# OAK WOODLANDS OF HUMBOLDT COUNTY

## A REPORT ON THEIR USE, DISTRIBUTION, DIVERSITY, OWNERSHIP, AND CONSERVATION

Prepared by the Northcoast Regional Land Trust

in collaboration with local partners and with support from the Headwaters Fund

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# TABLE OF CONTENTS

INTRODUCTION ..... 1
I. Oak Woodlands of Humboldt County ..... 2
Functions and Values ..... 2
Significance of Local Stands ..... 2
Native Oak Species ..... 2
Oregon white oak (*Quercus garryana*) ..... 3
California black oak (*Quercus kelloggii*) ..... 3
Canyon live oak (*Quercus chrysolepis*) ..... 4
Distribution ..... 5
Current Land Ownership Patterns ..... 7
Classification, Soils and structure ..... 9
II. Factors Affecting Oak Woodlands of Humboldt County ..... 10
Conifer encroachment and stand succession ..... 10
Regeneration ..... 11
Sudden oak death ..... 12
Introduced plants ..... 12
Public policy ..... 12
Land use changes ..... 13
Harvesting of oak trees for fuel wood or timber ..... 13
Climate change ..... 13
APPENDIX A: FOR MORE INFORMATION ..... 14
APPENDIX B: GIS MAP DEVELOPMENT AND META DATA ..... 15
APPENDIX C: CONSERVATION AND MANAGEMENT INCENTIVE PROGRAMS ..... 16
APPENDIX D: CONTRIBUTORS ..... 19
APPENDIX E: REFERENCES ..... 21
Works Cited ..... 21
Personal Communications ..... 22

# FIGURES AND TABLES

Figure 1: Distribution of oak woodlands in Humboldt County 6
Figure 2: Land ownership pattern of oak woodlands in Humboldt County 8
Figure 3: Vegetation mosaic involving oak woodlands in southern Humboldt County 9
Figure 4: Conifer encroachment into an oak woodland stand 10

Table 1: Estimated oak woodland acreage in Humboldt County by stand type 5
Table 2: Acres of privately-owned oak woodlands by ownership size class 7

**THE FOLLOWING STATUS REPORT IS INTENDED TO SUPPORT THE LONG-TERM, VOLUNTARY CONSERVATION OF OAK WOODLANDS BY PRIVATE LANDOWNERS IN HUMBOLDT COUNTY AND RECOGNIZES THAT FARMING, GRAZING AND RANCHING OPERATIONS GENERALLY HAVE BEEN AND CAN CONTINUE TO BE COMPATIBLE WITH OAK WOODLANDS CONSERVATION. THIS REPORT IS FURTHER INTENDED TO SUPPORT EDUCATION AND OUTREACH EFFORTS WHICH DEMONSTRATE THE ECONOMIC, SOCIAL, AND ECOLOGICAL VALUES ASSOCIATED WITH OAK WOODLANDS.**

# INTRODUCTION

Oak woodlands are a natural feature of ecological, economic, cultural, aesthetic, recreational, and historic importance to the people of Humboldt County and the rest of California. In addition to providing essential wildlife habitat, retaining soil, and contributing to the conservation of water resources, oak woodlands provide unique opportunities for food gathering, grazing, hunting and recreation. In response to the ongoing degradation and loss of oak woodlands in California, the state legislature has in recent years passed legislation (eg. Oak Woodlands Conservation Act of 2001) recognizing oak woodlands as a valuable but diminishing resource and creating new policies and programs designed to protect them.

Though still a prevalent part of the county's landscape, true oak[1] woodlands have been disappearing from Humboldt County for over a century. Without a focus on the stewardship of remaining stands, Humboldt County may assume the following risks:

- Loss of habitat, wildlife and natural diversity
- Diminishing viability of family ranching operations that rely on oak woodlands
- The possibility of new government regulations intended to protect oak woodlands
- Loss of cultural and scenic landscapes

The purpose of the report is to:

- Provide information on the status of oak woodlands in Humboldt County, including:
    - a description of all native oak species in the genus *Quercus*.
    - estimates of the current and historical distributions of oak woodlands
    - existing threats
    - status of natural regeneration and growth trends; and
    - maps displaying the current distribution of oak woodlands within the county.;
- Support voluntary efforts by landowners to conserve and maintain oak woodlands on their land;
- Meet the requirements necessary to participate in the California Oak Woodlands Conservation Program, which provides funds to support conservation, management, and educational activities around oak woodlands; and
- Demonstrate that there exists in Humboldt County a strong and focused local commitment to maintaining oak woodlands as an integral part of the county's landscape.

[1] Defined here as trees classified in the genus *Quercus*. This excludes the regionally common tree species tanoak, which is classified in the genus *Notholithocarpus*.

# I. OAK WOODLANDS OF HUMBOLDT COUNTY

This chapter provides an overview of use, distribution, diversity and ownership of oak woodlands in Humboldt County.

## FUNCTIONS AND VALUES

Oak woodlands are of ecological, economic and cultural significance to the people of Humboldt County. They provide food and cover for a wide range of wildlife, including game species such as deer, elk, quail, and grouse, and harbor a large number of native bird (Zack 2002) and plant species (Giusti et al. 1996). Oak woodlands provide important ecosystem services that support the health and well-being of people, including air purification, water conservation, and soil retention functions. Oak woodlands play an important role in economic activities such as livestock grazing and guest hunting operations that help sustain the local ranching industry. Native Americans have utilized oak woodlands for shelter and subsistence activities such as acorn gathering and hunting for thousands of years, and oaks and oak woodlands still retain great cultural and spiritual significance among Native American tribal members. Lastly, oak woodlands contribute to the natural beauty of Humboldt County, which inspires locals and visitors alike.

