types). The following account provides a summary of the Los Angeles County oaks species and communities identified in various publications and reports.

Coast live oak is the dominant species in most lower-elevation woodlands, but is co-dominant with **valley oak** in the San Fernando Valley, Santa Clarita Valley, and Santa Monica Mountains.

Scrub oak species cover a larger area than either of these two species, but often occur as individual shrubs in chaparral or coastal sage scrub vegetation.

North County mixed oak woodland
C. Cuba

Black, Canyon Live and **Interior Live** oaks are dominant species above 5000 ft. **Valley**, **Engelmann**, **Island**, **San Gabriel Mountain Leather**, and **Nuttall's** oaks are relatively rare and are typically provided special consideration in CEQA evaluation. No oak population in California has been listed under the Endangered Species Act (ESA) or California ESA; however, **Nuttall's** oak and several other narrowly distributed species could be petitioned for listing.

Table 1 – Native Oaks of Los Angeles County, lists the native oak species of Los Angeles County, as well as sub-species, and their distributions, general locations, growth forms, habitat types, and CALVEG types. Hybridization is common among species of the same family of oaks. Hybrid species are not included in the table.

Oak woodland areas based on CALVEG data have been mapped for this plan and are illustrated in **Figure 3 – Los Angeles County Oak Woodlands Areas Overlay** on page 41. This figure includes a 200 foot buffer around the woodland interface zone and potential oak woodlands zone, as mapped by CALVEG. Due to the scale of the CALVEG layers used to generate this map, it is possible that not all parcels located within the illustrated oak woodlands areas actually support existing oak trees. Individual parcels will be examined further whenever a permit request or application for voluntary oak woodland conservation is reviewed. Oak woodlands are identified in the legend with a differentiated color scheme, based on geographic distribution. Individual maps of these geographically referenced oak woodlands are presented in **Appendix 12**. Selected based on their density of oak woodland areas, these include the Santa Monica Mountains, Puente Hills, the San Gabriel Mountains, and the Santa Clarita Mountains.

TABLE 1 – NATIVE OAKS OF LOS ANGELES COUNTY

RED OAKS (sub-genus Lobatae)

Name	Species & ssp.	Distribution	Locations*	Growth Form	Habitats	CALVEG*
Coast Live Oak	*Quercus agrifolia (var.* agrifolia & *oxyadenia)*	Restricted to California Coast Ranges	CR, MTFT, MTS	Single Stem Tree in savannahs or forests	coastal canyons and n-slopes, foothills	CoLO, VO, RMH
Black Oak	*Quercus kelloggii*	Patchy distribution across mountains	MTS	Single Stem Tree in forests; woodlands	>4000ft elv.; gentle slopes	BlaO, MMH
Interior Live Oak	*Quercus wislizenii* (vars. *wislizenii and frutescens*	Widespread across western North America	MTF, MTS	Shrub to Multi-stem Tree in scrub; forests	>18 in precipitation in colder mtns	ILO, CMCh, SMCh, GBMSc

GOLDEN-CUP OAKS (sub-genus) Protobalanus

Name	Species & ssp.	Distribution	Locations*	Growth Form	Habitats	CALVEG*
Canyon Live Oak	*Quercus chrysolepis*	Widespread across western North America	SGM, LM,	Multi-stem tree, shrub at lower elevations	Steep canyons	CaLO, ILO, MMH
Island Oak	*Quercus tomentella*	Restricted to Channel Islands	ISL	Multi-stem Tree, in scattered stands	Canyon bottoms, north-facing slopes	CoMH
Palmers Oak	*Quercus palmeri* (*Q.dunnii*).	Widespread but patchy distribution across AZ & CA	LM	Shrub to Multi-stem Tree, in scrublands	desert transition	LMMCh, CaB, T/MScO, ScO
Oregon White Oak	*Quercus garryana var. breweri*	Widespread in pacific states	TR	Shrub	>4000ft elv. on gentle slopes	UMMCh, GBMSc
Huckle-berry Oak	*Quercus vaccinifolia*	Widespread in pacific states	MTS	Shrub to Multi-stem Tree in chaparral; forests	>4000ft elv. on gentle slopes	UMMCh, GBMSc

WHITE OAKS - TREE SPECIES (sub-genus Quercus)

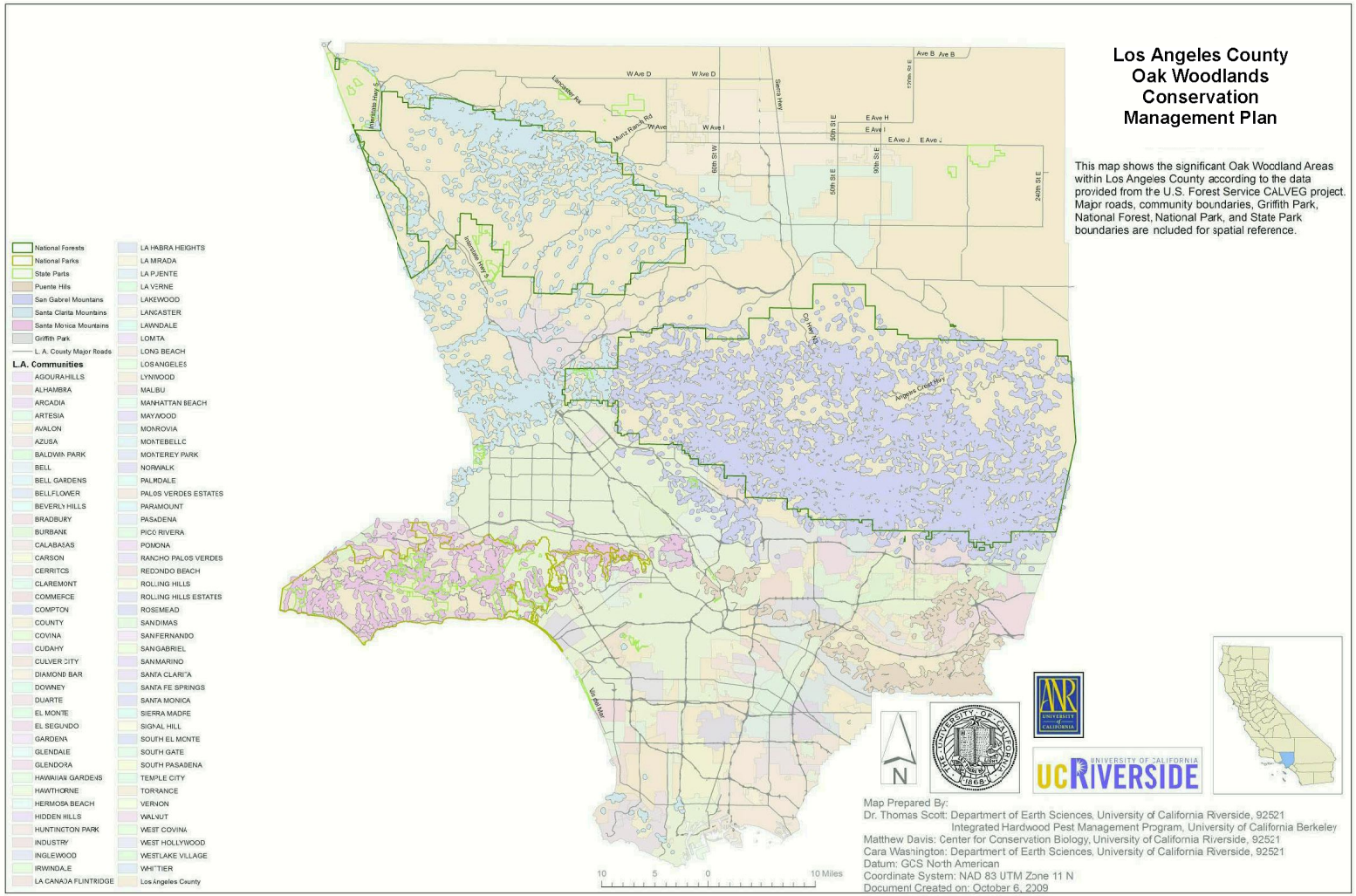
Name	Species & ssp.	Distribution	Locations*	Growth Form	Habitats	CALVEG*
Valley Oak	*Quercus lobata*	Widespread across California	SFV, SMM, SSM	Tall, Single Stemmed Tree in open woodlands	Gentle slopes, alluvial soils	VO, RMH
Blue Oak	*Quercus douglasii*.	Widespread across California	LM, TM	Single Stemmed Tree in woodlands	gentle slopes	BluO
Engel-mann Oak	*Quercus engelmannii* Greene	Endemic to cismontane So. Ca.	SGF	Single Stemmed Tree in dense to open woodlands	Rocky substrates	CoLO
Scrub Oak	*Quercus berberidifolia* Liebm	Widespread across California	MTFT	Shrub to small tree in chaparral	valley slopes	CMCh, SMCh
Tucker's Scrub Oak	*Quercus john-tuckeri* Nixon & Muller	Restricted to Transverse & Coast Ranges	DM	Shrub to small tree in chaparral	desert transition	T/MScO, ScO, HDMSc, CaB
Pacific Oak	*Quercus pacifica* Nixon & Muller	Narrowly restricted to Channel Islands	SCAI	Shrub to Multi-stemmed Tree in small stands	Canyon bottoms, north-facing slopes	CoMH
Muller Oak	*Quercus cornelius-mulleri*	Restricted to Transverse & Peninsular Ranges	DM	Shrub to small tree in chaparral Shrub	desert transition	T/MScO, ScO, HDMSc
Leather Leaf Oak	*Quercus durata* var. *gabrielensis*	Endemic to San Gabriel Mts	SGM	Shrub to Multi-stemmed Tree in small stands	desert transition	LMMCh, HDMSc
Arizona Scrub Oak	*Quercus turbinella* Greene	Widespread but patchy distribution in AZ & California	TM, LM	Shrub to Multi-stemmed Tree in small stands	desert transition	LMMCh, HDMSc

***Key to CALVEG types and the location abbreviations:**

CALVEG Types:	
Sc -	High Desert Mixed Scrub
LMMCh -	Lower Montane Mixed Chaparral
T/MScO -	Tucker / Muller Scrub Oak
ScO -	Scrub Oak
HDMSc -	High Desert Mixed Scrub
CoMH -	Coastal Mixed Hardwood
CaB- -	California Buckeye
CoLO -	Coast Live Oak
CaLO -	Canyon Live Oak
CMCh -	Ceanothus Mixed Chaparral
SMCh -	Southern Mixed Chaparral
BluO -	Blue Oak
VO -	Valley Oak
RMH –	Riparian Mixed Hardwood
UMMCh -	Upper Montane Mixed Chaparral
GBMSc -	Great Basin Mixed Scrub
ILO -	Interior Live Oak
MMH -	Mixed Montane Hardwood
Locations:	
L -	Liebre Mountains
SM -	Santa Monica Mountains and Simi Hills
SS -	Santa Susana Mountains
SG -	San Gabriel Mountains and foothills
V -	Verdugo Mountains
C-P -	Chino and Puente Hills

[1]

FIGURE 3- LOS ANGELES COUNTY OAK WOODLANDS AREAS OVERLAY



[1] This figure has been formatted to fit on the page and may not be to scale.

Table 2 below summarizes the **Acreage of Vegetation with Oak Species in Los Angeles County**. Vegetation types are listed by acreage on private lands and public lands, based on USFS PSW Vegetation Mapping Program (http://www.fs.fed.us/r5/rsl/projects/mapping/) for the southwest ecoregion of California. Most areas of Los Angeles were mapped since 2007.

TABLE 2 - ACREAGE OF VEGETATION WITH OAK SPECIES IN LOS ANGELES COUNTY

Woodland (OW) Type	San Gabriel Foothills & urban islands of oak woodlands	Santa Clarita and San Fernando Valleys	Santa Monica Mountains	Desert Transition	Private woodland	Public woodland	Total Acreage for Type
Coast Live Oak	13662	9380	4073	341	27456	16494	43950
Valley Oak	2938	919	134		3991	1510	5501
Black Oak						1430	1430
Canyon Live Oak	1546	90		1186	2822	43305	46127
Engelmann Oak						835	835
Blue Oak				95	95	31	127
Interior Live Oak				73	73	10	83
Coastal Hardwoods	2544	153	300	0	2297	4053	7051
Interior Hardwoods	493	33		105	631	14626	15258
Riparian Woodlands	1398	3365	611	599	5972	6604	12576
Total Ac. all Woodlands Types w/ Oaks	22581	13940	5118	2399	43337	88898	132936
OW in Lowlands & foothills	16599	10299	4208	341	31447	18880	50327
Mountain OW and Forests	1546	90	0	1186	2822	44735	47557
Scrub Oak Vegetation type	6574	304	173	1119	8170	68725	76895

The Oak Woodlands Habitat Conservation Strategic Alliance's (Alliance) estimate of oak woodland areas in Los Angeles County (using USFS PSW Vegetation Mapping data) is similar to Gaman and Firman (2006), but different survey techniques and more recent analyses yielded slightly different estimates of acreage among woodland types. Gaman and Firman used the Land

Cover Mapping and Monitoring Program (LCMMP: California Department of Forestry and US Forest Service; http://frap.cdf.ca.gov/projects/land_cover/index.html); and provided a statewide assessment of oak woodlands and forests. As such, they did not consider oak trees found in vegetation where they were sub-dominant, including riparian, cottonwood, alder, sycamore or pinon-juniper woodlands (see LCMMP vegetation descriptions); nor did they consider scrub oak vegetations, which are included in this report because scrub oak species grow large enough to be included in the current OTO and CEQA amendments (>5 inch DBH). There are also differences in individual woodland boundaries and classification types, with only about a 46% level of overlap.

Most important, both the Gaman and Firman (LCMMP) and the USFS (CALVEG) estimates have limitations due to the minimum polygon size used in the mapping process, and as a result do not include small stands of oaks that are covered under the Oak Woodlands Conservation Act supplemental statute (SB 1334). To resolve the issue of oak woodlands that were not mapped in either the LCMMP or CALVEG but fall under CEQA (and the Los Angeles County Oak Tree Ordinance), we created a map of potential oak woodlands (**Figure 4**) that was overlain on the data presented in **Figure 3**. This boundary of potential oak woodlands was derived from a Light Detection and Ranging (LiDAR) dataset maintained by the Los Angeles Region Imagery Acquisition Consortium (LAR-IAC) overlain on the CALVEG data. The LiDAR data provided imagery for all tree canopy areas within County administered lands. Translating this imagery into specific oak woodland types was beyond scope of the current study, so all tree canopy areas within 500 feet of CALVEG oak woodlands were considered to be potential oak woodlands with the exception of horticultural trees in landscaped settings. This produced an inclusive estimate of potential oak woodland areas, but provides the most realistic map of the areas in Los Angeles County potentially affected by the new CEQA guidelines for analyses of impacts to oak woodlands. The potential area could be refined in the future to eliminate canopies of non-oak species.

III.4 OAK WOODLAND OWNERSHIP PATTERNS

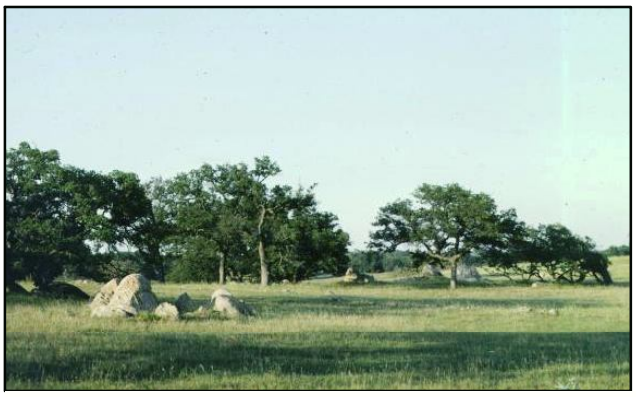
Gaman and Firman (2006) estimated that Los Angeles contains about 145,000 acres of oak woodland and forest, assigning about three quarters of these areas to public ownership (110,000 acres) and one quarter to private ownership (30,000 acres). They suggested that almost all of the

oak woodlands on private lands have been developed, stating that "There are a few thousand acres of undeveloped private oak woodland [in Los Angeles County], but most of them are likely to be developed by 2040." Their analysis was based on data designed to monitor large-scale change in vegetation, rather than an analyses of parcels in oak woodland areas of Los Angeles County. The Alliance's estimates for oak woodlands in private ownership are higher (44,000 acres, 33% of total woodlands). The discrepancy occurs because there is no current map of oak woodland preserves, easements, parks and other oak woodland conservation measures for Los Angeles.

Oak woodlands with the greatest probability of conversion tend to occur in linear stands or small patches embedded in other vegetation types. These interface woodlands often cover only a portion of larger parcels, making it somewhat difficult to reconstruct the actual acreage of woodlands converted into housing and other land-uses. Approximately 55,400 parcels between 0.5 and 160 acres are within or adjacent to oak woodlands throughout the county. Approximately half of the privately owned acres are within the Santa Monica Mountains area, even though this area has only about 1/4 of the overall woodland acreage in the region. This dichotomy points out the dispersed nature of the oak resource in many urbanizing areas.

III.4.1 Distribution of Oak Woodlands Among Parcels in Los Angeles County

Los Angeles County has the majority of oak woodlands in the Southern California region, with oaks representing over 80% of all trees (Gaman and Firman 2006). **Table 3 - Percent Distribution of Oak Woodlands in Unincorporated Los Angeles County,** on the next page, summarizes the existing, known distribution of oak woodlands in Los Angeles County.



Engelmann oaks T. Scott

TABLE 3 – PERCENT DISTRIBUTION OF OAK WOODLANDS IN UNINCORPORATED LOS ANGELES COUNTY

	Public Lands	Private Lands				Percent
Woodland Types Including Oaks	**All Types**	**Foothills and Lowlands**	**Santa Monica**	**Valleys**	**Desert**	**Total %**
Canyon Live Oak	30.8	1.2	0.0	0.1	0.9	32.9
Coast Live Oak	5.0	5.9	4.6	4.6	0.3	20.3
Walnut Woodland	0.6	2.1	0.2	0.7	0.0	3.6
Interior Hardwoods	3.2	0.1	0.0	0.0	0.1	3.4
Coastal hardwoods	0.9	1.7	0.3	0.1	0.0	3.1
Valley Oak	0.2	0.0	0.1	0.6	0.1	1.0
Black Oak	1.0	0.0	0.0	0.0	0.0	1.0
Blue oak	0.0	0.0	0.0	0.0	0.1	0.1
Interior live oak	0.0	0.0	0.0	0.0	0.1	0.1
Riparian Woodland	1.6	0.4	0.6	0.9	0.1	3.6
Cottonwood Woodland	0.4	0.0	0.0	0.3	0.3	1.0
Sycamore Woodland	0.4	0.1	0.2	0.0	0.0	0.7
Scrub oaks	25.0	1.9	0.2	0.2	0.9	28.2
Grand Total (%)	69.5	13.7	6.3	7.6	2.8	100.0

While much of the oak woodland is in public ownership within the Angeles National Forest, National and State Parks, the edge effects related to fragmentation and lack of coordinated long-term stewardship planning puts these protected areas at risk as well. The opportunities to reconnect isolated woodlands, encourage regeneration and expansion back into the historic range, and implement voluntary conservation in present oak woodlands are all outgrowths of this planning project.

Table 4 - Size of Parcels Within or Adjacent to Oak Woodlands in Unincorporated Los Angeles County summarizes the size of parcels within or adjacent to oak woodlands in the County that **may** represent opportunities for conservation or preservation.

TABLE 4 - SIZE OF PARCELS WITHIN OR ADJACENT TO OAK WOODLANDS IN UNINCORPORATED LOS ANGELES COUNTY

Parcel Size	Number of Parcels	Number of Acres
0.5-1 acre	15,000	11,000
1-5 acres	24,000	58,000
5-20 acres	12,000	95,000
20-80 acres	3,500	130,000
>80 acres	900	162,000
TOTAL	**55,400**	**456,000**

III.5 CHARACTERIZING OAK WOODLANDS FOR PLANNING PURPOSES

There is a wide variation of oak woodland types within Los Angeles County. Therefore, qualitative standards, such as associated understory conditions, including site topography, soil genesis, hydrology, presence of oak woodland associated flora and fauna, along with a description of the stand characteristics, such as number of trees, size, health, and vigor, should be used to provide a descriptive assessment, or definition, of the present condition of the oak woodland on a given site. The ecologic and aesthetic values of the oak woodland depends on the sum of activities of all members (including humans) and forces acting on the development, stability or even the demise of the oak woodland.

Oak woodlands are critical to ecological stability, therefore identifying the status of the sites within Potential Oak Woodlands Conservation Areas being considered for voluntary conservation or acquisition should be ranked based on their present condition and potential for restoration.

III.5.1 Condition Ranking: Oak Woodland Impact Decision Matrix

Because oak woodlands exist both in a temporal sense (present versus past distribution, potential for restoration) and a spatial sense (contiguous to fragmented, single tree, site and watershed), the OWCMP recommends adopting the definitions provided by the ***Oak Woodland Impact Decision Matrix*** (Guisti et al 2008) to identify **"Intact", "Moderately Degraded"** or **"Severely Degraded"** oak woodlands. These tiers of existing conditions provide property owners and planners guidelines for developing suitable strategies for developing an appropriate evaluation of proposed impacts, or strategies for potential conservation and restoration.

While specific thresholds of significance are not developed in **PART 1** of this document, proposed land development projects that may encroach upon, or otherwise affect oak woodlands should be evaluated, in part, based on whether the proposed project would degrade the oak woodland to the point that it would cause the woodland to be classified in a more degraded tier than its existing condition. Similarly, efforts to conserve or restore oak woodlands as mitigation for project impacts should attempt to restore or conserve oak woodlands that are at least as intact as those being impacted by the proposed project.

As discussed in the ***Oak Woodland Impact Decision Matrix***, these conditions are defined as follows:

III.5.1.a Intact Woodlands

Oak woodland on grazed hillsides
T. Garrison

The site is currently in a "wild" state where all ecological functions such as groundwater infiltration, shade, habitat, nutrient cycling, carbon sequestration, wind/noise/dust abatement, and the stand is self-sustaining and regenerating. Given that the majority of even the most intact oak woodlands in Los Angeles County have understory grasslands dominated by invasive exotic grasses and forbs, and that fire exclusion or frequency has altered many native oak woodlands, the designation of **Intact** needs to be somewhat

flexible. The designation of **Intact** refers mainly to sites where oak woodlands support associated flora and fauna and are free from destructive land practices that limit long-term persistence.

If a site is defined as **Intact,** any proposed projects that would alter the oak woodland should receive the highest level of scrutiny. Project alternatives that would avoid this alteration should be fully explored and given first consideration.

III.5.1.b Moderately Degraded

Non-native plants & fill material near shrub oak woodlands on urban interface
C. Cuba

Even though the site has been altered, oak woodlands persist and retain some of their functions. Natural regeneration is possible, wildlife use still occurs, and some level of ecosystem services are still present. Examples of moderately degraded oak woodlands in Los Angeles include golf courses intermixed with fragmented oak woodlands, many of the subdivisions and urban-wildland interface areas found in the Santa Monica Mountains, Santa Clarita Valley, along the foothills of the San Gabriel Mountains and throughout the Puente Hills. The majority of oak woodlands in the County fall within this category.

If a site is defined as **Moderately Degraded**, any proposed project needs to be reviewed within the context of preventing further ecosystem function losses. This could include reduction of project scale, adjusting project footprint to reduce impacts, identifying opportunities to preserve connectivity, increase groundwater retention, and restore habitat.

III.5.1.c Severely Degraded

These sites have been drastically altered from the natural condition to accommodate residential, commercial or industrial uses, and oak woodlands remain in scattered locations. Natural regeneration is not possible. Soil is compacted, contaminated or paved. Wildlife habitat is limited and associated understory vegetation has been replaced by managed non-

native landscaping. Examples of severely degraded oak woodlands include small clusters of oaks within or surrounding parking lots, isolated small stands in parks or open spaces surrounded by urban development, or woodlands remaining along freeway corridors.

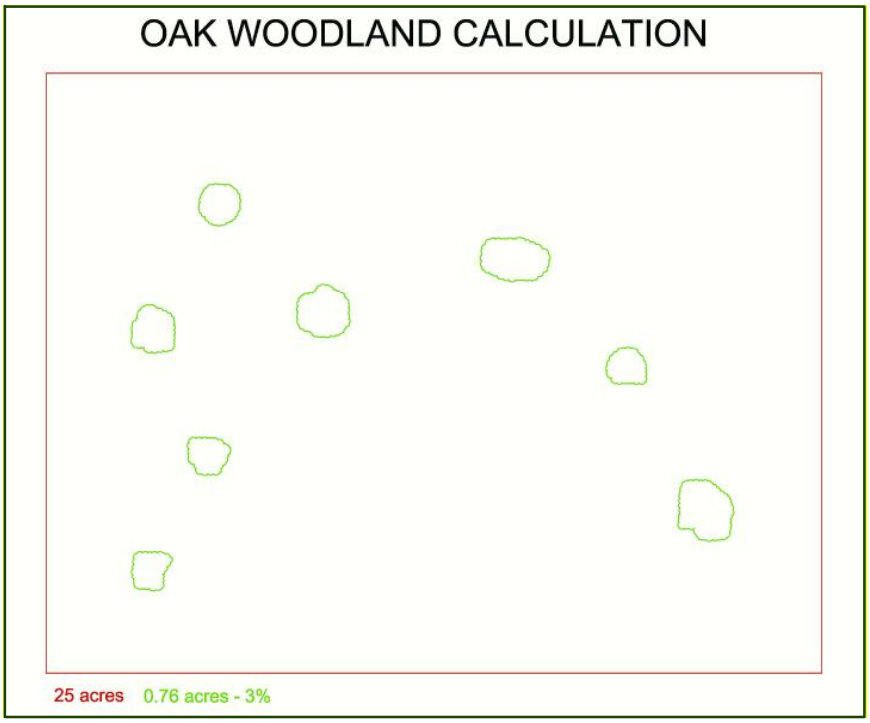
A **Severely Degraded** site should be reviewed within the context of adjacency to other oak woodland stands, potential for restoration and the potential to restore connectivity and ecosystem functions. A **Severely Degraded** site may be a good choice for a mitigation area that could be restored.

Remnant oaks in commercial site adjacent to pockets of other oak trees
C. Cuba

III.6 WOODLAND AREA CALCULATION STANDARDS

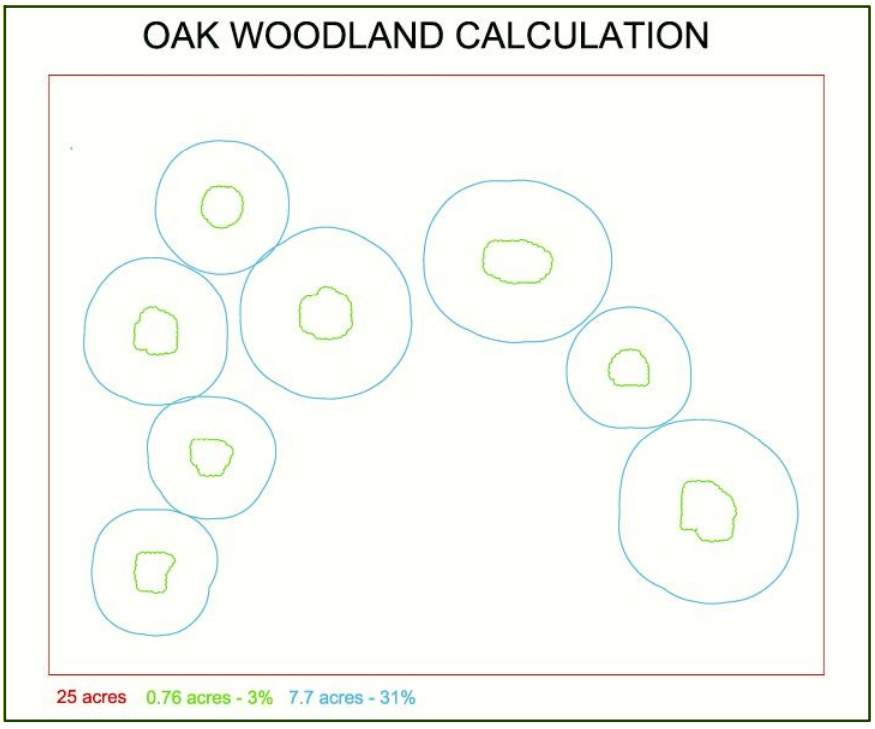
One important tool for evaluating oak woodlands is estimating woodland area. Because the CDFG definition identifies any area that currently or historically supported at least 10% canopy cover, this calculation is a critical element in evaluation, in addition to the condition ranking.

Using the state definition, woodland area is determined by measuring the area of oak tree canopy multiplied by ten (10). Depending on the oak species, canopies can overlap or be separated. By examining the County aerials, the density of oak woodland canopy for a given location can be evaluated in context of adjacent parcels, as woodlands rarely follow parcel boundaries. An example is illustrated on the following page. **Part II** of this plan expands the opportunities for additional protective measures.



Canopy area, as depicted by the green driplines, occupies only 3% of this 25 acre site.

The same method would be used to calculate the extent of the oak woodland anywhere, even when property lines are unaccounted for.



The extent of oak woodland is represented by the blue circle. This area is calculated by taking the area of the tree canopy and multiplying by 10, which then represents 10% coverage for each individual tree. The oak woodland is a portion of these 25 acres.

This represents a single example of the many potential oak woodland configurations.

III.7 CANOPY RETENTION STANDARDS

The goal of the OWCMP is to prevent additional loss of oak woodland canopy within Los Angeles County and to maximize the total amount of canopy cover, while recognizing that the density of desirable cover varies by species and oak community composition. Most of the ecosystem function benefits provided by oaks (air quality, temperature moderation, water quality, groundwater recharge, erosion and sediment reduction, etc.) are directly proportional to total canopy cover. The benefits for wildlife habitat and canopy cover are more complex and dependent on the oak community type, and the associated plants and animals relying on that community. One size does not fit all.

Another issue to consider is the relationship between tree density (the number of trees per unit area) and canopy cover. Optimal tree density is species and community dependent and varies with successional stage. Some species of oaks thrive when individuals are clustered together (scrub oaks), while other species require more space surrounding each individual to provide optimal use of available water and nutrients (valley oaks). When tree density is excessive, competition can weaken all the individuals in the stand. Conversely, when trees are too far apart, pollination is impeded and regeneration rates are low. Canopy retention goals thus need to take into account the natural spacing of the species, the diversity of oaks at a given site, and optimal sustainable cover. The spacing is also affected by elevation, with higher densities typically found in lowland areas, decreasing as elevation increases.

In order to help identify high priority opportunities for voluntary oak woodland conservation, we propose the following guidelines in Table 5.

TABLE 5 – CANOPY RETENTION GUIDELINES

High Priority for Conservation	The site has relatively high levels of tree canopy cover at stand densities that are sustainable.
Moderate Priority for Conservation	The site has intermediate levels of tree canopy cover. Stand densities on portions of the site may be excessively high or low.
Low Priority for Conservation	The site has low or very low levels of tree canopy cover OR most of the stand has unsustainably high tree densities.

III.8 POTENTIAL OAK WOODLANDS CONSERVATION AREAS

III.8.1 Criteria for Selecting Parcels in Potential Oak Woodlands Conservation Areas

By using the following method, it is possible to identify locations within Los Angeles County where optimal conditions occur for oak woodland preservation and restoration. Restoration planting and voluntary conservation of parcels within these areas provides the best opportunity to expand and replace oak woodlands lost to development.

Criteria for designating a parcel as part of the Potential Oak Woodlands Conservation Areas and thus eligible for easement acquisition, restoration, or long-term agreement under the Oak Woodlands Conservation Act include:

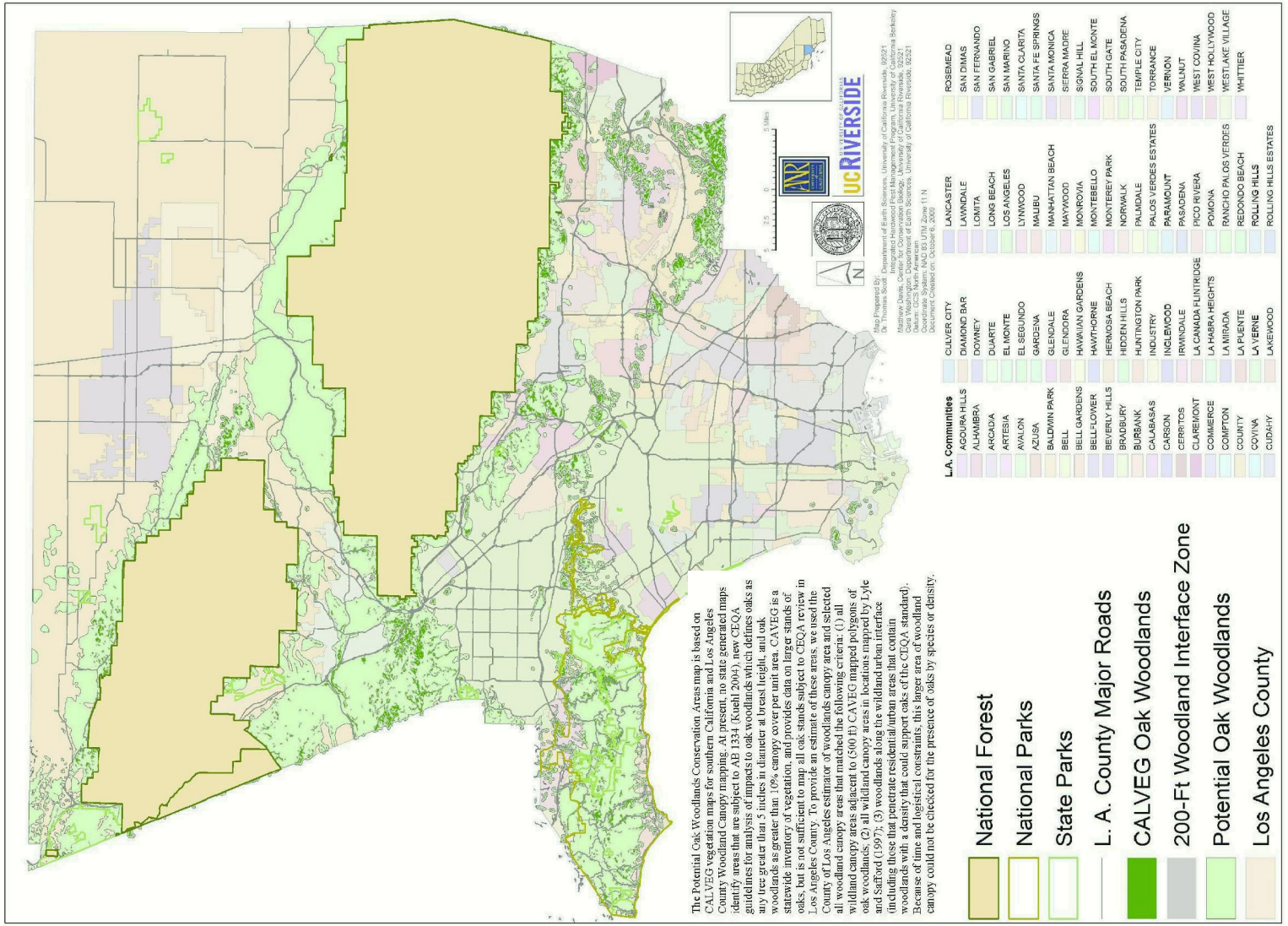
- Project area is adjacent to core oak woodland habitat area (either public or private).
- Project area is of sufficient size to provide superior wildlife values.
- Project area will improve connectivity and reduce fragmentation.
- Project area will improve wildlife corridors and linkages, especially in riparian areas.
- Project area meets suitability criteria for slope, aspect, drainage, etc. that would support restoration and regeneration.
- Project area contains a diverse size-class structure of oak woodland and/or a diversity of oak species that will promote the sustainability and perpetuation of oak woodlands.
- Project contributes towards regional or community goals, provides scenic open space, protects historic or archeological values, or contains unique geologic features.
- Project removes or reduces the threat of habitat conversion from oak woodlands to some other use.
- Project has the potential to serve as a stewardship model for other landowners.
- Project is NOT a required mitigation action.

Valley Oak woodland/savannah habitat is considered to be the highest priority for restoration and acquisition. **Figure 4** illustrates **Potential Oak Woodlands Conservation Areas in Los Angeles County**. As previously discussed on page 43, this map provides the most realistic map of the extent of potential oak woodlands in Los Angeles County. It includes CALVEG

data, a 200 foot buffer around the CALVEG data, and a larger buffer around these data derived from Los Angeles County LiDAR data to establish the boundaries of potential oak woodlands. These data are referred to in the map legend respectively as CALVEG Oak Woodlands; 200-foot Interface Zone; and Potential Oak Woodlands. Parcels located within in the boundaries of Potential Oak Woodlands may have more potential for oak woodland conservation than areas not included. However, small pockets of significant oak woodland resources are found within the urbanized areas outside the Potential Oak Woodlands boundaries and depending on species and location may also be candidates for potential conservation and restoration.

A gnarled old-timer
C. Cuba

Figure 4 - Potential Oak Woodlands Conservation Areas in Los Angeles County



III.9 STRATEGIES FOR PRESERVING POTENTIAL OAK WOODLANDS CONSERVATION AREAS

III.9.1 Incentive Strategies for Oak Woodlands Preservation

A main priority of the Los Angeles County OWCMP is to prevent impacts to existing oak woodlands and reward private landowners who take voluntary actions to preserve and restore these resources. To that end, the following incentive ideas are proposed for consideration. It is hoped that additional incentives will be developed and added to further encourage conservation of oak woodlands.

Coast live oak and Valley oak woodland
R. Dagit

While the priority is to enhance preservation and restoration of oak woodlands within the Potential Oak Woodlands Conservation Areas, any property located within a mapped oak woodland, or that can demonstrate suitability for the existence of an oak woodland on the parcel, could qualify.

III.9.1.a Dedications or Donations of Land

Dedication of conservation easements or donation of oak woodlands to a public trust is one way to achieve the goals of the Los Angeles County OWCMP. While this option applies more to larger developments, it also has implications for single family residences as well.

III.9.1.b Conservation Easements

Both the County and local Land Trusts are able to accept dedication of conservation easements. These easements allow the landowner to retain title for the land, but the County or Land Trust would obtain any development rights. By not exercising those rights, development of that land is prevented. Dedication of a conservation easement

"runs with the land", resulting in development restrictions will continue in perpetuity, even if the land is sold.

The easement must be donated for one of the following conservation purposes:

1. Preserving land areas for outdoor recreation by, or the education of, the general public. This includes preserving a water area for boating of fishing, or preserving a nature or hiking trail. The public recreation or education use must be substantial and regular.
2. Protecting a significant natural habitat of fish, wildlife, plants or a similar ecosystem. Public access may be restricted, e.g., to protect the habitat, or other justifiable reasons
3. Preserving open space (including farmland and forest land) for the general public's scenic enjoyment or under a governmental policy. The public must receive a significant benefit.
4. Preserving historically important land area or a certified historic structure. In this case, an easement on a private residence may qualify,

Oak woodlands are likely to fall under any of the first three categories, though choosing the second option may result in significantly more continued privacy than the others.

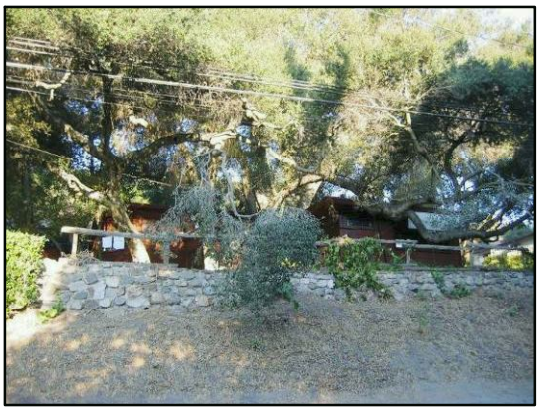
Why would a landowner give up property rights? In fact, the landowner is not losing property rights; he is controlling the future of his land by extinguishing them. Many landowners are motivated by personal, ethical or aesthetic reasons and want to ensure the long term sustainability of their property. Conservation easements provide a landowner an opportunity to protect a family's oak woodlands permanently, while still using existing structures or other uses.

There are several mechanisms for a landowner to benefit from dedicating an Oak Woodlands Conservation Easement, including both income and estate tax benefits.

Income and Property Tax Credit - Landowners who donate oak woodland conservation easements may be able to receive a tax receipt for the full value of their ecological gift. Landowners should consult with their tax or financial advisors to understand all of the potential local, state, and federal incentives that may be available. As feasible, the County will work to make general information available about these potential incentives to members of the public and professional planners.

Estate Planning - Landowners who donate oak woodland conservation easements may receive estate tax benefits, provided that they exceed the federal estate tax exclusion, which is currently $3.5 million per person. The maximum for the exclusion is $500,000 or up to 40% of the assessed land value, whichever is less value.

NOTE: The County Assessors Office should be consulted to determine the impact of a proposed conservation easement to the property owner's property taxes.



Coast live oak growing inside house
R. Dagit

III.9.1.c Transfer of Development Rights

Los Angeles County has a program in small lot subdivisions of the Coastal Zone where lots that are limited in allowable square footage can be retired in perpetuity, and the square footage transferred to another parcel. This could be applied in the existing County program for small lot subdivisions, such as those found in the Topanga Canyon area, as found in Zoning Ordinance Sections 22.44.119 and 22.44.123. These sections allow larger residences where the residential development rights on certain small lots on steep slopes are permanently extinguished. In the case of oak woodlands, transfer of development rights for parcels within Priority Oak Woodlands Conservation Areas would be obtained in exchange for higher density development in already disturbed locations.

III.9.2 Applying for Oak Funds

Both the state Oak Woodlands Conservation Fund and the County Oak Forest Special Fund identify specific criteria for allocation of monies. These funds can be used for:

Mule deer in riparian oak woodland
C. Cuba

- Purchase of oak woodland conservation easements
- Land improvement that enhances oak woodlands
- Cost-sharing incentives for landowners who enter into long-term conservation easements
- Public education and outreach
- Technical assistance for the purpose of preserving oak woodlands.

The funds specifically CANNOT be used for:

- Purchase of lands or easements that are required to satisfy a condition of project approval, including, but not limited to, a mitigation measure required pursuant to CEQA or mitigate a negative declaration (FGC 1366(b))
- Easements that involve the use of involuntary eminent domain (FGC 1368)

III.9.3 Land Acquisition

Outright purchase (fee simple) acquisition of valuable oak woodland resources is the most direct way to ensure long term protection, however funds for such purchases are limited. One of the benefits of the OWCMP is that the Priority Oak Woodlands Conservation Area map highlights the areas where oak woodland conservation funds should be directed first. Funding from the Los Angeles County Oak Forest Special Fund, as well as possible funding from the state Oak Woodlands Conservation Fund (managed by the Wildlife Conservation Board) or other grant sources will first be directed towards obtaining parcels identified as important either due to current intact conditions or other factors listed above.

III.10 CERTIFICATION OF PROPOSALS FOR OAK WOODLANDS CONSERVATION FUNDS

In order to comply with the grant application requirements of the Oak Woodlands Conservation Fund, as well as to provide transparent, consistent guidance for selecting projects for funding by the County, the following process is recommended:

1. Confirm that the property is located within a Priority Oak Woodlands Conservation Area and that the proposal provides more protective measures that are otherwise required (FGC 1366 (c)).
2. Document the existing condition of oak woodlands on the property.
3. Determine if securing the property would meet all the selection criteria outlined in *Section III.8.1 Criteria for selecting parcels in Potential Oak Woodland Conservation Areas.*
4. Identify likelihood of loss in the absence of intervention in the near term (< 5 years), mid-term (5-20 years), long term (>20 years).
5. Evaluate cost per acre. Easement applications that are most cost-effective in comparison to the actual resource value of the easement should be given priority (FGC 1365).
6. Develop a management plan to preserve, enhance, or restore sustainable oak woodland functions.