## SIGNIFICANCE OF LOCAL STANDS

The oak woodlands of the North Coast are unique among those occurring in California. Oregon white oak woodlands, the most common woodland type found in Humboldt County, are uncommon in California beyond the North Coast Ranges and Klamath Mountains[2]. The structural characteristics of Humboldt County's oak stands are distinctive, often involving dense stands of oak trees that are intermixed with patches of open grassland and conifer-hardwood forests (Griffin 1988).

The significance of true oak woodlands in Humboldt County is further underscored by the rapid spread of the introduced invasive plant pathogen *Phytophthora ramorum* that causes sudden oak death (SOD) in tanoak populations of California and southern Oregon. In the North Coast region, tanoak acorns currently function as a primary source of food for many wildlife populations, including bear, deer, quail, squirrel, and wild turkey. With the ongoing spread of SOD through the region's widespread tan oak stands, acorns from true oaks will likely be of increasing importance in sustaining North Coast wildlife in the future.

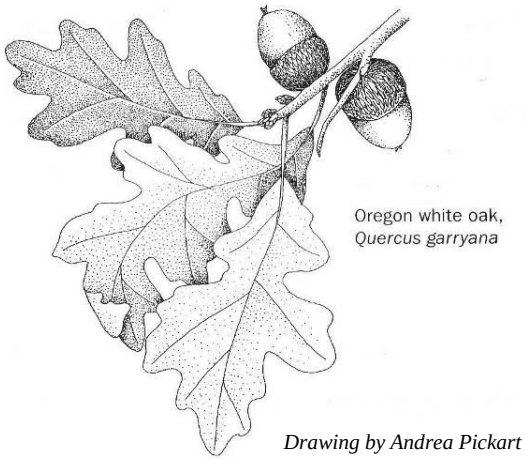
## NATIVE OAK SPECIES

Only three true oak species are prevalent in oak woodlands of Humboldt County—Oregon white oak, California black oak, and canyon live oak. Tanoak (*Notholithocarpus densiflorus*[3]) is a common tree in North Coast forests but belongs to a different genus, is not considered to be a true oak, and for purposes of this report will not be evaluated. The following is a brief description of

[2] Oregon white oak woodlands occur in the Pacific Northwest, including parts of Oregon and Washington.
[3] Formerly called *Lithocarpus densiflorus.*

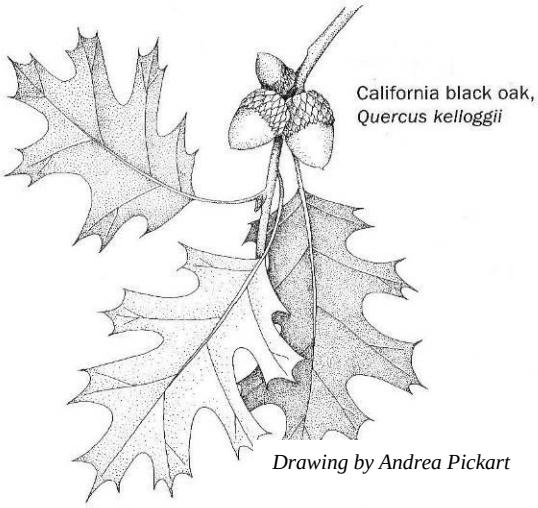
the characteristics and range of the three primary oak species occurring as trees in the county summarized from Hickman (1993), Pavlik (1991), and Stuart and Sawyer (2001).

## OREGON WHITE OAK (*QUERCUS GARRYANA*)



*Drawing by Andrea Pickart*

This tree species is the most common constituent of Humboldt County's oak woodlands. It ranges from western British Columbia to southern California, up to 5,900 feet in elevation. In California, Oregon white oak is found in the central and northern Coast Ranges and the foothills of the Cascades and Sierra Nevada. It is generally associated with ridges and slopes exposed to the south, woodland, mixed-evergreen forest and conifer forest. The species occurs in both tree (*Q. garryana* var. *garryana*) and shrub (*Q. garryana* var. *breweri*) forms, the latter generally occurring on harsher, higher elevation sites. Acorns of this species develop to maturity in a single year. Oregon white oak is able to regenerate from dormant buds in the trunk following disturbances such as fire or cutting. Mature trees are between 25 and 90 feet tall and can live as long as 500 years. This species is not susceptible to sudden oak death.



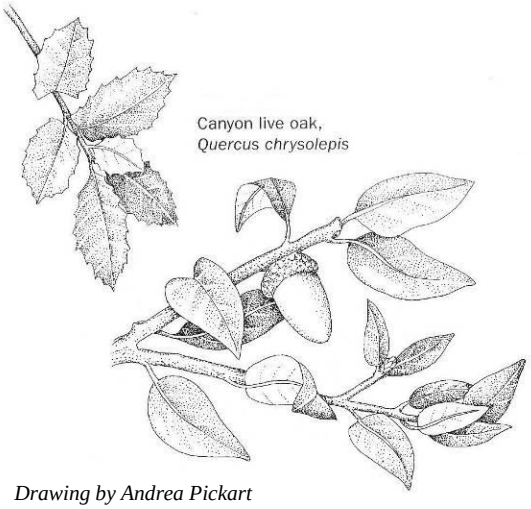
*Drawing by Andrea Pickart*

## CALIFORNIA BLACK OAK (*QUERCUS KELLOGGII*)

This tree species is also common in Humboldt County's oak woodlands, occurring both in pure stands and mixed with Oregon white oak. It is also frequently found in montane Douglas-fir forests as part of a Douglas fir-black oak forest type, where it tends to form patches in the sub-canopy.

This species ranges from western Oregon to Baja California, between 200 and 8,000 feet in elevation. It is associated with slopes, valleys, woodland, and coniferous forest. Mature trees are between 30 and 80 feet tall and can live as long as 500 years. Black oak acorns mature over a two year period. It will sprout after being burnt or cut. This species is shade tolerant when young, but loses its tolerance with age. It hybridizes with coast live oak and interior live oak. Black oak is the primary hardwood timber species in California, where it is used to make flooring, furniture, paneling, and other products. This oak species is susceptible to sudden oak death.

## CANYON LIVE OAK (*QUERCUS CHRYSOLEPIS*)



*Drawing by Andrea Pickart*

This evergreen species is sometimes present in oak woodlands, but is more typically found in mixed-evergreen forests and chaparral. Canyon live oak ranges from southwestern Oregon to Arizona and Baja California, between 300 and 9,000 feet. In California it is most often found west of the Sierra Nevada growing on cliffs, canyon walls, rocky outcrops, and shallow soils. Mature trees are between 15 to 70 feet tall and can live for more than 300 years. This species is drought and shade tolerant, and its acorns mature in one season. Trees of this species are susceptible to infection by *Phytophthora ramorum*, but do not usually (if ever) die from it.

Additional oak species that are presumed to occur along the inland or southern periphery of Humboldt County, especially in the high North Coast Ranges and Klamath Mountains, are briefly discussed below. They are neither dominant nor common in the county's oak woodlands, and all but interior live oak grows primarily in shrub form.

**Interior live oak (*Quercus wislizenii*)**
This species grows in woodlands and chaparrals throughout the western portion of California, from Siskiyou County south, where it occurs in both tree and shrub form It is prevalent in the Coast Ranges and southern California mountains from near sea level to over 6,500 feet in elevation. The species is shade tolerant and resistant to fire.

**Huckleberry oak (*Quercus vaccinifolia*)**
This montane species grows in forests, woodlands and chaparrals from Oregon south to the Sierra Nevada and northwestern California where it is often associated with serpentine soils. A prostrate or low, spreading shrub, huckleberry oak typically grows on cliffs, ridges, rocky slopes, or shallow soils above 3,000 feet in elevation.

**Sadler oak (*Quercus sadleriana*)**
Also known as deer oak, this species grows in montane forests and chaparral in the Klamath Mountains of California and Oregon, from approximately 2,000-7,200 feet in elevation. It is a small to medium-sized shrub that grows as an understory species in conifer forests or as an overstory species on dry ridges and serpentine soils.

**Leather oak (*Quercus durata*)**
This small to medium-sized shrub grows in conifer woodlands and chaparrals of the Coast Ranges, northern Sierra Nevada, and Great Basin, from about 500-5,000 feet in elevation. It occurs mostly on serpentine soils.

**Scrub oak (*Quercus berberidifolia*)**
This species grows in chaparral and woodlands between 1,000 and 5,000 feet in the Coast Ranges, Sierra Nevada, and southern California Ranges, and ranges south into Baja California. This shrub or small tree grows on steep, dry slopes and shallow soils.

## DISTRIBUTION

There are an estimated 138,132 acres of true oak woodlands in Humboldt County, comprising about six percent of the county's landscape. Oak woodlands are generally found inland of the coastal redwood belt, especially on south facing slopes, ridge tops and hills. The current distribution of oak woodlands in Humboldt County is similar to that of historic times (Giusti 2008, pers. comm.), yet total acreage has diminished substantially over the last 150 years due primarily to conifer encroachment and stand succession.

Table 1 shows estimates for acreage, percent of total oak woodland acreage, and ownership pattern for each oak woodland cover type (defined by the dominant species) in Humboldt County. Figure 1 on the following page shows the location and extent of oak woodlands in Humboldt County.

**Table: 1 Estimated oak woodland acreage in Humboldt County by stand type[4]**

| Oak woodland stand types | Acres | % of Total Oak Woodlands | % Privately owned (Acres) | % Publicly owned (Acres) | % Tribally owned (Acres) |
|---|---|---|---|---|---|
| Oregon White Oak | 100,526 | 73 | 90% (90,073) | 8% (7,886) | 2% (2,567) |
| Black Oak | 16,746 | 12 | 64% (10,762) | 29% (4,854) | 7% (1,130) |
| Canyon Live Oak | 20,860 | 15 | 34% (7,080) | 54% (11,196) | 12% (2,584) |
| **Total** | **138,132** | **100** | **78** | **17** | **5** |

[4] Source: CalFire's Fire and Resource Assessment Program (FRAP)/Land Cover Mapping and Monitoring Program (LCMMP)/VegType data– See Appendices B and D for details)