More detailed procedures may need to be developed by the County Forester and the Department of Regional Planning.

Riparian woodlands, Topanga Creek
R. Dagit

IV. MONITORING THE EFFECTIVENESS OF THE OAK WOODLANDS CONSERVATION MANAGEMENT PLAN

A key to documenting the success of the OWCMP is thorough monitoring. Monitoring responsibilities lie with both the County and individual projects as part of their mitigation monitoring programs. With available GIS tools, the County should be able to adequately identify the expansion or loss of oak woodlands over time, as well as characterize the changes to these resources associated with development. The success of implementation should be evaluated within 3-5 years of adopting the OWCMP and then every five years thereafter to provide feedback needed to evaluate cumulative impacts over time.

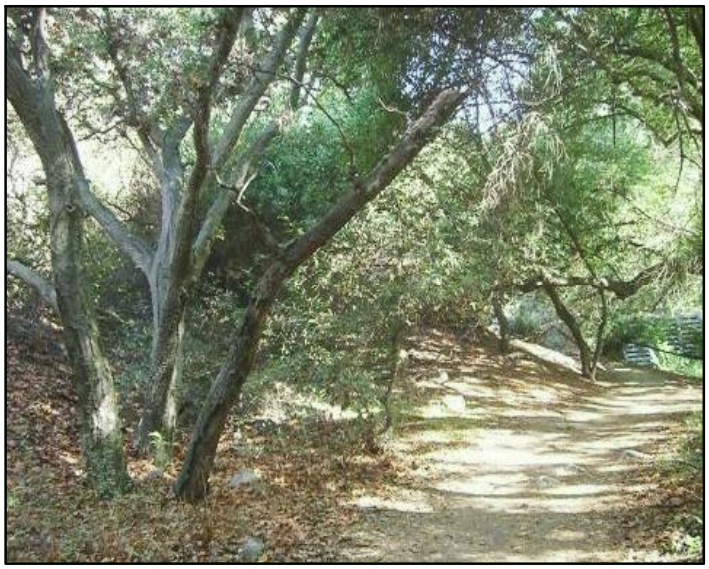
In order to evaluate the impact of the OWCMP on a larger scale, the County should contribute project data to the Natural Resources Projects Inventory (www.ice.ucdavis.edu/nrpi). This collaborative effort between the UC Davis Information Center for the Environment (ICE) and the California Biodiversity Council (CBC) has compiled a statewide database of thousands of natural resource projects, and provides a broader look at restoration project effectiveness.

Among the Coast live oaks
R. Dagit

By working with local partners, the County could establish a standard protocol for monitoring oak woodland conservation easements, developing adaptive management strategies and seeking grants to fund research on effective restoration and enhancement techniques. This could also expand to collaborations with local universities and other interested organizations to identify additional ways to monitor and evaluate the short and long-term success of oak woodlands conservation and enhancement projects.

PART II

PLANNING
AND IMPLEMENTATION
ELEMENTS OF THE OAK WOODLANDS
CONSERVATION MANGEMENT PLAN



Canyon oak, Coast live oak, California bay, big leaf maple
& white alder woodland
C. Cuba

V. SCOPE AND PURPOSE OF PART II

The recommendations provided in **PART II** are proposed for incorporation into relevant County regulations and planning documents. Some of these recommendations simply entail administrative changes, but others need more than administrative review. Following the adoption of **PART I** of this plan, the Board of Supervisors may direct the appropriate County departments to evaluate impacts of the proposed recommendations and provide recommended actions that can proceed, as needed, through the required county and public review and hearing process.

The implementation strategy has three components, which encompass the range of outcomes for oak woodland management:

1. Preservation, where oak woodlands remain intact and functional;
2. Conservation, where woodlands are integrated into land development; and,
3. Mitigation, where loss of oak woodlands is compensated for off-site.

The Preservation and Mitigation categories are self-evident; woodlands are either preserved or lost and off-site restoration implemented. The third category, Conservation, covers oaks woodlands from backyards to community open space. It reflects the gradient of woodland resource quality already present in Los Angeles County suburbs and the urban-wildland interface. The goal is to maximize the values of oak woodlands in a human-dominated landscape, with the recognition that these values must be matched against existing conditions and the other demands for land use in Los Angeles County.

The outcomes for preservation, conservation, and mitigation can also be viewed as options for property owners. For example, some large land holders may have a preservation strategy, agreeing to Habitat Conservation Plans in exchange for an ability to develop other areas of their property. Small landowners with limited options for conservation or preservation may opt for the sacrifice/mitigation strategy, where they mitigate the loss of oaks during construction by contributing to a conservation fund. Other landowners may conserve oaks woodlands by incorporating them into development plans or conservation easements, maximizing the amenity value of these woodlands in home sale prices.

Ideally, determination of the boundaries of an oak woodland would include not only the root protection zone (as defined by the County Oak Tree Ordinance), but incorporate the "Biological Protection Zone" (the canopy area x 10), so as to encompass the associated understory species and extend to include any native oak seedlings associated with those trees. This definition conforms to the current state law, but may better encompass the spatial, structural and biological characteristics of current oak woodlands.

Preservation is the preferred strategy.

The key issue is developing a strategy that encourages self-selection by landowners into the appropriate strategy for the location, type, and quality of their oak woodlands. The measurable goal of the OWCMP would be the acreage of woodlands preserved, conserved, or sacrificed, relative to idealized (negotiated) goals for the proportions of Los Angeles County woodlands in each category. The plan advocates the development of a GIS system to track the woodland categories to insure that adopted proportions are achieved as the County builds out to 2040.

V.1 THREATS TO OAK WOODLANDS

Conservation of existing oak woodlands within Los Angeles County is a challenge due to a number of factors that threaten their continued health and longevity. These factors include: land conversion resulting from urban and suburban development; road and infrastructure expansion; low oak seedling recruitment to replace the existing old oaks (also known as a lack of regeneration); increasingly limited access to groundwater in some areas that increases the mortality of both young and old oaks; introduced pests and diseases; changing climate conditions; and clearing for fire protection around developed areas. Identification of existing oak woodlands through mapping overlays and a monitoring program in Los Angeles County would detail the specific regional threats to these habitats.

Golden spotted oak borer
www.fs.fed.org

V.1.1 Land Conversion

Urban and rural residential developments are responsible for the majority of oak woodlands acreage conversion in Los Angeles County and elsewhere. The majority of the remaining oak woodlands within the county are found within unincorporated areas, many located on the fringes of the incorporated cities. Most of the landscape within the cities of Los Angeles County has been developed. As a consequence, it is the oak woodlands located within the unincorporated areas that are most often at risk for future growth by developers

It is noted that developers have been participating in the preservation of oak woodlands through the designation of conservation areas and open space for many years. Conservation areas and oak woodland preservation has been included in the numerous major developments throughout Los Angeles County. However, once an oak woodland resource is fragmented, paved and developed, restoration of functional ecological services is exceedingly difficult. By proactively identifying Priority Oak Woodlands Conservation Areas, the County can evaluate the potential site specific and cumulative impacts of a proposed development and make informed decisions that balance the need for housing with the need to protect significant oak woodlands.

Local and regional housing growth demands new infrastructure, including highways and roads. Road expansion projects located in regions where oak woodlands are found will continue to threaten these resources.

Retained oaks in development site
R. Dagit

V.1.2 Fragmentation

Fragmentation refers to the disruption of contiguous oak woodlands into smaller pieces that are separated by varying distances. The resulting isolated islands of oak woodland habitat are subjected to increased edge effects associated with proximity to developed areas. Impacts to native wildlife from domestic cats and dogs, increased populations of meso-predators such as raccoons and coyotes, invasions of non-native plant species, and increased night lighting and

irrigation all increase along the perimeter of fragmented habitats. The net effect of these disruptions results in degraded habitat and loss of biodiversity.

As new development intrudes into intact oak woodlands, fragmentation can directly impact natural reproduction. Oaks are wind pollinated and it has been shown that for maximum pollination to occur, valley oak trees need to be within 100-300 meters of each other (Sork, et al 2008). As the density of individual trees goes down and distances between individuals increases, the likelihood of successful pollination decreases. The inability to produce acorns has long term implications for sustainability that need to be carefully considered.

V.1.3 Infrastructure

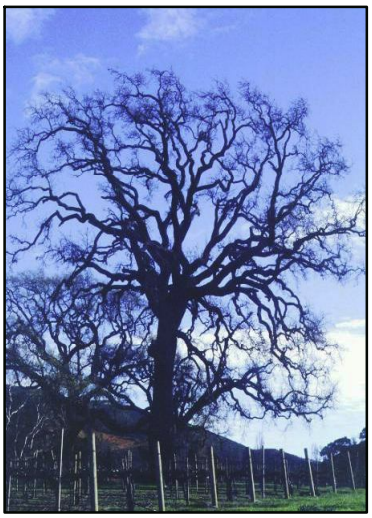
Currently the County Department of Public Works, as well as Caltrans, and utility companies are exempt from complying with oak tree protection requirements for existing structures and right of ways, although not exempt from complying with carbon emission requirements, as dictated by CEQA. Roads, power poles, and water lines are found in the majority of oak woodlands within Los Angeles County.

Utility line replacement
C. Cuba

Maintenance activities such as those that involve trenching within oak woodlands, and pruning oak trees to provide line and roadway clearance can have significant impacts. This work should be done in accordance with the policies and requirements of the Oak Tree Ordinance and incorporate Best Management Practices to reduce impacts.

V.1.4 Agriculture

There is an increasing trend to convert oak woodlands to vineyards, especially in the Santa Monica Mountains region of the County. As the County considers future vineyard development it should carefully assess the implications of this agricultural practice on the preservation of oak woodlands.



Vineyard oaks
R. Dagit

Vineyards have the potential to significantly increase erosion and sedimentation, especially on steep slopes formerly covered by deeply rooted chaparral and oak woodland. It is possible to retain substantial oak woodlands around the perimeter of vineyards, but Best Management Practices such as bioswales, limited use of fertilizers, pesticides and herbicides, limited irrigation and use of ground cover crops are essential.

One of the main problems with conversion of oak woodlands to vineyards is the impact to oak dependent plant and animal species. Conversions near riparian corridors or core habitat areas have a greater impact than conversion in previously fragmented or degraded areas. Large mammalian predators prefer wide habitat corridors linking to core habitat and preferentially use those areas with the least amount of disturbance (Hilty and Merelender 2004).

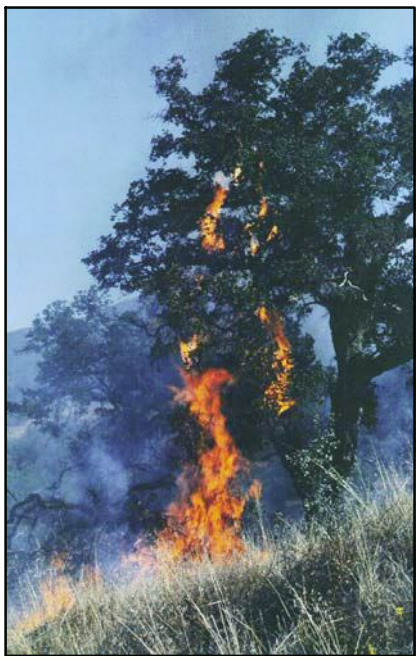
V.1.5 Low Groundwater Levels

Low groundwater tables resulting from groundwater overdraft can be particularly problematic for valley oak survivorship. Valley oaks often produce deep roots that can reach the ground water. This allows the tree to access a constant supply of moisture throughout the summer and permits fast growth of the canopy. Because the tree canopy is dependent on this permanent source of water, a substantial drop in the depth of the water table puts the tree under severe water stress. Although root growth can keep pace with minor fluctuations in the groundwater table, roots cannot grow fast enough to compensate for a rapid drop of several feet or more in the water table level. Furthermore, once the tree becomes severely water stressed, root growth is adversely affected, which can cause a spiraling cycle of increasing water stress that can severely debilitate or kill mature trees.

Large, mature valley oaks are more susceptible to rapid reductions in water table depth than are younger trees that may be able to adapt more rapidly to changing conditions. In addition, effects of lowered water table depth are more severe in sandier soils that store relatively low amounts of moisture in the soil profile than loam or clay loam soils.

V.1.6 Fire Frequency

Native Americans used periodic low intensity fires as a management tool to enhance oak regeneration, reduce pests and diseases, and reduce competition from dense annuals that reduces water availability (Blackburn and Anderson 1993). Oak trees have thick bark and the ability to regenerate lost canopy quickly following periodic burns, but at a cost. The use of stored energy reserves reduces the vigor of the tree for several years and can result in lower acorn production (Plumb 1980). Changes in fuel loads related to fire suppression and fuel modification policies over time have altered the dynamic of wind driven wildfires in the oak woodlands and chaparral mosaics found along the urban-wildland interface (Franklin 1995). Unfortunately, high intensity summer/fall wildfires are now the norm, and the impacts of these large-scale burns appear to inhibit oak regeneration, as well as reduce the health and vigor of mature trees that are burned. Thus the interval time between fires, as well as the intensity of the fires, has a significant impact on the integrity of oak woodlands. **Figure 5 – Fire History and Oak Woodlands in Los Angeles County** on page 69 illustrates a 50-year fire history in the County with an oak woodlands overlay. It does not include our most recent fires.



Fire ladder effect in oak woodlands
T. Scott

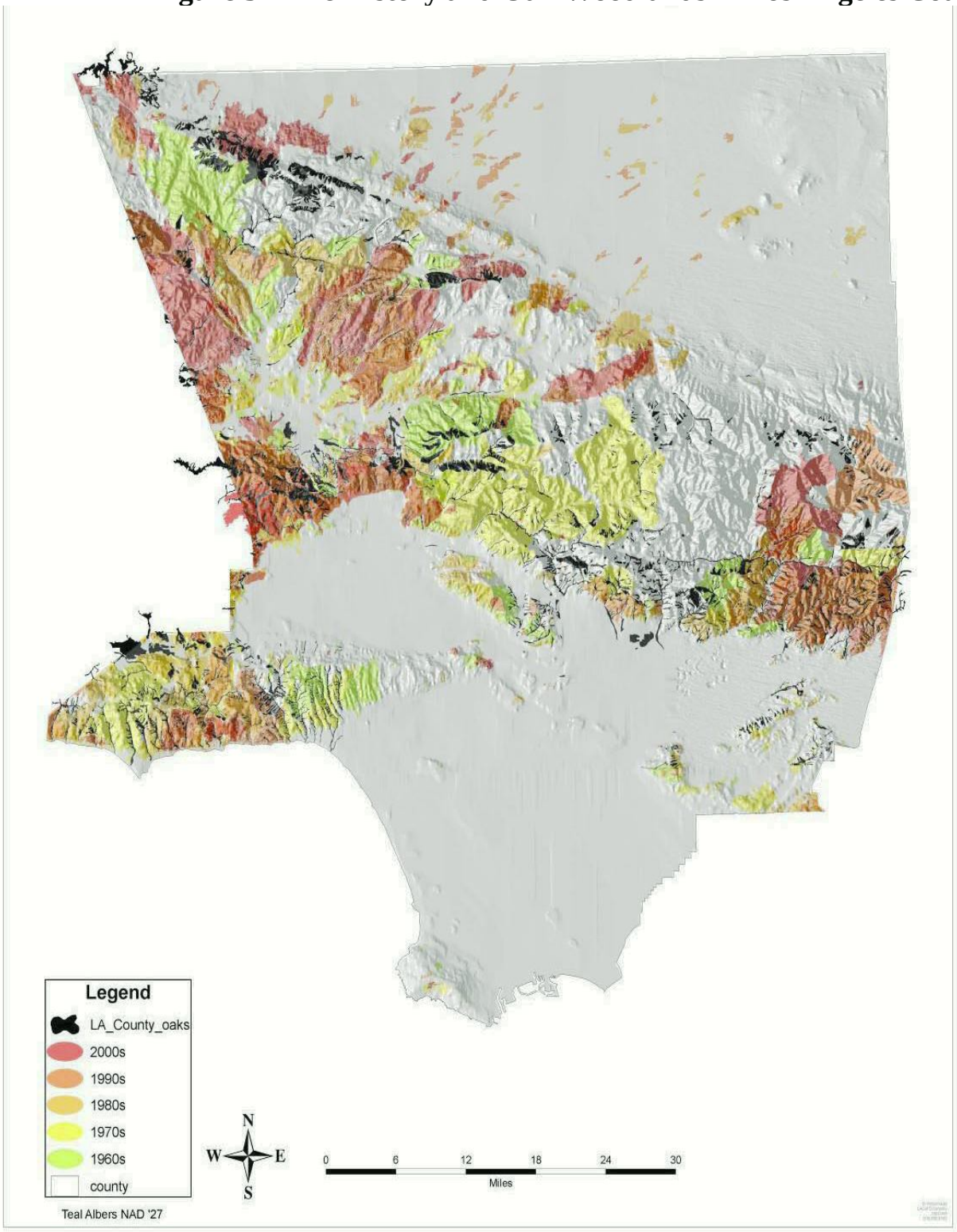
Destruction of oak woodlands by wildfire has rarely been evaluated, and yet the potential loss of both existing stands and opportunity for regeneration are significant. Large stands of oak woodlands do recover from wildfires, but it takes many years. In the meantime, regeneration is lower and the overall health of the stand is compromised.

V.1.7 Fuel Modification (Brush Clearance) Impacts

Oaks are considered to be one of the safest trees within a wildfire context, due to their slow ignition rates. However like everything else, they can burn. Clearing oak woodlands for fire protection within 100-200 feet of structures is fast becoming a major impact to oak woodland resources in Los Angeles County. Removal of understory shrubs and either limbing-up or thinning oak trees results in a loss of structural and species diversity. As more structures are

built in areas adjacent to oak woodlands, more fuel modification must be done that adversely affects the resource. Fuel modification within oak woodlands results in increasing fragmentation that could have severe repercussions for long-term sustainability.

Figure 5 - Fire History and Oak Woodlands in Los Angeles County



Source: Los Angeles County Fire Department, Forestry Division

V.2 CEQA EVALUATION OF OAK WOODLANDS CONVERSION

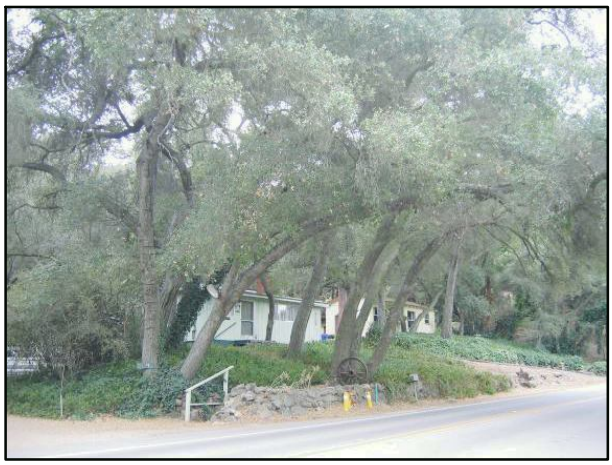
Coast live oak in residential yard
T. Garrison

The California Environmental Quality Act (CEQA) *Section 21083.4* requires a jurisdiction, such as a city or county, to analyze impacts to existing biological resources that may occur when a particular project proposal requesting a discretionary approval from that jurisdiction is being considered. Potential impacts to oak woodlands resulting from the implementation of a proposed development project are analyzed as a component of the biological resources of a project site. A detailed discussion of the specific impacts according to Appendix G of the *State CEQA Guidelines* is found in **Appendix 11**.

There is currently no oak species occurring within Los Angeles County that is considered a special-status species by CDFG. The valley oak and the Engelmann oak are considered by the County to be locally sensitive species. Protection for individual trees is provided through the provisions of the County's Oak Tree Ordinance (Part 16 of the County zoning code, sections 22.56.2050 through 22.56.2260), originally established in 1982 under Ordinance 82-0168. The processing of an Oak Tree Permit is intended to provide protection to individual trees, rather than consideration of oak woodland as a habitat with its associated ecological functions and values.

As the majority of oak woodland resources in the state are not considered to be sensitive vegetation associations, their protection is implemented through the application of the Public Resources Code Section 21083.4, Conversion of Oak Woodlands, directed by California Senate Bill 1334 which was enacted in 2004. The CEQA provisions became effective in January 2005. This CEQA section requires a county (these provisions do not apply to incorporated municipalities) to be responsible for analysis of impacts to oak woodlands, and when found to be significant, the County, as lead agency, must require mitigation for the impacts to the oak resource. The provisions within CEQA for the protection of oak woodlands are detailed in **Appendix 11**.

V.2.1 Thresholds of Significance



Non-native understory
R. Dagit

One problem that the County faces is the determination of the threshold of significance for impacts to oak woodlands. This is especially true for residential areas of the County that abut wildlands, such as areas within the Santa Monica Mountains or along the foothills of the San Gabriel Mountains. In these areas, as in others, the oak woodlands have already been disturbed through the construction of single-family residences and community commercial centers over many decades.

Under CEQA (21083.4(b)), if the County determines that there may be a potentially significant impact on oak woodlands, one or more of the following mitigation alternatives must be imposed:

- Conserve oak woodlands through the use of conservation easements;
- Planting an appropriate number of trees to a) restore former oak woodlands or b) can only be used for 1/2 of the mitigation requirement;
- Contribute to the Oak Woodlands Conservation Fund;
- Other mitigation measures identified by the County.

A well-evaluated project impact will not necessarily be easy and should consider as much of the ecological function of the woodland habitat in the analysis of impacts. These functions need to be examined at several spatial levels: landscape, woodland, stand and individual trees. For reference, **Table 6 - Impact Prediction Checklist**, created for the OWCMP is located on the next page.

TABLE 6 - IMPACT PREDICTION CHECKLIST

Criteria for determining significance of a proposed project. **Mitigation measures cannot ensure against long-term changes affecting the ecological processes and services. Therefore, any of the following occurrences can result in potentially significant impacts.**	**Significant for Intact Woodlands**	**Significant for Moderately Degraded Woodlands**	**Significant for Severely Degraded Woodlands**
Net loss of oak woodland acreage	X	X	
Increased habitat fragmentation	X	X	
Loss of vertical and horizontal structural complexity	X	X	
Loss of understory species diversity, locally uncommon or rare species or associations	X	X	
Loss of food sources for wildlife	X	X	
Loss of nesting, denning, burrowing, hibernating and roosting structures	X	X	
Loss of habitats and refugia for sedentary species and those with special habitat requirements, i.e. mosses, lichens, rocks, native grasses and fungi	X	X	
Road construction, grading, trenching, activities affecting changes in grade, other road-related impacts	X	X	
Stream crossings, culverts, and road associated erosion and sediment inputs	X	X	
Loss of riparian function, reduced bank stability and increasing sedimentation or water temperature that impacts native fishes and other aquatic species	X	X	
Road building activities that aggravate existing conditions		X	
Changes in environmental conditions that prevent existing residual trees from natural regeneration		X	
Proposed project designs that result in construction that poses barriers to wildlife or fish passage	X	X	
Proposed project designs that result in the probable introduction or expansion of invasive plants and animals	X	X	
Loss of individual heritage trees that are recognized and/or protected by ordinance or statutes	X	X	X
Loss of appropriate recruitment sites for recognized and/or protected heritage tree species	X	X	X
Loss of individual trees where the natural occurrence and range of the species has been dramatically reduced and altered resulting in decreased recruitment/restoration potential for the species	X	X	X
The removal of even a few individual trees that represents a significant portion of the existing population of that species	X	X	X
Loss of ecosystem services such as groundwater recharge, erosion protection, water quality protection, temperature moderation	X	X	X
Changes to carbon sequestration potential	X	X	X
Loss of viewshed, aesthetics, amenity value, public recreation opportunities, historic or cultural resources	X	X	X

V.2.2 Impact Magnitude Evaluation

The following questions are proposed for evaluating the magnitude of potential impacts to oak woodlands:

1. What is the spatial extent of the proposed action on the site scale?
   - Metrics could include: changes in road density, percent canopy cover and number of oak species present pre and post development. Defining the boundaries of oak woodlands can be somewhat confusing. By calculating the canopy cover of each subject tree and multiplying by 10 (to identify cover area), the spatial, structural and biological characteristics of oak woodlands can be more accurately represented.

2. At the landscape scale, would the proposed action cause fragmentation, loss of connectivity, or changes to ecosystem functions within a larger geographic area?
   - Metrics could include: changes in road density within 1 km of the site, distances between development and woodlands, changes in woodland size and configuration increasing patches and edge effects, impacts to wildlife corridors, increased fire risk, and changes to hydrology.

3. Will the proposed action cause long-term impacts to the oak woodland structure and ecosystem services?
   - Metrics could include: duration of proposed impacts, future consequences such as reduced regeneration, increased exotic weed cover, increased fire frequency or fuel modification clearing.

Scenarios that may be less than significant may include:

- Removal of a small number of immature trees for a road widening project.
- Removal of a single tree from a residential property associated with a remodeling project.
- Actions associated with tree care, maintenance, and health, such as pruning, shaping, etc.
- Removal and replacement of street trees.

Valley oak in a parking lot
R. Dagit

- Removal and replacement of landscape trees associated with existing developments.
- Removal of hazard trees where the threat of tree failure could injure people or property.

Following evaluation of the above checklist criteria, significance would be determined depending on the existing site condition, the degree to which the condition will be changed by the proposed action, and the location of the site with respect to the Potential Oak Woodlands Conservation Areas. The following two tables, **Table 7** and **Table 8**, are examples of matrices that have been used by others to determine significance and impact level based on initial site conditions.

TABLE 7- DECISION MATRIX DETERMINATION OF SIGNIFICANCE CONCEPT (From Guisti et al 2008)

	Site Condition		
Degree of Impact	**Undisturbed Intact**	**Moderately Degraded**	**Severely Degraded**
Low	Moderately significant	Least likely significant	Least likely significant
Moderate	Highly Likely significant	Moderately likely significant	Least likely significant
High	Significant	Highly Likely significant	Most likely significant

TABLE 8 - IMPACT LEVEL AND INITIAL SITE CONDITION MATRIX
(Modified from Guisti et al 2008)

	Initial Site Condition		
Impact Level	**Intact Woodland**	**Moderately Degraded Woodland**	**Severely Degraded Woodland**
Low	Minimal disturbance to stand structure and composition and habitat features resulting in no increased edge habitat or fragmentation; road and stream crossings are not being considered; activities will not result in the introduction of exotic or invasive species. [Minimal site or spatial disturbance may still result in significant impacts to an intact or core woodland.]	Regeneration potential is being maintained across the site; understory oak associates present or can be restored; expansion of developed areas are centralized; new road and stream crossings not being considered. [In the absence of special circumstances, statutes or ordinances, this may represent a non-significant impact.]	Majority of remnant trees are retained; understory removal or road widening protects existing tree health; no further loss of ecosystem services considered. [In the absence of special circumstances, statutes or ordinances, this may represent a non-significant impact.]
Moderate	Detectible change or reduction in canopy, structure or composition; loss of some habitat features, subtle impacts increasing fragmentation, edge creation or loss of connectivity (fences, roads, other artificial barriers or buffers). [These impacts are considered significant.]	Regeneration potential is being marginalized; developed areas expand into previously undeveloped areas; new roads or stream crossings proposed; habitat features are being lost; activities will add exotic and invasive species. [These impacts are considered significant.]	Loss of a majority of existing trees; activities will inhibit or harm residual tree health and vigor; barriers constructed will increase fragmentation; ecosystem services will be lost or degraded. [These impacts are considered significant.]
High	Obvious change or reduction or loss of canopy, structure or composition; loss of existing habitat features; fragmentation and parcelization of contiguous ownerships; introduced roads, stream crossings and/or exotic invasive species; creation of edge effects; construction of barriers (fences, roads, etc.). [These impacts are considered significant.]	Large scale impacts including loss of habitat, understory, resulting in fragmentation and increased edge effects; Loss of woodland structure and changes in composition in large continuous woodland patch. [These impacts are considered significant.]	Loss of remnant trees or stand increases fragmentation across the landscape through loss of connectivity. [These impacts are considered significant.]

V.3 CUMULATIVE IMPACT EVALUATION

Cumulative impacts to oak woodlands involve consideration of the changes to those communities resulting from the specific project under review, and the development of all other recent, approved and pending projects of which the lead agency is aware. Cumulative analysis is important in the CEQA process as it serves to identify the combined impacts of multiple projects on a landscape level. While a single proposed project may not pose significant impacts to oak woodlands on its own merit, when combined with other projects impacting similar local resources, it could trigger a significant impact for which full mitigation is not feasible. The feasibility for full mitigation of oak woodland habitat is reduced because the areas available for these habitats to exist have been greatly diminished.

V.3.1 Carbon Sequestration Estimation

Retained oaks in development project
C. Cuba

AB 32 legislation requires the state of California to reduce its emissions to 1990 levels by 2020, and also includes long-term goals for further reductions. As part of AB 32 implementation, the state is requesting that all counties develop a local Climate Action Plan to help achieve the goal of reducing emissions to 1990 levels by 2020. In July 2009, the Natural Resources Agency issued regulatory amendments for CEQA analysis and mitigation for the potential effects of greenhouse gas (GHG) emissions. The loss of sequestered carbon, and the potential for future sequestration impacts associated with oak woodland conversion need to be documented.

California forest carbon regulatory policy is based on the "net present value" of carbon biological emissions, meaning that a CO_2 forest emission avoided today is worth far more than an emission avoided tomorrow. This carbon sequestered by existing native trees is far more crucial than the potential carbon stored by any mitigation measures. Net present value and other forestry factors make fashioning proportional carbon mitigation for oak woodland conversions the most complicated of any greenhouse gas (GHG) sector.

Los Angeles County is developing a Climate Action Plan to provide specific analysis and effective/enforceable mitigation standards for project biogenic GHG emissions. Biogenic emissions include those from materials that are derived from living plant cells, as opposed to GHG emissions derived from fossil fuels, limestone and other materials that have been transformed by geological processes. Not one AQMD that has adopted GHG thresholds of significance has yet included biological emissions in their calculations. Moreover, there is no GHG legal interaction between CEQA and AB32; CEQA rules at the project-level.

Each county is allowed to identify a reasonable threshold of significance, incorporating the sum of habitat effects and both direct and cumulative carbon emission effects. These distinct habitat and carbon impacts are analyzed using different criterion and require separate mitigation measures. Due to the complexity of replacing the benefits of oak woodlands, it is difficult to consider their loss as anything but significant.

Biogenic GHG emissions associated with land-use change are carbon dioxide, methane and nitrous oxide. Forest conversions may result in direct greenhouse gas emissions. Further, such conversions remove existing forest stock and the potential for further carbon sequestration. Sequestration is recognized as a key mitigation strategy in the Air Resources Board's AB 32 Scoping Plan. (Appendix C, 168).

Although the Climate Action Reserve Forest Project Protocol (Version 3.1) was rescinded by the Air Resources Board in February 2010, several elements of that plan are potentially applicable to the County Climate Plan. The Forest Project Protocol identifies three types of projects that would qualify for the Climate Action Reserve, including reforestation (restoring forest cover), avoided conversion (permanently conserving forests at risk of conversion to other uses), and improved forest management (maintaining or increasing carbon stocks on forestland). Participation in this program is voluntary and requires that a conservation easement be recorded for Avoided Conversion projects on privately held forestland (if owned by a public entity, see protocol for details). It also requires that project credits (sequestered carbon) must be monitored and verified for 100 years from their issuance.

Conversion of oak woodlands has both direct and indirect cumulative impacts on the levels of biological GHG emissions. Direct emissions are associated with disposal of impacted trees and understory debris (down wood, mulch, roots, etc.). The indirect cumulative impact is a result of the loss of carbon sequestration potential over time. Each single mature coast live oak has the potential to sequester over nine (9) tons of carbon in a 50 year lifespan (Sacramento Municipal Utility District Tree Benefits Estimator). An acre of trees produces enough oxygen for 18 people and removes 2.6 tons of carbon dioxide each year (CaUFC Tree Facts). Overall, it is estimated that oak woodlands and forests in California currently sequester approximately 325 million tons of above- and below-ground carbon (Gaman 2008).

In order to analyze both the direct and indirect cumulative impacts, each oak woodland conversion project must include in the CEQA document the answers to the following questions:

1. *How much sequestered carbon dioxide will be released if the live trees over five inches or greater in DBH (including roots), standing dead trees or downed-woody debris are burned or otherwise disposed?*

Since 2006, the Climate Action Reserve (formerly the California Climate Action Registry) has been developing the Forest Project Protocol, which provides the measurement methodology to analyze forest carbon. Using these methods in conjunction with a forest inventory, foresters and arborists can measure carbon biological emissions associated with the conversion of forests to non-forest uses.

Mitigation oak planting
R. Dagit

There are several other tools available to estimate these values including the US Forest Service Carbon Online Estimator Tool (USFS 2008) and iTree, both of which are available online. Only the CARB forest protocol will be sanctioned by the State of California and specifically recognized by CEQA. Moreover,

under the protocol, all CEQA reports that reference carbon biological emissions must be submitted with the oversight of a state registered professional forester certified by the Climate Action Reserve.

2. *How much potential carbon dioxide sequestration over the next 100 years will be lost as a result of the proposed project?*

   Oak trees live on average for approximately 100 years, and the cumulative sequestration provided by existing oak woodlands is significant. Projecting out the amount of carbon sequestered over an additional 100 years for woodlands that will remain intact, versus those that will be developed provides a basis for understanding how much contribution these trees make. This can be estimated using a number of modeling tools available on-line including FVS, the US Forest Service Forest Vegetation Simulator, and the tools noted above.

3. *How will the loss of oak woodlands and the carbon sequestration they provide be mitigated?*

   The more traditional mitigation measures such as on-site tree preservation and planting seedlings will not do much to help offset the losses associated with removal of oak woodlands. Effective mitigation will need to not only replace the lost acreage by protecting an equivalent stand of comparable size, but also recognize that plantings will take 30-100 years to be effective at sequestering carbon. The costs of mitigation will be significant.

   Because of the long time lag between planting new trees and effective carbon sequestration, it appears that preservation is the only way to mitigate forest carbon biological emissions to less than significant. Avoiding carbon biological emissions now is probably more effective than relying on future emissions avoidance from still to be implemented mitigation measures. Also, the complexity of developing suitable mitigation measures can render them mostly ineffective when they are implemented.

V.4 PRESERVATION

Young of the year steelhead trout dependent on oak riparian cover.
R. Dagit

Preservation is the preferable way to ensure the long-term persistence of oak woodlands in Los Angeles County. Preservation provides the potential to protect and maintain the biological integrity of existing oak woodlands, incorporating all the comprehensive interdependent elements (soil, hydrology, species associations, connectivity, etc.). Essential to this effort is the opportunity to document the current status of oak woodland function on multiple scales, from the individual parcel to watershed level to regional context. This baseline will allow the County to accurately evaluate cumulative impacts associated with proposed land development and track these impacts over time.

V.4.1 Economic Benefits of Preserving Potential Oak Woodlands Conservation Areas

V.4.1.a Avoided Permitting, Mitigation and Monitoring Costs - Streamlined CEQA Process

In many cases, it is possible for sensitive development design to work with and around existing oak woodlands, rather than remove or degrade them. Los Angeles County requires permit fees for impacts to both individual oak trees (Oak Tree Ordinance) and potentially to oak woodlands. If a development project that is subject to discretionary review by the County is determined through the Initial Study process to pose potentially significant impacts to biotic resources, such as oak woodlands, then additional environmental evaluation in the form of a Mitigated Negative Declaration or Environmental Impact Report is required.

Often, the impacts associated with developing with these sensitive biological areas also requires permits from other regulatory agencies such as the U.S. Army Corps of Engineers, California Department of Fish and Wildlife, California Coastal Commission and/or the Regional Water Quality Control Board. Depending on the complexity of the issues, these

permits and the CEQA process can take years to complete. The mitigation measures identified as being necessary to mitigate significant impacts may also add to the cost of the project. Identifying and quantifying the carbon sequestration impacts adds another layer of complexity to the process.

Riparian oak corridor on urban edge
C. Cuba

When a development is designed to avoid impacts to the oak woodlands, the time, permit application development, mitigation and monitoring implementation costs may be reduced or avoided completely. In addition, designs that do not require these additional permits could move more quickly through the Regional Planning evaluation process, expediting the project timeline, waiving or reducing permit fees, modifying development standards, provide greater flexibility to development design, or allow transfer of development potential that was lost in preserving oak woodlands.

Mitigation requirements can vary from replacement planting to providing funds to either secure twice the amount of oak woodland habitat that will be lost, or match the Council of Tree and Landscape Appraisers (CTLA) value for the trees, whichever is more. Mitigation will also be required to offset the loss of carbon sequestration provided by the existing stand. The costs of these mitigations can be quite high. A typical mature, healthy coast live oak located in an oak woodland can be valued as much as $100,000. Preserving oak woodlands on the site avoids all these potential costs.

V.4.1.b Carbon Sequestration Benefits

Los Angeles County is in the process of developing a Climate Action Plan, which could provide the framework for assessing carbon sequestration impacts associated with oak woodland conversion or preservation. Carbon cap and trade systems are not yet in place, but the fees associated with offsetting the loss of oak woodlands could be substantial. Such

programs could potentially compensate property owners for preserving oak woodlands. One acre of oak trees is estimated to remove 2.6 tons of carbon dioxide from the air (CaUFC 2009). Quantifiable benefits to carbon sequestration stemming from the preservation, enhancement or expansion of healthy oak woodlands should be used to provide additional financial incentives to property owners who permanently maintain oak woodlands. These protocols may be based on the Forest Project Protocols that were created by the California Climate Action Registry (a project of the Climate Action Reserve) or other recognized sources. Carbon credits or emissions available through either state or federal programs or available on the private market may also be incorporated into this program.

V.4.1.c Existing Oak Woodland Expansion Credits

This incentive would allow a property owner that has preserved, protected or expanded the extent of oak woodland canopy cover on their property over a minimum of five years the ability for a limited expansion of the development footprint into the oak woodland.

Canyon live oak acorn
C. Cuba

Los Angeles County currently uses aerial photographs taken regularly to evaluate changes in vegetation cover. If a property owner can prove that the oak woodland canopy cover on their parcel has expanded by more than 10% over time (five years of continual ownership by that landowner), then that expansion will be evaluated and could be used to fulfill mitigation requirements. This process could also be added to the County Oak Tree Ordinance procedure and a review process established.

For example, suppose a landowner wishes to put an addition on an existing house located within an oak woodland. If he has owned the property for more than five years, he can obtain copies of the aerial photographs covering that parcel and as part of an oak tree report or oak woodland report, document recruitment of new saplings, extent and integrity of the understory vegetation, and document the potential impacts. If the impacts are less than or equal to the mitigation that would be required, and then the loss of a percentage of oak

woodland would be allowed. The property owner would need to maintain the remaining oak woodland expansion in perpetuity through either a conservation easement or deed restriction of some kind.

Because any impacts to an oak woodland caused by a discretionary project affecting trees over five inches in diameter would also be subject to CEQA Section 21083.4 (Conversion of Oak Woodlands) as well as carbon sequestration standards, expansion would need to be sufficient to exceed the level of mitigation measures that would ordinarily have been required (a 2:1 ratio), in order to qualify as "other mitigation measures". This provision would need to be incorporated into the County Code.

V.4.1.d Exemption for Oaks Planted or Volunteers Nurtured by Property Owners

Many volunteer seedlings of oaks are cut down by property owners when small, to avoid any future impediments to potential use of their property. Homeowners are also reluctant to plant oaks in their landscape for the same reason. However, if these volunteers and landscape oaks could be mapped and documented (by submitting a landscape plan to Building and Safety or other appropriate County office to be incorporated into the record for that parcel) as enhancement to existing oak woodlands, or expansion of oak woodlands on a property, then property owners could remove them at a later date if necessary **without penalty, permitting costs, or mitigation requirements.** This allowance for future flexibility to remove the planted oak without penalty under the Oak Tree Ordinance would substantially encourage retention of oak resources.

Canyon live oak seedling
C. Cuba

For example, several landfills have indicated interest in planting oaks on slopes that may or may not need landform grading in the future. At present, non-native tree species are preferred as there is no regulatory issue with future removal if needed. Potentially, these

facilities could develop and submit Oak Woodlands Conservation Management Plans for their sites to clearly identify management strategies that protect the overall resource but provide flexibility. Promoting the planting of oaks in the landscape, especially in locations along the fringes of native oak woodland, could be beneficial for both the property owner and the long-term sustainability of oak woodland resources.

V.4.1.e Fuel Modification Benefits

There are two Los Angeles County programs that are involved in creating defensible space which may impact oak woodland resources. They are the Brush Clearance Program, which is reactive and applies to existing structures; and the Fuel Modification Program, which is proactive and applies to new structures and/or significant remodels (greater than 50% square footage addition). The relevant sections of the Los Angeles County Fire Code that apply to fuel modification and brush clearance around structures are detailed in **Part I** on pages 16-18.

Each year County residents in High Fire Danger areas incur significant costs in order to meet fuel modification requirements. Clearing up to 200 feet from all structures can be very costly. The presence of oak woodlands significantly reduces clearance costs because:

- The native understory of oak woodlands typically contains less flammable vegetation.
- Oak trees are harder to ignite and not as prone to rapid combustion, which means they require less pruning and thinning.
- Oak stands that are well maintained (deadwood removed, retaining native leaf litter and perennial native shrubs and forbs) prevent slope failure, reduce erosion and can slow down a wildfire.

Oak woodlands after the 2009 Station Fire
C. Cuba

Low intensity fires (such as prescribed burns) have traditionally been used by Native Americans and fire managers to reduce the fuel loads within

oak woodlands, reduce pests and diseases and recycle nutrients. Using hand clearing methods, all of these management goals can be met even without prescribed burns. The cost of maintaining required fuel modification within or adjacent to an oak woodland is significantly less than similar fuel modification required for native chaparral or watering and care of non-native tree and landscape plants. Further, existing woodland maintenance requires far less water, a scarce and usually imported commodity that is becoming more costly.

V.5 Creating Oak Woodlands Conservation Management Plans

The goal of conservation management plans is to manage and sustain a functional ecosystem for the future. Developing conservation management plans for projects containing oak woodlands is a tool that can help direct planning before, during and following proposed development. These site specific plans provide the applicant and the County with a tool to identify priority preservation areas, address long-term management issues, and focus restoration opportunities. A critical element of adaptive management is responding to changes in the condition of preserved oak woodlands following natural disasters like fire and flood, intrusions from development along the boundaries, and invasions of exotic flora and fauna. Successful Oak Woodlands Conservation Management Plans will explain why the project woodland is significant and detail how that essence will be sustained in the face of any new use, alteration, restoration, or surrounding conditions.

The US Fish and Wildlife Service has specific requirements for the development of Habitat Conservation Plans (HCP). Several existing Habitat Conservation Management Plans in southern California could be used as the template for developing suitable plans for all oak woodlands that are to be preserved in perpetuity. Oak Woodlands Conservation Management Plans need to include but not be limited to the following elements found in the HCPs:

- Clearly describe the baseline conditions of the site;
- Identify immediate management needs;
- Define clear objectives and goals for long-term sustainability;
- Outline an action plan for adaptive management;
- Establish a monitoring plan;

- Identify responsible parties (i.e., fuel modification? monitoring? enforcement, etc.), and;
- Provide adequate funding.