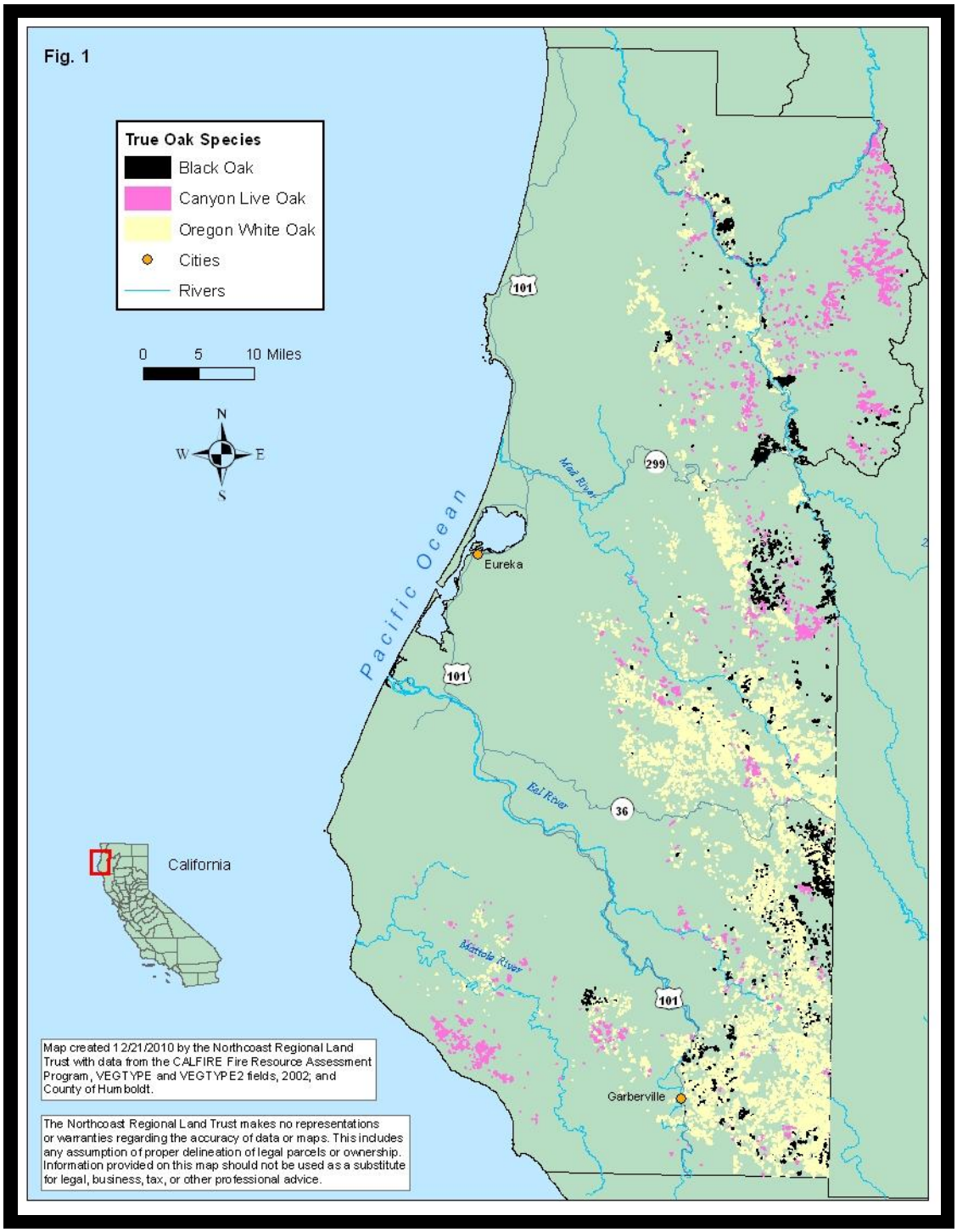



**Figure 1: Distribution of oak woodlands in Humboldt County**[5] [6]

[5] Source: FRAP/LCMMP/VegType data. Refer to Appendix B for information on how this map was derived.

[6] The data used to describe the county-wide distribution of oak woodlands may not be accurate for every location and should not be used as a substitute for reliable, site-level information.

# CURRENT LAND OWNERSHIP PATTERNS

While a large portion of the oak woodlands in Humboldt County are under private ownership, significant acreages also occur on public[7] and tribal[8] lands (see Table 1). Ownership patterns vary by oak stand type. Most black oak and white oak stands occur on private lands, while most canyon live oak stands occur on public lands. Nearly 80% of the privately-owned oak woodland stands in Humboldt County occur on ownerships greater than 160 contiguous acres in size (Table 2). Figure 2 on the following page illustrates the land ownership patterns in Humboldt County.