V.6 CONSERVATION

Conservation implies a directed effort to protect existing oak woodland resources. Oak woodlands are dynamic systems that are constantly responding to their environment. Although oaks are long lived, they are susceptible to impacts from both natural sources (diseases, pests, fire) and human sources (soil compaction, altered hydrology, topographic alteration). To integrate oak woodlands and development in a meaningful and sustainable way requires effort and consideration from the time a project is conceived until long after it is constructed. When oak woodland preservation is incorporated into the design and execution of a development, the opportunity exists for creating a compatible project that maximizes the contributions for the property owner and the community.

Valley oaks
C. Cuba

V.6.1 Oak Woodland Environmental and Initial Study Questionnaires

At the beginning of a discretionary project that is not exempt from CEQA, be it an addition to an existing residential structure, a redevelopment project, or a new subdivision, the applicant must submit the appropriate package of plans, applications, studies and technical reports for the project. As part of the package, applicants must complete an environmental questionnaire and submit existing site photographs. County planning staff will then review all the documentation and complete an Initial Study Questionnaire (ISQ) for the project, as required under the California Environmental Quality Act (CEQA). The ISQ is used to assist the planner in making a CEQA determination for the project. The ISQ lists a variety of environmental factors that may be affected, either individually or cumulatively, by the development of the project. It is recommended that the GIS overlay showing the designated oak woodlands areas be made available online for easy consultation. Several of the questions we recommend adding to the present ISQ request details on the extent of canopy cover and numbers of trees, and are consistent with current requirements of the Oak Tree Ordinance. As such, these questions

simply provide greater detail concerning the condition of the oak woodland on the parcel at the start of the permitting process and do not represent additional expense greater than what is already required. This information provides both the planner and the applicant an opportunity to discuss the environmental constraints of the site in hopes of developing a project that preserves as much of the oak woodland resource as possible. Once the ISQ is completed, the planner decides if the project qualifies for a Negative Declaration or will require an Environmental Impact Report. The CEQA process evolves from there based on the determination.

As a tool of this plan, if a project is located in designated Potential Oak Woodlands Conservation Areas (as shown on **Figure 4**), the applicant will be responsible for completing an expanded Environmental Questionnaire (EQ). The expanded EQ will provide information for the planner to use in support of the expanded ISQ that is proposed in this plan. A copy of the proposed expanded EQ and ISQ documents are provided in the **Appendix 1** of this Plan. Use of the expanded forms in the early planning stages of a project will assist planners and applicants to address the potential impacts of a project on oak woodland habitat, not just individual oak trees. Early identification of the resources present on a property and education of the property owner as to their alternatives will allow for informed project planning. The questions included in the expanded EQ are designed to be answered either by the property owner, the Oak Tree Report consultant, or the County planner.

Appendix 7 lists the common and characteristic species found in oak woodlands. **Appendix 8** lists special status species associated with oak woodlands. These appendices are included to assist property owners and planners accurately identify potential oak woodland impacts.

V.6.2 Integrating Oak Woodlands into Development Design

As the pendulum swings more towards "green" development, the opportunity for incorporating oak woodland protection into project designs in a meaningful way is seen as a viable opportunity by developers. The guiding principle for meaningful conservation is eloquently stated in the County's Santa Monica Mountains North Area Plan.

"Let the land dictate the use."

Essential to this effort is the integration of oak woodlands as an integral part of the project from the start. Oaks are persistent and forgiving. If we consider them as a living, growing part of the site infrastructure, like roads and utilities, we can begin to integrate them into the overall design in a functional way.

Oak woodlands need to be considered on a variety of scales in order to meaningfully incorporate them into a development design. Natural systems share several basic elements. They are connected and continuous on many scales. They are dynamic, living systems that respond to the environment continuously.

This evaluation process starts with the individual trees along the perimeter of the woodland. Move outward to identify the interrelationships between this particular stand of trees and those in the near vicinity. Evaluate the location and extent of the oak woodlands within the watershed boundaries. Finally, examine the landscape level relationships on a regional scale. Once the context of the oak woodland is identified, it is possible to explore ways to maintain connectivity and integrity of the habitat over time.

Streamside road with public building beyond
C. Cuba

Matheny and Clark (1998) summarize the guiding principles of successful tree (and woodland) protection as follows:

- Everyone involved in designing, constructing and managing a development is committed to conservation.
- Decisions about trees are based on accurate information gained from scientific literature and accumulated experience.

- Conservation begins when the project is conceived and continues through the planning, design, construction and maintenance phases.
- Conservation is based upon the long-term survival, health and structural stability of trees and focuses the efforts on those trees offering the best potential to be assets to the site for years to come.
- Construction impacts to trees are minimized or avoided altogether.
- All members of the project team work together to minimize impacts to trees, either through design decisions or construction practices.
- Trees (and woodlands) are accurately represented on all relevant plans.
- The composition, health and structure of the woodland or forest is considered and provisions for long term management are included.
- Trees (and woodlands) selected for retention are given adequate growing space.
- Post-development impacts from surrounding land uses are managed in a way that protects the integrity of the oak woodland over time.

Defining a suitable protected zone beyond the standard dripline buffer, where construction activities are prohibited, is an essential step in conserving oak woodlands during this phase of development. There are no hard and fast rules, but guidelines to consider include at minimum:

- Health and size of the trees on the perimeter of the oak woodlands, and;
- Any drainage or grade changes that could impact the oak woodlands.

Woodlands present variations on the challenges typically addressed by protecting individual trees. In addition to the efforts needed to protect the trees that make up the woodland, considerations must be given to such things as:

- Species composition,
- Sensitivity to impacts,
- Size of the oak woodland,
- Relationship to other oak woodlands (contiguity),
- Stand composition,
- Root and canopy conformations related to site features,

- Structural stability when a new edge is formed,
- Habitat connectivity or fragmentation, and
- Potential impacts from changes in surrounding topography and hydrology.

Connectivity and shape of the oak woodlands makes a big difference in the potential long term sustainability of any conservation effort. Oak woodlands function as high level biological reserves, supporting a wide variety of plants and animals, all of whom have specific needs. The placement of roads and extent of edge effects are significant factors to consider. Long narrow bands of woodlands are not as sustainable as larger circular, rectangular or oblong shaped woodlands. Topographic features such as ridgelines and riparian corridors are important wildlife habitat linkages that should be considered.

The combination of these factors makes it difficult to develop a one-size-fits-all set of recommendations. Instead, the project team is challenged to make the most of the benefits provided by the oak woodlands and use them to enhance the design. Numerous professional resources are available that can aide in defining appropriate site-specific requirements. Examples of successful development in or near oak woodlands are not well documented. We hope that as this OWCMP evolves, suitable examples will become better known.

V.6.3 Best Management Practices

The Los Angeles County Oak Tree Ordinance identifies numerous standard Best Management Practices (BMP's) that can be implemented to protect individual oaks before, during, and following the development process. Many of the BMP's are relevant to oak woodland protection as well. These include, but are not limited to:

Data collection for planning
C. Cuba

Before Construction -

- Baseline documentation of the oak woodland characteristics completed.
- Identify any potential impacts and recommend mitigation measures.

- Fencing should be installed around the designated protected zone.
- Required bonds should be posted.
- All project personnel should understand the goals, guidelines and restrictions associated with the project.
- Identify enforcement options and consequences.

During Construction -

- On-site monitoring should be required during all activities that might impact the oak woodlands.
- Maintain records of activities and decisions regarding oak woodlands.
- Work with construction personnel to protect the resources.
- Evaluate tree response to site activity and recommend appropriate action.

Construction monitoring
C. Cuba

- Provide guidance on temporary irrigation if needed.
- Treat any tree injuries appropriately.

Following Construction -

- Develop and implement a Monitoring Plan
- Provide recommendations for managing remnant oak woodlands
- Oversee implementation of a management program to preserve woodland function.
- Oversee fuel modification procedures and hazard tree management.

V.6.4 Development That Sacrifices Oak Woodlands

Despite best efforts at preservation, there will inevitably be times when it is deemed necessary to lose oak woodlands. The decision to allow oak woodland destruction should be made in the context of understanding the consequences of that loss on both a local and regional scale. Cumulative impact analysis should be carefully prepared so that the decision makers can

quantify: 1) the ecosystem service functions lost and their values to the community; 2) the costs of replacing those ecosystem functions with suitable infrastructure, and; 3) the biological impacts directly related to the cumulative reduction of oak woodland resources in Los Angeles County. With this information, the County can determine suitable mitigation values and strategies.

V.7 RESTORATION MITIGATION RECOMMENDATIONS

V.7.1 Replacing Oak Woodlands Habitats

The ability to recreate any lost ecosystem is fraught with difficulty. The complexity and diversity of oak woodlands habitats make them particularly problematic to restore to a self-sustaining, fully functional level. There are examples of successful oak tree plantings, but there is currently no documented example of a successful *oak woodland* restoration in Los Angeles County.

One study that measured the effectiveness of tree plantings to mitigate habitat loss in a blue oak woodland used models to evaluate restoration of oak habitat based on a variety of tree densities and management intensity (Standiford, McCreary and Frost 2002). Using data collected for ten years on a blue oak plantation, it was found that, at the highest level of management and a planting density of 200 trees per acre, it would take ten years following planting to reach the ten percent canopy cover criteria for woodland under optimal site conditions.

This sobering reminder of the limitations of restoration planting underscores the need to retain existing functional oak woodlands.

Transplanted oak in altered site
R. Dagit

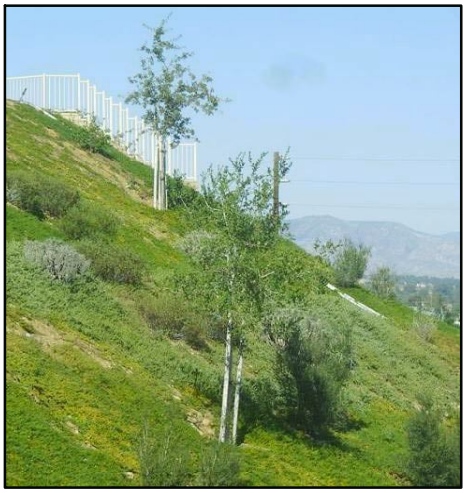
V.7.2 Transplanting Oaks

Under the present Oak Tree Ordinance, relocation of mature oak trees from their native site to a new location is considered to be the removal of that tree and requires suitable replacement planting as mitigation. Most of

these trees loose over 90% of their root system when boxed for transport. Few studies have followed the survivorship of transplanted oaks, but Dagit and Downer (2002) found that five years following transplantation, that less than 50% of the transplanted oaks showed signs of establishment and survival. If the goal of mitigation is to replace lost natural resources, then the cost-effectiveness of transplanting oaks needs careful consideration. While it is tempting to try to "save" a mature oak by moving it from a proposed development site, the reality is that even if it is planted in degraded oak woodlands, the cost of long-term maintenance, disease susceptibility and high hazard potential due to compromised stability from root loss make these trees much more difficult to manage. While there may be a few instances where moving an individual tree may be warranted, the use of this method as mitigation for oak woodland removal is not recommended.

V.7.3 On-site Mitigation Measures

On-site mitigation presents a host of problems. When there is insufficient space within a proposed development design to allow existing oak trees and woodlands to remain in their natural state, then the potential for having sufficient suitable space to replace those removed with two or more times that number of trees or acres of oak woodlands is unlikely. Typically, replacement planting done on-site is in marginal locations, such as cut or fill slopes, within median strips or within fuel modification zones.



New installation of mitigation oaks
C. Cuba

An informal survey of local arborists and foresters came up with very few success stories for individual tree replacement and none for successful restoration of fully functioning oak woodlands.

Mitigation measures should reduce the level of impacts, restore impacted resources or enhance degraded resources.

Examples of on-site mitigation measures include, but are not limited to:

- Retain mature trees with irreplaceable characteristics;
- Maintain snags that represent a variety of sizes, species and decay levels;
- Minimize storm water runoff;
- Retain on-site groundwater recharge and percolation;
- Protect stream crossings for fish passage and to reduce erosion and water quality degradation;
- Designate areas appropriate for seedling/sampling recruitment or replacement;
- Develop landscape plans that enhance native oak woodland associated species and preserve natural hydrologic patterns, and;
- Remove invasive plants.

On-site mitigation is only recommended when circumstances allow for: 1) potential long-term sustainability of the replacement plantings; 2) expansion or connection to adjacent oak woodlands, and/or; 3) the on-site mitigation effort improves degraded oak woodland.

V.7.4 Off-site Mitigation Measures

When it is infeasible to successfully implement required mitigation for loss of oak woodlands on a given parcel, then off-site mitigations are considered. The recommended ratio of replacement should be at least 2:1, providing two (2) acres of oak woodland protected in perpetuity for every one acre lost. This is consistent with the existing requirements of the Los Angeles County Oak Tree Ordinance, which also allows for in-lieu fee contribution to the County's Oak Forests Special Fund. The in-lieu fee is generally based on the estimated value of the oaks to be lost. Oak values are calculated using the standard CTLA formulas for landscape appraisal and may be negotiated between the County and the property owner.

The funds are intended for purchase of comparable acres of oak woodland that can be protected as public open space. In the case of oak woodlands, rather than individual oak trees, the mitigation cost should be equal to the cost of purchasing the necessary mitigation acres.

Priority should be given to restoring moderately or severely degraded oak woodlands by removing invasive exotics and restoring appropriate plant diversity located nearby the impacted property, preferably within the same watershed or sub-drainage. Selection of oak woodlands for acquisition to meet off-site mitigation requirements should conform to the same selection criteria (noted on page 52) for purchasing land within Potential Oak Woodlands Conservation Areas.

Valley oak near construction
C. Cuba

Alternatively, a plan to perform off-site habitat restoration of moderately or severely degraded oak woodlands could be developed as a mitigation strategy that would take the place of paying fees into the County's Oak Forests Special Fund.

To date, it has been difficult to track these funds and identify who administers the dispersal of County's Oak Forests Special Funds, as well as when and where they have been successfully used to purchase oak woodlands. Hopefully, a better tracking and implementation system can be established to ensure that the mitigation monies are used in the most effective way possible.

It is important the County establish clear criteria for when off-site mitigation is appropriate to ensure that the strategy is not abused. The *Planner's Guide for Oak Woodlands* (Guisti et al 2005) offers the following criteria for identifying suitable sites for this mitigation purpose:

- Sites will protect, promote or improve locally significant oak woodland resources.
- Sites will improve or expand threatened species habitat.
- Sites will reduce erosion or improve stream corridors.
- Sites will maintain or improve habitat connectivity and biological integrity.

V.7.5 Mitigating Fuel Modification Impacts to Oak Woodlands

Yearly brush clearance in the wildland-urban interface zone directly impacts oak woodlands within 200 feet of structures. The removal of native plants in the understory and along the chaparral-oak woodland edges has resulted in extensive conversion from native species that are adapted to the dry summer conditions to flashy invasive annual species such as mustard and bromes that are easily ignited and aggressively compete with natives for available soil moisture. While it is clear that oak branches within 10 feet of a structure are a problem, repeated, extensive pruning of oaks to lift limbs off the ground (the natural growth pattern for valley and coast live oaks), and removal of leaf litter to expose bare earth eventually impacts the health and vigor of the trees and can reduce recruitment of seedlings and saplings.

Oaks are typically more difficult to ignite than non-native trees such as eucalyptus, pepper, and some pines. A clearly described strategy for fuel modification within oak woodlands that prevents the type-conversion from native to invasive exotics is needed. This could be accomplished by revisiting the two programs that are involved in creating defensible space. They are the Brush Clearance Program, which is reactive and applies to existing structures; and the Fuel Modification Program, which is proactive and applies to new structures and/or significant remodels (greater than 50% square footage addition). For example, there are existing County site design strategies that avoid brush clearance impacts to state and national park lands by placing structures more than 200 feet from the property boundary of those lands. Similar site design guidelines may be feasible for some properties.

V.8 SUCCESSFUL MONITORING STRATEGIES

On a project level, monitoring needs to be clearly outlined so that the reports provided to the County provide sufficient detail to evaluate the effectiveness of required mitigations. Most of the projects that would require oak woodland monitoring potentially will require permits from the California Department of Fish and Game, US Army Corps of Engineers, Regional Water Quality Control Board or other state and federal agencies. While each of these agencies has specific requirements, the opportunity to develop a comprehensive monitoring plan that fulfills all these requirements is desirable. Due to the complexity of restoring oak woodlands, a minimum of seven years post-implementation monitoring is recommended.

At minimum, a successful monitoring plan should follow established guidelines, such as those provided by the Environmental Protection Agency (EPA). These include, but are not limited to:

- Describing the baseline condition of the site;
- Describe the mitigation measures to be implemented;
- Identify measurable performance standards and a timeline;
- Describe how these performance standards will be documented;
- Describe an adaptive management strategy for dealing with problems;
- Provide a monitoring schedule;
- Identify a person or agency responsible for the on-the ground monitoring;
- Provide for reporting, organizing and managing data collected;
- Identify and provide adequate funding;
- Identify enforcement issues;
- Identify contingency measures, and;
- Provide a mechanism for long term protection.

Soil around oaks disturbed by cattle and feral pigs
C. Cuba

V.8.1 Monitoring Oak Woodland Health

V.8.1.a Climate Change Response

Although Los Angeles County has a wide variety of oak species and communities, the response of specific species to climate changes is not predictable at this time. In addition to providing quantifiable documentation of the status of oak woodlands, GIS mapping can also provide useful information to help understand any changes related to large scale environmental factors such as climate change, changes in fire frequency and intensity, and the influx of new pests and diseases. Establishing a continuous monitoring system will provide the County with the opportunity to identify new threats to oak woodland communities in a timely manner, offering the potential for quick response.

V.8.1.b Introduced Pests and Diseases

New insects pests are arriving and becoming established in southern California at an estimated rate of 15 per year (Center for Invasive Species Research, 2010). Some, like the

gold-spotted oak borer, are devastating to both healthy and stressed oaks. Controlling the spread of these infestations can only be accomplished through a coordinated education and outreach program based on solid information concerning the extent and spreading vectors involved. Given the potential for extensive loss of oak woodlands from such threats, the benefits of monitoring become clear. Using information provided by property owners, oak woodland managers, and the County Foresters, the County can work with established programs to develop appropriate and timely responses to the influx of new pests and diseases.

V.9 OAK WOODLANDS ECONOMIC RESOURCE VALUES

Oak woodlands in Los Angeles County are considered "valuable" for a variety of different reasons. In order to make informed planning decisions, both the costs and benefits of a proposed land use action need to be examined. These valuations should be analyzed in the context of both short and long-term (50 years) impacts, as well as within the context of location. In addition, recent state legislation requires that ecosystem functions such as carbon sequestration and greenhouse gas emission reduction also be analyzed and explained. **Appendix 2** provides the background and context of ecosystem service valuation strategies that were used to develop the process recommended for Los Angeles County.

In order to evaluate these issues and make a determination that balances the preservation of the environment with development, land use changes within designated oak woodlands of Los Angeles County will be required to:

- Characterize the baseline contribution provided by the existing oak woodlands;
- Analyze how a proposed land use action would change this, either by enhancing the oak woodland ecosystem function or impairing it;
- Examine the proposed land use change within the context of the existing and identified restoration potential of local and regional oak woodlands (mapped zones), and;
- Calculate the relative costs/benefits to the County.

The Los Angeles County Oak Tree Ordinance identifies several of these values:

"As one of the most picturesque trees in Los Angeles County, oak trees supply beauty and charm to the natural and manmade landscape. Oak trees add distinct and unique aesthetic character to the areas of Los Angeles County in which they are indigenous. The Oak Tree Permit is established to recognize oak trees as significant and valuable historical, aesthetic and ecological resources."

Canyon oak (*Q. chrysolepis*)
C. Cuba

These "valuable historical, aesthetic and ecological resources" can be further defined in the context of economic costs and benefits associated with the long term survival and landscape functions provided by oak woodlands. When policy requires assessment of the costs associated with protecting, preserving, and regenerating oak woodlands versus the costs associated with the loss of individual trees, habitat, and ecosystem functions, then the choices between alternatives can be fairly evaluated.

Environmental economists examine these values from several different perspectives. Some believe that environmental amenities can and should be valued in exactly the same way as any other good (Baerenklau 2009). Salzman (2005) suggests that it is the role of government to pay for achieving ecosystem service protection, because these services cannot be bought or sold and thus function outside of the traditional market system.

Others feel that markets reflect individual, rather than community property values in the context of human use only, are volatile and reflect current ideas of value, but don't reflect enduring or intrinsic values. Another perspective is that only by examining the costs of restoring impaired or damaged oak woodlands, can we determine how much it costs to replace functional oak woodlands (Pincetl 2009).

After careful consideration, we recommend that property owners with parcels mapped in either the historic, existing, or potential oak woodlands conservation areas identified in this plan use the

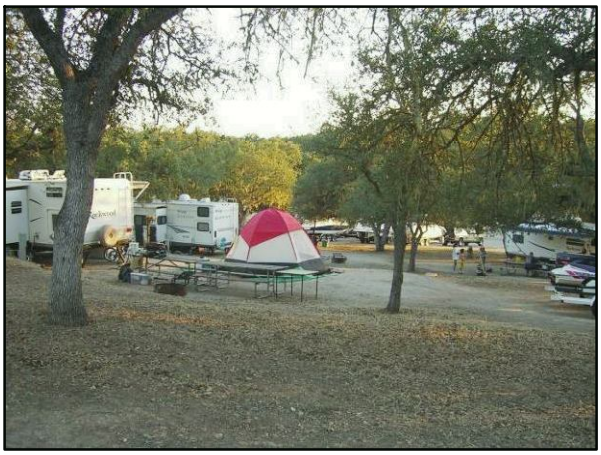
following process for developing an assessment of how their actions will impact the functions of oak woodlands.

Total Oak Woodland Value = Use Values + Non-Use Values + Ecosystem Function Values

The extent of this evaluation will be dependent on the following conditions:

1) The land use change is proposed for a parcel located within the Oak Woodlands areas (historic extent, existing, potential conservation),
2) Single family home parcels within oak woodlands are not subject to more than the Oak Tree Ordinance UNLESS the proposed action requires a discretionary permit, and
3) The oak woodland was planted or expanded by the property owner who can provide documentation.

V.9.1 Non-Use Values



Campground shaded by oaks
C. Cuba

Non-Use Values are those that do not derive from in-situ consumption of the resources (Kopp and Smith, 1993). Recreational opportunities provided by oak woodlands (hiking, bird watching, etc.) result in dollar benefits to local businesses, increase real estate value of adjoining properties, and are considered valuable by both local and long distance stakeholders. Travel costs to access an oak woodland open space, and willingness-to-pay for protecting oak woodlands are examples of methods used to identify how important these resources are in a contingency valuation setting. Contingent valuation is a survey method that can estimate total value based on hypothetical scenarios that present changes in environmental quality; it is appropriate to estimate non-use value, and more specifically existence value (the fact that we give value to an ecosystem just to preserve it, even though we are not planning on visiting or relying on what it

produces. Typically, the benefits provided by functional oak woodlands have not been incorporated into the cost-benefit equation because they are difficult to assess.

Ecosystem service values have also been hard to quantify. Oak woodlands are critical components of healthy terrestrial and aquatic ecosystems, providing habitat, preventing erosion, moderating water quantity and supporting water infiltration, sequestering carbon, filtering out air and water pollutants, moderating temperatures, and supporting watershed function.

The California Air Resources Board and CEQA have recognized that the conversion of oak woodlands to non-forest use represents potentially significant carbon biological emission effects. The air quality criteria established requires the measurement of oak woodland biological emission by documenting the live tree biomass (including roots), standing dead tree biomass, and wood lying on the ground. With this information in hand, the protocol requires that the potential carbon sequestration over the next 100 years be calculated for all trees over five inches or greater diameter at breast height (dbh), as well as determining how much sequestered carbon would be released if the live trees, standing dead trees and woody debris were burned. Comparison of the existing condition to the proposed condition following the land use change would then be used to identify the level of significance for this impact.

Additionally, there are several methodologies that are used to document the amount of water run-off reduction, air pollution filtration, temperature moderation (energy use) and erosion control benefits are provided by a tree or group of trees. Most are designed for use primarily within the urban forest context, rather than natural landscapes, however, given the proximity of most oak woodlands in Los Angeles County to the urban edge, these may be applicable. Urban Forest Effects (UFORE) is a computer model designed to characterize forest structure, e.g. species composition, number of trees, size, density, health, leaf area, biomass, and diversity, and use these variables to evaluate primarily air quality parameters like removal of particulate matter, carbon sequestration and storage, temperature effects resulting in energy use benefits and pollen impacts (Nowak and Crane 2000).

STRATUM is the street tree management and analysis tool used by many local cities. Using commonly collected inventory data on tree species, size, health and location, the computer model calculates the dollar value of aesthetics, energy conservation, air quality improvement, carbon dioxide reduction, storm water control and property value increases. The applicability of this model to oak woodlands land use conversion is dependent on the location of the proposed development in relation to a more urbanized environment and careful assessment of model biases and assumptions (USFS 2009).

Incorporating these elements into the assessment of the costs of oak woodlands loss that the community will assume will begin to provide a more realistic understanding of the trade-offs between conservation and development.

V.9.2 Use Values

Public benefits
R. Dagit

It is easier to put a dollar value on more concrete and tangible ways the oak woodland is used. These are categorized as *Use Values*. Properties having functional oak woodlands offer higher real estate benefits (amenity values) than comparable lands without oaks (Standiford 1999). Real estate development costs are usually considered here. The "soft" costs of design, permitting, marketing and sales are added to the "hard" costs of grading, construction, infrastructure and utility establishment, mitigation and monitoring. These costs vary, but are typically passed on to the consumer.

The Council of Tree and Landscape Appraisers (CTLA) "Guide for Plant Appraisal" is currently the most common method used to assess individual tree value. With a long history of use in legal circumstances, it provides a tool to calculate the value of a tree based on its depreciated replacement cost. The Replacement Cost Method uses the installed cost of an equivalent tree to estimate value. The Trunk Formula Method is based on the assumption that a tree the size of the appraised tree could not be replaced in-kind with an available specimen of the same size. It relies on extrapolating the data from a smaller and more readily available

nursery tree and increasing that cost proportionately for size. In both cases, the cost is then depreciated for factors such as species, location, and condition of the tree to arrive at an estimate of value.

A recurring controversy with this method is that it may generate values that exceed the real estate value of the land the trees occupy. This method also does not attempt to incorporate any ecosystem service values.

V.9.3 Oak Woodlands Conservation Fund Contributions

There are several ways to decide upon suitable compensation to the residents of Los Angeles County for the loss of oak woodlands resources. The simplest is to require that the acreage of oak woodlands lost be replaced by at least a 2:1 ratio, purchasing woodlands of comparable or better integrity for the public. This ratio is the current policy standard of the minimum needed to prevent net loss of woodlands. Another strategy would be to use the cumulative CTLA values of the individual oaks within woodlands as the basis for compensation. In cases where that value of the trees exceeds the value of the land, then the appraised value of the land could be used as the basis for identifying the compensation required, incorporating the non-use and ecosystem function values as identified above. These funds could be administered by the County's existing Oak Forests Special Fund.

V.10 OPPORTUNITIES FOR OAK WOODLANDS RESTORATION AND RECOVERY

The task of restoring or enhancing oak woodlands is difficult, fraught with many obstacles. Mitigation planting of seedlings to replace the loss of mature oaks has not effectively addressed the magnitude of ecosystem services lost when functional oak woodlands are reduced to isolated oaks trees stranded within a development. This should be the last mitigation strategy to be considered. Replacement oaks planted on cut or fill slopes usually struggle to survive. Under ideal conditions, it takes between 30 and 100 years for these seedlings to reach the same size as the mature trees that were removed. How can we compensate for the years of services lost while the seedlings grow?

If we want to restore lost oak woodlands or enhance those remaining, then we need to define our restoration goals. Do we want to replace lost aesthetic, amenity, ecological services or wildlife habitat values? We also need to know how to predict how many of the seedlings actually grow to the size of the oaks removed. What is the best way to incorporate the risk of loss or inadequate survival into our management plans?

These questions are not new. In fact, an OAK REVEGETATION STRATEGY for Los Angeles County was produced by Lyle and Safford (1997) and provides a well thought out set of criteria for deciding when and where it makes sense to try to plant oak trees. This does not mean that oaks cannot successfully be restored in other locations, but it provides a valuable starting point for directing restoration actions. It is important to recognize that the Oak Woodland Restoration Potential Model (Lyle and Safford 1997) presents a general pattern, not a precise delineation of sites. Its purpose was to provide a broad indication of areas within Los Angeles County where coast live oak woodland might be most easily and cost-effectively established. In fact, coast live oaks grow on all different solar aspects, but the model shows oaks growing much more frequently on some aspects than others. Thus, the distinction is a matter of "more or less", which leads to a general pattern and not to precise delineation.

Factors that need to be carefully evaluated prior to undertaking an oak woodland restoration include, but are not limited to; slope, aspect, elevation, soils and water availability. Using GIS modeling, Lyle and Safford (1997) identified several suites of variables that offer the best chance of success. A summary of their results are found in **Appendix 5.**

The Oak Woodland Restoration Potential Model (Lyle and Safford 1997) presents an extremely complex pattern. The most extensive areas of highest and high potential for oak restoration are in the general area of the Santa Clara River valley. In inland areas west and south of the Grapevine (I-5) north of Santa Clarita, areas with high potential are fewer and are confined to larger canyons. There are numerous areas with high potential for oaks in the coastal zone, but these are smaller scale than those in the Santa Clara River valley.

Unmapped areas of high potential may exist below 300 meters in elevation at the base of the interior ranges. Most of the area available for study at this elevation had already been cultivated or developed by the time vegetation mapping was completed in the 1920's and is covered by suburban development today. Therefore, it did not appear on the Weislander map (**Figure 2**), which form the baseline used for this model. Most of the oak woodlands still present occurs in the larger canyon openings of the interior ranges and along the perimeter of core habitats of public open space such as the Santa Monica Mountains National Recreation Area.

V.10.1 Recovery of Oak Woodlands

Regeneration and restoration are considered appropriate mitigation strategies only in locations where the chance of success is reasonable. The costly and long-term effort to develop successfully restored oak woodlands should be undertaken only as a last resort to mitigate for removing oak woodlands, and cautiously when attempting to increase regeneration and longevity within degraded oak woodlands. Environmental benefits of attempted restoration include:

Coast live oak acorn sprouting after fire
C. Cuba

- *Species diversity and wildlife populations will increase.*
  Oak woodland constitutes much richer habitat than the scrub communities that have replaced it. Oaks are among species supporting the greatest diversity and largest numbers of wildlife.

- *Erosion control will be enhanced.*
  Flood waters and eroded soils flowing from foothills and lower mountain slopes into the urbanized valleys would decrease because oaks are less vulnerable to fire than most other native species when well maintained. They effectively hold soil in place and allow increased soil absorption of rainwater near where it falls. Oaks furthermore speed the processes of soil formation by retaining moisture in contact with the underlying rock.

- *Carbon dioxide absorption and oxygen production will increase.*
  This increase will be in increments that can be significant in improving the region's air quality, while reducing greenhouse effects.

- *Intensities of wildfires will likely be reduced.*
  In comparison with the heavily fueled, intense fires that are now common, newly established stands of oaks can form buffers between suburban areas and wildlands.

- *Recreational uses will be much improved.*
  Cool, shaded landscapes of oak woodlands invite greater use.

V.10.2 Implementing Oak Woodlands Restoration

Under some circumstances, restoration will be the desired action to restore a degraded oak woodland or establish new oak woodlands in areas that have been converted to other uses. Providing a clear rationale as to why restoration is the best alternative is a critical first step. Due to the complexity of oak woodland communities, and the extreme variety of oak woodland types, oak woodlands restoration plans will need to be tailored to specific site conditions. A one size fits all strategy is not possible. There are numerous resources available to guide planners and consultants on successful restoration strategies. However, the following process outlined in **Table 9 – Restoration Planning Process** is recommended to be considered when identifying a potential restoration site, developing and implementing a restoration strategy, establishing an adaptive monitoring plan and providing for long-term maintenance needs.

Riparian & upland oak restoration project
C. Cuba

TABLE 9 - RESTORATION PLANNING PROCESS	
Step 1. Site Assessment	Comprehensive mapping, documentation of physical and biological site conditions including but not limited to: species surveys, soil surveys, drainage mapping, constraints analysis.
Step 2. Develop restoration strategy – clearly define goals and objectives of the restoration	Where to focus planting efforts, what species to plant, planting timeline and specifications for seed/plant provenance, size, condition, planting guidelines, maintenance plan, monitoring plan.
Step 3. Implementation	Identify funding source and responsible entity to carry out restoration, develop explicit work plan, schedule and budget for site preparation, installation and post-installation actions. Include strategy for making prompt mid-course corrections as needed. Note: Implementation is often phased over a 5-10 year timeline to provide greater diversity of planting ages, and respond to conditions (rainfall, fire, flood, etc.).
Step 4. Monitoring	Establish monitoring timeline, develop detailed strategy for what will be monitored and why, develop explicitly stated performance standards, identify consequences/remedies when restoration goals/performance standards are not met, establish responsible party for correcting problems.
Step 5. Adaptive Management	Develop strategy for revisiting implementation or performance standards if necessary. Identify an advisory team of appropriate responsible parties to provide advice and direction.
Step 6. Long term Maintenance	Explicitly identify what, when and how maintenance actions will be conducted, who is responsible for performing these tasks, budget available.
Step 7. Reporting Requirements	Explicitly identify what information will be provided in the reports, how often reports are required and who will receive and review them for accuracy and completeness.

VI. RECOMMENDED POLICY AND IMPLEMENTATION STRATEGIES FOR OAK WOODLANDS CONSERVATION AND RECOVERY

VI.1 GENERAL PLAN POLICY RECOMMENDATIONS

The Los Angeles County Board of Supervisors, the Forestry Division of the Los Angeles County Fire Department, and the Department of Regional Planning have actively supported the development of the Los Angeles County Oak Woodlands Conservation Management Plan as a means of improving and codifying the County's efforts to preserve, enhance and restore oak woodlands. One of the key methods of ensuring that the concepts of the Los Angeles County OWCMP will be put into action is incorporating them into the County's General Plan.

This is critical because the land use and infrastructure decisions made by the County will have a profound and permanent impact on the viability, or lack thereof, of the County's remaining oak woodlands. A valuation of the contribution of oak woodlands toward carbon sequestration and other climate change-related benefits may also be included in the section of the General Plan addressing Air Resources and Climate Change.

As the General Plan evolves, oak woodlands considerations should be incorporated as appropriate into a variety of elements such as:

- **Land Use**
  Zoning designations, setbacks, restrictions
- **Mobility** (Transportation and Access)
  Road development and maintenance impacts
- **Air Resources**
  Benefits of oak woodlands in mitigating air pollution
  Carbon sequestration benefits
  Climate change benefits
- **Noise**
  Buffers provided by oak woodlands
- **Conservation and Open Space**
  Recreation and public health benefits

Utility upgrades
T. Garrison

Significant Ecological Areas

Woodlands and forests

Relationship between agriculture and oak woodlands

Scenic resources

Water quality benefits

- **Safety**

  Flood hazard reduction benefits

  Fire hazard reduction benefits

- **Public Services and Facilities**

  Groundwater recharge benefits

Steelhead in the Santa Monica Mountains
R. Dagit

Specifically, Goals, Policies and Implementation Actions explicitly addressing the following issues should be incorporated into the draft General Plan's "Conservation and Open Space Element" prior to the time the draft is first officially considered by the Regional Planning Commission. The Goals should set broad policy objectives and govern the interpretation of individual policies. Policies should implement each of the Goals. Together, the Goals and Policies should create a firm policy foundation for the preparation of ordinances, programs, and other Action Items that will implement the plan. Specific Implementation Actions with measurable timeframes should be identified as part of the general plan process.

VI.1.1 Goals

The General Plan should set firm goals toward the preservation, enhancement and restoration of oak woodlands. The recommended goal to be incorporated into the General Plan is as follows:

"Oak Woodlands are preserved and restored so that they are conserved in perpetuity with no net loss of existing oak woodlands."

This goal is supported by additional sub-goals detailed on page 22.

VI.1.2 Policies

The following policies should be considered by the Department of Regional Planning for inclusion in the County's draft General Plan:

VI.1.2.a Incentives for Private Landowners and Related Changes to the County Code

Single family homes requiring a discretionary permit but that retain and avoid damaging all oak woodland resources on site should move through the planning approval process related to oak impacts quickly and smoothly.

Encourage property owners to plant oaks and retain volunteer oak seedlings in their landscape by allowing documentation to be submitted that clearly identifies oaks planted versus original mature native trees and permits removal of planted or volunteer oaks without penalty.

Incentives should be developed based on the "Incentive Strategies for Oak Woodlands Conservation" section (page 55) of this plan that will encourage developments to exceed the minimum preservation and restoration standards established by this plan and its implementing ordinances. Specific incentives may include density bonuses within smaller development footprints, transfer of development rights, permit streamlining, and taxation advantages.

Develop a fuel modification strategy for oak woodlands that reduces yearly brush clearance costs and maximizes retention of the native understory and reduces type conversion to annual invasive species that provide flash fuels.

VI.1.2.b Development Design Recommendations

Continue to require developers to consider the protection of oak woodlands and other sensitive resources early in the scoping process. Developments that retain and avoid damaging, or enhance existing oak woodlands should move through the planning approval process related to oak impacts quickly and smoothly.

Where a proposed development would remove or degrade identified oak woodlands, first priority shall be given to redesigning the development to avoid those impacts. Replacement of lost woodlands shall be a secondary mitigation alternative that is to be used only where the Regional Planning Commission determines that avoidance of the impacts is not feasible.

Require developments undergoing CEQA review to develop and evaluate alternative designs that fully preserve and protect the resources.

Oak & sycamore woodland – open space dedication area
T. Garrison

If the proposed development cannot avoid removing or degrading identified oak woodlands, then the second priority would be to: a) acquire acres of oak woodland of equal or greater habitat quality at a ratio of 2:1 to be placed into either a conservation easement or other deed restriction, or simply dedicated to the public trust, and; b) remove exotic invasives and restore degraded oak woodlands identified as potential restoration sites by the County.

Develop site-planning guidelines to assist planners and developers in integrating oak woodlands successfully into project development. Encourage or require alternatives that preserve the oak woodland and still meet the objectives of the project.

VI.1.2.c Preserving the Character and Integrity of Oak Woodlands

Oak woodlands that have been identified within Potential Oak Woodlands Conservation Areas should be given early and priority consideration by Trustee Agencies and non-profit organizations whose mission is to preserve natural lands in perpetuity.

The Los Angeles County Department of Public Works and all utility companies (public and private) should be required to adhere to the policies and requirements of the Oak Tree Ordinance and those proposed by the Oak Woodlands Conservation Management Plan

when developing plans to expand existing or develop new infrastructure. Infrastructure projects should avoid impacts and be conducted in the appropriate season.

VI.1.2.d Restoration of Oak Woodlands

Support efforts to protect existing individual oak trees and plant new oak trees in urban areas that were historically oak woodlands.

Where oak woodlands need to be replaced, Oak Replacement Plans shall be prepared by a qualified professional. Such plans should be reviewed prior to approval by designated experts such as the County Foresters, SEATAC or ERB.

Oak Replacement Plans should at minimum include the following elements: proven suitability of the site for oak woodlands; long-term viability of that site as a conservation area; planting plans that are consistent with recognized standards such as those presented in the IHRMP publication; a mix of species and density of oaks similar to what would be found in a healthy oak woodland indigenous to the location of the replacement planting; specify that species will be of local genetic material and maintain local genetic strains, and; long-term management and maintenance plans.

All mitigation areas shall be protected in perpetuity.

Funding for long term maintenance and management should be identified and secured.

Monitoring tree installations
C. Cuba

VI.1.2.e On-site Replacement Mitigation

On-site replacement plantings for removal of oak woodland canopy shall only be considered as a last resort and must replace lost canopy area at a ratio of at least 2:1.

Priority should be given to on-site retention of existing oak resources. Where on-site retention is not feasible, or the Regional Planning Commission determines that on-site restoration would not be the best method of ensuring the long-term health of the oak

woodland, off-site locations mapped by the Los Angeles County OWCMP as Potential Oak Woodlands Conservation Areas should be given first priority for mitigation restoration.

VI.1.2.f Off-site Replacement Mitigation

Off-site restoration may be accomplished by any one of the following measures:

a. Acquiring an off-site conservation easement for functional and proportional oak woodland of similar or higher quality.
b. Contributing to the Los Angeles County's Oak Forests Special Fund at a MINIMUM ratio of 2:1 based on the space needed (acreage or parcel) to replace woodland removed. The contribution should include provisions for revegetation, maintenance, and monitoring and be based on actual purchase cost of identified parcels in mapped Potential Oak Woodlands Conservation Areas.
c. Replacement planting, together with maintenance and monitoring for seven years, at a location identified by the Los Angeles County OWCMP Potential Oak Woodlands Conservation Area maps at a MINIMUM ratio of 2:1.
d. Restoring moderately or severely degraded oak woodlands in the same geographic area identified for restoration by the Los Angeles County OWCMP at a MINIMUM ratio of 2:1.

VI.2 ADMINISTRATION AND FUNDING

- Make transparent the status and administration of the County's Oak Forests Special Fund. Develop guidelines for receiving and managing off-site mitigation funds. Provide clear direction and policy on when and where these funds should be used in order to purchase fee-title or conservation easements to protect oaks woodlands in perpetuity.

- Develop long term maintenance and monitoring guidelines needed to manage off-site mitigation areas or properties secured with County and State funds.

- Develop a tracking system so that the effectiveness of off-site mitigation efforts, amount of oak woodlands preserved, and cumulative impacts to oak woodlands can be monitored over time.

- Evaluate the effectiveness of the Los Angeles County Oak Woodlands Conservation Management Plan within 3 to 5 years following adoption and revise as necessary in accordance with FGC 1367(b) (4).

- Develop performance criteria so that the effectiveness of the Plan in meeting County goals can be adequately characterized.

- Work with local partners to establish a standard protocol for accepting, managing and monitoring oak woodlands conservation easements.

Scrub oak woodland
T. Garrison

VI.3 IMPLEMENTATION ACTIONS

- Create and use an expanded Environmental Questionnaire (such as that provided in Appendix 1) for any project subject to CEQA review that is located within a Potential Oak Woodland Conservations Area as shown in **Figure 4**.

- Establish the appropriate threshold of significance for impacts to oak woodlands to effectively administer CEQA Section 21083.4.

- Undertake a comprehensive review of the County's Oak Tree Ordinance provisions in Title 22 of the County Code and consider: any Regional Planning Commission concerns; use of Oak Woodlands Conservation Funds to purchase conservation easements; historic oak

woodlands in urban areas; pruning standards and timing relating to nesting birds, and; Department of Public Works and utility company infrastructure expansion.

- Amend appropriate parts of the County Code to add incentives for private landowners that would encourage oak woodlands preservation including: transfer of development rights, development permit streamlining, density-controlled development (clustering), fuel modification, and brush clearing.

- Institute a County training program covering all aspects of oak woodlands preservation, management and restoration including CEQA thresholds of significance.

- Consider having the Board of Supervisors appoint a county official as the oak tree and woodlands manager to oversee implementation of the plan, track and evaluate effectiveness over time, and establish partnerships to further oak woodland conservation efforts in a collaborative way.

VI.4 OTHER RECOMMENDATIONS

- Develop a program to conserve and enhance local oak genetic resources and make locally grown oak planting stock available.

- Work with Caltrans and the Los Angeles County Department of Public Works to identify protection and enhancement opportunities along state and county roads traversing oak woodlands, such as Highway 2 (Angeles Crest Highway), Highway 27 (Topanga Canyon Blvd.), Malibu Canyon/Las Virgenes Road, Mulholland Highway, and others.