**Table 2. Acres of privately-owned oak woodlands by ownership size class.**

| **Private ownership size classes (in acres)** | **Oak woodland acreage** | **Percent of all oak woodlands under private ownership** |
|---|---|---|
| 0-40 | 6,958 | 7 |
| 41-160 | 16,328 | 15 |
| 161-600 | 11,990 | 11 |
| 601 and over | 72,640 | 67 |

[7] Especially lands administered by the Six Rivers National Forest, Redwood National Park, Humboldt Redwoods State Park, and the Bureau of Land Management.
[8] Primarily the Hoopa Valley and Yurok Indian Reservations

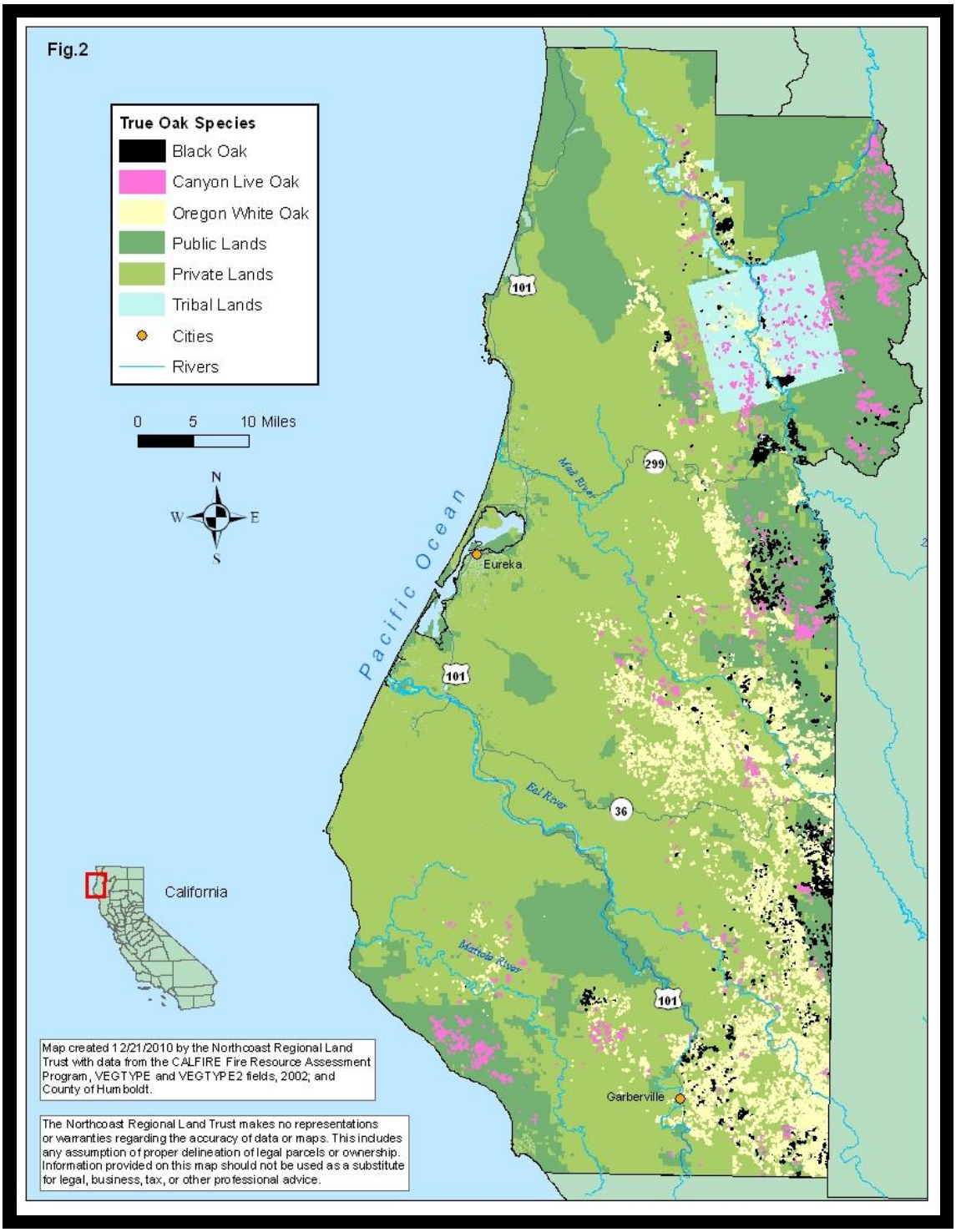



**Figure 2: Land ownership pattern[9] of oak woodlands in Humboldt County[10].**

[9] The depicted ownership patterns are based on parcel data retrieved from the Humboldt County Planning Department. Refer to Appendix B for more information about how this map was derived.
[10] Oak woodlands are known to occur more extensively in Redwood National Park and Humboldt Redwoods State Park than is indicated by this map.

## CLASSIFICATION, SOILS AND STRUCTURE

Oregon white oak woodland, California black oak forest, and canyon live oak forest are the most common types (Sawyer et al. 2009) of true oak stands in Humboldt County. Many Humboldt County stands are indicative of a "bald hills" woodland type that has been recognized for being unique in California (Griffin 1988). Bald hills oak woodlands often occur as part of a complex vegetation mosaic consisting of oak stands interspersed with patches of grassland and stands of evergreen hardwood and conifer trees (See Figure 3). Bald hills are common in Humboldt and Mendocino Counties (Sugihara et al. 1987b). These hills are in contrast to the savanna-like structure that characterizes many oak woodlands in California, with individual oaks widely spaced across a grassy plain or slope. Studies suggest that the bald hills vegetation mosaic is partially the result of underlying soil patterns. In Humboldt County, Oregon white oak generally occurs on Tyson series soils, while Laughlin, Yorkville, and related soil series tend to support grass patches (Griffin 1988).

**Figure 3: Vegetation mosaic involving oak woodlands among the bald hills of southern Humboldt County.(*Photo by Tricia Colleran, March 2008)***

The structure of oak woodlands in Humboldt County varies considerably and likely reflects complex interactions between environmental characteristics, combined with differing site histories and successional states. At least three oak stand structural types were described for oak stands in Redwood National Park: 1) young dense; 2) clustered; and 3) all-aged (Sugihara and Reed 1987). Young dense stands are dominated by a large number of young, small diameter trees that are relatively recent in origin. All-aged stands are dominated by relatively few, large and generally older trees that are widely spaced and represent a pattern of sustained regeneration.

Clustered stands are dominated by multiple-stemmed trees and exhibit average tree ages, densities and sizes that are intermediate to the young dense and all-aged types. Stands representing a mix of these characteristics also occur in the park. The extent to which these stand structural types represent oak woodlands elsewhere in the county has not been thoroughly studied.

## II. FACTORS AFFECTING OAK WOODLANDS OF HUMBOLDT COUNTY

A number of factors influence the distribution and long-term viability of oak woodlands in Humboldt County. Competition from native conifer trees (and the subsequent transition of oak woodland stands into conifer stands) is generally thought to pose the most extensive and urgent risk to this resource. A brief discussion of this process and other factors generally thought to affect oak woodlands and their management follows.

### CONIFER ENCROACHMENT AND STAND SUCCESSION

Douglas-fir (*Pseudotsuga menziesii*), historically excluded from oak woodlands by the regular occurrence of fire (manually or naturally ignited), has become a major competitor of many oak species in the modern era of fire suppression (Agee 1993; also see Figure 4). Encroachment may be exacerbated by severe local disturbance events that create conditions (often bare soil) conducive to the establishment of Douglas-fir seedlings. Once Douglas-fir becomes established in oak woodland stands, the growth and regeneration of oaks becomes jeopardized; Douglas-fir can quickly overtop oak trees, shade them out, and suppress oak regeneration. Within decades, stands of oaks are converted to coniferous forest in this way. Conifer encroachment threatens the future of many oak woodlands in northern California (Stewman 2001) and has been implicated in the loss of prairie and oak habitats elsewhere in the Pacific Northwest (Crawford and Hall 1997). Stand succession is a primary factor driving the loss of oak woodlands in Humboldt County.

**Figure 4: Conifer encroachment into an oak woodland stand.**
***(Photo by Tricia Colleran, March 2008)***

Historically, the burning practices of Native Americans (and later those of European settlers and ranchers) augmented lightning-caused wildfires to inhibit the establishment and growth of conifers in oak stands across much of the area now known as Humboldt County. But by the 1950's, due the widespread removal of fire as a management tool and the suppression of most lighting or human-ignited fires, Douglas-fir trees were establishing themselves in many of the county's oak stands. The extent of the county's grassland prairies, which often occur adjacent to oak stands, have also been decreasing in recent decades as woody species (conifers, oaks and others) become established on grassy sites in the absence of fire (Arguello 2011, pers. comm.) and grazing impacts from wild and domestic herbivory (Fulgham 2011, pers. comm.). While the practice of burning is still culturally important to Native Americans and is used on tribal lands (as well as on some public lands such as Redwood National Park), concerns over safety, liability, and regulatory obstacles have made the use of fire an uncommon practice in maintaining oak woodlands elsewhere in the county.

A scientific study in Redwood National Park estimated that 29% percent of the areas bald hills vegetation (oak woodlands and grasslands) had converted to conifer forest between 1850 and 1983, and that over 50% of the bald hills oak woodland vegetation that remained in 1983 had sufficient Douglas-fir in the understory (greater than 25% cover) to make the conversion of those stands to conifer forest a likely scenario over the next few decades (Sugihara and Reed 1987; Redwood National Park 1992). Observations in the southeastern part of the county suggest that as much as 60-70% of the remaining oak woodland acreage is actively undergoing stand succession and could be lost within a few decades without intervention (Barnwell 2011, pers. comm.; Moore 2011, pers. comm.). Conifer encroachment and stand succession are ongoing trends that need to be addressed if oak woodlands are to persist as a prominent feature of the Humboldt County landscape.

## REGENERATION

Oak regeneration patterns in Humboldt County are not well known or understood. Some landowners have noted that little oak regeneration is occurring on their properties (Pricer 2008, pers. comm.) and it has been reported that very little regeneration is occurring from seed on private land in general (Lee 2008, pers. comm.) [11]. However, the magnitude and extent of the problem is difficult to ascertain—regeneration often increases when canopy openings are created by disturbance (Giusti 2008, pers. comm.) and long periods of time may transpire between such events. Regeneration is not usually considered to be a problem unless seedling and sapling reproduction is insufficient to replace trees lost to mortality, or unless reproduction is insufficient to achieve a desired stand density (Standiford and McCreary 1996). Black oak, canyon live oak, and Oregon white oak are all capable of regenerating from dormant buds in the trunk following disturbance.

In Redwood National Park, Oregon white oak is reported to be regenerating quite well (Arguello 2008, pers. comm.). On the Six Rivers National Forest, white oak is observed in the seedling stage but not commonly in the sapling stage; black oak seedlings and saplings are seldom if ever observed (Hoover 2011, pers. comm.).

[11] "Regeneration" as used here refers to the perpetuation of oak stands through the processes of reproduction and growth. Oak seedlings and young sprouts are more commonly observed in many stands than are saplings and young trees, indicating that survival may be low in the early stages of oak tree development in many Humboldt County stands.