VI.5 PUBLIC OUTREACH AND EDUCATION

- Los Angeles County should develop and distribute guidelines to assist landowners and developers, utilizing Best Management Practices, to recognize alternatives to oak tree removal, root system compaction, fill placement near trunk bases, landscape irrigation, road construction, and other conflicts that may arise during construction.

- The County should work closely with the American Institute of Architects (AIA), the Building Industry Association (BIA), and the American Society of Landscape Architects (ASLA) to discuss oak woodlands conservation, promote low impact or creative design development within oak woodlands, and identify new Best Management Practices.

- The County should make use of existing available support documents for oak woodlands management to private landowners, such as through UC Extension and the Wildlife Conservation Board. Examples include *Guidelines for Oak Woodlands Management* and *Regenerating Rangeland Oaks in California*.

- The County should conduct workshops, seminars, and other outreach activities about oak woodlands for the general public and developers.

Creek-side Coast live oaks
C. Cuba

- Coordinate information sharing to provide oak woodlands conservation information to various County departments including Regional Planning, Public Works, Parks and Recreation, and Fire.

- The County should create a stewardship program called Oak Guardians, similar to the Audubon California Landowner Stewardship Program, which works with private landowners to conserve, restore and enhance oak woodlands habitat and associated wildlife in a manner compatible with existing land use patterns.

- Restoration efforts should provide erosion control, planting of oak seedlings, establishment of appropriate fencing around plantings and important resource areas, planting of native

perennial shrubs and grasses, and the control of non-native invasive weed species that may inhibit seedling establishment and survival. The County should partner with the California Native Plant Society and the National Arbor Day Foundation in the procurement of appropriate plant materials.

- The County needs ongoing interaction and exchange with stakeholders. Encouraging participation from all parties facilitates informed decision-making and increases the likelihood of successful implementation of long-term stewardship.

- Potential funding sources are detailed in Appendices 9 and 10.

Canyon live oak (left) and Interior live oak (right) – side by side C. Cuba

VI.6 PARTNERSHIPS

Achieving conservation of oak woodlands depends upon the concerted effort of all the stakeholders within Los Angeles County, including public land managers and its cities. Leveraging the expertise and resources of these stakeholders is an effective way for the County to achieve the goals promoted by this plan. Establishing ties to local colleges and universities, along with public and private schools would tap into numerous opportunities for educational outreach. Los Angeles County could partner with numerous local agencies, non-profits and community group including, but not limited to:

American Society of Consulting Arborists (ASCA)	North East Trees (NET)
Arroyo Seco Foundation	Natural Resources Conservation Service (NRCS)
Audubon Society	Pasadena Beautiful Foundation
Building Industry Association	Puente Hills Landfill Native Habitat Preservation Authority
Caltrans	Rancho Santa Ana Botanical Garden
California Department of Fish and Game (CDFG)	Resource Conservation District of the Santa Monica Mountains (RCDSMM)
California Department of Parks and Recreation (CDPR)	Santa Clarita Organization For Planning the Environment (SCOPE)
California Native Plant Society	Save Open Space (SOS)
California Oak Foundation (COF)	Santa Monica Mountains Trail Council (SMMTC)
California Urban Forest Council (CUFC)	Sierra Club
Community ReLeaf	Street Tree Seminar, Inc.
Habitatworks	Shade Tree Partnership
Hollywood/Los Angeles Beautification Team	Santa Monica Mountains Conservancy
International Society of Arboriculture (ISA)	Southern California Association of Governments (SCAG)
Los Angeles Community Forest Advisory Committee	Santa Monica Mountains National Recreations Area (SMMNRA)
Los Angeles County Arboretum	Theodore Payne Foundation
Los Angeles and San Gabriel River Watershed Council (LASGWC)	Topanga Creek Watershed Council
Malibu Creek Watershed Council	Tree Musketeers
Mountains Recreation Conservation Authority (MRCA)	TreePeople
Mountains Restoration Trust (MRT)	U.S. Forest Service -Angeles National Forest
National Park Service (NPS)	West Hollywood Tree Preservation Society

VI.7 LONG-TERM STEWARDSHIP AND MANAGEMENT OF OAK WOODLANDS

Stewardship is the cooperative planning and management of resources, such as oak woodlands, with interested parties and agencies actively participating in the prevention of the loss of a habitat with the goal of long-term sustainability. For oak woodlands occurring on private properties, stewardship would consist of the conservation of the resources present with the objective to promote the natural processes, allowing the habitat to self-perpetuate in perpetuity.

Long-term stewardship is a component of all aspects of the oak woodlands decision-making processes, where mitigation strategies are designed that are practical and permanent, generating habitat of equal or greater functional value to what was destroyed.

Long-term stewardship is a county-wide responsibility and should be incorporated into relevant County land use planning policies, practices and systems. Partnerships between Los Angeles County and individuals (e.g., property owners) and organizations (e.g., Santa Clarita Oak Foundation, Mountains Restoration Trust) to conserve and enhance oak woodlands is encouraged.

Because one of the goals of the Los Angeles County Oak Woodlands Conservation Management Plan is the protection of public health and the environment, public participation and education is part of a long-term stewardship program. Increasing public awareness of the value of oak woodland habitats, carbon sequestration, watershed protection, air quality, and psychological benefit is part of that endeavor.

Advanced stewardship incentives would include cost sharing of resource management or other incentive payments such as tax breaks, carbon credits, or securing landowner assurances for specific development uses.

VI.8 STEWARDSHIP IMPLEMENTATION

The Los Angeles County OWCMP focus is on preserving existing oak woodlands, guiding development to areas which will have the least impact on oak woodlands or other sensitive ecosystems, and identifying Potential Oak Woodlands Conservation Areas to offset the loss that will inevitably occur. This comprehensive planning effort which evaluates the oak woodlands

within the context of several spatial scales (parcel, watershed, landscape) provides the County with the opportunity to more accurately track and assess cumulative impacts associated with any proposed development.

Ultimately, implementing long term stewardship of oak woodlands will depend on the Board of Supervisors directing County staff to incorporate these recommendations into regular County-wide resource evaluations. Partnerships with local universities, national and state parks, private landowners, non-profits and governmental agencies could be developed so that a more collaborative and comprehensive stewardship effort results.

Canyon and Interior live oak woodland C. Cuba

DEFINITIONS

Biological protected zone – Area of each individual tree canopy multiplied by 10, includes all associated species and incorporates native oak seedlings associated with that tree(s).

BMP – Best Management Practice

Canopy – The total foliar cover in a forest stand consisting of one or several layers. Such spread includes leaves, twigs and branches.

CARB – California Air Resources Board

CEQA – California Environmental Quality Act

Composition – The constituent elements of an entity, e.g. the species that constitute a plant community.

Connectivity – Pertaining to the extent to which conditions exist or should be provided between separate forest areas to ensure habitat for breeding, feeding, or movement of wildlife and fish within their home range or migration areas.

Conservation – Encompasses the protection of plant and animal habitat; the management of a renewable resource with the objective of sustaining its productivity in perpetuity while providing for human use compatible with sustainability of the resource. (NOTE: the Society of American Foresters further notes that for a forest this may include managed, periodic cutting and removal of trees followed by regeneration conservation.)

Conservation easement – A deed restriction landowners voluntarily place on the property to protect land.

Conversions – A generic term for situations in which forest lands become used for non-forest uses, particularly those uses that alter the landscape in a relatively permanent fashion.

CTLA – Council of Tree and Landscape Appraisers

Damage- Any act causing or tending to cause injury to the root system or other parts of an oak tree, including, but not limited to, the acts of burning, pruning, cutting, application of toxic substances, operation of equipment or machinery, paving, construction, changing the natural grade, and trenching of excavation with the protected zone of an oak tree.

Deadwood – Limbs or branches that contain no green leaves or live tissue. A tree or limb may be considered dead if it does not show evidence of any green leaves or live branches over the span of one year, inclusive of prime growing weather.

DBH – Diameter of the trunk measured 4.5 feet above natural grade

Dripline – The area under a tree defined as the distance between the main trunk extending to the farthest branch tip. When depicted on a map, the dripline will appear as an irregular shape that follows the contour of the tree's branches as seen from overhead.

Ecosystem – An ecosystem is a complex set of relationships among the biotic (living resources) and abiotic (physical elements) of an area functioning as a unit.

Ecosystem functions – The physical, chemical, and biological processes or attributes that contribute to the self-maintenance of an ecosystem. Examples include provision of wildlife habitat, carbon cycling, or the trapping of nutrients.

Ecosystem services - Ecosystem services are the benefits provided to the natural environment or humans that result from ecosystem functions. Examples of ecosystem services include support of the natural ecosystem, erosion and sediment control, air pollution reduction, temperature moderation, improved water quality and scenic views.

Edge effects – The modified environmental conditions or habitat along the margins (edges) of forest stands or patches. This can also refer to impacts to native flora and fauna related to proximity to developed areas.

Emergency Oak Tree Permit – A permit issued by County Foresters to remove or prune hazardous trees or limbs.

Encroach – Any act which damages an oak tree and/or to conduct any activity within the protected zone of any oak tree, including, but not limited to: 1) construction and placement of permanent, semi-permanent or temporary structures; 2) grading; and 3) any single instance, repeated or permanent activities that would result in compaction of soils, such as parking, storage, etc. as determined by the Director of Planning or the County Forester.

ERB – Environmental Review Board

ESHA – Environmentally Sensitive Habitat Area

Forest – An ecosystem characterized by a more or less dense and extensive tree cover, often consisting of stands varying in characteristics such as species composition, structure, age class, and associated processes. Forests can also be synonymous with **woodland.**

Forest land – Land that can support 10% native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits.

Fragmentation – The process by which a landscape is broken into small islands of forest within a mosaic of other forms of land use or ownership, such as islands of a particular age class (e.g. old growth) that remain within areas of younger-aged forest. Fragmentation is a concern because of the effect of noncontiguous forest cover on connectivity and the movement and dispersal of animals in the landscape.

GHG- Greenhouse gas

Habitat – The place or environment (including climate, food, cover and water) where a plant, animal or population normally lives and grows.

Heritage tree – A heritage oak is either of the following: a) an oak that measures 36 inches or more in diameter, as measured at four and one-half feet above mean natural grade; or an oak that has significant historical or cultural importance to the community, notwithstanding that the tree measures less than 36 inches in diameter.

Intact oak woodland - Site is currently in a "wild" state where all ecological functions such as groundwater infiltration, shade, habitat, nutrient cycling, carbon sequestration, wind/noise/dust abatement, and the stand is self-sustaining and regenerating.

IHRMP- Integrated Hardwood Range Management Program

Landowner – An individual, partnership, private, public, or municipal corporation, Indian tribe, state agency, county or local government entity, educational institution, or association of individuals of whatever nature that own private forest lands or woodlands.

Landscape – A spatial mosaic of several ecosystems, landforms, and plant communities across a defined area irrespective of ownership or other artificial boundaries, and repeated in a similar form throughout.

Mitigation measures – Actions included in a proposed project's environmental impact report (or other CEQA document) that reduce or eliminate a significant environmental effect.

Moderately degraded oak woodland - Even though the site has been altered, oak woodlands persist and retain some of their functions. Natural regeneration is possible, wildlife use still occurs, and some level of ecosystem services are still present.

Monitor – A qualitative or quantitative, or both documentation of existing conditions of a site.

NRCS- Natural Resource Conservation Service

Oak tree – Any tree of the species *Quercus* native to Los Angeles County.

Oak Tree Ordinance – County ordinance (82-0168) protecting all indigenous oaks (*Quercus* species) found in Los Angeles County that are over eight (8) inches in diameter as measured four and one-half feet above mean natural grade.

Oak Tree Permit– A permit required under the Los Angeles County Oak Tree Ordinance, in order to have permission to cut, destroy, remove, relocate, inflict damage, or encroach into the protected zone of any tree of the oak tree genus, which is 8" or more in diameter four and one-half feet above mean

natural grade or in the case of oaks with multiple trunks combined diameter of twelve inches or more of the two largest trunk.

Oak woodland – Oak Woodlands Conservation Act (Fish and Game Code 1361) defines an oak woodland as an oak stand having greater than 10 percent canopy cover, or that may have historically supported greater than 10 percent canopy cover.

Patch size – A descriptive term used to quantify the remnant areas of habitat that have been reduced to "islands" surrounded by alternative or incompatible land uses.

Potential – The highest ecological status an area can attain given no political, social, or economical constraints; often referred to as the "potential natural community (PNC)".

Potential oak woodlands conservation areas – Areas within Los Angeles County mapped to reflect the best possible estimate of oak woodlands distribution, with a 200 foot buffer zone added. Parcels located within this mapped zone maybe have more potential for oak woodland conservation than areas not included, but small pockets of significant oak woodlands may also be found within urbanized zones outside this boundary. Depending on species and location, they may also be candidates for potential conservation or restoration.

Preservation – A term that implies both passive and non-consumptive land-use management.

Protected oak tree – A live native oak tree (*Quercus* genus) indigenous to southern California with at least one trunk measuring eight inches or more in diameter. Protected oak trees include those that have been planted as a requirement of a county permit or code, regardless of the trunk diameter.

Protected zone – The surface and subsurface area of a protected oak tree that lies within the dripline of such tree, plus the area extending to a minimum of five(5) feet beyond the dripline, or fifteen (15) feet outward from the outside perimeter of the trunk of such tree, whichever is greater.

Pruning – The removal of a portion of an oak tree's shoots, branches, limbs or rots.

Public resources agency – A government or non-profit agency that has the authority to manage, preserve or enhance public resources for the benefit of the County and its residents.

Regeneration – The act of renewing tree cover of the same forest type by establishing young trees naturally or artificially.

Remove – Any act to cut down or destroy any oak tree or to encroach upon any protected oak tree beyond a reasonable expectation of recovery, as determined by the County forester. Relocation of protected oak trees shall be considered removals.

SEATAC – Significant Ecological Areas Technical Advisory Committee

Severely degraded oak woodland - These sites have been drastically altered from the natural condition to accommodate residential, commercial or industrial uses, and oak woodlands remain in

scattered locations. Natural regeneration is not possible. Soil is compacted, contaminated or paved. Wildlife habitat is limited and associated understory vegetation has been replaced by managed non-native landscaping.

SERA – Sensitive Environmental Resource Area

Significant oak woodlands – Areas designated only in the (Malibu) Local Coastal Plan, which guides planning decisions in the unincorporated Coastal Zone of the Santa Monica Mountains. A closed canopy has generally been understood to be oak woodland in the Coastal Zone, but this is not codified, and savannahs are equally noted as being significant.

Significant watershed - Relatively undisturbed watershed areas containing riparian and oak woodlands (or savannahs) and recognized as important in contributing to the integrity of these woodlands.

Stand – A group of similar trees growing in a contiguous pattern, having sufficiently diverse age-class, distribution, composition and structure, and growing on a site of sufficiently uniform quality that is distinguishable as a unit. Mixed stands have a mixture of species. Pure stands are usually a single species. A stratified mixed stand has different species occupying different strata of the total crown canopy.

Stand structure – The horizontal and vertical distribution of components of a forest including the height, diameter, crown layers and stems of trees, shrubs and herbaceous understory, snags and down woody debris.

Threshold of Significance – An identifiable, quantitative, qualitative, or performance standard, or set of criteria, of a particular environmental effect. It is evaluated based on noncompliance, which means that the effect is determined to be significant by the agency, and by compliance, which means the effect is determined to be less than significant.

Understory – The area found beneath the dripline and protected zone of an oak tree.

Urban-wildland interface – A forest or shrub-land commonly found in the foothills of rural areas, where structures and other human development meet or intermingle with undeveloped wildland vegetation. The junction may be well defined or diffuse.

Wildland-urban interface – The area in which residential and suburban development come into contact with lands in a “wild” or undeveloped state.

Wildlife corridor – Land area linking two habitats, providing cover and habitat stepping stones for many kinds of wildlife. Also referred to as wildlife linkages.

Woodlands – A plant community in which, in contrast to a typical forest, the trees are often small, characteristically short-boled relative to their crown depth, and composed mostly of hardwood species such as oak.

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Los Angeles County Oak Woodlands Conservation Management Plan

APPENDICES

MAY 2011

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APPENDIX 1

PROPOSED REVISIONS TO LOS ANGELES COUNTY PLANNING APPLICATIONS AND FORMS

Prepared by:

Los Angeles County Oak Woodlands Habitat Conservation Strategic Alliance

PROPOSED NEW QUESTIONS FOR THE
L. A. COUNTY SITE PLAN REVIEW APPLICATION

Is the proposed project located within mapped County Oak Woodland Area Overlay? (Planner pulls up on-line map and looks with applicant based on property APN(s)) The online map of the overlay will be available to the public, too, on the Regional Planning & Fire/Forestry Dept websites)	**Yes** ☐ **No** ☐ **Maybe** ☐
Is there more than one native oak of any size on the property or located within 200 feet of the protected zone of oaks on adjacent properties? (Planner reviews site and surrounding property photos provided by the applicant at the counter – photos will be required at this stage – and compares them to a photographic guide to oaks of L.A. County that they will have at the desk and/or online. Online version will also be available to public) – if photos are not available, and an on-line map does not illustrate otherwise (i.e., Google Earth or other easily-accessed program) the planner will check "Maybe"	**Yes** ☐ **No** ☐ **Maybe** ☐
If the answer to either of these questions is YES or MAYBE, then the applicant would be asked to work with the planner to answer the following additional questions: (the average applicant would need some preliminary reports on the site conditions to help answer these questions…)	
What is the cover and number of trunks 5" or greater of all native oak tree species on the parcel(s)? NOTES: Cover = mapped canopy area x 10 For multiple-trunked trees, if one of the multiple stems is at least 5 inches, count that as one tree, not each of the stems over 5 inches. The extent of the woodland should be identified on a site plan or aerial photograph at a scale acceptable to the County Forester and should include any off-site oaks within a 200 foot radius of the property boundary. Off-site oaks may be separately identified by color code on the map.	Approximate # of Trees with at least 5" Trunks _____ Canopy cover area _____ ☐ ft^2 ☐ ac.

List any parcel(s) APN's that contain jurisdictional oak woodlands and calculate the overall acreage of parcel(s) that have oak woodlands.	APN: _____ _____ AC: _____
Does the oak woodland on this property or within 200 feet meet the state definition of oak woodland, having a "stand with greater than 10% canopy at present or historically" (CDFG)? **For the purposes of this plan, we are using the County Oak Woodland Overlay Zone Map showing locations of known oak woodlands.**	**Yes** ☐ **No** ☐ **Maybe** ☐
Is the stand within 200 feet of another existing or potential oak woodland?	**Yes** ☐ **No** ☐ **Maybe** ☐
To your knowledge, has the parcel burned? If so, describe when, extent, etc.	**Yes** ☐ **No** ☐ **If yes, when?** _____
To your knowledge, has the site been grazed? If so, describe.	**Yes** ☐ **No** ☐ **Description** _____
To your knowledge, are there any special habitat areas or features including but not limited to drainages, seep, springs, etc.. If so, describe.	**Yes** ☐ **No** ☐ **Description** _____
What is the current zoning for the site?	**Zone(s)** _____
Is zoning or land use change that would impact the oak woodland being proposed?	**Yes** ☐ **No** ☐ **Maybe** ☐

SAMPLE OF PROPOSED REVISIONS FOR
LA COUNTY INITIAL STUDY QUESTIONNAIRE

RESOURCES - 3. Biota/Oak Woodland
SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☐	☐	Is the project site located within a Significant Ecological Area (SEA), SEA Buffer, or coastal Sensitive Environmental Resource (ESHA, SERA, etc.), or is the site relatively undisturbed and natural? .
b.	☐	☐	☐	Will grading, fire clearance, or flood related improvements remove substantial natural habitat areas **or change the hydrologic regime of the site?**
c.	☐	☐	☐	Is a drainage course located on the project site that is depicted on USGS quad sheets by a dashed blue line or that may contain a bed, channel, or bank of any perennial, intermittent or ephemeral river, stream, or lake?
d.	☐	☐	☐	Does the project site contain a major riparian or other sensitive habitat (e.g. coastal sage scrub, oak woodland, sycamore riparian, woodland, wetland, etc.)?
e.	☐	☐	☐	Does the project site contain oak or other unique native trees (specify kinds of trees)?
f.	☐	☐	☐	**Is the proposed project located within mapped L.A. County Oak Woodland Overlay or buffer zone?**
g.	☐	☐	☐	Is there more than one native oak of any size on the property or located within 200 feet of the protected zone of oaks on adjacent properties?
h.	☐	☐	☐	Is this woodland within the viewshed of a private road, public lands/trails, public roads, scenic highway? (County, State and Federal Trail maps will be used for basis of analysis)
i.	☐	☐	☐	Is the project site habitat for any known sensitive species (federal or state listed endangered, etc.)?
j.	☐	☐	☐	Other factors (e.g., wildlife corridor, adjacent open space linkage, oak woodland connectivity or potential)?

☐ **MITIGATION MEASURES** ☐ **OTHER CONSIDERATIONS**
☐ Lot Size ☐ Project Design ☐ Oak Woodlands Overlay ☐ Oak Tree Ordinance
☐ ERB/SEATAC Review (Biota Report required) ☐ Biological Constraints Analysis

CONCLUSION
Considering the above information, could the project have a significant impact (individually or cumulatively) on, **biotic** resources, including oak woodlands?

☐ **Potentially significant** ☐ **Less than significant with project mitigation** ☐ **Less than significant /No Impact**

SAMPLE QUESTIONS TO BE ADDRESSED IN THE EXPANDED ZONING PERMITS APPLICATION IF THE PROJECT IS DEEMED TO BE IN AN OAK WOODLAND OVERLAY OR BUFFER AREA:

1. List any known locally rare or uncommon species or associations found on the property. (Refer to CDFG Special Animal and Plant lists, Rare Habitat Associations, etc.).

2. What native understory species or associations are present? Describe.

3. Is natural leaf litter layer present? What is average depth?

4. What non-native species are present? List species, extent and impacts.

5. What watershed is the project located within?

6. What is the site elevation, slope percent and aspect?

7. Describe surface soil characteristics. (sand, loam, clay, rock, etc.).

8. What is the designated NRCS erosion potential for the site? Are there any other NRCS listed site constraints (shrink-swell potential, percolation limitations, etc.).

9. Is this project located within a listed impaired water body?

10. Has the hydrologic regime or water source for the project site and surroundings been altered? Is so, describe.

11. Is the project site irrigated? Is so, describe.

12. Is this woodland within the viewshed of a private road, public lands/trails, public roads, scenic highway? (County, State and Federal Trail maps will be used for basis of analysis).

13. Describe any public use of the woodland (trails, birdwatching, etc.).

14. Describe any known historic or cultural significance of this oak woodland.

In addition, the following questions should be included in a Mitigated Negative Declaration (Oak Woodland Impacts) or Environmental Impact Report level of review.

1. Evaluate the existing carbon sequestration functions provided by the woodland in accordance with Air Resources Board forest conservation guidelines (ruling Oct 25, 2007).

2. The Forest Protocol established air quality criteria to be used to measure oak woodland biological emission for CEQA review: live biomass (including roots), standing dead tree

biomass, and wood lying on the ground. Questions to be answered include: (1) how much potential CO^2 sequestration over the next 100 years will be lost due to impacts to live native trees three (3) inches or greater dbh; (2) how much sequestered CO^2 will be released if the live trees, standing dead trees or woody debris are burned?

3. How much temperature moderation is currently provided by the existing oak woodland?
4. How much stormwater runoff is currently being contained or absorbed on site?
5. How does this oak woodland contribute to air quality by reducing pollutants?
6. What level of management is needed to attain or maintain sustainability?
7. What is the influence of surrounding land uses such as zoning changes, LUP changes, specific plans, etc.
8. Describe the current level of oak woodland sustainability and ecosystem function.
9. Describe potential for degradation.
10. How will the proposed project impact any of the above factors?

APPENDIX 2

ECONOMIC VALUES ASSOCIATED WITH LAND DEVELOPMENT IN OAK WOODLANDS

Prepared by:
Tom Scott
Rosi Dagit

INTRODUCTION

In 2004 the California legislature approved Senate Bill 1334, amending the California Environmental Quality Act (CEQA) to specifically address impacts to California's oak woodlands. The law requires counties to determine if projects under their jurisdiction will have significant impacts to oaks and oak woodlands. SB1334 also provided a set of mitigation guidelines for these impacts, but gave project proponents the options of a mitigation fee in lieu of mitigations measures, to be paid to a state or local mitigation fund (Chapter 732, and Statutes of 2004) (PRC 21083.4). Hence the success of SB1334 in Los Angeles County is dependent on a transparent method of calculating oak woodlands values, and the subsequent development of acceptable mitigation measures.

CEQA neither permits nor prohibits damage to the environment. It forces project proponents to disclose the potential impacts of a project on the environment and to consider meaningful alternatives and mitigation measures. Like many other aspects of CEQA, the estimation of significant impacts to oak woodlands under SB1334 was left to the discretion of individual counties. However, the primary power of CEQA lies in the ability of project antagonists to demand adequate methods of impact disclosure and to ultimately file lawsuits if methods prove to be inadequate.

SB 1334 allows counties to create local standards for oak woodland mitigation, but this flexibility forces the county to create mitigation/fee structures that are acceptable to all the parties involved in a CEQA process. If mitigation (by fee or action) becomes the price for oak woodland damage, then it seems reasonable to develop a way to insure that these mitigations are commensurate with any significant losses of oak woodland values.

Identifying significant damage to oak woodlands is a complex task, involving the delineation of woodlands, description of the ecosystem structures and processes altered by a project, and calculations of the significance of these alterations relative to natural fluctuations. Like the bundle of landowner rights (discussed later), woodlands have components that are intangible or at least difficult to define in the CEQA process.

Furthermore, oak woodlands can be defined by a number of overlapping but not completely coincidental parts in natural landscapes (e.g., the distribution of two different oak tree species; insect species that migrate between oaks and different vegetation types, or the above- and below-ground oak biomass). Finally, oak woodlands cross all the boundaries (property, municipal, and county boundaries) that are used to define project areas in environmental reviews, and wildlife associated with oak woodlands move across these boundaries at even broader spatial scales.

In almost all situations, oak tree species are integrated into other vegetation types making oak woodland boundaries somewhat, to very, indistinct. Under these circumstances, solitary oak trees often become the units of conservation and management, and sparse oak woodlands are often demarcated at the drip lines of individual trees. The California Forest Practices Act uses a minimum of 10% cover of trees on the landscape (CPR 1978) to define a woodland. SB 1334 considered any stand of with more than 5 oak trees of >5 inch diameters as a woodland. These actions tend to protect oak trees as objects rather than component parts of woodland ecosystems. The characteristics of oaks and oak woodlands are further de-emphasized when mature oaks are mitigated with seedlings or saplings.

Treating seedling and saplings as comparable units to mature oaks ignores the size, age, life history, survivorship, and wildlife habitat value of these large trees.

OAK WOODLAND OWNERSHIP

Since 1900, the population of the County has grown at a rate of 1 million residents a decade; with 10.4 million residents and a housing base of approximately 3.3 million units in 2008. About 60% of these units are single-family detached homes. The County is still has about 56,000 parcels (>0.5 acres) in or near oak woodlands. As of 2009, there are over 150,000 existing homes in the immediate vicinity of oak woodlands in Los Angeles, and about 3.5 million residents live in census tracks with oak woodlands. Land and development potential have become commodities in Los Angeles County due to its scarcity. Waves of land development have divided many communities into homeowners who want to maintain their surroundings, and land developers, who wish to acquire yet more land to build houses. Each group has created a set of oak woodland values that they believe should take precedence over other values.

Land parcels are the primary units of oak woodland management, existing as legal descriptions of land boundaries filed with counties or cities (as representatives of the state). Catastrophic erosion or grading may change the landform of a property, but the parcel boundaries remain imperishable as lines connecting a set of geographic coordinates. In this sense, a parcel persists without regard to changes that occur to its physical attributes (structures, landscaping, vegetation cover, soils, geologic substrates or topography). Therefore, it is possible to calculate a value for land that completely ignores its woodland resources, or any other physical attributes.

Bundle of Rights in Land Ownership

Property ownership is traditionally described as a bundle of individual rights, which can be grouped into general categories of:

(1) right of possession – land ownership is protected by the title;
(2) rights of disposition - the title holder can sell, transfer or rent the land or its component parts;
(3) right of exclusion - others can be excluded from using the land;
(4) rights of control – title holders control the use of the land;
(5) rights of enjoyment - the owner can enjoy the products and use and of the land; and,
(6) right to remain free from harm (often considered a subset of the right of enjoyment).

These rights are sanctioned and protected by federal, state, and local governments, but this covenant can be modified by those entities in a number of situations, including:

(1) right to possess can be modified by eminent domain;
(2) rights of disposition can be restricted by anti-discrimination laws;
(3) right of exclusive use can be restricted by hunting-access laws, prescriptive rights, and involuntary easements;
(4) right to control use can be restricted by zoning, codes, conditions, or covenants;
(5) right of enjoyment (use) is not sovereign, and use of land is restricted by all laws that may apply to landowner activities; and
(6) right to be free from harm is imperfect, because unavoidable harm may have to be distributed inequitably across a group of landowners.

County options for oak woodland persistence are embedded among the rights associated with items 3 through 6. The crux of the issue involves the rights of enjoyment of use and freedom from harm.

Historic Property Laws and the Value of Plants and Animals and Oak Woodlands

In frontier landscapes, property laws emphasized owners' relationships with their land, and their right to improve it as they saw fit. U.S. courts have staunchly protected property rights, but at the same time have upheld state ownership (stewardship) of wildlife on private lands, and to a lesser extent the rights of non-owners to use that wildlife on unimproved lands (Lund 1980, Goble and Freyfogle 2002). State control of wildlife on private lands stems from British common law, where wildlife were protected by the king as a public trust. Even though plants are considered to be part of the land, British common law gave authority to the king to regulate activities involving both plants and animals, specifically to control damage to places where wildlife lived (Goble and Freyfogle 2002). The king also regulated some forms of plant use, with the prominent example of timber harvest.

The history of timber harvest regulations in the US dates from 1691 when the Massachusetts Charter restricted the cutting of all trees suitable for masts on British Naval ships (Dana and Fairfax 1980). California Forestry Laws have not treated oak trees (*Quercus agrifolia, Q. chrysolepis, Q. douglassii, Q. engelmannii, Q. kelloggii, Q. lobata, Q. tomentella, Q. palmeri*) as commercial-timber species under the state's forestry acts (1945, 1973), although these species were harvested for charcoal, firewood, palettes, stamp mills and other mining needs (Bahre 1991, Pavlic et al 1991). Wild plants, like oaks, were not given any kind of status, and by default were considered attached to property by the soil in which they grew (Merrill 2007). Products from wild plants were called ***Fructus naturales***, to separate them from cultivated plant products ***Fructus industriales***. Both were considered the property of the landowner.

After the American Revolution this control was passed onto states, and wildlife were not considered property of the owners of lands where they occurred. Oak woodlands tend to be used by a large number of species, including federally listed endangered species, like the Least Bell's Vireo (*Vireo belli pusillus*).

Finally, regulations over state-owned wildlife have a nexus with owner's use of plants and land on issues of habitat. Here again, government regulation of habitat (specifically habitat quality and destruction) stems from British common law, focused on restricting land uses that harmed wildlife. Habitat degradation on private lands was seldom an issue in the early colonization of the American West; but by the 1970s, habitat protection on private lands was enforced through a series of laws against habitat degradation, including Clean Water Act (CWA 1972), the Endangered Species Act (ESA 1973), and riders on other laws like the Federal Power Act (Beatzi and Wilderson 1990, Lund 1995).

Community Values and Private Lands

The demand for housing and the abstract nature of parcels can completely separate the value of land from the values of its oak woodlands or any other community values. In the built-out suburban environments of southern California, land laws have come to emphasize a tripartite relationship

between the landowners, their neighbors, and the government. This is particularly true for highly developed regions, such as Los Angeles.

Singer (2000) suggests that the bundle of rights associated with land ownership has evolved into a more complex mixture of rights and responsibilities. The first cases of zoning and land regulation were instituted to separate incompatible land uses; then nuisance laws were created to protect one landowner from another (Platt 2006). This interaction was expanded to protect entire communities from broader forms of nuisance (traffic congestion) and as cities grew, to protect community standards, in the form of codes, covenants, and restrictions (Platt 2006).

In contrast, landowners have developed the perspective that unfretted land-use is a norm and that regulations can be invoked only under exceptional situations (also see in Singer 2000). This vision of sovereign landownership has become conventional wisdom in southern California. However, land ownership is meaningless without the sanction of federal, state, and local governments.

Environmentalists have a different model, supporting local governments that allow a landowner to undertake only a limited set of permitted activities. The extent to which Los Angeles County chooses to protect oak woodland is a function of reconciling these two models' land-use controls. Local government restrictions on use of lands typically fall between these two perceptions of entitlements, based on community standards rather than comprehensive rules. State government, through Senate Bill 1334 (Kuehl 2004), has recognized oak woodlands (five or more trees of 5 inch diameter) as significant resources in the communities where they occur. Los Angeles County must therefore reconcile the requirements from a state level with local community values.

Discretionary permits, zoning, and planning documents like County General Plans all fall under the California Environmental Quality Act. Many of these County actions are based on protecting other landowners from harm, specifically the nuisance created by adjacent, incompatible land uses. Local governments attempt to keep landowners free from harm, but the creation of zoning also has established standing for non-owners in legal proceedings and discretionary decisions over land use (Scott et al 2007). The California Environmental Quality Act (CEQA, 1970) also gives non-owners standing in environmental reviews, and to be plaintiffs in lawsuits if these reviews inadequately disclose environmental impacts. CEQA doesn't prohibit land owners from any activity; it just requires them to fully disclose the impacts their actions may have on the environment and surrounding communities. SB 1334 instructed agencies involved in the CEQA process to specifically consider project impacts to oak woodlands as entities (Kuell, 2002), although the standards for what constitutes a significant impact to oak woodlands are not necessarily clear (Guisti et al 2007).

Stakeholders in Oak Values

A wide variety of groups are involved in these calculations of oak values, with equally diverse motivations and needs. Land developers calculate the costs and benefits of building around oak woodlands. Homebuyers may see amenity value in oak woodlands or oak woodland viewsheds, and therefore are willing to pay more for these amenities when they buy property (Diamond et al 1987, Standiford and Scott 2002). Real estate agents and appraisers incorporate these premiums into the price of woodland properties (http://danr.ucop.edu/ihrmp/oak89.htm). Homeowners may estimate and demand compensation if someone kills or damages oaks on their property (CTLA 2000).

For example, the City of Arcadia has assumed stewardship of oak trees within its boundaries, and requires an application for tree removal, including a method to mitigate the loss of oak woodland values. The County of Los Angeles, in a similar role of oak stewardship, requires that oak trees removed under the current Oak Tree Ordinance permitting system must be replaced. Both of these systems require that the permitees plant seedlings to replace the oaks removed under permits. In this sense the City and the County have become stakeholders in oak value calculations, and the price of compensation is mitigation actions.

Finally, many environmental laws are written to grant standing to anyone seeking involvement in an environmental review or management of a resource. Because of SB 1334, anyone can become a stakeholder in the oak values of Los Angeles County, and demand that damage to their oak woodland values be calculated and mitigated under CEQA. The Endangered Species Act (ESA) gives anyone the right to challenge or sue to protect habitat for federally listed endangered species, which can include oak woodlands. Hence individuals and groups that are neither landowners nor regulatory agencies can become stakeholders when oak woodland values are calculated. This creates an exceptionally broad pool of individual potential stakeholders, including community, state, US, and international residents, and they seek an equally broad array of outcomes from existence values to firewood harvest.

TYPES OF OAK WOODLAND VALUES

The preamble of the Los Angeles County Oak Tree Ordinance identifies several kinds of oak woodland values:

> "*As one of the most picturesque trees in Los Angeles County, oak trees supply beauty and charm to the natural and manmade landscape. Oak trees add distinct and unique aesthetic character to the areas of Los Angeles County in which they are indigenous. The Oak Tree Permit is established to recognize oak trees as significant and valuable historical, aesthetic and ecological resources.*"

A number of other values have been defined for natural ecosystems since the Oak Tree Ordinance was written in 1982, including the amenity value of living next to a oak woodland preserve, or the value of ecosystem services like carbon sequestration, slope stability, and flood control.

ECOLOGICAL VALUES

Spatial Context

Ecologists include the spatial distribution of oaks when discussing the functional value of an oak woodland (IHRMP 2005). This value resembles the monopolistic value of land, in that the aggregate resources in an oak woodland at one location can never be replicated anywhere else. From a pragmatic perspective, oak woodlands in Los Angeles County are as similar or dissimilar as we choose to view them. Nevertheless, the complex climate, geology, soils, and biogeography of the county tend to enhance the unique features of individual oak woodlands.

The value of these woodlands is linked to their scarcity; which in turn is affected by the rate and extent of oak woodland conversions. Location can become critical even when oak woodlands are still

abundant: If a linear woodland is permanently severed, then the movement of wildlife along that woodland cannot be restored at a different location. In this sense, the spatial structure and context of an oak woodland are integral parts of its value.

Ecological Processes

Ecosystem processes represent a second component of oak woodlands that strongly influences their value. For example, oak trees survive summer drought because of hydrologic processes that move water through the soils and substrates where oaks occur; and symbiotic processes allow oaks to move water into their roots. Environmental reviews may fail to consider the source of water for woodlands. However, if the pathway of this process is disrupted, then woodlands are unlikely to remain intact. It is important to note that processes like the hydrologic cycle extend far beyond the canopy of oak trees. The relationship between the woodland and its watershed must be considered in defining an oak woodland and hence are important in estimating oak woodland values.

The life history of oaks provides another example of woodland processes that are difficult to detect in standing trees. Stands of oaks appear remarkably stable; however, individual oak trees eventually succumb to diseases, insect pests, and competition for water, nutrients and light. The process of tree replacement is not necessarily visible in the patterns of trees across a landscape. Coast live oaks have a remarkable ability to expand woodland boundaries when conditions are good, and to survive in an area when conditions degrade. Oaks can rapidly produce thousands of acorns and seedlings, and an established seedling can become trees in a relative short time (5 years). The process however, is dependent on suitable conditions for seedlings to germinate and thrive. The values associated with the individual oak trees can be intact, but the values associated with the ability of the oak woodland to thrive over time have been altered.

CURRENT METHODS OF ESTIMATING OAK WOODLAND VALUES

Types of Estimates

Oak woodland values are never absolute; they are governed by the situation wherein they occur and the motivations of the persons involved. In the past, these values have been calculated to: (A) estimate compensation for damage; (B) appraise land value in real estate transactions; or (C) estimate non-market values and cost/benefit of management options.

In the first case, oak woodlands are assigned a dollar value to calculate the cost of settlements in tort cases, CEQA mitigation, or *post facto* penalties/fines when oak trees or woodlands are damaged. In the second case, oak woodlands have a market value in real estate transactions, either as an amenity, because they enhance the land-owner's quality of life; or as a resource attached to the land (firewood, edible mushrooms). In the third case, values present in oak woodlands become independent of the land where they occur, and are used to estimate the relative costs and benefits of management actions or relative value of ecosystem services (wildlife habitat, carbon sequestration, watershed protection).

Replacement Values

One of the most direct means of establishing the value of oak woodlands is to calculate the cost of recreating these values after they are lost. Pincetl (2009) suggests that only by examining the costs of restoring impaired or damaged oak woodland, can we determine how much functional oak woodland is worth. In theory, replacement or restoration costs bypass the need for estimation of abstract or non-market values, by assuming that all these values are restored once the mitigation is carried out. Organizations can forego the complicated process of identifying stakeholders and calculating the values for each instance where an oak tree or oak woodland is damaged. The disadvantage is that the replacement value becomes a general solution to the specific values that are lost when an oak woodland is damaged. There are four models of replacement value: (1) acquisition of oak woodlands that are equivalent to the oak woodlands converted to other land-uses; (2) complete restoration (or creation) of oak woodlands; (3) partial restoration of oak woodland values; (4) planting of oak saplings to replace oak trees removed from the landscape, and; (5) transplanting oak trees that would be lost in a project.

Acquisition of Oak Woodlands

The value of oak woodlands is linked directly to the land price (and subsequent management costs) and endowments to manage replacement woodlands. The structure of woodland acquisitions and the mitigation fee are not fixed; however the WCB set guidelines to insure consistency in mitigation across counties. In turn these guidelines can be translated into the price of mitigation and hence the value of oak woodlands.

The foremost guideline is that mitigation payments will be used to acquire oak woodlands that are at minimum equivalent to the oak woodlands lost (same species, physical characteristics and site conditions). Ideally the woodlands that are appropriate for mitigation would be identified *a priori*, through an inventory conducted by the County.

Second, the amount of compensation should be calculated as the assessed value of the land that contains the replacement oak woodland or the assessed value of an easement over the replacement woodland. If no replacement woodland can be found, then the value would be based on either the appraised value of the land where the impact to oaks occurs, or the median assessed value of comparable oak woodlands in the vicinity.

Third, the acreage of replacement woodlands have at least a >2:1 ratio to the acreage of the impacted oak woodlands.

Fourth, the total area of oak woodland acquired should match area (footprint) of all significant impact to the oak woodlands - both direct loss (housing pads, driveways) and indirect loss (changes in hydrology, pastures, recreational trails and other activities).

Finally, mitigation depends on the persistence of the replacement woodlands. Because there is risk in perpetuity, woodland persistence needs to be underwritten with an endowment, calculated by a

standard method (CNLM 2004). This guideline translates into 10 to 25% of the land value, depending on the size and circumstances of the replacement woodland.

Restoration of oak woodlands

Oak woodland value can also be calculated by the cost of restoring woodland ecosystem structures and processes. This occurs in two forms: first, on-site restoration has been undertaken to reclaim lands after mining or temporary construction (i.e., underground pipelines); second, off-site restoration has been undertaken to mitigate the permanent conversion of oak woodlands into other land-uses.

In either case the value of an oak woodland is set by the cost of re-establishing woodland ecosystem structure and functions. Uncalculated in this cost are loss of woodland ecosystem functions for the time period between initial loss and recovery. Furthermore, there is a risk that the price of restoration, negotiated at the time of loss, may not necessarily cover the cost of woodland restoration or may not achieve a complete restoration of the values lost. The state requires a bond to insure that the restoration is still underway 5 years after it is initiated.

Restoration Of Specific Oak Woodland Values

There are situations where restoration efforts are focused on part but not all of the oak woodland values. This situation arises when an oak woodland has an identified problem, such as exotic grasses in the understory, altered hydrology or soil surfaces, or a lack of seedlings/sapling recruitment. It is less frequently employed to enhance the value of a woodland for a single species. This provides a way to calculate the replacement value of a woodland component; but it also may create new costs if the oak woodland ecosystem is further disrupted. Finally, partial restoration efforts can occur because only a subset of the woodland values is impacted by a project.

Replacement of Individual Trees

In 1982 the County of Los Angeles adopted an Oak Tree Ordinance that required a County permit to cut or remove any oak tree larger than eight inches in diameter (Chapter 22.56.2050: Regulations, Los Angeles County, Adopted: August 20, 1982; Amended: September 13, 1988). Permits to remove oaks require that each oak be replaced by minimum ratio of two saplings or seedlings. The unresolved issue with this replacement method is that mitigation seedlings do not replace the values associated with mature trees: size, shape, and other aesthetics; wildlife habitat, acorn mast, shade.

More important, replacement seedlings have some probability of failure as a mitigation, but this risk of failure is not built into the calculation of the mitigation price (two planted seedlings). Finally, it takes up to 100 years to replace a 100-year-old tree. This creates a long-term gap in resource availability, which translates into a cost (loss of use) that is not calculated in the price paid for mitigation.