Factors that likely influence oak regeneration in Humboldt County include disturbance patterns, drought cycles, seedbed conditions, animal foraging and grazing, the presence and size of seed disperser populations, and the density of non-native grasses.

## SUDDEN OAK DEATH

Sudden oak death is caused by infection from the pathogen *Phytophthora ramorum*. Of the true oak species occurring in Humboldt County, black oak is most susceptible to mortality from infection. Canyon live oak is known to function as a host for the fungus but does not usually (if ever) die from it. Oregon white oak does not exhibit signs of infection. At this writing, SOD had been found in southern Humboldt County and as far north as Redwood Creek. Yet while the disease is already having a significant impact on tanoak populations in Humboldt County, it is not clear if the disease will cause widespread mortality or stress among on the county's true oaks. SOD is spread by the movement of infected plant material (such as infected rhododendrons) and though the air. Efforts to monitor spread of the disease and where possible to control its spread in Humboldt County are being spearheaded by the University of California Cooperative Extension Program based in Eureka.

## INTRODUCED PLANTS

An assortment of introduced plant species have become naturalized in oak woodlands of Humboldt County. Introduced annual grasses and associated herbaceous species can displace native species and are thought by some to alter oak regeneration patterns. The understory composition of oak woodlands, which was historically characterized by the dominance of native perennial grasses, has changed markedly in many parts of Humboldt County over the last 150 years. Introduced perennial grasses, also common in the oak woodlands of today, function (ecologically) more like native grasses than do introduced annuals. The perennial native bunchgrass California fescue (*Festuca californica*), accompanied by a host of native herbaceous associates, still occurs as a dominant understory species in many stands.

## PUBLIC POLICY

Efforts to enhance or restore oak woodlands in Humboldt County face several policy hurdles. For example, in order to remove conifer trees of commercial species (including Douglas-fir or white fir) from oak woodlands and sell those conifer trees, landowners are required to obtain a timber harvest permit. Current policy within the California Forest Practice Rules (FPR 14 CCR § 912.7, 932.7, 952.7) requires the restocking of conifers after harvest, even if the goal of the harvest is to reduce conifer stocking in oak stands. This requirement may pose a significant obstacle to oak woodlands enhancement and restoration efforts on private lands, especially where landowners seek to recoup project costs through conifer log sales. A change in the California Forest Practices Rules to address this issue may help to facilitate the recovery of oak woodlands in the county. Similarly, those attempting prescribed burning projects to restore or maintain oak woodlands must comply with air quality laws, which introduces costs, risks and uncertainties that are a disincentive for such efforts.

## LAND USE CHANGES

Ranching is the most common land use associated with oak woodlands in Humboldt County. Yet the "highest and best use" of many ranchlands, as determined by market indicators, has in recent years shifted to large lot residential development and/or alternative economic uses. This trend drives the transfer and parcelization of large ownerships encompassing oak woodlands and often leads to increased human influence that can affect the functions and values of oak woodlands. Parcelization patterns associated with oak woodlands in Humboldt County can be inferred from data presented under Current Land Ownership Patterns in Section1.

## HARVESTING OF OAK TREES FOR FUEL WOOD OR TIMBER

Fuel wood harvesting has removed large stands of living oaks at other locations in the state. However, neither fuelwood nor timber harvesting of oak trees appear to be occurring at a scale that poses a significant threat to true oak woodlands in Humboldt County. While direct harvesting of true oak trees is limited, timber harvesting of commercial conifer species in oak woodlands may provide oaks with a competitive advantage and be favorable to the long-term viability of oak stands.

## CLIMATE CHANGE

Changes in temperature, precipitation, season length, wind velocity, seed dispersal and fire regime, all predicted effects of global climate change, have the potential to impact oak woodlands in Humboldt County in the future. Exactly how these changes will be expressed across the Humboldt County landscape, and their combined effect on oak woodlands, remains unclear.

# APPENDIX A: FOR MORE INFORMATION

The following websites contain additional information on California's oak woodlands and the approaches being used to conserve and manage them statewide:

- University of California Oak Woodlands Conservation Workgroup (formerly the Integrated Hardwood Rangeland Management Program): http://ucanr.org/sites/oak_range/.

- California Oaks Foundation: http://www.californiaoaks.org/.

# APPENDIX B: GIS MAP DEVELOPMENT AND META DATA

There is currently no single data layer that accurately captures the location of true oak populations in Humboldt County. The maps in this report were compiled using the LCMMP vegetation data file downloaded from the Fire Resources Assessment Program (FRAP) website: http://frap.cdf.ca.gov/data/frapgisdata/select.asp. The VegType data set within the LCMMP data file represents dominant vegetation by species and is based on remotely sensed image analysis with some ground truthing. Three oak species (Canyon live oak, Oregon white oak, and Black oak) were identified in the tabular query by identifying their codes (QC, QG, and QK, respectively). The VegType data layer identifies the dominant vegetation by species in a particular polygon. The VegType2 data layer identifies the sub-dominant layer (for example, an oak stand inter-mixed with mature conifers). We felt that it was important to select for the dominant and sub-dominant oak populations, in order to identify areas where conifers have encroached into existing oak stands.

Figure 1, Oak Woodlands Distribution, was created by selecting polygons from the Humboldt County-specific LCMMP data file that had VegType or Vegtype2 classifications for QC, QG, or QK. It is important to note that through this method some areas identified as true oak woodland stands in Figures 1 and 2 may in fact be Douglas-fir dominant stands with true oak understories.