Transplantation

Oaks transplanted during a project maintain a fraction of their original values at the transplant site. The County does not count transplanted trees as part of the mitigation plan, but rather as a risk taken by the property owner. The value of these oaks is reduced because:

(1) transplanted oaks will not have the same functions at the new location,
(2) transplanted oaks have reduced root areas and often have reduced canopy areas,
(3) transplanted trees do not have the same level of vigor,
(4) the absence of oaks at the transplant site may indicate that oak do not belong there and may require permanent maintenance, and
(5) cost of the loss of another habitat when the oak trees are transplanted.

Nevertheless the high number of transplanted oak trees in Los Angeles suggests that individual trees are considered worth the cost of transplantation (>$25,000 for small trees; over 1 million dollars for specimen trees).

Appraised Land Values

Land Transactions

The most fundamental means of transferring property is a ***Fee simple*** transaction, where the rights attached to ownership of a parcel are passed from one owner to another. Land owners also can divide and independently transfer individual rights during these transactions (Platt 2007), creating a complex array of relationships between owners and their use of land. The flexible nature of land transactions and the separable nature of land rights contradict the conventional wisdom that land ownership carries a fundamental set of land use rights. The obvious example in Los Angeles County is homeowner relationship to the mineable minerals or water within their parcels, which vary by prior use, jurisdiction, and location in a watershed.

Real estate markets have created a demand for flexibility, leading to a variety of ways to own and transfer rights beyond ***Fee simple*** transactions such as ***Leaseholds*** where a subsets of rights are rented or ***Easements*** which provide rights in specific locations on a parcel. Different types of ***trusts*** and ***contracts*** transfer different arrays of ownership rights by complex schedules and conditions among complex collections of interested parties. Options for oak woodland protection acquisition include: (1) fee simple acquisition of parcels with oak woodlands; (2) purchase or dedication of conservation easement to restrict use of oak woodlands; (3) deed restriction on type and footprint of land development; (4) subdivision of property with oaks into parcels that can be developed and parcels with oak woodlands, with are not allowed to be developed.

Fees in lieu of Acquisition

SB 1334 allows developers to pay into a mitigation fund as part or all of mitigation measures for impacts to oak woodlands (CPRC 2004). Payment can be made to either the state Wildlife Conservation Board (WCB), in the California Department of Fish and Game, or to the agency administering oak conservation in the county where a CEQA review occurs. In theory these fees represent the cost of acquiring an oak woodland equivalent to the woodland lost, allowing some flexibility in where mitigation occurs. This may or may not result in adequate compensation for loss of the oak woodlands in a specific location where there are few opportunities to protect comparable acres of oak woodland. Mitigation funds can also be used for management and education, and in theory fees represent some combination of acquisition and management costs of replacement woodlands.

Fees related to the Intrinsic value of individual trees

The Council of Tree & Landscape Appraisers "*Guide for Plant Appraisal*" (CTLA) is currently the most common method used to assess individual tree value. With a long history of use in calculating the value of tree damage in tort cases, the CTLA provides an accepted tool for calculating the worth of a tree based on its species, condition, and location. These factors are evaluated either using a Replacement Cure method, which is applied to smaller trees that could realistically be purchased at a nursery, or the Trunk Formula Method, which is used to estimate the value of trees considered too large to be readily available. Each factor can be depreciated by the appraiser if the species is not locally native, in poor condition, or located where it does not contribute substantially to the overall woodland landscape.

The advantage of the CTLA system is that the damaged party is paid at the time of damage, and is not left with a promissory mitigation, which may or may not materialize. A recurring disadvantage with this method is that it is possible to generate a value for the trees that is greater than the real estate value of the land the trees occupy. Another problem is that this method fails to incorporate any ecosystem service values, and instead focuses primarily on the anthropogenic values.

Amenity Values in Real Estate

Properties with functional oak woodlands offer higher real estate benefits (amenity values) than comparable lands without oaks (Standiford et al 1988, Standiford 1999, Standiford and Scott 2002). Appraisers separate the value of trees on a property, often by comparing the sales prices of property with and without oaks woodlands. This valuation only captures the buyers willingness to pay for oak woodlands, and does not reflect the ecosystem service function values.

Estimating Non-market Values

Economists examine environmental values from several different perspectives. A few believe that environmental amenities can and should be valued in exactly the same way as any other good (Baerenklau 2009). However, others such as Salzman (2005) suggests that it is the role of government to pay for achieving ecosystem service protection, because these services cannot be bought or sold and thus function outside of the traditional market system. Others feel that markets reflect individual, rather than community property values in the context of human use only, are volatile and reflect current ideas of value, but don't reflect enduring or intrinsic values.

Typically, the benefits provided by functional oak woodlands have not been incorporated into the cost-benefit equation because they are difficult to assess. These benefits are described as *non-market values*, and include those elements of oak woodlands that have no commodity, consumptive or dollar equivalency. Examples would be passive uses such as recreation, open space, and watershed protection.

Contingency Values

Non-Use values are those that do not derive from in-situ consumption of the resources (Kopp and Smith, 1993). Recreational opportunities provided by oak woodlands (hiking, bird watching, etc.)

result in dollar benefits to local businesses, increase real estate value of adjoining properties, and are considered valuable by both local and long distance stakeholders. Travel costs to access an oak woodland open space, and willingness-to-pay for protecting oak woodlands are examples of methods used to identify how important these resources are in a contingency valuation setting.

Ecosystem Services

Oak woodlands are critical components of healthy terrestrial and aquatic ecosystems, providing habitat, preventing erosion, moderating water quantity and supporting water infiltration, sequestering carbon, filtering out air and water pollutants, moderating temperatures, and supporting watershed function.

The California Air Resources Board (2008) and the California Forest Protocol (SB 812 2002) has designated the conversion of oak woodlands to non-forest use as a biological emission of carbon dioxide that is subject to CEQA analysis and mitigation. The air quality criteria established requires the measurement of oak woodland biological emission by documenting the live tree biomass (including roots), standing dead tree biomass, and wood lying on the ground. With this information in hand, then the protocol requires that the potential carbon sequestration over the next 100 years be calculated for all trees over three inches or greater diameter at breast height (dbh), as well as determining how much sequestered carbon would be released if the live trees, standing dead trees and woody debris were burned. Comparison of the existing condition to the proposed condition following the land use change would then be used to identify the level of significance for this impact.

Additionally, there are several methodologies that are used to document the amount of water run-off reduction, air pollution filtration, temperature moderation (energy use) and erosion control benefits provided by a tree or group of trees. Most are designed for use primarily within the urban forest context, rather than natural landscapes, however, given the proximity of most oak woodlands in Los Angeles County to the urban edge, these may be applicable.

Existing models that may have applicability for oak woodland service estimation include:
- Urban Forest Effects (UFORE) is a computer model designed to characterize forest structure (species composition, number of trees, size, density, health, leaf area, biomass, diversity) and use these variables to evaluate primarily air quality parameters like removal of particulate matter, carbon sequestration and storage, temperature effects resulting in energy use benefits and pollen impacts (Nowak and Crane 2000).

- STRATUM is the street tree management and analysis tool used by many local cities. Using commonly collected inventory data on tree species, size, health and location, the computer model calculates the dollar value of aesthetics, energy conservation, air quality improvement, carbon dioxide reduction, stormwater control and property value increases. The applicability of this model to oak woodland land use conversion is dependent on the location of the proposed development in relation to a more urbanized environment (USFS 2009).

-InVEST is another computer program designed to “help land managers and
government workers assess this wide array of services” (ESA Press Release). InVEST stands for Integrated Valuation for Ecosystem Services and Trade-offs.2

FUNDAMENTAL MODEL FOR OAK WOODLAND VALUATION

All of these different means of calculating oak woodlands values can be combined in the following manner:

Total Oak Woodland Value =
Market Values (includes underlying land value) + Non-Use Values + Ecosystem Function Value

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APPENDIX 3

OVERVIEW OF OAK WOODLANDS IN LOS ANGELES COUNTY

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OVERVIEW OF OAK WOODLANDS IN LOS ANGELES COUNTY

Oak woodlands are the most biologically diverse broad habitat in the state and very important to basic functions that are in the public commons. Removal of oak woodlands is a substantial impact to the biological diversity of the southern California area and Los Angeles County. These trees, especially jurisdictional trees, provide numerous values to the commons: they supply aesthetics, recreational opportunities, control soil erosion, provide management of the water table with slow release to the atmosphere and soil, provide carbon sequestration, and produce oxygen. They filter water; filter air; amend the soil. Woodland loss in general throughout the world results in more greenhouse gas production than all burning of fossil fuels for transportation. California has about 8 million acres of oak woodlands, and about 1 million of these are considered jeopardized by development and other clearing. In terms of biological function they provide habitat for over 300 vertebrate species, thousands of insects, and innumerable associated plants. They moderate temperature extremes for all these organisms as well as humans.

When oak woodlands are removed, it is not simply trees that are missing but all the attendant functions and habitat. Woodlands are a repository for biodiversity, due to the number of affected species. Along with other individuals in their population, they are a repository of genetic variability that can sustain the species in times of environmental change. Removal of woodland habitat needs to be fully mitigated to 100% replacement in order to claim "reduction of impacts to a less than significant impact." The replacement of the entire habitat must be undertaken, but return of the oak woodland is chiefly out of the tree mitigators' hands, and is a matter of probability. Oaks grow slowly. It will be a long time or perhaps never when the lost community of an oak woodland is replaced by plantings. When a project replaces the woodland loss, it also mitigates for losses of the species that live or use the habitat.

HISTORIC EXTENT OF OAK WOODLANDS IN LOS ANGELES COUNTY

Oaks and humans have a long, interrelated and interdependent history in Los Angeles County. Understanding the nature of this relationship provides important context to our efforts to protect, preserve and restore oak woodlands in Los Angeles County.

For over 25,000 years, oaks have played an important role in the landscape we know as Los Angeles County. Oak woodlands were key elements of a moist plant complex, more similar to current conditions in the Monterey region. Between 25,000 and 10,000 years ago, a variety of oak species were found in deep canyons, edges of chaparral, coastal sage scrub and along riparian corridors (Mount 1971). Mixed age stands supported a wide variety of birds, mammals, insects and related plant species. Wooly mammoths, sabre tooth tigers and other Ice Age fauna probably relied upon acorns as a seasonal food source, much as their current counterparts do.

Then as now, oaks were a keystone species in a complex ecosystem. Today there are over 5,000 insects, 80 species of reptiles and amphibians, 100 species of birds, and over 60 mammals that all rely on oaks for their survival (Pavlik et al. 1991*). The diversity supported by oak woodlands is a major reason why Los Angeles County hosts 20% of all species listed as federally endangered.*

Of these listed endangered or extinct species, perhaps the most notable loss has been the grizzly bear. Grizzly bears roamed the hills of Los Angeles County until the last one was killed in Sunland in 1916. Grizzlies relied heavily on acorns and used their huge claws to rip up the soil in search of roots and grubs. Their "tilling" helped cultivate oaks by reducing competitive annuals, and providing good places for acorns to grow. A mature grizzly was a big competitor for acorn resources. Archeologists estimate that the amount of acorns consumed by each bear equaled that consumed by as many as seven humans (Moratto, pers. comm.).

The first human inhabitants of Los Angeles were the early Tongva-Gabrielino, Chumash and Fernandeno/Tataviam Tribe, with the Tongva-Gabrielino group most widespread in central Los Angeles. Since at least 7,000 BC, the local Native Americans selected village sites near water and oaks. Oaks provided food, medicine, shelter and were actively managed to favor maximum acorn production (Blackburn and Anderson 1993). Low intensity fires were regularly used to clear the understory and remove competition.

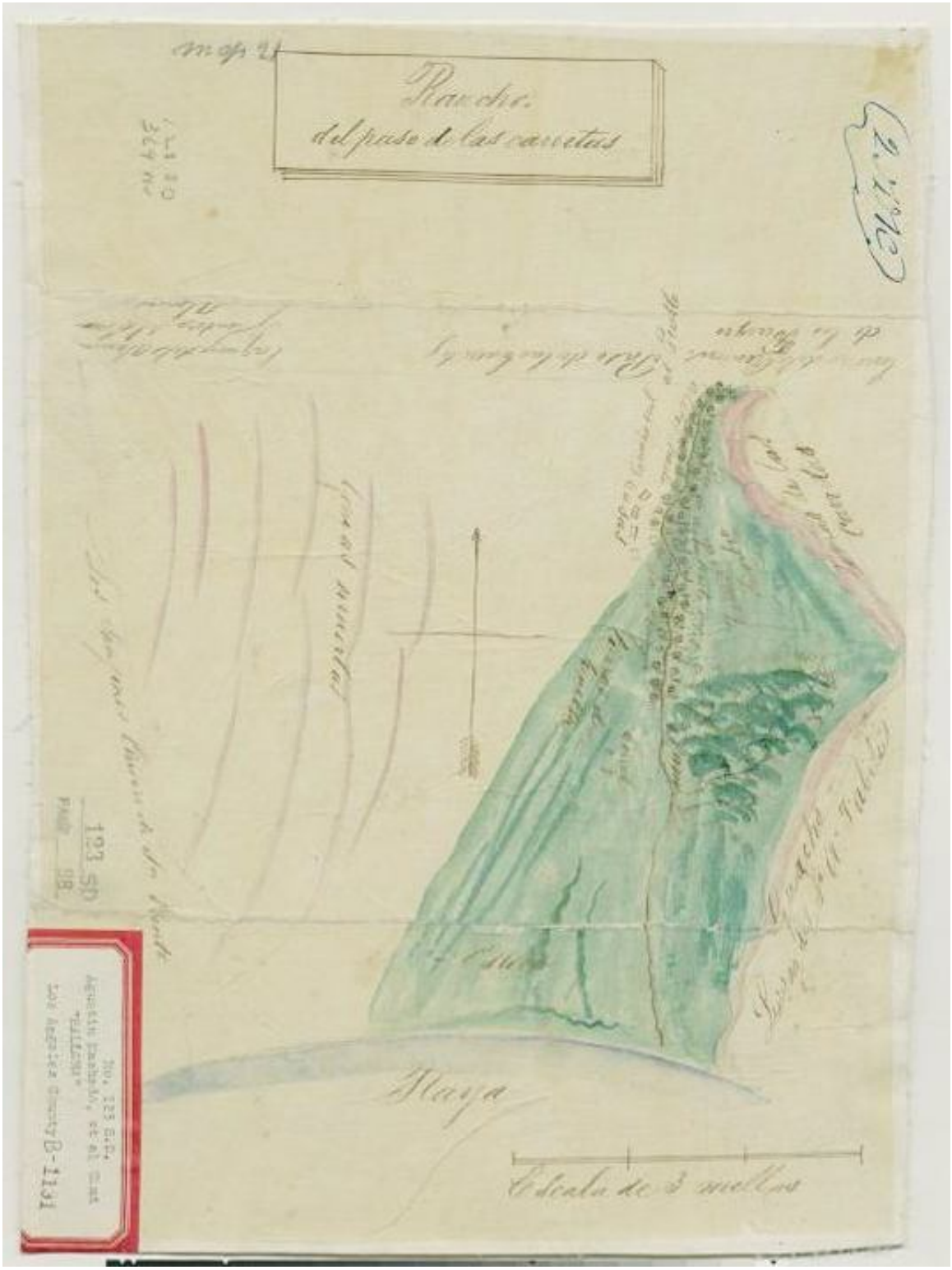
Harrington (1924) and others estimated that each person consumed between 700-1,000 pounds of acorns per year. A mature oak could produce approximately 140 pounds in a good mast year. Individual trees that were consistent acorn producers were passed down in families (McCawley, 1996).

Distribution of oak woodlands was extensive when the early European settlers arrived. Most of the early diaries mention finding oaks along the canyon bottoms, slopes of the hillsides and across much of the San Fernando Valley. In 1769, the Portola Expedition traveled from what is now known as Santa Ana, up through the Puente Hills, along what is now Wilshire Boulevard and followed what is now called Sepulveda Boulevard on their way north to San Francisco (Johnston 1962). Father Crespi described the route from the sacred spring located at University High School, over the Sepulveda Pass towards the San Fernando Valley.

"We set out at a little past 2 o'clock….taking a northward course through the mountains. These are quite high and rather steep, however, much covered everywhere with a great deal of grass (I have seen none better anywhere), and the hollow which we were following much lined with large sycamores, live oaks and white oaks."

With the coming of the Europeans, agriculture and grazing thousands of cattle and sheep transformed the landscape. As with the Native Americans, development was concentrated near water and oaks, both considered essential to survival. The Spanish land grants often showed the streams and oaks on a property, as can be seen in **Figure 1A – Ballona Creek Land Grant** on the next page.

FIGURE A1 - BALLONA CREEK LAND GRANT [2]



[2] Source: Bancroft Library, Berkeley, CA

Oaks are a prominent part of the descriptions the first arriving European settlers made of the land. It is said that in 1602 Sebastian Vizcaino, the first European to land at Monterey, used a coast live oak as a "church" for a religious ceremony, and that 168 years later Friar Junipero Serra said mass under the same tree. To the early arriving Spanish the oaks must have reminded them of their homeland where oaks are also a significant component of the landscape. Since the beginning of European settlement in California the oak has been praised in prose and poetry, cursed and removed by farmers and ranchers who wanted to use the land for other purposes, cut down and chopped up for railroad construction, steamship fuel, stove wood, and firewood and enjoyed by many for their aesthetic (and shade) value.

In 1792 George Vancouver, commander of the English ship *Discovery* said this about the oaks in the Santa Clarita Valley: "For about twenty miles it could only be compared to a park which had originally been closely planted with the true old English oak; the underwood, which had probably attended its early growth, had the appearance of having been cleared away and left the stately lords of the forest in complete possession of the soil which was covered with luxuriant herbage."

As more and more oaks were removed to provide firewood and create more grazing space, the water table began to drop. Remaining springs were channelized into “zanjas”, further impacting the local hydrology (Gumprecht 1999). Predators were removed, and the consequences of increased rodent and livestock consumption of acorns, along with increased spread of annual grasses limited regeneration. Soils were compacted by the livestock and seedlings were eaten or trampled by many hooves.

The 1886 report of the California State Board of Forestry summarized the status of oak woodlands throughout the state, describing the forests of Los Angeles County as dominated by willows and oaks, suitable for “furnishing a large amount of firewood”. However, this is followed by a series of specific site anecdotes collected by Abbot Kinney, (at that time Chairman of the Board of Forestry) which clearly makes the connections between removing oak woodlands and the flooding, erosion and reduced water tables that result (California Board of Forestry, 1886). **Figure 1** in the main text on the page 34 illustrates the **1886 Map of Timber and Forests of Southern California**.

By the mid-1800’s much of the economy of Los Angeles was based on leather production, using oaks as fuel, and a source of tannins. The other main impact came from widespread clearing to create

vineyards and orchards. The population explosion began. The pattern of individual tree preservation was established, and the fragmented habitat we see today was fully developed by 1920.

Despite the widespread loss of oak woodlands, some individual oaks were considered to be quite special for historic and cultural reasons. The Gold Oak, located in Placerita Canyon, provided shade for Franscisco Lopez, who discovered gold while harvesting wild onions near the tree in 1842. The Peace Oak, located in the Cahuenga Pass was made famous when General Pico surrendered to John Fremont in January, 1847 creating the state of California. Neither of these oaks remain alive today.

The boom and bust economy that characterized the development of Los Angeles County was largely dictated by the availability of water. Until the Los Angeles Aqueduct was completed in 1913, most water was delivered through the ever more complex web of zanjas that started in the 1700's. Oaks provided the main fuel source for the whole region until fossil fuels and electricity became available after 1910 (Forrest et al. 1981). The development of brick factories, the need to provide everything from tool handles to tannin, and the introduction of roads and the railroad all contributed to supporting a population explosion and resulting in the loss of more oak woodlands (Lyle and Safford 1997). By 1935, the majority of oaks that were easily accessed had been harvested.

A second growth pattern that began in fragmented areas of the canyons, on steep slopes and along less developed stream corridors was documented. Vegetation maps were generated at that time for most of the state by A. E. Wieslander, a silviculturist with the U.S. Forest Service, with the goal of documenting distribution of vegetation, including oaks, on a scale of 1:1,000,000. The map, as illustrated on page 35 in the main text in **Figure 2 - Los Angeles County 1935 Historical Map of Oak Woodlands**, was based on direct sampling of identified plots located along a gradient of vegetation types. Data recorded included tree stand structure, percent cover, understory species, and more. This snapshot of conditions has become the main reference tool for understanding the changes in vegetation since that time. **Figure 2** illustrates conditions from 1935 and includes species information overlain on current community areas for reference.

The building boom continued as Los Angeles became the center of pre- and post-World War II manufacturing. Environmental awareness grew along with the developments. By 1970, the California

Environmental Quality Act (CEQA) was enacted. This law required full disclosure of any proposed project impacts, required avoidance or reduction of impacts, and most importantly solicited public participation in the planning process.

As awareness of the impacts of losing oak woodlands grew, the County responded by developing one of the first Oak Tree Ordinances in the state in 1982. This well intentioned effort has increased public awareness about the special role oaks have in our ecosystem. However, it has limitations. By focusing on protection of only individual mature oak trees, the ordinance does not promote regeneration/recruitment, ignores intrinsic benefits, and often leads to fragmentation and isolation. Under the ordinance, there is no cumulative impact assessment required to demonstrate how the loss of individual trees impacts the whole woodland. Statistics provided later in this document indicate the Oak Tree Ordinance alone has not been very successful at protecting oak woodland resources in almost 30 years of implementation.

The ordinance protects aging trees, not communities. The ordinance also fails to assess benefits provided by oak woodlands in mitigating the effects of fire, flood, erosion, air pollution, water pollution, and loss of species diversity. When oak woodlands are removed, the cost of building the necessary infrastructure to provide a similar level of service once provided by the woodlands is passed on to the community in perpetuity.

Recognizing these issues, the state of California passed the Oak Woodlands Conservation Act (AB 242 2001). This law set up a process for voluntary conservation and identified oak woodlands as a significant resource throughout the state. This law also requires Counties to develop an Oak Woodlands Conservation Management Plan in order to be eligible for state funds to assist in acquiring oak woodlands for the public trust. Only 15 of the 54 counties statewide had developed plans as of 2008.

In 2007 (revised in 2009), the California Forest Protocol (CFP) was adopted by the California Air Resources Control Board (CARB) and incorporated into the CEQA Initial Study Checklist by the Natural Resources Agency in July 2009. CEQA now requires the analysis and mitigation of potential effects of greenhouse gas emissions related to conversion of oak woodlands. Future CEQA documents

must include analysis of how biological carbon emissions will change if oak woodlands are converted to other uses.

All of these laws acknowledge that oak woodlands have intrinsic values that provide quantifiable benefits. These include aesthetic values, public health benefits, recreational values and ecosystem function values.

Los Angeles County is in the process of revising and updating the General Plan. The development of an Oak Woodlands Conservation Management Plan is a complementary effort to expand public awareness, assist with multi-faceted impact evaluation, and identify specific management strategies related to development of the remaining oak woodlands.

By seriously considering what we want oak woodlands in Los Angeles County to look like in 50 years, we can develop a vision with attainable goals. Expanding our evaluation to view oak woodlands management issues from several spatial levels, in the context of past oak woodlands distribution and future potential conservation, it will be possible to incorporate a more complete cost-benefit analysis to guide planning decisions.

FACTORS AFFECTING OAK WOODLANDS

Habitat for Plant and Wildlife Species

Oak woodlands provide critical wildlife corridors and linkages, promoting dispersal from one area to another for numerous species, from fungi to mule deer. The shape and size of oak woodland habitats dictates the function, with larger, contiguous woodlands functioning most effectively. Some species are more sensitive than others to edge effects, and rely on the larger oak woodlands to provide a buffer to intrusions. The notion of a corridor is somewhat misleading, in that very few species utilize long narrow corridors of habitat. When oak woodlands are embedded within other urban and agricultural land uses, their integrity declines and the barriers of houses and roads, clearing and night lighting alter wildlife movement, disrupting dispersal between stands.

A variety of studies show that species diversity and composition change between larger and smaller woodlands, and change in relation to the distance from development (Scott 1996). The composition of the understory plays an important role in woodland value, with native undisturbed areas more diverse than those dominated by non-natives (Hilty et al. 2006).

Landscape Function (parcel level, watershed level, regional level)

Removal of oak woodlands has ripple effects starting at the single tree and extending throughout the watershed. Because oaks are wind pollinated, trees isolated further than 200 meters apart have difficulty producing acorns (Sork 2008). Individual trees often survive, but their contribution to the long-term stability of the oak woodland is compromised. The ripple effects of oak woodland loss within a watershed and on a landscape level are both direct and indirect.

When oaks and their associated community are removed, there can be immediate changes in soil stability and water quality. A study done in the Sierra Nevada foothills found that following the removal of blue oaks, the sedimentation levels in nearby streams increased. Nutrient concentrations in the streams also increased, while they decreased in the soils (Camping et al. 2002). The ecosystem service functions provided by the woodland are reduced, and removal necessitates costly built infrastructure, such as storm drainage systems. Storm drains are required to replace the woodlands' moderation of storms through oak canopies and percolation through the native leaf litter and soils that restores groundwater processes. Several cities have found that the cost of protecting the floodplain and maintaining an intact riparian corridor was far less expensive than building a stormwater system capable of doing the same job (Seattle Public Utilities 2009).

On the landscape level, these ecosystem service values add up significantly. Whether it be the aesthetic and visual benefits of driving along a road through oak studded hillsides, hiking a trail through the woodland or the cumulative benefits of air pollution reduction, water quality improvements, or water storage benefits, the contributions of oak woodlands to the health and well-being of the residents of Los Angeles is enormous.

Oak Population Biology

Throughout California, the lack of oak regeneration in various native oak species has raised serious concern for landowners, policy makers and the public. Several statewide surveys have shown that some native oak species, including blue and valley oak, have inadequate levels of regeneration to sustain their populations over the long term. Oak woodlands need to produce enough new trees to offset the loss of mature trees due to natural mortality factors. This process relies on the successful establishment and growth of new seedlings and eventual recruitment of these seedlings to the sapling and tree stages. Without adequate regeneration, oak stands thin out over time and eventually disappear as the last specimens die.

Low acorn production

Acorn production varies widely from year to year, and from species to species. Also, acorns of many of the oak species found in Los Angeles County germinate in the winter after they have dropped and do not persist as a seed bank in the soil from year to year. Most oaks regenerate from a bank of persistent seedlings beneath the canopy, or a "seedling bank." Since most acorns land under or near the canopy of the parent tree, most of the seedling bank is in this area. The shading and buildup of organic mulch beneath oak canopies favor acorn germination and early seedling growth.

Poor Seedbed Conditions

Although oak canopy enhances seedling establishment, it suppresses the transition of seedlings to saplings. Persistent oak seedlings, which may be no taller than six inches in species such as blue oak, may survive for years in the understory (Bernhardt and Swiecki 2001). These seedlings can produce a strong root system but show little shoot growth. In fact, shoots of persistent seedlings may periodically die back to the ground, and resprout from the seedling base in the following growing season.

Understory seedlings typically remain suppressed until competition is removed or eliminated by the decline, death, or removal of overstory trees. Seedlings released from overstory suppression can respond with relatively rapid shoot growth and can grow into saplings that eventually refill the canopy gap. Although a lack of sapling-sized oaks has been used to suggest that oak regeneration is inadequate, oak saplings are not likely to be found in well-stocked woodlands. A lack of saplings in and near recent canopy gaps, however, is clear evidence of inadequate regeneration. In woodlands with

stable canopy cover, low populations of persistent seedlings in the understory are the primary indicators of inadequate regeneration.

Although most oak regeneration occurs through this pattern, some acorns are planted beyond the oak canopy by seed-eating animals, especially scrub jays and acorn woodpeckers. If these acorns are placed in a favorable seedbed in areas that have good levels of soil moisture, minimal amounts of plant competition, and little or no impact from herbivores, the acorns can produce vigorous seedlings. Pioneer colonization of this type is seen in gardens, landscape beds, and sometimes along roadsides beyond pasture fences where browsing is minimal and road runoff provides additional soil moisture. Artificial methods for establishing oaks from seed are based on creating such favorable conditions through weed control and protective enclosures. These conditions are uncommon in open grasslands used for livestock range, however, so oaks do not typically colonize these areas even if they have historically supported oak woodlands.

Various factors can contribute to poor seedling establishment, short seedling persistence, and lack of recruitment from the seedling to the sapling stage. Some or all of the following factors may constrain regeneration at a given site— alleviating only one constraint may not be adequate to ensure regeneration.

Pollination

Most California oaks that have been studied appear to require cross pollination to produce adequate acorn crops. Because oak pollen is dispersed by wind, adequate pollination will not occur in oaks that are far from others of the same species. Hence, isolated trees may produce few if any acorns.

Leaf litter

Healthy mature acorns normally fall from trees between September and October, often well before the soil has been wetted by fall rains. Natural mulch composed of leaf litter provides protection for acorns. Mulch prevents acorns from being overheated and desiccated and also protects at least some from being eaten. In areas that lack natural mulch and have been compacted by livestock, few acorns may be able to survive and germinate.

Herbivory

Animals that eat acorns and seedlings can substantially impact the growth and survival of oak seedlings and saplings. Rodents, deer, and livestock all have the potential to limit or eliminate oak reproduction, but the relative importance of each herbivore varies by location. Gophers, ground squirrels, and voles can kill juvenile oaks by chewing and girdling stems. Livestock eat and trample understory seedlings, depleting or eliminating understory advance regeneration. Heavy browsing of seedlings by livestock or deer can indefinitely suppress their growth and inhibit recruitment to sapling and tree size classes. Interior live oak is less palatable to livestock than valley and blue oak, so grazing impacts species differently.

Sudden Oak Death

Phytophthora ramorum is the cause of both Sudden Oak Death, a forest disease that has resulted in widespread dieback of several tree species in California and Oregon forests, and Ramorum blight, which affects the leaves and twigs of numerous other plants in forests and nurseries.

Since the mid 1990s, *P. ramorum* has caused substantial mortality in tanoak trees and several oak tree species (coast live oak, California black oak, Shreve oak, and canyon live oak), as well as twig and foliar diseases in numerous other plant species, including California bay laurel, Douglas-fir, and coast redwood. The pathogen was also discovered in European nurseries in the mid 1990s, and it has since spread to wildland trees in the U.K. and the Netherlands. Although the first *P. ramorum*-infested California nursery stock was identified in 2001 (Santa Cruz County), the U.S. nursery industry was not widely impacted by the disease until 2003, when the pathogen was detected in California, Oregon, Washington, and British Columbia nurseries.

P. ramorum thrives in cool, wet climates. In California, coastal evergreen forests and tanoak/redwood forests within the fog belt are the primary habitat. Research in California forests has shown that the greatest predictor of *P. ramorum* is the presence of California bay laurel (*Umbellularia californica*). Nurseries outside of these cool, moist areas often create microclimates which mimic the preferred environment of *P. ramorum* and allow it to grow and spread far from the coast.

Sudden Oak Death has not been identified in the wild in Los Angeles County to date.

Pests and Diseases

Native oaks in California are host to, and may be affected by, a wide range of insects, mites and diseases. There are probably about fifty such agents, which may either cause serious damage or produce conspicuous impacts. Some of these may be difficult to detect and can cause significant structural and/or health impacts. Others may be highly visible but do little harm to the oaks. Some of the most damaging and/or visible are listed below (those that can be serious problems to oak survival are marked by an asterisk).

Recent introduction of the gold-spotted oak borer (*Agrilus coxalis*) in San Diego County is of particular concern. Trees infested with this borer die.

Common Diseases:

Oak anthracnose, twig blight, leaf spots (various fungi species)

Powdery mildews (various fungi species)

Branch canker (*Diplodia quercina*), orange hobnail canker (*Cryphonectria gyrosa*)

Oak mistletoe (*Phoradendron villosum*)

* Canker rots (*Inonotus andersonii, I. dryophilus*)

Hypoxylon thouarsianum

*Sulfur fungus (*Laetiporus sulphureus*)

Wetwood, alcoholic flux (various microorganisms)

*Oak root fungus (*Armillaria mellea*)

*Ganoderma root rot (*Ganoderma applanatum, G. brownii, G. lucidum*)

*Phytophthora root rot (*Phytophthora cinnamomi* and others)

Common Insects

Filbert weevils (*Curculio* sp.), filbertworm (*Cydia latiferreana*)

California oakworm (*Phryganidia californica*)

Gall wasps (various species)

Goldspotted Oak Borer (*Agrilus coxalis*)

Kuwana oak scale (*Kuwania quercus*)

Oak lecanium scale (*Parthenolecaium quecifex*), pit scales (*Asterolecanium* sp.)

Whiteflies (various species)

Twig borers (various species), oak twig girdler (*Agrilis angelicus*)

Ambrosia beetles (*Monarthrum* sp.), bark beetles (various species)

Borers (various species), Sycamore borer (*Synanthedon resplendens*)

Water stress

Due to California's Mediterranean climate, water stress associated with summer drought is an important factor limiting oak seedling survival and growth. Water stress is increased by the presence of non-native annual grasses and forbs in the understory that deplete soil moisture rapidly in the late spring. Shading provided by the oak canopy reduces impacts from temperature and wind speed, thereby reducing water stress. However, overstory oaks ultimately compete with seedlings for soil moisture, suppressing their growth. In riparian areas where soil moisture is less limited, valley oak regeneration can advance to the sapling size class even in the presence of overstory canopy.

Fire

Most of the tree oak species in California are adapted to tolerate fire in varying degrees, but none have been shown to require fire for regeneration. In contrast, studies have shown that even though oak seedlings and saplings resprout readily after topkill, many juvenile oaks are killed by fire. After topkill, resprouting oak saplings require several to many years to recover their aboveground biomass. Repeated destruction of oak shoots in successive years depletes seedling energy reserves and increases the likelihood of mortality. The combination of repeated fire and grazing is especially damaging to oak regeneration, and has historically resulted in conversion of woodlands to grasslands.

At a given site, one or more of the factors listed above may be constraining seedling establishment and growth. Restoring regeneration potential may require changes in management practices to alleviate those factors that completely inhibit oak seedling establishment and sapling recruitment. Management

changes can have both positive and negative consequences, however. In some areas, complete cessation of grazing can lead to greater competition from non-native grasses and increased vole populations, leading to more seedling damage and reduced oak seedling establishment. Site-specific assessments are generally needed to assess the status of oak regeneration, identify factors that may be limiting regeneration, and develop management strategies that can promote natural regeneration. These same principles apply in areas where attempts are being made to restore oak woodlands.

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APPENDIX 4

OAK SPECIES OF LOS ANGELES COUNTY

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INTRODUCTION

Los Angeles County encompasses 470 square miles with a complex topography ranging from sea level to 5,080 feet. The County contains islands, coastal plains, inland basins, foothills, precipitous mountains, and desert.

The Jepson Manual of Higher Plants of California (Hickman 1993) recognizes five major physiographic-biologic subdivisions in Los Angeles County. There are two provinces, the Southwestern Region of the California Floristic Province and in the north-east, the Mojave Region of the Desert Province. The Southwestern Region is represented by three subregions having distinct topographic, climatic and plant-community characteristics: South Coast (Coastal Basins and Valleys), Peninsula Ranges (Chino and Puente Hills), and the Transverse Ranges. The Transverse Ranges subregion is divided into two districts representing localized physiographic and biotic variations: the San Gabriel Mountains and the Western Transverse Ranges, the latter including the Santa Monica, Santa Susana and Liebre Mountains.

The result of this physical and environmental diversity is high biologic diversity. Fourteen of the 22 native oak species listed in the Jepson Manual occur in Los Angeles County. In addition, a new species has been recently recognized in the County (Roberts 1995) and two hybrids occur not recognized in Jepson (Boyd 1999). Oak communities are similarly diverse, with at least 13 alliances (regional community types) and numerous associations (local community types). The follow account provides a summary of the Los Angeles County oaks species and communities identified in various publications and reports.

OAK SPECIES OCCURRING IN LOS ANGELES COUNTY

The following summary is primarily drawn from the Oaks of the Southern Californian Floristic Province by Fred M. Roberts, Jr. (1995).

Listed locations are the Liebre Mountains located on the west end of the San Gabriel Mountains (**L**), Santa Monica Mountains and Simi Hills (**SM**), Santa Susana Mountains (**SS**), San Gabriel Mountains and foothills (**SG**), the Verdugo Mountains (**V**) and the Chino and Puente Hills (**C-P**).

TREE OAKS

Coast live oak (*Quercus agrifolia*)
Below 3,000 feet. L, SM, SS, SG (southern slopes), V, C-P, Santa Catalina Island. Evergreen. Canyons, valleys, foothills, moist slopes and along streams. The most common tree oak in Los Angeles County. Frequently occurs in sycamore woodland and chaparral.

Valley oak (*Quercus lobata*)
Below 2,000 feet. L, SM, SS, San Fernando Valley (minor).
Deciduous. Valleys, rolling hills and along streams in the west County. Often occurs as open savanna.

Blue oak (*Quercus douglasii*)
Below 3,500 feet. L, Santa Catalina Island.

Deciduous. Valleys, foothills. Restricted to the northwest County.

Engelmann's Oak (*Quercus engelmannii*)
Below 4,000 feet. SG (foothills Pasadena to Sierra Madre).
Semi-deciduous. Foothills and alluvial fans of the southern San Gabriel Mountains.

Canyon live oak (*Quercus chrysolepis*)
Above 1,700 feet. L, SG.
Evergreen. Shrub at higher elevations. Mountain canyons and slopes. Often a component of conifer forests and sometimes higher-elevation chaparral.

Black Oak (*Quercus kelloggii*)
Above 4,000 feet. L, SG (eastern).
Deciduous. Montane species. Occurs in conifer forest. Restricted to the northwest and far east of the County.

***Quercus x morehus.* Hybrid of black oak and interior live oak.**
Above 4,000 feet. L.
Evergreen. Sometimes a large shrub. Western edge of Liebre Mountains. Also occurs in San Diego County.

SHRUB OAKS

California Scrub Oak (*Quercus berberidifolia*)
Below 5,000 feet. L, SM, SS, SG (western), V, C-P.
Evergreen. Sometimes a small tree. Canyons, foothills, dry slopes, mountains. The most common shrub oak in Los Angeles County. Frequent component in oak woodlands, chaparral, coastal sage scrub, and conifer forests.

Interior live oak (*Quercus wislizenii* var. *frutescens*)
Above 3,000 feet (2,100 feet in the SM). L, SG, SM (minor).
Evergreen, sometimes a tree. Mountain canyons and slopes. Component in oak woodlands, chaparral, and conifer forests.

Quercus agrifolia* x *Quercus wislizenii.
Approximately 3,000 feet. L.
Evergreen. Large shrubs. Montane Canyons.

San Gabriel Mountains leather oak (*Quercus durata* var. *gabrielensis*)
Between 1,500 and 3,300 feet. SG.
Evergreen. Endemic to the Los Angeles County. Canyons, slopes, ridges. Component in oak woodlands and chaparral.

Oregon Oak (*Quercus garryana* var. *breweri*)
Above 800 feet. L.

Deciduous. Limited to a few locations in the Liebre Mountains. Dry slopes. Component of chaparral and conifer forests.

Tucker's oak (*Quercus john-tuckeri*)
Above 2,900 feet. L, SG (north slopes).
Evergreen. Sometimes a small tree. Montane chaparral and desert-chaparral transition. Limited to the north slopes of the Liebre and San Gabriel Mountains.

***Quercus x alvordiana*. Hybrid of blue oak and Tucker's oak.**
Above 2,900 feet. L (northwest).
Semideciduous to evergreen. Shrub to small tree. Limited to the northwest Liebre Mountains, forming more extensive stands north of the County.

ISLAND OAKS

Island Oak (*Quercus tomentella*)
Santa Catalina Island, San Clemente Island. Canyons, ravines, moist slopes. Component of oak woodlands, chaparral, pine forest.

Channel Islands scrub oak (*Quercus pacifica*)
Santa Catalina Island.

MacDonald Oak (*Quercus x macdonaldii*). Hybrid of valley oak and California scrub oak
Santa Catalina Island.

DESCRIPTIONS OF OAK SPECIES PRESENT

Coast Live Oak (*Quercus agrifolia*)

Form: The coast live oak is a picturesque evergreen tree 10-25 meters tall and a canopy spread of 45 meters in especially large specimens.

Leaves: This evergreen species has leaves that are usually oval to oblong in general outline with fine spiny teeth along the margins. The leaves are generally about 20-60 mm long with a texture is best described as crisp - they will break rather than bend. Mature leaves are usually convex but interior leaves that are heavily shaded may be flat and considerably larger than average; petioles 4-15 mm long.

Acorns: Acorns are 25-35 mm long and 10-14 mm wide with cups that are 8-12 mm long and 10-16 mm wide. The cups have thin, flat scales and are silky-hairy within.

Habitat: Common in foothills, canyons, valleys and mesic, usually north-facing, slopes. The coast live oak is also found on exposed slopes in the coastal zone where temperature and humidity extremes

are moderated by the ocean. The species is usually found in well drained soils of the coastal plains and bluffs but may be found up to 5000 feet in inland canyons.

Range: The coast live oak is found primarily found along the coastal slope of the coast ranges from Mendocino County in the north into Baja California in the south. In several places the coast live oak crosses the coast ranges with populations along waterways on the inland side of the mountains in the central valley. In Southern California the species is found along the transverse range, in many inland valleys, and up to the 5,000-foot level in the local mountains. In Los Angeles County the coast live oak occurs in most of the county's mountains and foothills. The species is frequently associated with other oaks in the foothills of the San Gabriels and with California black walnuts and scrub oaks in the hills of the coastal plain such as the Elysian Hills and Puente Hills.

Notes: The coast live oak is the tree most native Southern Californians associate with the word "oak," the early Spanish explorers called the tree "encina" which accounts for many familiar place names in California.

California Scrub Oak (*Quercus berberidifolia*)

Form: Evergreen shrub 1-6 meters tall. The scrub oak usually grows as a bush and often has many trunks originating from a basal burl. The trunks are not usually more than 15 cm in diameter and the shrub is usually less than 6 meters tall. Because of the many trunks growing in divergent directions from the burl, the canopy spread may be more than 12 meters. In some conditions, scrub oaks may adopt a tree-like growth form, reaching heights of 9 meters and having trunk diameters up to 35 cm. This illustrates the variability of all morphological characteristics of the scrub oak.

Leaves: 15-30 mm long, oblong to elliptic or somewhat rounded; margins mostly toothed, these often minute spine-tipped, or spinose; leathery, upper surface glabrate, green and shiny, lower surface paler and with scattered minute hairs; petioles 2-6 mm long.

Acorns: California scrub oak acorns are between 0.4 and 1.25 inches long, broadly elliptic or egg-shaped and broadest at the base and rounded at the tip that may be blunt or pointed. The cups are from 0.2 to 0.4 inch tall and 0.4 to 0.8 inch wide with heavy tubercles.

Habitat: California scrub oak occurs on dry slopes, hillsides, canyons, and mountains, usually in thin soils. Habitat associations include other oaks, chaparral, coastal sage scrub and yellow pine forest.

Range: The California scrub oak is found from the western slope of the central sierra Nevada foothills to lower (Baja) California and on the coast from Santa Barbara south through the Santa Monica Mountains through the Verdugo Hills, the foothills of the San Gabriels, and the Puente Hills.

Notes: Scrub oaks typically occur in stands growing close to one another and make up a significant part of the chaparral in many Southern California locations. Though often considered scrub or chaparral, stands of scrub oaks may also be identified as scrub oak woodland.

Canyon Live Oak (*Quercus chrysolepis*)

Form: The canyon live oak is an evergreen tree that reaches nearly 70 feet in height. The canopy is rounded and about as wide as tall.

Leaves: Canyon live oak leaves are elliptical and 1 to 2.5 inches long with smooth margins on the older branches and toothed-spiny margins found on the leaves of younger branches and sprouts.

Acorns: The acorns are up to 2 inches ling with broad bases and large cups. The cups are from 0.2 to 0.5 inches long and from 0.7 to a little over 2 inches wide. When green the cups are covered with fine golden hairs.

Habitat: The species is common in canyons and slopes but is not generally found where heavy snows accumulate.

Range: Canyon live oak can be found in most mountain ranges from Oregon south into Baja California. In Los Angeles County the species is found throughout the San Gabriel Mountains and in the Santa Susanna Mountains.

Blue Oak (*Quercus douglasii*)

Form: The blue oak is a medium sized tree, seldom exceeding 60 feet in height. It's canopy is well rounded when occurring in the lower foothill savanna areas, but may be quite vertical in crowded woodlands.

Leaves: The leaves are 1 to 3 inches long and usually have wavy margins, though then may also have shallow, irregular lobes. The underside of the leaves is pale green minute hairs and the upper surfaces are dull dark green with a waxy coating that reduces desiccation and gives the tree its bluish color when viewed from a distance.

Acorns: The acorns are ¾ to 1.5 inches long, narrow and sit in small shallow cups (1/4 to ½ inch long and ½ to 1 inch wide) with tuberculate scales.

Habitat: Blue oaks usually occur below 3500 feet in foothills on the margins of hot interior valleys. They are generally found in soils that are not well developed and in areas where rainfall is less than 15 inches per year.

Range: Blue oak is limited to California, but is widespread occurring in a broad ring around the central valley with scattered disjunct populations such as Sutter Buttes and the Channel Islands. In Los Angeles County the species occurs at Liebre Mountain, Oak Flat near Castaic, and on Catalina Island.

Notes: Blue oak may be the most abundant widespread oak in California and is adapted remarkably to the hot, dry foothills of the interior valleys. Many characteristics of the species are similar to desert plants, such as the waxy cuticle on the leaves, quick germination and root development with early rains, and drought deciduousness in extreme conditions.

Nuttall's Scrub Oak (*Quercus dumosa*)

Form: Evergreen or semi-deciduous shrub, 1-3 meters tall, with multiple trunks, intricate and dense, occasionally forming dense low, matted clumps; branches often sharply angled, sparsely short-haired and deep red-brown.

Leaves: 10-25 mm long, usually short, round in outline or slightly longer than broad; base rounded; tip with spine, or rounded; margin flat or wavy, with abruptly pointed teeth or spines; shiny green and sparsely minute-stellate hairy above, pale and dull green below, and covered with fine, densely matted gray hairs, these becoming sparse with age; petioles to 5mm long.

Acorns: Subsessile, or up to 3 mm; acorn cup bowl-shaped, 8-15 mm wide, 5-8 mm tall, scales flat, well defined to moderately tuberculate toward base; acorn nut 10-20 mm long, narrow, egg-shaped but tapering to a pointed tip, shell glabrous on inside

Habitat: Coastal hills, mesic slopes, canyons and coastal bluffs, chaparral, coastal sage scrub, maritime succulent scrub and closed pine forests

Range: Local, often common where found from southern Santa Barbara County, south along the immediate coast disjunctly through Orange County and San Diego County and beyond. Probably not found in Los Angeles County, but oaks strongly influenced by this species may be found in the Verdugo Hills.

Notes: Much of what was once classified as *Q. dumosa* is now identified as *Q. berberidifolia*.

San Gabriel Mountains Leather Oak (*Quercus durata var. gabrielensis*)

Form: Evergreen shrub, 1-3 meters tall; twigs densely hairy.

Leaves: 15-30 mm long, leathery, oblong to elliptic in outline, slightly convex, margins entire (without lobes or teeth), irregular teeth, or with shallow lobes, often toothed, slightly inrolled; tip spine-tipped or abrubtly pointed; upper surface dark green and with scattered minute, stellate hairs, lower surface paler, with long, dense minute stellate hairs; petioles hairy, less than 5 mm long.

Acorns: Sessile (lacking a stalk), or nearly so; acorn cup bowl-shaped, 4-6 mm long, 12-19 mm wide, scales tubercled; acorn nut 15-25 mm long, ovoid to cylindric, tip abruptly rounded, or with a short, tapered point, shell glabrous on inner and outer surface.

Habitat: Occasional to common in canyons, ridges, and on slopes; chaparral, canyon oak woodland.

Range: Endemic to Los Angeles County, southern slopes of San Gabriel Mountains, 450-1000 meters.

Notes: Considerable hybridization occurs with *Q. berberidifolia* and *Q. engelmannii* at east and west end of range.

Engelmann's Oak (*Quercus engelmannii*)

Form: Engelmann oak is a large tree with a rounded or spreading crown that may reach heights of 60 feet. The canopy is generally not dense, with interior branches and the background visible through the crown when viewed from a distance. The trunk is up to 4 feet in diameter in the largest specimens with bark that is light gray, thick, heavily furrowed and somewhat scaly.

Leaves: The thick, leathery leaves are 1 to 3 inches long and elliptical with flat or wavy margins that do not have lobes, teeth, or spines. The upper surfaces are dull blue-green and lower are paler blue-green. Engelmann's oak is semi-deciduous, the leaves remaining on the tree until being replaced by the next year's new foliage. During drought the leaves may also drop, leaving the tree bare until the following spring.

Acorns: Engelmann oak acorns are cylindric to broadly ovate or elliptic and 0.6 to 1 inch long and nearly half contained within the cup. The cups are broad and shallow, about 0.4 inch wide and about 0.75 inch wide. The cups may be tuberculate near the base and covered with small dense hairs

Habitat: Engelmann oaks are found in a variety of soils from deep alluvium to thick, loamy, clays. They also occur in rocky shallow soils if there is a source of summer moisture. In their current distribution they are strongly associates with basalt derived mesas, though that may be an artifact of their elimination from many areas due to human factors.

Range: The northwestern limit of the species range is along foothills of the San Gabriels near Pasadena extending eastward along the foothills. There are scattered populations in the Santa Ana Mountains and San Joaquin Hills in Orange County. A larger more contiguous distribution begins at the Santa Rosa Plateau in Riverside County and continues southward through the Peninsular Range to northern Baja California, Mexico. In Los Angeles County the species occurs along the south face of the San Gabriel Mountains from near Pasadena to near the eastern county line.

Notes: Engelmann oak is a relict of a more mesic period in North American prehistory. The remaining stands are confined to areas the get enough moisture but are generally free of freezing temperatures and have mild summers. As a result, the Engelmann oak has been characterized as both the rarest white oak in California and the rarest tree oak in California.

Oregon Oak (*Quercus garryana var. breweri*)

Form: Deciduous rounded shrub 1-5 meters tall; twigs reddish brown.

Leaves: 50-90 mm long, leathery; longer than broad, elliptic in outline, often broadest above middle; margins with course lobes, these sometimes spine-tipped; the lobes mostly less than half way to midvein; base rounded to wedge shaped; tip rounded; margin with narrow, rounded lobes, these often 2-3 toothed; petioles 5-20 mm long.

Acorns: Sessile, or nearly so; acorn cup shallow, cup-shaped, or bowl-shaped 4-9 mm long, 12-16 mm wide; cup scales flat to weakly tuberculate, minutely hairy within; acorn nut 20-30 mm long, oval

shaped to rounded, tip rounded; shell glabrous on inner surface, slightly minutely hairy on outer surface.

Habitat: Locally common on dry slopes in chaparral and yellow pine forest, often forming extensive brush fields.

Range: Northern Coast Ranges in Trinity and Plumas County south through foothills of the Sierra Nevada and Tehachapi Mountains south to northern Los Angeles County (Liebre Mountains 245-1800 meters).

Tucker's Oak (*Quercus john-tuckeri*)

Form: Evergreen shrub 2-5 meters tall, occasionally arborescent and up to 7 meters tall, branches rather slender, with densely matted, fine hairs when young.

Leaves: 15-35 mm long, shape highly variable, usually longer than broad, or with slightly egg-shaped outline, being broadest toward base; base rounded to wedge-shaped, rarely heart-shaped; tip rounded or abrubtly pointed; margin with irregularly spaced spiny teeth; upper surface dull, gray to grayish-green, lower surface finely hairy and pale gray-green; petioles 2-3 rarely to 5 mm long.

Acorns: Sessile, or nearly so; acorn cup bowl-shaped or cup-shaped, 5-7 mm long, 10-15 mm wide, cup with scales, or slightly tuberculate; acorn nut dark brown, 2-30 mm long, narrow, to cylindric to broadly elliptic, tapering gradually, to the tip, shell glabrous on inner surface

Habitat: Mountains, chaparral, desert-chaparral transitional communities, pinion-juniper woodland, and Great Basin sage.

Range: Inner southern Coast Ranges from San Benito County south to the Tehachapi Mountains, southern Sierra Nevada, and the southeast along the desert slopes of the Transverse Ranges to the Little San Bernardino Mountains in Riverside and San Bernardino Counties. Occasional to common on arid slopes from the Lockwood Valley and Mount Pinos area east to Gorman and along the desert slopes of the San Gabriel and San Bernardino Mountains; mostly 900-2000 meters.

California Black Oak (*Quercus kelloggii*)

Form: Deciduous tree 10-25 meters tall; crown broad, rounded; trunk thick, bark smooth, dark, becoming ridged in age; twigs minutely hairy when young.

Leaves: 70-200 mm long; bright green, broadly elliptic in outline, often broadest above middle; base wedge-shaped; tip spinose-tipped; margin divided deeply into lobes, these often bearing 1-4 bristle-tipped teeth; bright green and mostly glabrous, paler and with trichomes below; petioles 25-50 mm long.

Acorns: Sessile, or nearly so; acorn cup deeply cup-shaped, 15-25 mm long, 20-28 mm wide; cup minutely hairy within, cup scales thin, flat, paper-like, often minutely hairy; acorn nut 25-30 mm long, thick, longer than wide, tip round with an abrupt small point; shell hairy on inner surface.

Habitat: Common in montane, yellow pine forest.

Range: Central western Oregon south through the Coast Ranges and the Sierra Nevada to central San Diego County. Mount Pinos, interior northern Ventura County, Liebre Mountains, eastern San Gabriel Mountains, San Bernardino Mountains, San Jacinto and Santa Rosa Mountains, Palomar, Cuyammaca and Laguna Mountains, disjunct into Mexico. 1200-2400 meters.

Notes: Fruit matures in 2 years.

Valley Oak (*Quercus lobata*)

Form: A mature valley oak is a magnificent sight. The tree is typically 40 to 75 feet tall but may reach heights of 125 feet and has a canopy that is usually broader than tall.

Leaves: The leaves of this deciduous oak are pinnately lobed (lobes originate at the midrib) typically having 3 to 4 lobes on a side and are usually 3 to 4 inches long. The lobes often have 2-3 irregular teeth at the tip. The upper surface is shiny and dark green with sparse hairs and the lower is paler with short, dense, fine hairs.

Acorns: The large acorn may be 2 inches long and is contained in hemispheric cup that ranges from 0.5 to 1.2 inches deep by 0.75 to 1.2 inches wide. Cup scales are tuberculate.

Habitat: The species distribution is formed by the presence of rich loamy soils, Jepson (1923) noted the valley oak is often a "sign of the richest soil." This affinity for good soil is evidenced by its presence in the foothill valleys along either side of the Sacramento and San Joaquin Valleys.

Range: The valley oak is found as far north as the Trinity River in Shasta County and historically as far south as San Fernando in Los Angeles County. The valley oak is also known to occur farther south and west in the areas around Calabasas and Thousand Oaks. There are scattered populations on some Channel Islands and a hybridized population in the San Joaquin Hills of Orange County. Valley oak hybrids are known to occur with other white oaks. Two named hybrids exist, both with scrub oaks, *Q. x kinselae* with *Q. dumosa* and *Q. x macdonaldii* with *Q. berberidifolia*. Other hybrids such as with Tucker oak have also been noted. In Los Angeles County the valley oak is found primarily in the Santa Monica Mountains, and the 101 freeway is close to the southern extent of its range, although scattered individuals were formerly found in other areas of the County.

Notes: The valley oak was called "roble" by the Spanish and, like the coast live oak, has lent its name to many familiar places in Southern California. Unfortunately many of these places no longer support any oak trees.

Channel Islands Scrub Oak (*Quercus pacifica*)

Form: Subevergreen, shrubs, rarely small trees 2-5 meters tall; Bark scaly on older branches and trunk. Twigs brownish or reddish, minutely puberulent, becoming glabrate and gray with age.

Leaves: 15-45 mm long by 7-20 mm, obovate or oblong, planar to moderately convex or undulate; base cuneate, wedge-shaped, or sometimes rounded, attenuate-decurrent along petiole; margins minutely cartilaginous, entire or with 1-5 irregular teeth on each side; apex blunt or rounded, occasionally subacute with mucronate tip; with scattered minute, flat, appressed, ± 8-rayed stellate hairs, green, glossy, glabrate or with minute, scattered, stellate hairs. petioles 2-5 mm long. Trichomes on lower leaf surface longer and denser than *Q. berberidifolia.*

Acorns: Subsessile, paired or solitary in leaf axil; cup hemispheric to turbinate, to 15 mm deep by 20 (35) mm wide, scales moderately to heavily tuberculate, irregularly formed; acorn nut light brown, acute-cylindric or fusiform, tapered, 15-30 mm long by 6-15 mm, apex acute, glabrate.

Habitat: Chaparral, oak woodlands, margins of grasslands, understory in closed-cone pine stands.

Range: Santa Rosa, Santa Cruz, and Santa Catalina Islands to 300 meters.

Notes: Newly described (1994); appears intermediate between *Q. berberidifolia* and *Q. douglasii*.

Island Oak (*Quercus tomentella*)

Form: Evergreen tree 5-12 meters tall, often with rounded crown; bark red brown, scaly, becoming grayish and furrowed; young twigs yellowish, hairy.

Leaves: 50-80 mm long, leathery, slightly revolute with evident parallel veination, oblong to oblong-ovate in outline; base rounded to squared off; tapering to pointed tip, or abruptly pointed; margin mostly coarsely toothed; leaves densely hairy when young, in age upper surface shiny, deep green, lower surface pale gray-green, covered with dense grayish hairs; trichomes minute, yellowish to grayish; petioles 5-18 mm long.

Acorns: Sessile, or nearly so; acorn cup shallow to bowl-shaped, 6-8 mm deep, 20-30 mm wide; cup scales tuberculate, and almost obscured by small dense hairs; acorn nut 25-35 mm long, broadly ovoid, tip rounded; shell with densely matted hair on inner surface.

Habitat: Occasional to common in canyons, ravines, and on mesic slopes in oak woodland, chaparral and closed-cone pine forest.

Range: Channel Islands of southern California and south into Mexico. Santa Rosa, Santa Cruz, Anacapa, Santa Catalina and San Clement Islands to 600 meters.

Notes: Fruit matures in two years.

Interior Live Oak (*Quercus wislizenii var. frutescens*)

Form: Evergreen multi-stemmed shrub 2-6 meters tall, bark becoming furrowed and gray.

Leaves: 18-40 mm long, leathery, flat, oblong to elliptic or lanceolate in outline; base rounded to squared off, tip tapered to a point or abruptly pointed; margin entire, or with course spinose teeth; glabrous, upper leaf surfaces shiny and green, lower surface often paler and more yellow-green; petioles 3-15 mm long.

Acorns: Sessile, or nearly so; acorn cup deeply cup-shaped or bowl-shaped, 12-16 mm deep, 12-18 mm wide, scales evident, thin and flat; acorn nut 20-40 mm long, cylindric to broadly ovoid, tip tapering to a point, shell hairy on inner surface and minutely glabrous on outer surface.

Habitat: Mountain slopes, canyons; chaparral, oak woodland, bigcone Douglas fir-canyon oak forest, Coulter pine forest.

Range: Species is in Humboldt and Shasta Counties south through the Coast Ranges, Sierra Nevada Range, Transverse and Peninsular Ranges through San Diego County and south into Mexico. *Q. w. frutescens* scattered throughout the Santa Ynez Mountains east through the mountains of Ventura County and east into the San Gabriel and San Bernardino Mountains of Los Angeles County, the Santa Ana Mountains, San Jacinto Mountains and disjunctly south into San Diego County and Mexico. 850-2000 meters.

Notes: Fruit maturing in 2 years.

OAK COMMUNITIES OCCURRING IN LOS ANGELES COUNTY

The concept of an ecological or natural plant community, defined by Oosting in "*The Study of Plant Communities*" (1948) as "…an aggregation of living organisms having mutual relationships among themselves and to the environment", takes into account both biological composition and the complex interactions that occur among species and their physical environment. Community processes, however, are not readily apparent or even fully understood. As a practical matter, both lay and professional observers generally rely on a more intuitive floristic definition such as that provided by Munz and Keck in "*A California Flora*" (1959). In this work, a plant community is "…each regional element of the vegetation that is characterized by the presence of certain dominant species." While based on floristic composition this definition nevertheless implicitly takes into account the environmental conditions and biotic processes that cause and result from recurrent plant assemblages.

This floristic definition of community is in wide use today, expressed as the Alliance (Series) and Association concept adopted by the National Vegetation Classification Standard (Jennings et al. 1996), the California Department of Fish and Game, and the California Native Plant Society (Sawyer and Keeler-Wolf 1995). Under this system, an alliance is the generic unit of vegetation defined by the dominant and characteristic plant species in the layer of vegetation with the greatest plant cover. Alliances are often regional in extent and are named for a single dominant or less frequently, two

equally codominant species. Associations are the fundamental vegetation units, localized to particular geographic subregions and clearly associated with certain environmental settings. Similar associations are grouped into alliances based on patterns of plant species dominance, similar to the way species are grouped into genera. Associations are defined by a dominant and one or more codominant or characteristic species. The following Los Angeles County oak community listing provided in tabular and mapped formats are an attempt to document and illustrate the diversity of oak communities found in Los Angeles County based on a review of available literature.

Vegetation alliances are those recognized by the California Department of Fish and Game (2007). The alliances and associations in the discussions below are drawn from local flora and vegetation descriptions (Boyd 1999, Hanes 1976, Keeler-Wolf & Evens 2006, Miles & Goudey 1997, Mullally 1997, Roberts 1996). These sources collectively provide near complete geographic coverage of oak habitats in mainland Los Angeles County. However, there are undoubtedly additional community associations not included in the tables. Also, occurrences of associations may not be limited to only those locations for which a reference is cited. Island community types are not included in this listing. The Liebre Mountains are not commonly identified on road maps, but are identified by biologists as the western segment of the San Gabriel Mountains.

Valley and Canyon Oak Woodlands

These low elevation (below 3,600 feet) oak communities are those most commonly encountered by Los Angeles County residents. They are common on north slopes, valley bottoms and along streams. Alliances include the ubiquitous Coast Live Oak Woodland, mixed with Engelmann oak in the San Gabriel foothills, and Valley Oak Woodland found in the western County. Communities occur as two distinct types. In valleys and on rolling hills they are generally open, often appearing as savannah. The understory is frequently grass, less commonly coastal sage and chaparral. In canyons and along streams communities occur as dense closed-canopy stands, where coast live oak and mixed oak riparian forests may develop (Stephenson & Calcarone 1999).

Table A1 – Alliance and Distribution of Valley and Canyon Oaks

Dominant Oak Species	Number of Alliances	Geographic Distribution
Coast Live Oak	20	Throughout LA County
Valley Oak	5	Liebre, Santa Monica & Santa Susanna Mountains
Blue Oak	1	Liebre Mountains

Figure A2 – Distribution of Oak Species in Los Angeles County is provided on the next page to illustrate the distribution of oak species in Los Angeles County. **Figure A3 - Los Angeles County Woodland Types** is provided on page 55 to illustrate the mapped locations of oak woodland types in Los Angeles County.

FIGURE A2 – DISTRIBUTION OF OAK SPECIES IN LOS ANGELES COUNTY

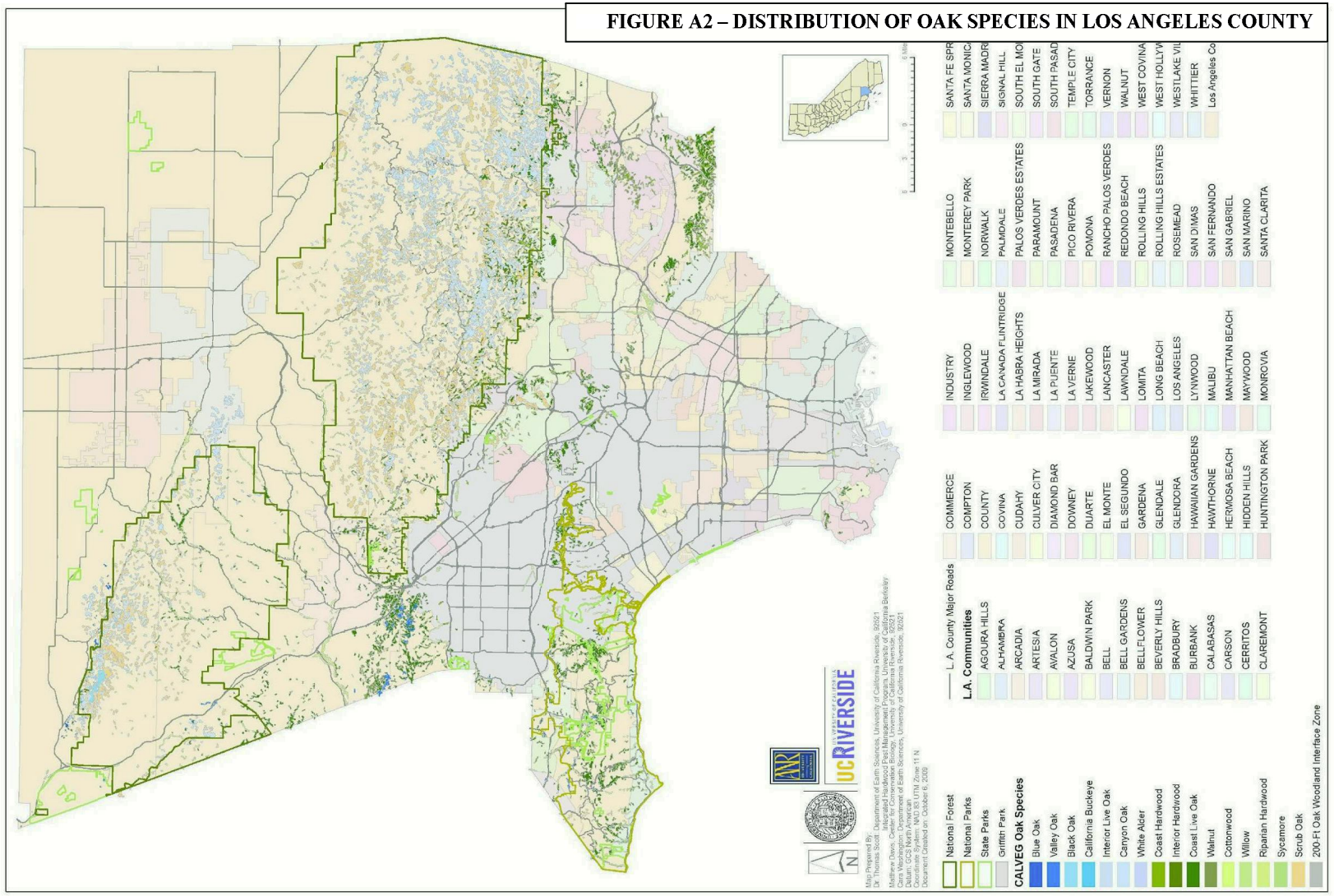

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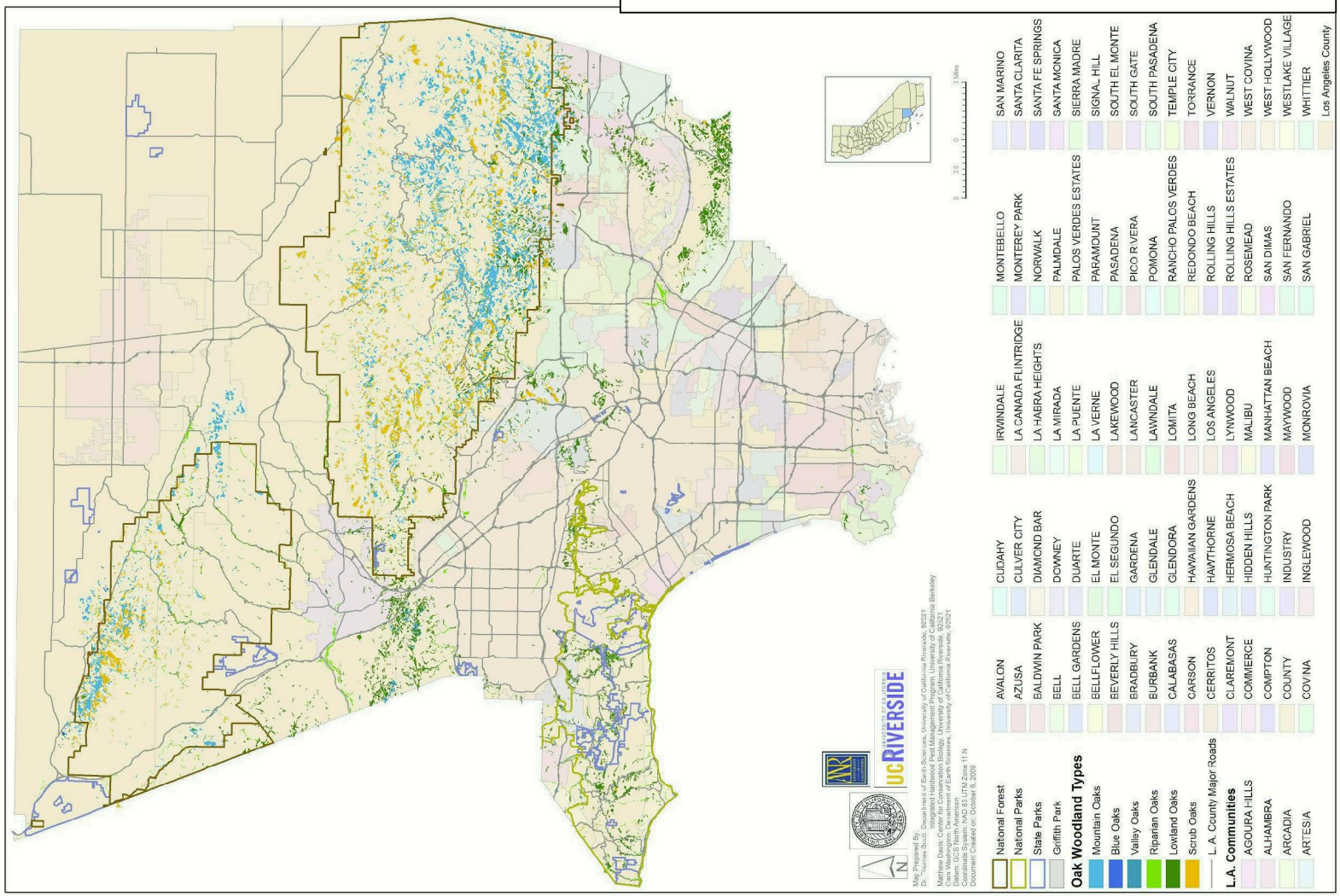
FIGURE A3 – LOS ANGELES COUNTY OAK WOODLAND TYPES



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Montane Oak Woodlands

These high elevation (above 3000 feet) oak woodland communities are of limited distribution in Los Angeles County. They occur only in the upper elevations of the San Gabriel and Liebre Mountains. Montane oak stands are often mixed with conifers, and oaks often occur as associates within a conifer alliance. Live oaks can be shrub-like in uplands, but also occur as tall, spreading trees along streams (Stephenson and Calcarone 1999).

Table A2 - Alliance and Distribution of Montane Oak Woodlands

Dominant Oak Species	Number of Alliances	Geographic Distribution
Black Oak	1	Liebre Mountains, Wrightwood
Canyon Live Oak	1	Liebre, Santa Susanna and San Gabriel Mountains
Interior Live Oak	1	San Gabriel Mountains
Mixed Oak Woodland	1	Liebre Mountains, Wrightwood

Scrub Oak Chaparral

Scrub oak is an important, widespread component of chaparral, with communities occurring from sea-level up to 5000 feet. It forms dense closed canopy stands, often in association with other chaparral shrub species. Some scrub oaks can occasionally take the form of a small tree.

Table A3 - Alliance and Distribution of Scrub Oak Chaparral

Dominant Oak Species	Number of Alliances	Geographic Distribution
Shrub Oak	4	Throughout Los Angeles County
Shrub Oak - Chamise	1	Liebre and Santa Monica Mountains
Shrub Oak – Birchleaf Mountain Mahogany	1	Liebre and Santa Monica Mountains
Shrub Oak – Chaparral Whitethorn	1	Liebre and San Gabriel Mountains

Montane Live Oak Scrub

These oak communities generally occur above 4,000 feet (interior live oak occurs above 2,000 feet in the Santa Monica Mountains). They are dominated by the shrub forms of canyon and interior live oak,

although tree forms may sometimes occur. They are associated with higher elevation chaparral species.

Table A4 - Alliance and Distribution of Montane Live Oak Scrub

Dominant Oak Species	Number of Alliances	Geographic Distribution
Canyon Live Oak Shrubland	1	Liebre Mountains
Interior Live Oak Shrubland	3	Liebre, Santa Monica and Santa Susanna Mountains

Other Vegetation Types Containing Oaks

Oaks are a ubiquitous element in plant communities of Los Angeles County, where they can occur as individuals or small stands in alliances otherwise dominated by other species. Coast live oaks in particular occur in many chaparral types and are common in riparian areas where it forms associations within sycamore, willows and California bay alliances, such as the Sycamore – Coast Live Oak Association of the Santa Monica and Santa Susana Mountains.

The following Los Angeles County oak community listing by alliances is an attempt to document and illustrate the diversity of oak communities found in Los Angeles County based on a review of available literature. Often, oaks are not the dominant species, but are a critical element that needs to be identified. Vegetation alliances are those recognized by the California Department of Fish and Game (2007). The listed alliances and associations are drawn from local flora and vegetation descriptions (Boyd 1999, Hanes 1976, Keeler-Wolf and Evens 2006, Miles and Goudey 1997, Mullally 1997, Roberts 1996). While these sources collectively provide near complete geographic coverage of oak habitats in mainland Los Angeles County, there are undoubtedly additional community associations not included in this list. In addition, occurrences of associations may not be limited to only those locations for which a reference is cited. Island community types are not included in this listing.

Vegetation alliance groupings follow the "Southern California Mountains and Foothills Assessment" (Stephenson and Calcarone 1999). Listed locations are the Liebre Mountains (**L**), Santa Monica Mountains and Simi Hills (**SM**), Santa Susana Mountains (**SS**), San Gabriel Mountains and foothills (**SG**), Verdugo Mountains (**V**) and the Chino and Puente Hills (**C-P**). A hyphen ("-") indicates codominant species occurring in the same layer while a slash ("/") indicates species occurring in different layers. The order of species names generally reflects decreasing levels of dominance, constancy, or indicator value.

Valley and Foothill Oak Woodlands

These low elevation (below 3,600 feet) oak communities are those most commonly encountered by Los Angeles County residents. They are common on north slopes, valley bottoms and along streams.

Alliances include the ubiquitous Coast Live Oak Woodland, mixed with Englemann oak in the San Gabriel foothills, and Valley Oak Woodland found in the western County. Communities occur as two distinct types. In valleys and on rolling hills they are generally open, often appearing as savanna. The understory is frequently grass, less commonly coastal sage and chaparral. In canyons and along streams communities occur as dense closed-canopy stands, where coast live oak and mixed oak riparian forests may develop (Stephenson and Calcarone 1999).

Blue Oak Woodland Alliance (L)

Blue oaks are the only species in this alliance.

Coast Live Oak Woodland Alliance (L, SS, SM, SG, C-P)

Coast Live Oak
Coast Live Oak South Coastal Woodland (SM)
Coast Live Oak / Annual Grass – Herb (SS, SM, SG)
Coast Live Oak and Valley Oak / Grass (SS)
Coast Live Oak – Englemann Oak (SG – Altadena to Claremont)
Coast Live Oak – Southern California Walnut (SM, SS, SG)
Coast Live Oak and Southern California Walnut and California Ash (SS)
Coast Live Oak and California Ash (SS)
Coast Live Oak / Poison Oak (SM, SS)
Coast Live Oak / Poison Oak – Bush Monkey Flower Phase (SM)
Coast Live Oak / Creeping Snowberry (SS)
Coast Live Oak – Arroyo Willow (SM, SS)
Coast Live Oak – California Bay (SM)
Coast Live Oak – California Bay / Hairy Leaf Ceanothus (SM)
Coast Live Oak / Chamise (SM)
Coast Live Oak / California Scrub Oak (SM)
Coast Live Oak / Greenbark Ceanothus (SM)
Coast Live Oak / Toyon – Poison Oak (SM, SS)
Coast Live Oak / Purple Sage – California Sagebrush (SM)
Coast Live Oak and Coastal Sage (SS)

Valley Oak Woodland Alliance (L, SM, SS)

Valley Oak / Annual Grass – Herb (SM)
Valley Oak – Coast Live Oak / Annual Grass – Herb (SM, SS)
Valley Oak and Southern California Black Walnut/Grass (SS)
Valley Oak/Coastal Sage Scrub (SS)
Valley Oak and California Ash (SS)

Canyon Live Oak Woodland Alliance (SS) – Transitional to montane oak woodlands

Canyon Live Oak and Coast Live Oak (SS)
Canyon Live Oak and Coast Live Oak and Valley Oak (SS)

Montane Oak Woodlands

These high elevation (above 3000 feet) woodland communities are of limited distribution in Los Angeles County and because they occur only in the upper elevations of the San Gabriel and Liebre Mountains, are infrequently encountered. Oak stands are often mixed with conifers, and oaks often occur as associates within a conifer alliance. Live oaks can be shrub-like in uplands and occur as tall spreading trees along streams (Stephenson and Calcarone 1999).

Black Oak Woodland Alliance (L)
Canyon Live Oak Woodland Alliance (L, SS, SG)
Interior Live Oak Alliance (SG)
Mixed Oak Woodland Alliance (L)

Scrub Oak Chaparral

Scrub oak is an important, widespread component of chaparral, with communities occurring from sea-level up to 5000 feet. It forms dense closed canopy stands, often in association with other chaparral shrub species. Shrub can occasionally take the form of a small tree.

Scrub Oak Shrubland Alliance (L, SM, SS, SG, V, C-P)
- Scrub Oak (L, SM, SS, SG, V, C-P)
- Scrub Oak – Greenbark Ceanothus (SM)
- Scrub Oak – Interior Live Oak Shrub (SG)

Scrub oak – Chamise Shrubland Alliance (L, SM)
Scrub oak – Birchleaf Mountain Mahogany Shrubland Alliance (L, SM)
Scrub Oak – Chaparral Whitethorn Alliance (L, SG)

Montane Live Oak Scrub

These communities generally occur above 4,000 feet (interior live oak occurs above 2,000 feet in the Santa Monica Mountains). They are dominated by the shrub forms of canyon and interior live oak, although tree forms may sometimes occur. They are associated with higher elevation chaparral species.

Canyon Live Oak Shrubland Alliance (L)
Interior Live Oak Shrubland Alliance (L, SM, SS)
- Interior live oak – scrub oak (L)
- Interior Live Oak – Canyon Live Oak Shrub (L)

Other Vegetation Types Containing Oaks

Oaks are an ubiquitous element in plant communities of Los Angeles County, where they can occur as individuals or small stands in alliances otherwise dominated by other species. Coast live oak in particular occurs in many chaparral types and is common in riparian areas where it forms associations

within sycamore, willows and California bay alliances, such as the Sycamore – Coast Live Oak Association of the Santa Monica and Santa Susana Mountains.

Latin Names for Non-oak Species Listed:

Arroyo Willow	*Salix lasiolepis*
Birchleaf Mountain Mahogany	*Cercocarpus betuloides*
Bush Monkey Flower	*Diplacus aurantiacus*
California Ash	*Fraxinus dipetala*
California Bay	*Umbellularia californica*
California Black Walnut	*Juglans californica*
California Sagebrush	*Artemisia californica*
Chaparral Whitethorn	*Ceanothus leucodermis*
Chamise	*Adenostoma fasciculatum*
Creeping Snowberry	*Symphoricarpos mollis*
Greenbark Ceanothus	*Ceanothus spinosus*
Hairy Leaf Ceanothus	*Ceanothus oliganthus*
Poison Oak	*Toxicodendron diversilobum*
Purple Sage	*Salvia leucophylla*
Toyon	*Heteromeles arbutifolia*

Glossary:

arborescent- tree like
glabrate- generally lacking hairs, nearly glabrous
glabrous- without hairs
glaucous- waxy
lanceolate- longer than wide and broadest toward the base
oblong- longer than wide and with parallel sides, rounded at both tip and base
obovate- an egg shaped outline, broadest toward leaf tip
petiole- leaf stalk
revolute- edges inrolled
sessile- lacking a stalk
spinose- bearing spines
stellate- rayed like a many-armed star
trichomes- minute stellate hairs
tuberculate- warty

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APPENDIX 5

OAK REVEGETATION STRATEGY FOR LOS ANGELES COUNTY

Excerpted and summarized from:

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Principal Investigators

Prepared for:
County of Los Angeles Fire Department
Forestry Division

Sponsored by:
Browning-Ferris Industries, Inc.

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OAK REVEGETATION STRATEGY

PURPOSE

While the gradual disappearance of oaks was hardly notices for nearly two centuries, concern of the past years has grown enough to establish active preservation and enhancement programs. In 1982, Los Angeles County passed the Oak Tree Ordinance. As with similar ordinances in several southern California cities, it original intent was simply to require developers to preserve oaks existing on their development sites. Since this often presented considerable difficulties, the ordinance included a provision for planting two or more oak seedlings on the same site or nearby to replace any trees removed.

With experience, it became apparent that ideal conditions for planting oaks often did not exist on the same site, and that the trees might be better established elsewhere. In lieu of planting trees on the same site, a number of additional alternatives have been developed by the county. Developers may be permitted to dedicate one acre of land of equal resource value to the county for every acre of oak woodland that they wish to develop. Mitigation efforts at off site locations have been an option in recent years. Careful planning to preserve oak woodland on site however is still the recommended management alternative.

As another alternative for special circumstances, the county established the Oak Forests Special Fund in 1993. After careful review by the county and approval by the county foresters, in lieu of planting trees, developers could now pay into the fund an amount equivalent to the value of the oak resource in compensation for removing oaks. The fund could be used to acquire established oak woodland for preservation, to improve existing habitat or to plant trees in appropriate locations. The, the original limited purpose of the Oak Tree Ordinance expanded to include both land acquisition and land revitalization. This expansion of purpose also suggests a focus not merely on protecting and replacing individual trees but on preserving and establishing plant communities.

REGENERATION OF OAK WOODLAND

This expanded focus suggests an even larger framework of possibilities. Alternative mitigation strategies available could be the beginning of an effort to reestablish oak woodland throughout its original natural range in the still undeveloped portions of southern California foothills. Environmental benefits can be great, among them:

- Species diversity and wildlife populations will increase.

  Oak woodland constitutes much richer habitat than the scrub communities that have replaced it. Oaks are among species supporting the greatest diversity and largest numbers of wildlife.

- Erosion control will be enhanced.

  Flood waters and eroded soils flowing from foothills and lower mountain slopes into the urbanized valleys would decrease because oaks are less vulnerable to fire than most other native species when well maintained. They effectively hold soil in place and allow increased soil absorption of rainwater near where it falls. Oaks furthermore speed the processes of soil formation by retaining moisture in contact with the underlying rock.

- Carbon dioxide absorption and oxygen production will increase.

  This increase will be in increments that can be significant in improving the region's air quality, while reducing greenhouse effects.

- Intensities of wildfires will likely be reduced.

  In comparison with the heavily fueled, intense fires that are now common, newly established stands of oaks can form buffers between suburban areas and wildlands.

- Recreational uses will be much improved.

  Cool, shaded landscapes of oak woodland invite greater use.

QUESTIONS FOR RESEARCH AND PLANNING

The time has come to provide a strategy and a means of focusing the efforts to reestablish oaks into a larger, coordinated program.

In order to accomplish this, the following questions were considered:

- Which conditions optimally allow oak woodland to thrive, and continue to thrive on their own after an initial period of planting and nurturing?

- Where do optimal conditions exist in Los Angeles County? Where have oaks existed historically and therefore are most readily restored?

- Which plant associations form oak woodland communities under varied topographic conditions and hydrologic regimes?

- Which are the most effective planting and management techniques?

OAK WOODLAND POTENTIAL MODEL

It is important to recognize that the Oak Woodland (Restoration) Potential Model (Lyle and Safford 1997) presents a general pattern, not a precise delineation of sites. Its purpose was to provide a broad indication of areas within Los Angeles County where coast live oak woodland might be most easily and cost-effectively established. In fact, coast live oaks grow on all different solar aspects, but the model shows oaks growing much more frequently on some aspects than others. Thus, the distinction is a matter of "more or less", which leads to a general pattern and not to precise delineation.

Factors that need to be carefully evaluated prior to undertaking an oak woodland restoration include, but are not limited to; slope, aspect, elevation, soils and water availability. Using GIS modeling, Lyle and Safford (1997) identified several suites of variables that offer the best chance of success.

The Oak Woodland Restoration Potential Model presents an extremely complex pattern. The most extensive areas of highest and high potential for oak restoration are in the general area of the Santa Clara River valley. In inland areas west and south of the Grapevine (I-5) north of Santa Clarita, areas with high potential are fewer and are confined to larger canyons. Numerous areas with high potential for oaks occur in the coastal zone, but are smaller in scale than those in the Santa Clara River valley.

Unmapped areas of high potential may exist below 300 meters in elevation at the base of the interior ranges. Most of the area available for study at this elevation had already been cultivated or developed by the time vegetation mapping was completed in the 1920's and is covered by suburban development today. Therefore it did not appear on the Weislander maps, which form the baseline used for this model. Most of the oak woodland still present occurs in the larger canyon openings of the interior ranges and along the perimeter of core habitats of public open space such as the Santa Monica Mountains National Recreation Area.

METHODS

Identifying Optimal Conditions

A key premise for identifying optimal conditions is that existing remnant stands of oak woodland are to be found generally in areas with favorable combinations of conditions. Thus, if we can identify places where oaks are growing now or where they are known to have grown, we can determine the array of characteristic conditions most favorable for survival and regeneration. We can infer that these attributes will be most conducive to establishing oaks. This information will make it possible to concentrate oak planting where it is most likely to succeed and to lead to self-propagation of oak woodland.

Variables considered included:

VARIABLE	DATA SOURCE USED
Soil type	U. S. Soil Conservation Service soil reports
Slope classification (by percentage)	USGS 1:250,000 scale (Digital/ DEM)
Slope aspect (direction facing)	USGS 1:250,000 scale (Digital/ DEM)
Elevation (100 meter intervals)	USGS 1:250,000 scale (Digital/ DEM)
Streambeds	USGS 1:250,000 scale (Digital/ DEM)
Stream environs (zone 50 meters wide centered in blue line streambeds)	USGS 1:250,000 scale (Digital/ DEM), buffer polygon created within ARC/INFO
Fire History	LA County Fire Department records since 1919

*Note Data is based on 90 meter grid cells

The Wieslander maps were used as the base layer and the variable layers were combined by attribute. After accounting for the total amount of each variable on the site, mathematical calculations provided a number representing the density of oaks occurring on any one particular attribute. These densities were then ranked from high to low, revealing degrees of preference shown by oaks for a particular variable.

Results showed strong consistent relationships between coast live oak woodland and three variables: elevation, slope aspect and zones of streambeds. Relationships with slope classes were weak but significant. Comparisons of oaks to soil types showed no preference pattern. The results confirmed that there are differences between inland and coastal areas in the distribution of oaks.

After analyzing the differences, however, the research team concluded that the best criteria for application to the county as a whole were those resulting from the study done of the Malibu Creek Watershed site. Where the results of the Sunshine Canyon study site differed from these, the differences were explainable by locally anomalous conditions.

When used to create a map for the County, the model criteria rankings form the basis for determining the best general locations for replanting oak woodland at the regional scale. The map model of these potential woodland sites is the Oak Woodland Potential Model for Los Angeles County

RESULTS

While the purpose is to identify best locations for future planting, the Oak Woodland Potential Model also suggests a geographic pattern of oak woodland that existed prior to modern development. It is important to understand that this model is by no means definitive. Rather, it presents a pattern derived through orderly analyses of the best information available (as of 1997). As more precise information becomes available from site-specific analysis, that information can be examined in light of the existing map and adapted accordingly.

It is important to recognize that the Oak Woodland Potential Model presents a general pattern, not a precise delineation of sites. Its purpose is to provide broad indication of areas within Los Angeles County where coast live oak woodland might be most easily and cost-effectively established. In fact, coast live oaks grow on all different solar aspects, but he model shows oaks growing much more frequently on some aspects than others. Thus, the distinction is a matter of "more or less", which leads to a general pattern and not to precise delineation.

Two study areas were selected for the Lyle and Safford (1997) analysis and represent Interior Transverse Range (sunshine Canyon) and Coastal Transverse Range (Malibu Creek Watershed). Details of the results from each of the two study sites can be found in Appendix 2 of that analysis.

Percentage of land within Los Angeles County within the Six Potential Levels of Restoration (1997)

Level of Potential for Oak Woodland Restoration	Percentage of LA County	Square Kilometer Area (10,654 total)
Highest	0.9	94
High	2.1	228
Medium High	3.3	352
Medium Low	5.9	630
Low	13.8	506
Lowest	4.8	1472
Not suitable (urban, suburban, rural and high desert)	69.2	Elevation >1,200m = 1222 Urban-rural Dev = 2972 Dev Open Area=278 High desert=2900

These rankings were based on the following criteria:

(Areas excluded from the criteria but shown on the Oak Woodland Potential Model map include areas with an elevation higher than 1,200 meters, urban, suburban and rural developed open areas, high desert and 0-300 meter elevation zones.)

Interior Transverse Range Model Criteria:

Highest:

Flat aspect and 100 meter wide stream buffer

North and Northwest aspects, and 500-700 meter elevation

High:

North and Northwest aspects, and 400-500 or 700-800 meter elevations

Flat and Northeast aspects, and 500-700 meter elevation

Medium High:

North and Northwest aspects, and 300-400 or 700-800 meter elevation

Flat and Northeast aspects, and 400-500 or 700-800 meter elevation

East, Southeast, and Southwest aspects, and 500-700 meter elevation

Medium Low:

North and Northwest aspects, and 900-1100 meter elevation

Flat and Northeast aspects, and 300-400 or 800-900 meter elevation

East, Southeast, and Southwest aspects, and 400-500 or 700-800 meter elevation

West and South aspects, and 500-700 meter elevation

Low:

Flat and Northeast aspects, and 900-1100 meter elevation

East, Southeast, and Southwest aspects, and 300-400 or 800-900 meter elevation

West and South aspects, and 400-500 or 700-800 meter elevation

Lowest:

East, Southeast, and Southwest aspects, and 900-1100 meter elevation

West and South aspects, and 300-400 or 800-1100 meter elevation

All slopes greater than 60%

All elevations over 1100 meters.

Coastal Transverse Range Model Criteria:

Highest:

Flat aspect and 100 meter wide stream buffer.

North and Northwest aspects, and 0-200 meter elevation

High:

North and Northwest aspects, and 200-400 meter elevations

Flat and Northeast aspects, and 0-200 meter elevation

Medium:

North and Northwest aspects, and 400-900 meter elevation

Flat and Northeast aspects, and 200-400 meter elevation

East, Southeast, and Southwest aspects, and 0-200 meter elevation

Low:

Flat and Northeast aspects, and 400-900 meter elevation

East, Southeast, and Southwest aspects, and 200-400 meter elevation

West and South aspects, and 0-200 meter elevation

Lowest:

East, Southeast, and Southwest aspects, and 400-900 meter elevation

West and South aspects, and 200-900 meter elevation

All slopes greater than 60%

A summary analysis of each variable identified revealed the following results:

SLOPE: The position of oak woodlands in the field study was found to be narrowly correlated to slope steepness. Based on field observation, slope did not appear to be a primary determining factor in oak distribution.

ASPECT: Aspect is an important factor in the distribution of oak woodland. Aspect influences soil moisture, sun/shade relationship and other microclimate factors. The aspects observed to be most favored by oaks extended from the northeast, through the north to the northwest. *Quercus sp*. were absent from all southern exposures except where drainage channels were present.

DRAINAGE: The drainage is an influential factor in oak woodlands. *Quercus sp*. were observed in close proximity to drainage areas. Seasonal swales and the tops of watershed are key *Quercus sp*. habitat areas. Along riparian zones, the trees occurred on higher, well-drained ground.

MOISTURE; Moisture availability appeared to be a determining factor in *Quercus sp*. habitats. Moister is influenced by slope, aspect, drainage, microclimate, and soil. Based on observations, *Quercus sp*. preferred a medial level of moisture compared to the xeric chaparral and the mesic riparian vegetation. However, where moisture levels were higher, denser populations of oaks were found.

ASSOCIATED PLANT COMMUNITIES: The associated plant communities often found adjacent to the oak woodland include riparian woodland, chaparral, coastal sage scrub and grasslands. The observed understory included grass and shrub species. The composition of the adjacent plant communities did not seem to have a bearing on *Quercus sp*. distribution. However, *Quercus sp.* seemed to influence the adjacent communities through alteration of microclimate conditions and resource competitions.

OUTSIDE IMPACTS: Many impacts on the oak communities were observed. The clearing of vegetation for various development activities has impacted soil stability, drainage, soil depth and the continuity of established groves. Cattle grazing had a great impact as oak seedlings are grazed along

with low-hanging foliage. Soils also become compacted as the result of cattle activity. Other possible negative impacts might stem from air pollution, degraded water quality, and climatic variations.

FIRE: Older trees exhibited evidence of past fires. The role of fire is an important, yet not fully understood factor. Fire suppression leads to an accumulation of litter and snags, thus potentially increasing the fire risk to this community type.

COMMUNITY SUCCESSION: *Quercus sp.* do not seem to be dependent on other communities for their survival. Once an oak woodland is established, it perpetuates itself through the regulation of microclimate the provide protection for young *Quercus sp*. and saplings. Observations suggest that the new *Quercus sp*. growth takes place in the drip line of established trees.

SPATIAL AND VISUAL ANALYSIS: The *Quercus sp.* observed were denser in canyons and more sparsely spaced on ridges due to exposure to wind and more sunlight. Through the edges between oak woodland and other vegetation types are important ecotones biologically, the change between the communities appears to be abrupt.

APPLYING THE STRATEGY FOR RESTORATION

Site Specific Application

Once a site has been identified as being within a potential restoration zone, then a parcel level analysis that incorporates specific factors such as fire history, geology, location and specific condition of existing oak woodland (stand age, diversity, health, etc.) will be needed.

Define Suitable Plant Associations

Each oak revegetation project will include the community of plants associated with the oaks in that location. Selection and planting of oak associated understory plants shall be part of the restoration design.

Planting and Management Guidelines

The planting plan that includes layout, plant propagation and establishment goals needs to be developed. Random spacing and cluster configuration patterns should mimic nearby stands.

Replacing oak woodland habitats

The ability to recreate any lost ecosystem is fraught with difficulty. The complexity and diversity of oak woodland habitats make them particularly problematic to restore to a self-sustaining fully functional level. There are examples of successful oak tree planting, but there is currently no example of a successful oak woodland restoration in Los Angeles County.

A study done of the effectiveness of tree planting to mitigate habitat loss in a blue oak woodland used models to evaluate restoration of oak habitat using a variety of tree densities and management intensity (Standiford, McCreary and Frost 2002). Using data collected for ten years on a blue oak plantation, it was found that at the highest level of management and a planting density of 200 trees per acre, it would take ten years following planting to reach the ten percent canopy cover criteria for woodland under optimal site conditions.

This sobering reminder of the limitations of restoration planting underscores the need to retain existing functional oak woodlands.

APPENDIX 6

LOS ANGELES COUNTY OAK TREE ORDINANCE INFORMATION

&

COMPATIBLE PLANTS LIST

Prepared by:

Los Angeles County Forestry Division
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A copy of the Oak Tree Ordinance is included on the following pages. Additional information of the Oak Tree Ordinance may be found at:

http://Fire.lacounty.gov/forestry/environmentalreview-oaktreeordinance.asp

for regional assistance on oak related identification:

http://Fire.lacounty.gov/fireprevention/fireprevcontacts.asp

Part 16 OAK TREE PERMITS

22.56.2050 Established--Purpose.

The oak tree permit is established (a) to recognize oak trees as significant historical, aesthetic and ecological resources, and as one of the most picturesque trees in Los Angeles County, lending beauty and charm to the natural and manmade landscape, enhancing the value of property, and the character of the communities in which they exist; and (b) to create favorable conditions for the preservation and propagation of this unique, threatened plant heritage, particularly those trees which may be classified as heritage oak trees, for the benefit of current and future residents of Los Angeles County. It is the intent of the oak tree permit to maintain and enhance the general health, safety and welfare by assisting in counteracting air pollution and in minimizing soil erosion and other related environmental damage. The oak tree permit is also intended to preserve and enhance property values by conserving and adding to the distinctive and unique aesthetic character of many areas of Los Angeles County in which oak trees are indigenous. The stated objective of the oak tree permit is to preserve and maintain healthy oak trees in the development process. (Ord. 88-0157 § 1, 1988: Ord. 82-0168 § 2 (part), 1982.)

22.56.2060 Damaging or removing oak trees prohibited--Permit requirements.

A. Except as otherwise provided in Section 22.56.2070, a person shall not cut, destroy, remove, relocate, inflict damage or encroach into a protected zone of any tree of the oak genus which is (a) 25 inches or more in circumference (eight inches in diameter) as measured four and one-half feet above mean natural grade; in the case of an oak with more than one trunk, whose combined circumference of any two trunks is at least 38 inches (12 inches in diameter) as measured four and one half feet above mean natural grade, on any lot or parcel of land within the unincorporated area of Los Angeles County, or (b) any tree that has been provided as a replacement tree, pursuant to Section 22.56.2180, on any lot or parcel of land within the unincorporated area of Los Angeles County, unless an oak tree permit is first obtained as provided by this Part 16.
B. "Damage," as used in this Part 16, includes any act causing or tending to cause injury to the root system or other parts of a tree, including, but not limited to, burning, application of toxic substances, operation of equipment or machinery, or by paving, changing the natural grade, trenching or excavating within the protected zone of an oak tree.
C. "Protected zone," as used in this Part 16, shall mean that area within the dripline of an oak tree and extending therefrom to a point at least five feet outside the dripline, or 15 feet from the trunks of a tree, whichever distance is greater. (Ord. 88-0157 § 2, 1988: Ord. 82-0168 § 2 (part), 1982.)

22.56.2070 Exemptions from Part 16 applicability.

The provisions of this Part 16 shall not apply to:
A. Any permit, variance or tentative map for a subdivision, including a minor land division, approved prior to the effective date of the ordinance codified in this Part 16 by the board of supervisors, regional planning commission or the planning director;
B. Cases of emergency caused by an oak tree being in a hazardous or dangerous condition, or being irretrievably damaged or destroyed through flood, fire, wind or lightning, as determined after visual inspection by a licensed forester with the department of forestry and fire warden;
C. Emergency or routine maintenance by a public utility necessary to protect or maintain an electric power or communication line or other property of a public utility;
D. Tree maintenance, limited to medium pruning of branches not to exceed two inches in diameter in accordance with guidelines published by the National Arborists Association, (see Class II), intended to insure the continued health of a protected tree;
E. Trees planted, grown and/or held for sale by a licensed nursery;

F. Trees within existing road rights-of-way where pruning is necessary to obtain adequate line-of-sight distances and/or to keep street and sidewalk easements clear of obstructions, or to remove or relocate trees causing damage to roadway improvements or other public facilities and infrastructure within existing road rights-of-way, as required by the Director of Public Works. (Ord. 93-0018 § 1, 1993; Ord. 88-0157 § 3, 1988; Ord. 82-0168 § 2 (part), 1982.)

22.56.2080 Application--Filing--Repeated filings.

Any person desiring an oak tree permit, as provided for in this Title 22, may file an application with the director, except that no application shall be filed or accepted if final action has been taken within one year prior thereto by the hearing officer or director or the commission on an application requesting the same or substantially the same permit. (Ord. 85-0195 § 12 (part), 1985; Ord. 82-0168 § 2 (part), 1982.)

22.56.2090 Application--Information and documents required.

An application for an oak tree permit shall include the following information and documents:
A. The name and address of the applicant and of all persons owning any or all of the property proposed to be used;
B. Evidence that the applicant:
1. Is the owner of the premises involved, or
2. Has written permission of the owner or owners to make such application;
C. Location of subject property (address or vicinity);
D. Legal description of the property involved;
E.1. A site plan drawn to a scale satisfactory to, and in the number of copies prescribed by the director, indicating the location and dimension of all of the following existing and proposed features on the subject property:
a. Lot lines,
b. Streets, highways, access and other major public or private easements,
c. Buildings and/or structures, delineating roof and other projections,
d. Yards,
e. Walls and fences,
f. Parking and other paved areas,
g. Proposed areas to be landscaped and/or irrigated,
h. Proposed construction, excavation, grading and/or landfill. Where a change in grade is proposed, the change in grade within the protected zone of each plotted tree shall be specified,
i. The location of all oak trees subject to this Part 16 proposed to be removed and/or relocated, or within 200 feet of proposed construction, grading, landfill or other activity. Each tree shall be assigned an identification number on the plan, and a corresponding permanent identifying tag shall be affixed to the north side of each tree in the manner prescribed by Section 22.56.2180. These identifications shall be utilized in the oak tree report and for physical identification on the property where required. The protected zone shall be shown for each plotted tree,
j. Location and size of all proposed replacement trees,
k. Proposed and existing land uses,
l. Location of all surface drainage systems,
m. Other development features which the director deems necessary to process the application,
2. Where a concurrent application for a permit, variance, zone change, tentative map for a subdivision, including a minor land division or other approval, is filed providing the information required by this subsection E, the director may waive such site plan where he deems it unnecessary to process the application;
F.1. An oak tree report, prepared by an individual with expertise acceptable to the director and county forester and fire warden, and certified to be true and correct, which is acceptable to the director and county forester and fire warden, of each tree shown on the site plan required by subsection E of this section, which shall contain the following information:
a. The name, address and telephone number during business hours of the preparer,
b. Evaluation of the physical structure of each tree as follows:
i. The circumference and diameter of the trunk, measured four and one-half feet above natural grade,
ii. The diameter of the tree's canopy, plus five feet, establishing the protected zone,

iii. Aesthetic assessment of the tree, considering factors such as but not limited to symmetry, broken branches, unbalanced crown, excessive horizontal branching,
iv. Recommendations to remedy structural problems where required,
c. Evaluation of the health of each tree as follows:
i. Evidence of disease, such as slime flux, heart rot, crown rot, armillaria root fungus, exfoliation, leaf scorch and exudations,
ii. Identification of insect pests, such as galls, twig girdler, borers, termites, pit scale and plant parasites,
iii. Evaluation of vigor, such as new tip growth, leaf color, abnormal bark, deadwood and thinning of crown,
iv. Health rating based on the archetype tree of the same species,
v. Recommendations to improve tree health, such as insect or disease control, pruning and fertilization,
d. Evaluation of the applicant's proposal as it impacts each tree shown on the site plan, including suggested mitigating and/ or future maintenance measures where required and the anticipated effectiveness thereof,
e. Identification of those trees shown on the site plan which may be classified as heritage oak trees. Heritage oak trees are either of the following: any oak tree measuring 36 inches or more in diameter, measured four and one-half feet above the natural grade; any oak tree having significant historical or cultural importance to the community, notwithstanding that the tree diameter is less than 36 inches,
f. Identification of any oak tree officially identified by a county resource conservation district.
2. The requirement for an oak tree report may be waived by the director where a single tree is proposed for removal in conjunction with the use of a single-family residence listed as a permitted use in the zone, and/or such information is deemed unnecessary for processing the applications;
G. The applicant shall provide an oak tree information manual prepared by and available from the forester and fire warden to the purchasers and any homeowners' association. (Ord. 88-0157 § 4, 1988: Ord. 82-0168 § 2 (part), 1982.)

22.56.2100 Application--Burden of proof.

A. In addition to the information required in the application by Section 22.56.2090, the application shall substantiate to the satisfaction of the director the following facts:
1. That the proposed construction of proposed use will be accomplished without endangering the health of the remaining trees subject to this Part 16, if any, on the subject property; and
2. That the removal or relocation of the oak tree(s) proposed will not result in soil erosion through the diversion or increased flow of surface waters which cannot be satisfactorily mitigated; and
3. That in addition to the above facts, at least one of the following findings apply:
a. That the removal or relocation of the oak tree(s) proposed is necessary as continued existence at present location(s) frustrates the planned improvement or proposed use of the subject property to such an extent that:
i. Alternative development plans cannot achieve the same permitted density or that the cost of such alternative would be prohibitive, or
ii. Placement of such tree(s) precludes the reasonable and efficient use of such property for a use otherwise authorized, or
b. That the oak tree(s) proposed for removal or relocation interferes with utility services or streets and highways, either within or outside of the subject property, and no reasonable alternative to such interference exists other than removal of the tree(s), or
c. That the condition of the oak tree(s) proposed for removal with reference to seriously debilitating disease or danger or falling is such that it cannot be remedied through reasonable preservation procedures and practices;
4. That the removal of the oak tree(s) proposed will not be contrary to or be in substantial conflict with the intent and purpose of the oak tree permit procedure;
B. For purposes of interpreting this section, it shall be specified that while relocation is not prohibited by this Part 16, it is a voluntary alternative offering sufficient potential danger to the health of a tree as to require the same findings as removal. (Ord. 88-0157 § 5, 1988; Ord. 82-0168 § 2 (part), 1982.)

22.56.2110 Application--Filing fee.

When an application for an oak tree permit is filed, it shall be accompanied by the filing fee as required in Section 22.60.100. (Ord. 82-0168 § 2 (part), 1982.)

22.56.2120 Application--Denial for lack of information.

The director may deny without further action an application requesting an oak tree permit if such application does not contain the information required by this Part 16. The director may permit the applicant to amend the application. (Ord. 82-1068 § 2 (part), 1982.)

22.56.2130 Application--Notice requirements.

Notification pertaining to an application for an oak tree permit shall be provided as follows:
A. Where an application for a permit, variance, zone change or tentative map for a subdivision, including a minor land division, is concurrently filed, notice that an oak tree permit will also be considered shall be included in required legal notices for such permit, variance, zone change or tentative subdivision map;
B.1. Where no concurrent application is filed as provided in subsection A of this section and except as otherwise expressly provided in subsection C, the director not less than 20 days before the date of public hearing shall cause notice of such filing to be published once in a newspaper of general circulation in the county of Los Angeles available in the community in which such oak tree permit is proposed.
2. Such notices shall include the statement: "Notice of Oak Tree Permit Filing." Also included shall be information indicating the location of the subject property (address or vicinity), legal description of the property involved, the applicant's request, and the time and place of the proposed public hearing. The notice shall also provide the address and telephone number of the department of regional planning, and state that the department may be contacted for further information;
C. Notwithstanding the other provisions of this section, publishing shall not be required where removal or relocation of not more than one tree is proposed in conjunction with the use of a single-family residence listed as a permitted use in the zone. (Ord. 88-0157 § 6, 1988: Ord. 82-0168 § 2 (part), 1982.)

22.56.2140 Review of oak tree report by county forester and fire warden.

A. On receipt of an application for an oak tree permit, the director shall refer a copy of the applicant's oak tree report as required by Section 22.56.2090 to the county forester and fire warden. The county forester and fire warden shall review said report for the accuracy of statements contained therein, and shall make inspections on the project site. Such inspections shall determine the health of all such trees on the project site and such other factors as may be necessary and proper to complete his review, a copy of which shall be submitted in writing to the director and/or commission within 15 days after receipt from the director;
B. The county forester and fire warden may at his option also suggest conditions for use by the hearing officer or the director or commission pursuant to Section 22.56.2180.
C. When the county forester determines that replacement or relocation on the project site of oak trees proposed for removal is inappropriate, the forester may recommend that the applicant pay into the oak forests special fund the amount equivalent to the oak resource value of the trees described in the oak tree report. The oak resource value shall be calculated by the applicant and approved by the county forester according to the most current edition of the International Society of Arboriculture's "Guide to Establishing Values for Trees and Shrubs."
D. Funds collected shall be used for the following purposes:
1. Establishing and planting new trees on public lands;
2. Maintaining existing oak trees on public lands;
3. Purchasing prime oak woodlands;
4. Purchasing sensitive oak trees of cultural or historic significance.
E. Not more than seven percent of the funds collected may be used to study and identify appropriate programs for accomplishing the preceding four purposes. (Ord. 93-0017 § 1, 1993: Ord. 88-0157 § 7, 1988: Ord. 85-0195 § 12 (part), 1985; Ord. 82-0168 § 2 (part), 1982.)

22.56.2150 Application--Commission consideration when concurrently filed.

When an application for a permit, variance, zone change or tentative map for a subdivision, including a minor land division, is concurrently filed with an application for an oak tree permit as provided by this Title 22, the hearing officer or the commission shall consider and approve such application for an oak tree permit concurrently with such other approvals. The hearing officer or the commission, in making their findings, shall consider each case individually as if separately filed. (Ord. 85-0195 § 10 (part), 1985; Ord. 82-0168 § 2 (part), 1982.)

22.56.2160 Application--Public hearing required when.

Where no concurrent consideration is conducted by the hearing officer or the commission pursuant to Section 22.56.2150, a public hearing shall be held pursuant to the procedure provided in Part 4 of Chapter 22.60 subject to the notice requirements of subsection B of Section 22.56.2130; provided, however, that no hearing shall be required for a filing in conjunction with the use of a single-family residence when publishing is not required by said subsection C of Section 22.56.2130. (Ord. 2008-0043 § 12, 2008: Ord. 85-0195 § 10 (part), 1985; Ord. 82-0168 § 2 (part), 1982.)

22.56.2170 Application--Grant or denial conditions.

The hearing officer or the director or commission shall approve an application for an oak tree permit where the information submitted by the applicant and/or brought to their attention during public hearing, including the report of the county forester and fire warden, substantiates that the burden of proof set forth in Section 22.56.2100 has been met. The hearing officer or the director or commission shall deny such application where the information submitted fails to substantiate such findings. (Ord. 85-0195 § 12 (part), 1985; Ord. 82-0168 § 2 (part), 1982.)

22.56.2180 Additional conditions imposed when.

The hearing officer or the director or commission, in approving an application for an oak tree permit, shall impose such conditions as are deemed necessary to insure that the permit will be in accord with the findings required by Section 22.56.2100. These conditions may involve, but are not limited to, the following:
A. The replacement of oak trees proposed for removal or relocation with trees of a suitable type, size, number, location and date of planting. In determining whether replacement should be required, the hearing officer or the director or commission shall consider but is not limited to the following factors:
1. The vegetative character of the surrounding area,
2. The number of oak trees subject to this Part 16 which are proposed to be removed in relation to the number of such trees currently existing on the subject property,
3. The anticipated effectiveness of the replacement of oak trees, as determined by the oak tree report submitted by the applicant and evaluated by the county forester and fire warden,
4. The development plans submitted by the applicant for the proposed construction or the proposed use of the subject property,
5. The relocation of trees approved for removal shall not be deemed a mitigating factor in determining the need for replacement trees,
6.a. Required replacement trees shall consist exclusively of indigenous oak trees and shall be in the ratio of at least two to one. Each replacement tree shall be at least a 15-gallon size specimen and measure at least one inch in diameter one foot above the base. The hearing officer, director or commission may, in lieu of this requirement, require the substitution of one larger container specimen for each oak tree to be replaced, where, in its opinion, the substitution is feasible and conditions warrant such greater substitution,
b. Replacement trees shall be properly cared for and maintained for a period of two years and replaced by the applicant or permittee if mortality occurs within that period,
c. Where feasible replacement trees should consist exclusively of indigenous oak trees and certified as being grown from a seed source collected in Los Angeles or Ventura Counties,

d. Replacement trees shall be planted and maintained on the subject property and, if feasible, in the same general area where the trees were removed. The process of replacement of oak trees shall be supervised in the field by a person who, in the opinion of the county forester and fire warden, has expertise in the planting, care and maintenance of oak trees;
B. A plan for protecting oak trees on the subject property during and after development, such as, but not limited to, the following requirements:
1. The installation of chain link fencing not less than four feet in height around the protected zone of trees shown on the site plan. Said fencing shall be in place and inspected by the forester and fire warden prior to commencement of any activity on the subject property. Said fencing shall remain in place throughout the entire period of development and shall not be removed without written authorization from the director or the forester and fire warden,
2. Where grading or any other similar activity is specifically approved within the protected zone, the applicant shall provide an individual with special expertise acceptable to the director to supervise all excavation or grading proposed within the protected zones and to further supervise, monitor and certify to the county forester and fire warden the implementation of all conditions imposed in connection with the applicant's oak tree permit,
3. That any excavation or grading allowed within the protected zone or within 15 feet of the trunk of a tree, whichever distance is greater, be limited to hand tools or small hand-power equipment,
4. That trees on other portions of the subject property not included within the site plan also be protected with chain link fencing thus restricting storage, machinery storage or access during construction,
5. That the trees on the site plan be physically identified by number on a tag affixed to the north side of the tree in a manner preserving the health and viability of the tree. The tag shall be composed of a noncorrosive all-weather material and shall be permanently affixed to the tree. The tree shall be similarly designated on the site plan in a manner acceptable to the director,
6. That corrective measures for trees noted on the oak tree report as requiring remedial action be taken, including pest control, pruning, fertilizing and similar actions,
7. That, to the extent feasible as determined by the director, utility trenching shall avoid encroaching into the protected zone on its path to and from any structure,
8. At the start of grading operations and throughout the entire period of development, no person shall perform any work for which an oak tree permit is required unless a copy of the oak tree report, location map, fencing plans, and approved oak tree permit and conditions are in the possession of a responsible person and also available at the site. (Ord. 93-0018 § 2, 1993; Ord. 88-0157 § 8, 1988: Ord. 85-0195 § 12 (part), 1985; Ord. 82-0168 § 2 (part), 1982.)

22.56.2190 Notice of action--Method of service.

A. The director shall serve notice of action upon:
1. The applicant, as required by law for the service of summons or by registered or certified mail, postage prepaid, return receipt requested; and
2. All protestants testifying at the public hearing who have provided a mailing address, by first class mail, postage prepaid.
B. Where the hearing officer or the commission has concurrently considered a permit, variance, zone change or tentative map for a subdivision, including a minor land division, notice shall be included in the notice of action required for such concurrent actions. (Ord. 85-0195 § 10 (part), 1985; Ord. 82-0168 § 2 (part), 1982.)

22.56.2200 Appeal--From director's decision--Procedures.

Any person dissatisfied with the action of the director may file an appeal of such action with the secretary of the commission within the time period set forth in, and subject to all of the other provisions of, Part 5 of Chapter 22.60. (Ord. 2008-0026 § 19, 2008: Ord. 96-0026 § 8, 1996: Ord. 82-0168 § 2 (part), 1982.)

22.56.2220 Appeal--Hearing procedures.

In all cases where the commission sets the matter for public hearing, it shall be held pursuant to the procedure provided for public hearings in Part 4 of Chapter 22.60. (Ord. 85-0195 § 46, 1985:

Ord. 82-0168 § 2 (part), 1982.)

22.56.2240 Effective dates of decisions.

The decision of:
A. The director shall become final and effective as set forth in Part 5 of Chapter 22.60 unless an appeal is timely filed pursuant to the provisions of said Part 5 of Chapter 22.60;
B. The commission shall be final and effective on the date of decision. Appeal of an oak tree permit to the board of supervisors is only allowed where an oak tree permit is concurrently considered with a permit, variance, zone change or tentative map for a subdivision, including a minor land division, and such oak tree permit shall be appealable only as a part of an appeal on the concurrent entitlement. Said appeal must be made within the applicable time period and shall be subject to the applicable procedures established for appealing the concurrent entitlement. (Ord. 2008-0026 § 22, 2008: Ord. 82-0168 § 2 (part), 1982.)

22.56.2250 Expiration date for unused permits.

An approved oak tree permit which is not used within the time specified in the approval or, if no time is specified, within one year after the granting of such approval, becomes null and void and of no effect; except that, where an application requesting an extension is filed prior to such expiration date, the director may extend such time for a period of not to exceed one year. (Ord. 82-0168 § 2 (part), 1982.)

22.56.2260 Enforcement.

In interpreting the provisions of Section 22.04.090 as they apply to this Part 16, each individual tree cut, destroyed, removed, relocated or damaged in violation of these provisions shall be deemed a separate offense. (Ord. 82-0168 § 2(part), 1982.)

COMPATIBLE NATIVE PLANTS AROUND OAKS IN THE SANTA MONICA MOUNTAINS

Recommended by the California Native Plant Society

TREES

Cercis occidentalis	Western Redbud
Heteromeles arbutifolia	Toyon
Juglans californica	California Walnut
Quercus agrifolia	Coast Live Oak
Quercus lobata	Valley Oak
Sambucus mexicana	Mexican Elderberry+
Umbellularia californica	CA Bay

SHRUBS

Adenostoma fasciculatum	Chamise
Amorpha californica	False Indigo
Artemisia californica	California Sagebrush
Baccharis pilularis consanguina	Coyote Bush*
Baccharis salicifolia	Summer Holly
Ceanothus sp.	California Lilac
Cercocarpus betuloides	Mountain Mahogany
Erigonium fasciculatum	California Buckwheat*
Isomeris arborea	Bladder-pod
Malosma laurina	Laurel Sumac
Prunus ilicifolia	Holly-leaf Cherry
Quercus dumosa	Scrub Oak
Quercus wizlizenii	Interior Live Oak
Rhamnus californica	California Coffeeberry
Rhamnus crocea	Redberry
Rhus ovata	Sugar Bush
Rhus trilobata	Squaw Bush
Ribes aureum	Golden Current
Ribes californicum	Hillside Current
Ribes malvaceum	Chaparral Current+
Ribes speciosum	Fuchsia-flowering Gooseberry
Salvia apiana	White Sage
Salvia mellifera	Black Sage
Symphoricarpus mollis	Snowberry

PERENNIALS	
Achillea millefolium	Yarrow
Asclepias eriocarpa	Indian Milkweed
Asclepias fascicularis	Narrow-leaved Milkweed
Delphinium parryi	Blue Larkspur
Delphinium patens	Blue Larkspur
Dodecatheon clevelandii	Shooting Star
Dudleya cymosa	Lax Dudleya
Dudleya lanceolata	Lance Live Forever
Dudleya pulverulenta	Chalk Dudleya
Encelia californica	California Bush Sunflower
Erigonium elongatum	Wand Buckwheat
Eschscholzia californica	California Poppy
Gnaphalium californicum	California Everlasting
Grindelia robusta	Gum Plant
Keckiella (Penstemon) cordifolia	Climbing Penstemon
Lupinus longiflorus	Bush Lupine
Penstemon centranthifolius	Scarlet Bugler
Penstemon heterophyllus	Foothill Penstemon
Potentilia glandulosa	Sticky Cinquefoil
Salvia spathacea	Hummingbird Sage*
Satureja douglasii	Yerba Buena
Scophularia californica	California Figwort
Scutellaria tuberosa	Skull Cap
Sidaa malvaeflora	Common Checkerbloom
Sisyrinchium bellum	Blue-eyed Grass
Solanum xanti	Purple Nightshade
Thalictrum fendleri var. polycarpum	Meadow Rue*
Viola pedunculata	Johnny Jump Up
Epilobium canum	California Fuschia*

ANNUALS	
Calandrinia ciliata menziesii	Red Maids
Clarkia bottae	Clarkia
Clarkia unguiculata	Elegant Clarkia
Collinsia heterophylla	Chinese Houses
Eschscholzia caespitosa	Collarless Poppy
Lasthenia coronaria	Gold Fields
Layia platyglossa campenstris	Tidy Tips
Lupinus succulentus	Succulent Lupine
Nemophilia menziesii	Baby Blue Eyes
Castilleja densiflora	Owls Clover
Platystemon californicus	Cream Cups
Salvia columbariae	Chia

BULBS	
Bloomeria crocea	Golden Stars
Dichelostemma) capitatum	Blue Dicks
Calochortus albus	White Globe Lily
Calochortus catalinae	Catalina Mariposa Lily
Calochortus clavatus	Yellow Mariposa
Zygadenus fremontii	Star Lily
FERNS	
Dryopteris arguta	Downy Wood Fern
Pellaea mucronata	Bird's Foot Fern
Pentagramma triangularis	Goldback Fern
Polypodium californicum	California Polypody
PERENNIAL GRASSES	
Bromus carinatus	California Brome
Elymus condensatus	Giant Wild Rye
Elymus triticoides	Creeping Wild Rye
Melica imperfecta	Chaparral Melica
Muhlenbergia rigens	Showy Deer Grass
Stipa cernua	Spear Grass
Stipa lepida	Needlegrass
Stipa pulchra	Purple Needlegrass
VINES	
Lathyrus vestitus	Wild Sweet Pea

* = ground cover + = unusual and colorful fruits

LOCAL SOURCES OF NATIVE PLANTS AND SEEDS

PLANTS

Matilija Nursery
8225 Waters Rd
Moorpark, CA 93021
805-523-8604

Las Pilitas Nursery
Las Pilitas Road
Santa Margarita, CA 93453
805-438-5992

Sperling Nursery
Calabasas Road
Calabasas, CA 91302
818-591-9111

Theodore Payne Foundation
10459 Tuxford Street
Sun Valley, CA 91352
818-768-1802

Tree of Life Nursery
33201 Ortega Highway
San Juan Capistrano, CA 92693
714-728-0685

SEEDS

Albrights Seed
487 Dawson Drive
Camarillo, CA 93012
805-484-0551

S & S Seeds
P.O. Box 1275
Carpinteria, CA 93013
805-684-0436

Santa Barbara Botanic Garden
1212 Mission Canyon Rd
Santa Barbara, CA 93105
805-682-4726

APPENDIX 7

COMMON AND CHARACTERISTIC OAK WOODLAND SPECIES OF LOS ANGELES COUNTY, CALIFORNIA

Prepared by:
Dan Cooper
Rosi Dagit
Rebecca Latta

COMMON AND CHARACTERISTIC OAK WOODLAND SPECIES OF LOS ANGELES COUNTY, CALIFORNIA

This list is not meant to be exhaustive, but provides a sampling of species typical of oak woodlands throughout Los Angeles County, including lowland coast live oak (*Quercus agrifolia*) and Engelmann oak (*Q. engelmannii*) woodland, valley oak (*Q. lobata*) savannah, and foothill oak forest comprised of *Q. chrysolepis* and *Q. kelloggii*. The species listed are not necessarily associated with scrub oaks (e.g., *Q. berberidifolia*) which often support a chaparral plant and animal community distinct from that of oak woodland. The list is intended to be used as a guide in quickly assessing the overall quality of oak woodland in the county - in general, intact oak woodland in the county should have many of many of these species; more degraded stands will have fewer.

COMMON AND CHARACTERISTIC OAK WOODLAND SPECIES OF LOS ANGELES COUNTY, CALIFORNIA

Animals / Plants	Group	Family	Genus	Species	Notes
Animals	Mammals	Cervidae	*Odocoileus hemionus*	Mule deer	
Animals	Mammals	Sciuridae	*Sciurus griseus*	Western gray squirrel	
Animals	Mammals	Vespertilionidae	*Eptisicus fuscus*	Big brown bat	
Animals	Birds	Accipiteridae	*Aqulia chrysaetos*	Golden eagle	Savannahs
Animals	Birds	Accipiteridae	*Accipiter cooperii*	Cooper's hawk	
Animals	Birds	Accipiteridae	*Buteo lineatus*	Red-shouldered hawk	
Animals	Birds	Accipiteridae	*Elanus leucurus*	White-tailed kite	Savannahs
Animals	Birds	Phasianidae	*Calipepla californica*	California quail	
Animals	Birds	Columbidae	*Columba fasciata*	Band-tailed pigeon	
Animals	Birds	Strigidae	*Strix occidentalis*	Spotted owl	Above 3000'
Animals	Birds	Strigidae	*Otus kennicottii*	Western screech-owl	
Animals	Birds	Picidae	*Melanerpes formicivorus*	Acorn woodpecker	
Animals	Birds	Picidae	*Picoides nuttallii*	Nuttall's woodpecker	
Animals	Birds	Picidae	*Picoides villosus*	Hairy woodpecker	Above 3000'
Animals	Birds	Picidae	*Colaptes auratus*	Northern flicker	
Animals	Birds	Tyrannidae	*Contopus sordidulus*	Western wood-pewee	
Animals	Birds	Tyrannidae	*Empidonax difficilis*	Pacific-slope flycatcher	
Animals	Birds	Tyrannidae	*Myiarchus cinerascens*	Ash-throated flycatcher	
Animals	Birds	Vireonidae	*Vireo huttonii*	Hutton's vireo	
Animals	Birds	Corvidae	*Aphelocoma californica*	Western scrub-jay	
Animals	Birds	Corvidae	*Cyanocitta stelleri*	Steller's jay	Above 3000'
Animals	Birds	Paridae	*Baeolophus inornatus*	Oak titmouse	
Animals	Birds	Sittidae	*Sitta carolinensis*	White-breasted nuthatch	
Animals	Birds	Certhiidae	*Certhia americana*	Brown creeper	Above 3000'
Animals	Birds	Turdidae	*Sialia mexicana*	Western bluebird	
Animals	Birds	Ptilogonatidae	*Phainopepla nitens*	Phainopepla	
Animals	Birds	Parulidae	*Vermivora celata*	Orange-crowned warbler	
Animals	Birds	Emberizidae	*Spizella passerina*	Chipping sparrow	
Animals	Birds	Emberizidae	*Chondestes grammacus*	Lark sparrow	Savannahs
Animals	Birds	Emberizidae	*Junco hyemalis*	Dark-eyed junco	

Animals	Birds	Cardinalidae	*Pheucticus melanocephalus*	Black-headed grosbeak	
Animals	Birds	Fringillidae	*Carpodacus purpureus*	Purple finch	
Animals	Reptiles and amphibians	Plethodontidae	*Aneides lugubris*	Arboreal salamander	
Animals	Reptiles and amphibians	Plethodontidae	*Batrachoseps nigriventris*	Black-bellied slender-salamander	
Animals	Reptiles and amphibians	Plethodontidae	*Ensatina eschscholtzii*	Ensatina	
Animals	Reptiles and amphibians	Salamandridae	*Taricha torosa*	Coast Range newt	Near streams
Animals	Reptiles and amphibians	Colubridae	*Diadophis punctatus*	Ringneck snake	
Animals	Reptiles and amphibians	Colubridae	*Masticophis lateralis*	Striped racer	
Animals	Reptiles and amphibians	Colubridae	*Tantilla planiceps*	Western black-headed snake	
Animals	Reptiles and amphibians	Emydidae	*Clemmys marmorata*	Western pond turtle	Near streams
Animals	Invertebrates	Nymphalidae	*Adelpha californica*	California sister	
Plants	Dicots	Anacardiaceae	*Rhus ovata*	Sugar sumac	
Plants	Dicots	Anacardiaceae	*Rhus trilobata*	Squawbush	
Plants	Dicots	Anacardiaceae	*Toxicodendron diversilobum*	Poison-oak	
Plants	Dicots	Asclepiadaceae	*Asclepias fascicularis*	Narrow-leaved milkweed	
Plants	Dicots	Asteraceae	*Artemisia douglasiana*	Mugwort	
Plants	Dicots	Caprifoliaceae	*Lonicera spp.*	Honeysuckle	
Plants	Dicots	Caprifoliaceae	*Symphoricarpus mollis*	Snowberry	
Plants	Dicots	Fabaceae	*Amorpha californica*	California false-indigo	
Plants	Dicots	Fabaceae	*Lathyrus laetiflorus*	Canyon pea	
Plants	Dicots	Fagaceae	*Quercus spp.*	Oaks	
Plants	Dicots	Hydrophyllaceae	*Pholistoma auritum*	Fiesta flower	
Plants	Dicots	Juglandaceae	*Juglans californica*	California black walnut	
Plants	Dicots	Lauraceae	*Umbellularia californica*	California bay laurel	
Plants	Dicots	Onagraceae	*Clarkia unguiculata*	Elegant clarkia	
Plants	Dicots	Poaceae	*Muhlenbergia rigens*	Deer grass	
Plants	Dicots	Rannunculaceae	*Thalictrum polycarpum*	Meadow rue	
Plants	Dicots	Rhamnaceae	*Rhamnus californica*	Coffeeberry	
Plants	Dicots	Rhamnaceae	*Rhamnus illicifolia*	Holly-leaved redberry	
Plants	Dicots	Rosaceae	*Heteromeles arbutifolia*	Toyon	
Plants	Dicots	Rosaceae	*Prunus illicifolia*	Holly-leaved cherry	
Plants	Dicots	Rosaceae	*Rosa californica*	California rose	
Plants	Dicots	Saxifragaceae	*Lithophragma affine*	Woodland star	
Plants	Dicots	Saxifragaceae	*Potentilla glandulosa*	Sticky potentilla	
Plants	Dicots	Saxifragaceae	*Ribes aureum*	Golden currant	
Plants	Dicots	Saxifragaceae	*Ribes speciosum*	Fuchia-flowered gooseberry	
Plants	Dicots	Scrophulariaceae	*Keckiella cordifolia*	Heart-leaved penstemon	
Plants	Dicots	Scrophulariaceae	*Mimulus aurantiicus*	Sticky monkey-flower	
Plants	Dicots	Urticaceae	*Hesperocnide tenella*	Western nettle	
Plants	Dicots	Violaceae	*Viola pedunculata*	Johnny jump-up	
Plants	Monocots	Liliaceae	*Chlorogalum pomeranium*	Soaproot	

Plants	Monocots	Liliaceae	*Zigadenus fremontii*	Star lily
Plants	Ferns	Dennstaedtiaceae	*Pteridium aqualinum*	Bracken fern
Plants	Ferns	Blechnaceae	*Woodwardia fimbrata*	Giant chain fern

APPENDIX 8

SPECIAL STATUS SPECIES FOUND IN OAK WOODLANDS OF LOS ANGELES COUNTY

Prepared by:
Dan Cooper
Rosi Dagit

References:

The rare plants were taken solely from the
CNPS Inventory of Rare and Endangered Plants, 7th Ed. : http://cnps.site.aplus.net/cgi-bin/inv/inventory.cgi

Rare vertebrates were compiled using the CNDDB "Quickviewer" function:
http://imaps.dfg.ca.gov/viewers/cnddb_quickviewer/app.asp

L.A. Co. Habitat preferences of animals in L.A. were gauged by the author's own judgment/experience with the use of:

Life History Accounts and Range Maps - California Wildlife Habitat Relationships System:
http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx

Huffman, Margaret. 1998. The Wild Heart of Los Angeles: the Santa Monica Mountains.

Schoenherr, A.A. 1992. A Natural History of California.

Stephenson, J. and G. M. Calcarone. 1999. Southern California mountains and foothills assessment: habitat and species conservation issues. General Technical Report PSW-GTR-172, USDA Forest Service, Pacific Southwest Research Station, Albany, CA, US.

The California Partners in Flight Oak Woodland Bird Conservation Plan:
http://www.prbo.org/calpif/htmldocs/oaks.html

SPECIAL-STATUS OAK WOODLAND SPECIES OF LOS ANGELES COUNTY, CALIFORNIA*

Latin name	English name	ESA	CESA	Other status**	O	P	A/D	Habitat notes***	Elevation (for plants)
Accipiter cooperii	Cooper's hawk	N	N	WL	1	1	0		
Ammodramus savannarum	grasshopper sparrow	N	N	SSC	1	1	0	Occurs in oak savannah with widely-scattered trees	
Aquila chrysaetos	golden eagle	N	N	FP | WL	1	1	0	Oaks historically important nesting sites, though uses a wide variety of habitats, including barren desert	
Elanus leucurus	white-tailed kite	N	N	FP	1	1	0	Nests in oaks, forages in oak savannah	
Falco columbarius	merlin	N	N	WL	1	1	0	Habitat generalist	
Gymnogyps californianus	California condor	E	E		1	1	0	Forages/roosts in oak savannah in NW portion of county	
Asio otus	long-eared owl	N	N	SSC, LACBSSC	1	1	1		
Cathartes aura	turkey vulture	N	N	LACBSSC (breeding)	1	1	0		
Catharus ustulatus	Swainson's thrush	N	N	LACBSSC (breeding)	1	1	1	Breeds in undisturbed oak-riparian habitat	
Contopus cooperi	olive-sided flycatcher	N	N	SSC	1	1	0	Breeds in oak-conifer canyons	
Lanius ludovicianus	loggerhead shrike	N	N	SSC	1	1	0	Oak savannah	
Picoides villosus	hairy woodpecker	N	N	LACBSSC (lowland pops.)	1	1	0		
Progne subis	purple martin	N	N	SSC	1	1	1	Breeds in oak savannah on ridges in NW county	
Strix occidentalis occidentalis	California spotted owl	N	N	SSC	1	1	1	Resident in foothill and montane oak forest	
Sturnella neglecta	western meadowlark	N	N	LACBSSC	1	1	0	Oak savannah	
Callophrys mossii hidakupa	San Gabriel Mountains elfin butterfly	N	N		1	1	1		
Eucyclogobius newberryi	tidewater goby	E	N	SSC	1	1	0	Some sites are within oak woodland (e.g., Upper Santa Clara River)	
Gasterosteus aculeatus williamsoni	unarmored threespine stickleback	E	E	FP	1	1	0	Some sites are within oak woodland (e.g., Upper Santa Clara River)	
Gila orcuttii	arroyo chub	N	N	SSC	1	1	0	Most sites are within oak woodland	
Oncorhynchus mykiss irideus	southern steelhead - southern California ESU	E	N	SSC	1	1	0	Most "steelhead streams" are within oak woodland	

SPECIAL-STATUS OAK WOODLAND SPECIES OF LOS ANGELES COUNTY, CALIFORNIA*

Latin name	English name	ESA	CESA	Other status**	O	P	A/D	Habitat notes***	Elevation (for plants)
Onychomys torridus ramona	southern grasshopper mouse	N	N	SSC	1	1	0		
Rhinichthys osculus ssp. 3	Santa Ana speckled dace	N	N	SSC	1	1	0	Most sites are within oak woodland	
Antrozous pallidus	pallid bat	N	N	SSC	1	1	1	Per Stephanie Remington (7 Oct. 2009), roosts and forages in oak woodland	
Chaetodipus fallax fallax	northwestern San Diego pocket mouse	N	N	SSC	1	1	0		
Perognathus alticolus inexpectatus	Tehachapi pocket mouse	N	N	SSC	1	1	0		
Taxidea taxus	American badger	N	N	SSC	1	1	0		
Actinemys marmorata pallida	southwestern pond turtle	N	N	SSC	1	1	1	Terrestrial habitat = oak woodland/chaparral	
Anniella pulchra pulchra	silvery legless lizard	N	N	SSC	1	1	0	Occurs in a wide variety of habitat, incl. coastal dune, grassland	
Aspidoscelis tigris stejnegeri	coastal whiptail	N	N	(was SSC)	1	1	0		
Diadophis punctatus modestus	San Bernardino ringneck snake	N	N	(was SSC)	1	1	1		
Ensatina eschscholtzii croceator	yellow-blotched salamander	N	N	SSC	1	1	1		
Lampropeltis zonata (parvirubra)	California mountain kingsnake (San Bernardino pop.)	N	N	SSC	1	1	0		
Lampropeltis zonata (pulchra)	Califonia mountain kingsnake (San Diego pop.)	N	N	SSC	1	1	0		
Taricha torosa torosa	Coast Range newt	N	N	SSC	1	1	1		
Thamnophis hammondii	two-striped garter snake	N	N	SSC	1	1	0		
Anomobryum julaceum	Slender sliver moss	N	N	2.2				BUFrs	100-1000
Asplenium vespertinum	Western spleenwort	N	N	4.2				CmWld	180-1000
Selaginella asprella	Bluish spike-moss	N	N	4.3				CmWld	1600-2700
Acanthomintha obovata ssp. cordata	Heart-leaved thorn-mint	N	N	4.2				CmWld	785-1540
Androsace elongata ssp. acuta	California androsace	N	N	4.2				CmWld	150-1200
Baccharis malibuensis	Malibu baccharis	N	N	1B.1				CmWld	150-305
Baccharis plummerae ssp. plummerae	Plummer's baccharis	N	N	4.3				CmWld	5-425
Berberis nevinii	Nevin's barberry	E	E	1B.1				CmWld	274-825
Brodiaea filifolia	Thread-leaved brodiaea	T	E	1B.1				CmWld	25-1219
Californica macrophylla	Round-leaved filaree	N	N	1B.1				CmWld	15-1200
Calochortus catalinae	Catalina mariposa-lily	N	N	4.2				CmWld	15-700
Calochortus clavatus var. clavatus	Club-haired mariposa-lily	N	N	4.3				CmWld	75-1300
Calochortus plummerae	Plummer's mariposa-lily	N	N	1B.2				CmWld	100-1700
Calystegia peirsonii	Peirson's morning-glory	N	N	4.2				CmWld	30-1500
Camissonia lewisii	Lewis' evening-primrose	N	N	3				CmWld	0-300
Chorizanthe parryi var. parryi	Parry's spineflower	N	N	1B.1				CmWld	275-1220
Clarkia xantiana ssp. parviflora	Kern Canyon clarkia	N	N	4.2				CmWld	700-3620
Dodecahema leptoceras	Slender-horned spineflower	E	E	1B.1				CmWld	200-760

SPECIAL-STATUS OAK WOODLAND SPECIES OF LOS ANGELES COUNTY, CALIFORNIA*

Latin name	English name	ESA	CESA	Other status**	O	P	A/D	Habitat notes***	Elevation (for plants)
Dudleya cymosa ssp. agourensis	Agoura Hills dudleya	N	N	1B.2				CmWld	200-500
Dudleya densiflora	San Gabriel Mountains dudleya	N	N	1B.1				CmWld	244-610
Galium andrewsii ssp. gatense	Phlox-leaf serpentine bedstraw	N	N	4.2				CmWld	150-1450
Galium cliftonsmithii	Santa Barbara bedstraw	N	N	4.3				CmWld	200-1220
Galium grande	San Gabriel bedstraw	N	N	1B.2				BUFrs, CmWld	425-1500
Heuchera elegans	Urn-flowered alumroot	N	N	4.3				CmWld	1155-2650
Horkelia cuneata ssp. puberula	Mesa horkelia	N	N	1B.1				CmWld	70-810
Juglans californica	Southern California black walnut	N	N	4.2				CmWld	50-900
Lilium humboldtii ssp. ocellatum	Humboldt lily	N	N	4.2				CmWld	30-1800
Malacothamnus davidsonii	Davidson's bush-mallow	N	N	1B.2				CmWld	185-855
Microseris douglasii ssp. platycarpha	Small-flowered microseris	N	N	4.2				CmWld	15-1070
Monardella macrantha ssp. hallii	Hall's monardella	N	N	1B.3				BUFrs, CmWld	730-2195
Mucronea californica	California spineflower	N	N	4.2				CmWld	0-1400
Nemacladus gracilis	Slender nemacladus	N	N	4.3				CmWld	120-1900
Pentachaeta aurea ssp. aurea	Golden-rayed pentachaeta	N	N	4.2				CmWld	80-1850
Perideridia pringlei	Adobe yampah	N	N	4.3				CmWld	300-1800
Phacelia mohavensis	Mojave phacelia	N	N	4.3				CmWld	1400-2500
Piperia cooperi	Chaparral rein orchid	N	N	4.2				CmWld	15-1585
Piperia leptopetala	Narrow-petaled rein orchid	N	N	4.3				CmWld	380-2225
Polygala cornuta var. fishiae	Fish's milkwort	N	N	4.3				CmWld	100-1000
Pseudognaphalim leucocephalum	White rabbit-tobacco	N	N	2.2				CmWld	0-2100
Quercus durata var. gabrielensis	San Gabriel Mountains leather oak	N	N	4.2				CmWld	450-1000
Quercus engelmannii	Engelmann oak	N	N	4.2				CmWld	50-1300
Rupertia rigida	Parish's rupertia	N	N	4.3				CmWld	700-2500
Senecio aphanactis	Chaparral ragwort	N	N	2.2				CmWld	15-800
Symphyotrichum defoliatum	San Bernardino aster	N	N	1B.2				CmWld	2 to 2040
Symphyotrichum greatae	Greata's aster	N	N	1B.3				BUFrs, CmWld	300-2010

Notes:

* By: Daniel S. Cooper, Cooper Ecological Monitoring, Inc.
October 7, 2009; rev. Dec. 9, 2010
List of Animals determined using CNDDB records for L.A. Co., cross-referencing with known habitat preferences.
List of plants determined by searching CNPS inventory for L.A. Co., sorting by "Ecological status", selecting those found in "cismontane woodland" and/or "broadleaf forest", and deleting island taxa.

** (WL = WatchList, a CDFG designation; FP = Calif. Fully Protected; SSC = Calif. Species of Special Concern; LACBSSC = L.A. County Bird

*** CmWld = Cismontane woodland; BUFrs = Broadleaf Forest

APPENDIX 9

FUNDING SOURCES AVAILABLE FOR OAK WOODLANDS CONSERVATION

Prepared by:
Rosi Dagit

This is a partial list of potential ways property owners can find assistance in conserving their oak woodlands.

1.Partners for Fish and Wildlife, U.S. Fish and Wildlife Service

Website: http://partners.fws.gov Contact: 916-414-6462
Goals:

- Implement pro-active, voluntary, on-the-ground habitat restoration projects that benefit Federal trust fish and wildlife species on private and tribal lands.
- Develop partnerships to implement these habitat restoration projects.
- Demonstrate applied technology for habitat restoration projects to help the public understand and participate in fish and wildlife resource conservation.

Funding available: 50:50 cost share
Requirements: Must own the land, must agree to maintain for 10 years

2.Wildlife Habitat Improvement Program, National Resources Conservation Service

website:http://www.nhq.nrcs.usda.gov/PROGRAMS/whip/
Contact: 805-386-4489

State Priorities:

- Riparian and stream corridor habitat restoration and enhancement that benefit wildlife corridors, water quality improvement, reduction in flood damage, and more.
- Federal or State threatened or endangered species habitat restoration or enhancement.
- Treatment or improvement of habitats in uplands (e.g. restoration of burned areas, oak regeneration projects, etc.)
- Wetland area creation, restoration, enhancement and management.
- Coldwater fisheries habitat restoration and improvement (steelhead and rainbow trout)
- Habitat restoration and enhancement for game and other species (deer, quail, butterflies, etc.)

Funding available: up to $10,000 over 10 years, property owner contributes 25%
Requirements: Must own the land, must agree to maintain for 10 years

3. Center for Invasive Plant Management Grants

Website: cipm@montana.edu Contact: Janet Clark, 406-994-6832

Goals: Involving citizens in controlling invasive plants

Funding available: $400 – 10,000

4.Cost Share and Assistance Programs for California landowners and Indian Tribes

website: http://ceres.ca.gov/foreststeward/financial.html

List of program goals, types of projects considered, eligibility requirements and contact info.

5.Catalog of Federal Domestic Assistance

Website: www.cdfa.gov

On-line catalog updated annually contains information on all financial and non-financial assistance programs provided by the Federal government

6. D.I.R.T Grants from Powerbar

website: www.powerbar.com/whoWeAre/dirt

Goals:
Endeavor to increase or maintain access to the outdoors or the size of an outdoor recreational resource.

Have a regional or local focus.
Identify a specific land area or waterway that will benefit.

Have a real potential for success or significant measurable progress over a short term.

Be quantifiable (i.e. have specific goals, objectives, and action plans) and include a measure for evaluating success.

Funding available: $1,000-5,000
Requirements: see website

7. Wildlife Conservation Board Oak Woodlands Conservation Program

Website: www.wcb.ca.gov Contact: 916-445-8448

Goals:
The Oak Woodlands Conservation Act (2001) created the Oak Woodlands Conservation Program administered by the Wildlife Conservation Board. The specific legislation focuses these efforts on the following:

1. Support and encourage voluntary, long-term private stewardship and conservation of California oak woodlands by offering landowners financial incentives to protect and promote biologically functional oak woodlands;
2. Provide incentives to protect and encourage farming and ranching operations that are operated in a manner that protect and promotes healthy oak woodlands;
3. Provide incentives for protection of oak trees providing superior wildlife values on private land, and;
4. Encourage planning that is consistent with oak woodland preservation.

Funding available: Varies

Up to 80% of funds are directed towards purchase of easements, restoration and enhancement

20% of funds may be used for public education and outreach

20% may be used for grants to provide technical assistance or develop oak conservation elements in general plans

Requirements: See website

APPENDIX 10

FEDERAL, STATE, AND LOCAL OAK WOODLANDS CONSERVATION PROGRAMS

Prepared by:
Rosi Dagit

The following is a list of agencies and organizations that provide existing programs to assist in the conservation and restoration of oak woodlands in Los Angeles County. We modified the list in the YOLO County Oak Woodland Conservation and Enhancement Plan to include relevant local entities. This list represents our current knowledge, but may not be totally inclusive.

1. FEDERAL

National Park Service, Santa Monica Mountains National Recreation Area (SMMNRA)
Scientists from the SMMNRA have worked extensively in mapping the vegetation throughout the Santa Monica Mountains, and monitoring wildlife populations.

Natural Resources Conservation Service (NRCS)
NRCS works with landowners in a variety of ways, but two incentive programs funded by the Farm Security and Rural Investment Act of 2002 (Farm Bill) are most applicable to oak woodland conservation.

- The Environmental Quality Incentives Program (EQIP) provides 75% funds needed to projects that promote agricultural production and environmental quality. In Los Angeles, the program goals include water quality protection and erosion control, as well as protection of at-risk species through habitat conservation. The landowner must provide at least 25% of the total cost in either cash or in-kind contributions.

- The Wildlife Habitat Incentive Program (WHIP) is more focused on projects that directly benefit wildlife.

Both programs require cooperative planning with NRCS staff and opportunities for applying varies yearly.

United States Forest Service (USFS)
The Angeles National Forest is the largest forest located within an urban area in the country. Parts of the Los Padres National Forest straddle the western border of the county. The foothill and montane oak woodland communities found within the National Forests comprise the largest segments remaining in the county.

2. STATE

California Department of Fish and Game (CDFG)
CDFG has been a partner or provided funding for extensive research and restoration on numerous species that reside in oak woodlands of Los Angeles County. They are the responsible agency charged with the protection of local wildlife.

California Department of Forestry and Fire Protection (CDF)
CDF has several small cost-sharing opportunities to promote protection of working forests, including oak woodlands. These include the Forest Legacy Program which provides assistance for obtaining

conservation easements, the California Forest Improvement Program covers development of management plans, oak planting, tree shelter installation and non-commercial thinning or pruning projects. The Vegetation Management Program assists in prescribed burns.

California Department of Parks and Recreation (CDPR)
As the largest public landowner in the Santa Monica Mountains, CDPR protects and restores oak woodlands in Leo Carrillo, Los Encinos State Historic Park, Malibu Creek, Topanga State Park, and numerous other parks within Los Angeles County. Active restoration and prescribed burns have contributed to maintaining the integrity of oak woodlands throughout the mountains.

California Oak Foundation (COF)
Although COF has state-wide outreach, they have participated in the development of the Los Angeles County Oak Woodland Conservation Management Plan in many ways.

California Urban Forest Council (CaUFC)
Since most of the oak woodlands of Los Angeles County are located within or adjacent to highly developed urban areas, the wildlife interface management issues are of great concern to CaUFC.

California Native Plant Society (CNPS)
There are several local chapters of CNPS located within Los Angeles County. Each provides extensive education and outreach efforts, including active restoration projects within oak woodlands.

Caltrans Adopt-A-Highway Program
This program provides opportunities for local residents, organizations or businesses to help maintain sections of California Highways. Volunteers can collect litter, plant trees or wildflowers, remove graffiti and /or control vegetation. See their website for specific guidelines.

Mountains Recreation Conservation Authority (MRCA)
MRCA is a joint powers authority between the Santa Monica Mountains Conservancy, the Conejo Recreation and Park District and the Rancho Simi Recreation and Park District. They are dedicated to the preservation and management of over 60,000 acres of open space, parkland, watersheds, trails and wildlife habitat.

Resource Conservation District of the Santa Monica Mountains (RCDSMM)
Conservation biologists from the RCDSMM have been involved in oak woodland conservation and preservation through on the ground restoration efforts as well as by participating in policy development. The RCDSMM coordinates several local watershed councils and works extensively with landowners to encourage voluntary conservation.

University of California Natural Reserve System
Stunt Ranch, locates on 310 acres in the Cold Creek watershed of the Santa Monica Mountains. Numerous oak woodland education and research programs are provided.

University of California Cooperative Extension (UCCE) Los Angeles County
UCCE provides research based information on a variety of subjects relevant to oak woodland conservation including fuel modification strategies, and watershed protection.

University of California Los Angeles (UCLA)
Professors and students have been an integral part of the research and planning efforts undertaken to help understand the role of oak woodlands in sustaining the biodiversity and ecological integrity of the Los Angeles region.

University of California Integrated Hardwood Range Management Program (IHRMP)
Researchers from IHRMP have been involved in promoting local and regional conservation planning efforts directed at protecting remaining oak woodlands in Los Angeles County.

Wildlife Conservation Board (WCB) Oak Woodland Conservation Program
The program offers landowners, cities, and counties the opportunity to obtain funding for projects that will protect, conserve and restore oak woodlands.

3. LOCAL

Arroyo Seco Foundation
The Arroyo Seco Watershed reaches from the San Gabriel Mountains into downtown Los Angeles. Their coordinated community efforts focus on maintaining the integrity of this important watershed that contains significant oak woodlands.

Audubon Society, Debs Park
This wonderful example of a LEEDS certified building provides extensive education and outreach to the community. It is located within chaparral and oak woodlands.

Los Angeles Community Forest Advisory Committee
Established in 1999, this appointed group of fourteen advises the LA City Council on tree related issues.

Los Angeles County Arboretum
The Arboretum contains 127 acres of plantings, including the last remaining native stand of Engelmann oak woodlands.

Los Angeles County Forestry
Although part of the Fire Department, County Forestry is charged with assisting in administering the Oak Tree Ordinance, providing on-site consultations to property owners and propagating oaks and oak associated species for local residents. They are instrumental in protecting and preserving oak woodlands throughout the county.

Los Angeles County Parks and Recreation District
Responsible for all the parks and nature centers within unincorporated Los Angeles County, the Parks and Recreation District manages significant stands of oak woodland throughout the county.

NorthEast Trees
NorthEast Trees has coordinated extensive outreach, education and restoration projects in the densely populated and challenged communities of Los Angeles.

Pasadena Beautiful
The oaks trees of Pasadena are a matter of importance to the community, resulting in extensive education and outreach as well as preservation projects to protect their oak resources.

Rancho Santa Ana Botanical Garden
Although not located within Los Angeles County, the Garden has an extensive collection of native oaks and is involved in education and outreach regarding oak woodlands.

Santa Clarita Open Space Preservation District
Dedicated to protecting the rare biological and geological resources surrounding the city, the residents of Santa Clarita added an annual property tax assessment to provide funds to secure a greenbelt around development. Oak woodlands are one of the dominant habitats in the city.

Santa Clarita Organization for Planning the Environment (SCOPE)
Dedicated to protecting the natural resources of the Santa Clarita Valley, SCOPE has been actively involved in protecting oak woodlands. They were the key organization involved in publicizing the fate of "Old Glory", a valley oak.

Sierra Club
Active on many levels, members of the Sierra Club have been involved in numerous efforts to protect and preserve oak woodlands in Los Angeles.

TreePeople
For many years TreePeople have made planting and protection of trees in Los Angeles a priority. They are currently involved in several oak woodland planting and restoration projects.

Tree Musketeers
A youth driven environmental organization that has planted many trees and provides education and outreach on the benefits of native plants.

APPENDIX 11

CEQA EVALUATION OF OAK WOODLANDS CONVERSION

Prepared by:
Dr. Daryl Koutnik

CEQA EVALUATION OF OAK WOODLANDS CONVERSION

The California Environmental Quality Act (CEQA) requires a jurisdiction, such as a city or county, to analyze impacts to existing biological resources that may occur when a particular project proposal requesting a discretionary approval from that jurisdiction is being considered. Potential impacts to oak woodlands resulting from the implementation of a proposed development project are analyzed as a component of the biological resources of a project site. According to Appendix G of the *State CEQA Guidelines*, a project may result in significant impact to biological resources if it would:

1. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations or by the CDFG or USFWS;
2. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by the CDFG or USFWS;
3. Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;
4. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;
5. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or,
6. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan.

Using the significance thresholds listed above, potential impacts to oak woodlands could fall under the following categories:

Category 1: If an oak species were considered to be a sensitive species (only *Quercus dumosa* may be considered of special-status because of its California Native Plant Society listing of 1B.1 - considered to be very rare and very endangered);

Category 2: Where an oak species is a component of riparian vegetation or is a vegetation community considered by the California Department of Fish and Game (CDFG) as sensitive, (Valley oak, Engelmann oak and Island oak woodlands are sensitive plant communities), or;

Category 5: When developments do not comply with replacement or other mitigation provisions of local ordinances the impacts could be significant.

Impacts to oak woodlands could also constitute breach of a significance threshold for any of the following categories of significant thresholds of the State CEQA Guidelines:

Category 3: Riparian vegetation is essential to cleansing runoff and percolated water and to ameliorating temperature and climate for the wetland. Riparian vegetation provides erosion control and habitat for riparian and other species. If riparian vegetation includes oak woodlands, the woodland removal or serious impact to the woodland can impair the wetland's water quality and climate in a significant way.

Category 4: Oak woodlands often provide cover needed by many kinds of wildlife as they move along wildlife corridors. Removal of or impact on the woodland can seriously impact ability of much wildlife to use the corridor. Substantial removal could convert the corridor from useable to dysfunctional.

Category 6: Oak woodlands may be an important part of Significant Ecological Areas (SEAs) in Los Angeles County. There are some Sensitive Ecological Resource Areas (SERAs) that are designated especially for their oak woodlands. The criterion for approval of a Conditional Use Permit for development within an SEA and SERA is that the development design be highly compatible with the biotic resources present including preservation of appropriate and sufficient undisturbed areas. A proposal to remove or seriously impact oak woodland within these specially designated areas could result in a significant impact.

Los Angeles County is rich in oak woodland resources in both hillside and riparian habitats. The County has excellent representatives of black oak (*Quercus kelloggii*), canyon live oak (*Q. chrysolepis*), coast live oak (*Q. agrifolia*), and interior live oak woodlands. Blue oak (*Q. douglasii*) woodlands reach the southern limit of its distribution in the far northwest part of Los Angeles County. None of these oak woodland associations are considered to be sensitive plant communities by the CDFG. In addition, the County has representatives of valley oak (*Q. lobata*), Engelmann oak (*Q. engelmannii*), and island oak (Q. *tomentella*) woodlands, all of which being recognized as sensitive plant communities by CDFG along with southern coast live oak riparian forest associated with the bottoms of the wetter drainages.

There is currently no oak species occurring within Los Angeles County that is considered a special-status species by CDFG. The valley oak and the Engelmann oak are considered by the County to be locally sensitive species. Protection for individual trees is provided through the provisions of the County's oak tree ordinance (Part 16 of the County zoning code, sections 22.56.2050 through 22.56.2260), originally established in 1982 under Ordinance 82-0168. The processing of an Oak Tree Permit is intended to provide protection to individual trees but consideration of the oak woodland as a habitat and its association ecology did not receive protection under this ordinance.

As the majority of oak woodland resources in the state are not considered to be sensitive vegetation associations, their protection is implemented through the application of CEQA, specifically Public Resources Code Section 21083.4, Conversion of Oak Woodlands. This code section was established by Senate Bill 1334, authored by Sheila Kuehl, and enacted in 2004. These CEQA provisions became effective in January 2005. This CEQA section requires a county (these provisions do not apply to incorporated municipalities) to be responsible for analysis of impacts to oak woodlands and when found to be significant, the County, as lead agency, must require mitigation for the impacts to the oak resource.

CEQA carbon provisions apply to all local jurisdictions. The following are the provisions within CEQA for the protection of oak woodlands:

CEQA Section 21083.4 Conversion of Oak Woodlands

a) For purposes of this section, "oak" means any native tree species in the genus Quercus not designated as commercial species pursuant to regulations adopted by the State Board of Forestry and Fire Protection pursuant to Section 4526 and that is 5 inches or more in diameter at breast height;

b) As part of the environmental determination pursuant to Section 21080.1, a county shall determine whether a project within its jurisdiction may result in a conversion of oak woodlands that will have a significant effect on the environment. If a county determines that here may be a significant effect to oak woodlands, the county shall require one or more of the following oak woodlands mitigation alternatives to mitigate the significant effect of the conversion of oak woodlands:

1) Conserve oak woodlands, through the use of conservation easements;
2) A) Plant an appropriate number of trees, including maintaining plantings and replacing dead or diseased trees.
   B) The requirement to maintain trees pursuant to this paragraph terminates seven years after the trees are plants;
   C) Mitigation pursuant to this paragraph shall not fulfill more than one-half of the mitigation requirement for the project;
   D) The requirements imposed pursuant to this paragraph also may be used to restore former oak woodlands.
3) Contribute funds to the Oak Woodlands Conservation Fund, as established under subdivisions (a) of Section 1363 of the Fish and Game Code, for the purpose of purchasing oak woodlands conservation easements, as specified under paragraph (1) of the subdivision (d) of that section and the guidelines and criteria of the Wildlife Conservation Board. A project applicant that contributes finds under this paragraph shall not receive a grant from the Oak Woodlands Conservation Fund as part of the mitigation for the project.
4) Other mitigation measures developed by the county.

c) Notwithstanding subdivision (d) of Section 1363 of the Fish and Game Code, a county may use a grant awarded pursuant to the Oak Woodlands Conservation Act (Article 3.5 (commencing with Section 1360) of Chapter 4 of Division 2 of the Fish and Game Code) to prepare an oak conservation

element for a general plan, an oak protection ordinance, or an oak woodlands management plan, or amendments thereto, that meets the requirements of this section.

Exemption from these CEQA provisions: Projects under an approved Natural Community Conservation Plan that includes oaks and affordable housing projects for lower income households are exempt from these CEQA provisions.

APPENDIX 12

SMALL SCALE OAK WOODLANDS AREAS MAPS FOR LOCALIZED AREAS

Prepared by:
Dr. Thomas Scott
Matthew Davis
Cara Washington

The following figures, which are based on **Figure 3 – Los Angeles County Oak Woodlands Areas Overlay** in the main body of this plan, provide for a more detailed view of four major geographical areas of Los Angeles County where oak woodlands have been mapped.

Figure A4 -
Los Angeles County - Santa Monica Mountains
Oak Woodland Areas

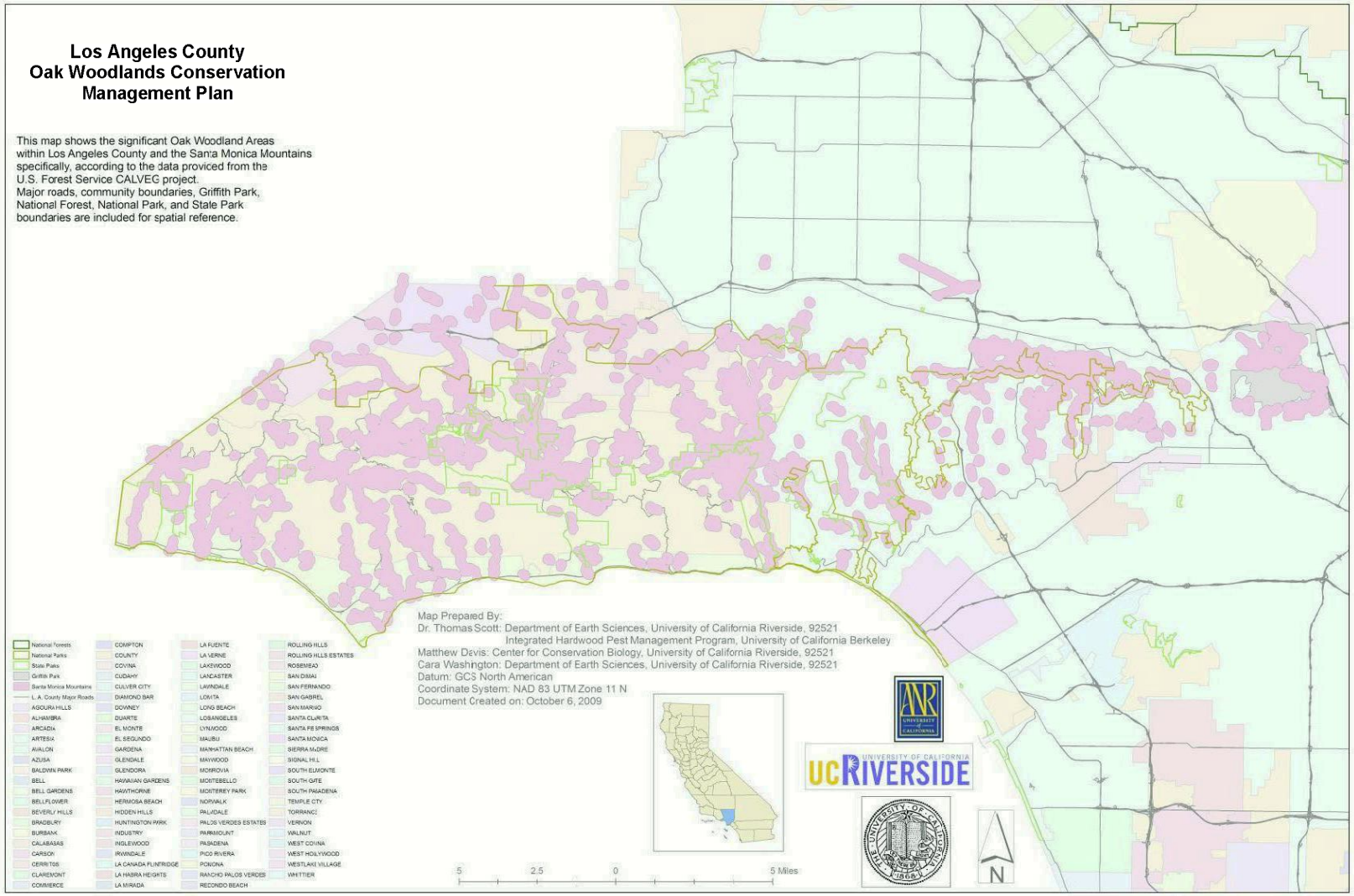


Figure A5 -
Los Angeles County - Puente Hills Oak Woodland Areas

Los Angeles County
Oak Woodlands Conservation
Management Plan

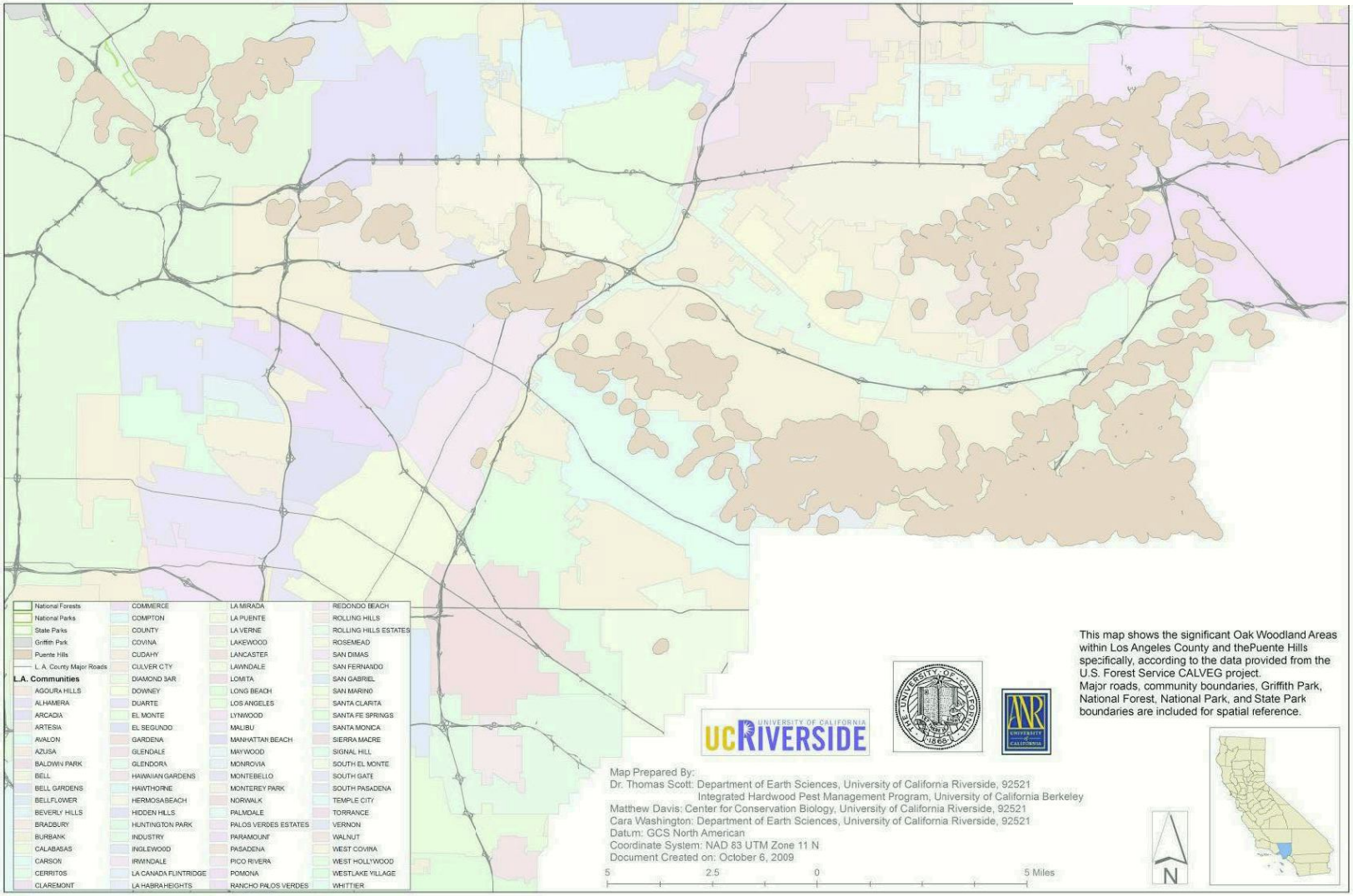


Figure A6 -

Los Angeles County - San Gabriel Mountains Oak Woodland Areas

This map shows the significant Oak Woodland Areas within Los Angeles County and the San Gabriel Mountains specifically, according to the data provided from the U.S. Forest Service CALVEG project.
Major roads, community boundaries, National Forest, National Park, and State Park boundaries are included for spatial reference.

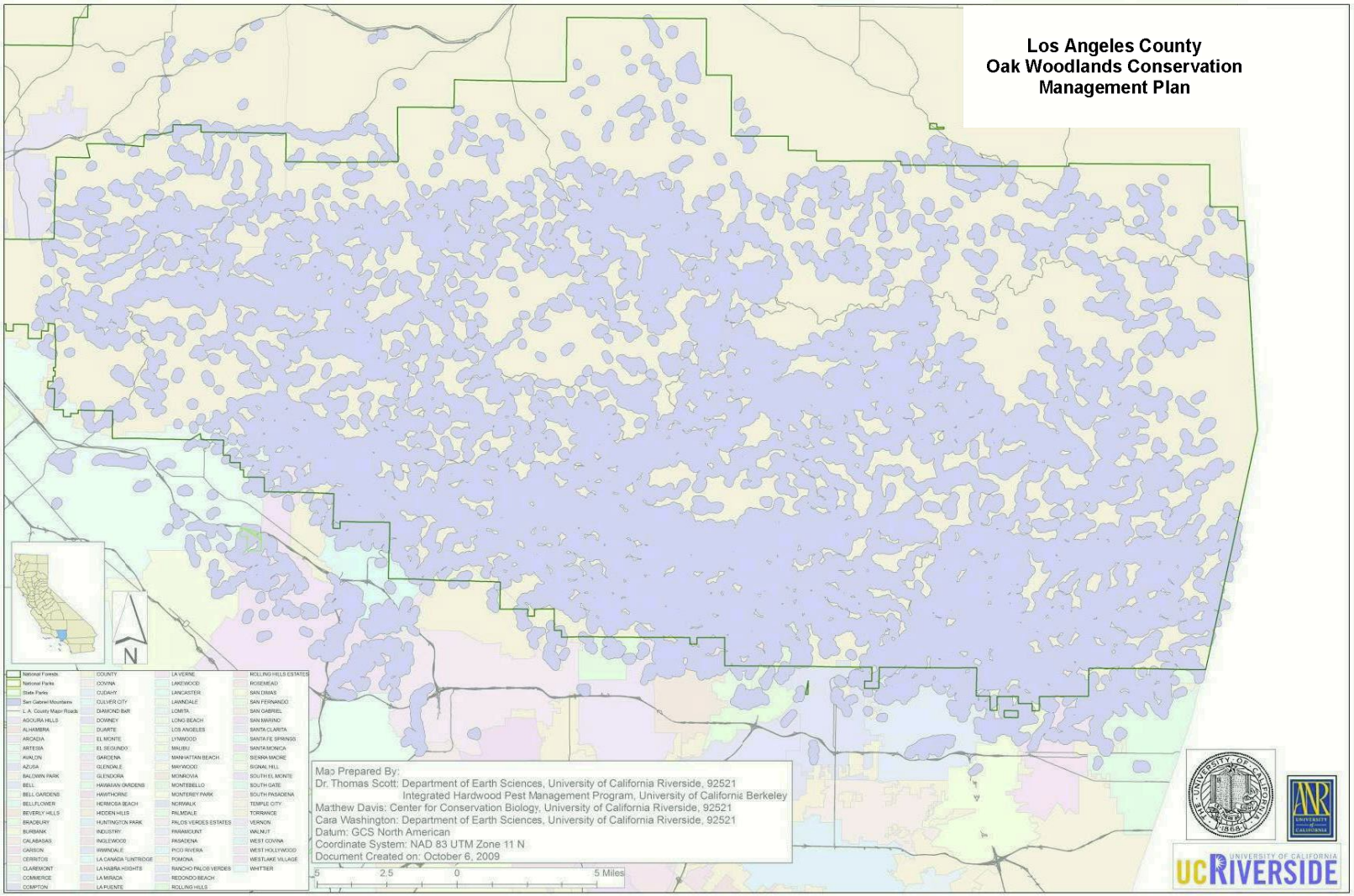
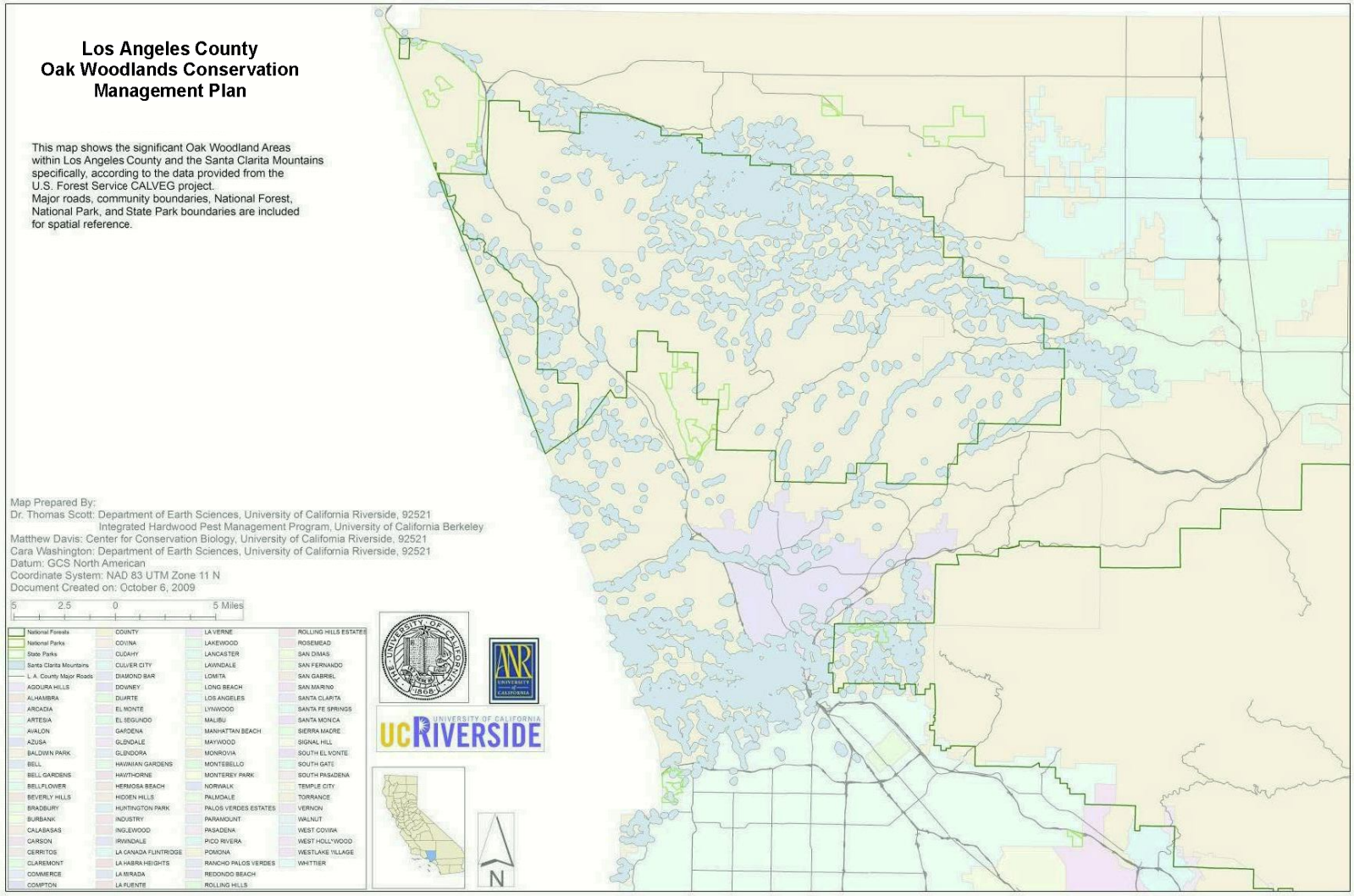


Figure A7 -

Los Angeles County - Santa Clarita Mountains Oak Woodland Areas



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