Figure 2, Oak Woodlands Ownerships, used the layer resulting from Figure 1 and overlaid it with an ownership layer created from parcel shapefiles collected from Humboldt County Planning Department: http://co.humboldt.ca.us/planning/maps/datainventory/gisdatalist.asp. Parcel shapefiles were consolidated by landowner name, using the [DISSOLVE] function, in order to merge and categorize multiple parcels according to ownership. A separate column identifying ownership type was created to separate lands into public, private, and tribal ownership. The [CLIP] function was used on the preceding VegType data layer to separate oak woodlands by ownership type (Public, Private, and Tribal).

# APPENDIX C: CONSERVATION AND MANAGEMENT INCENTIVE PROGRAMS

There currently exists a wide range of approaches to the conservation and management of oak woodlands in Humboldt County. These approaches reflect the diverse priorities of landowners, both public and private, and the resources available to them.

Ranching is a historic activity that continues, at an extremely low cost to the public, to help maintain a variety of public resource values associated with oak woodlands. Supporting the viability of ranching operations (including certain commercial timber harvesting practices in and around oak woodland stands) and providing positive incentives for restorative management activities are logical strategies in the effort to maintain oak woodlands in the county.

There are many tools and voluntary programs that can support landowners in the conservation and management of oak woodlands. Some of the more notable of these include:

**The Environmental Quality Incentives Program (EQIP)**, administered by the Natural Resource Conservation Service, is a voluntary program that provides financial and technical assistance to agricultural producers through contracts up to a maximum term of ten years in length. These contracts provide financial assistance to help plan and implement conservation practices that address natural resource concerns and for opportunities to improve soil, water, plant, animal, air and related resources on agricultural land and non-industrial private forestland. More information on this program can be found at: http://www.nrcs.usda.gov/programs/eqip/

**The Wildlife Habitat Improvement Program (WHIP**), also administered by the Natural Resource Conservation Service, provides both technical and financial assistance to establish and improve fish and wildlife habitat on agricultural land, non-industrial private forestlands, and tribal lands. National priorities for the program include promoting the restoration of declining or important native wildlife habitats and reducing the impacts of invasive species on wildlife habitats. More information on this program can be found at: http://www.nrcs.usda.gov/programs/whip/

**The Vegetation Management Program (VMP)**, administered by CalFire, is a cost-sharing program that focuses on the use of prescribed fire, and mechanical means, for addressing wildland fire fuel hazards and other resource management issues on State Responsibility Area (SRA) lands. VMP allows private landowners to enter into a contract with CAL FIRE to use prescribed fire to accomplish a combination of fire protection and resource management goals. More information on this program can be found at: http://www.fire.ca.gov/resource_mgt/resource_mgt_vegetation.php

**The California Forest Improvement Program (CFIP) program**, also administered by CalFire, encourages private and public investment in, and improved management of, California forest lands and resources. While the focus is on timber stand improvement, the program scope includes the improvement of all forest resources, including fish and wildlife habitat, soil, and water quality. Cost share assistance is provided to private forest landowners, Resource Conservation Districts, and non-profit watershed groups. Cost-

shared activities include management planning, site preparation, tree purchase and planting, timber stand improvement, fish and wildlife habitat improvement, and land conservation practices for ownerships containing up to 5,000 acres of forest land. More information on this program can be found at:
http://www.fire.ca.gov/resource_mgt/resource_mgt_forestryassistance_cfip.php

**The Forest Legacy Program (FLP),** administered in California by CalFire, uses conservation easements to protect environmentally important forestland threatened with conversion to non-forest uses, such as subdivision for residential or commercial development. The program is comprised of two separate but complimentary programs: the Federal Forest Legacy Program (administered by the United States Forest Service) and the California Forest Legacy Program. The program, which emphasizes the protection of working forests, has been successfully used in combination with other conservation programs to conserve oak woodlands in Humboldt County. More information on this program can be found at:
http://www.fire.ca.gov/resource_mgt/resource_mgt_forestryassistance_legacy.php

**The Oak Woodlands Conservation Program,** administered by the Wildlife Conservation Board, offers landowners, conservation organizations, cities and counties, an opportunity to obtain funding for projects designed to conserve and restore California's oak woodlands. Program functions include the purchase oak woodland conservation easements and providing grants for land improvements, restoration efforts, and education. The program provides cost-sharing incentive payments to private landowners who enter into long-term agreements. Such agreements are structured to include management practices that benefit oak woodlands and promote the economic sustainability of the farming or ranching operation. More information on this program can be found at: http://www.wcb.ca.gov/Oaks/index.html.

**The Habitat Enhancement and Restoration Program**, also administered by the California Wildlife Conservation Board, funds restoration projects and other projects that improve native habitat quality within the State. Eligible projects that are approved and funded must provide for the long-term maintenance of the project once completed, and must receive a recommendation from the Department of Fish and Game. More information on this program can be found at: http://www.wcb.ca.gov/HERP/index.html.

**The Rangeland, Grazing Land and Grassland Protection Program,** administered by the California Wildlife Conservation Board, provides funding for the purchase conservation easements in order to prevent the conversion of rangeland, grazing land and grassland to nonagricultural uses; to protect the long-term sustainability of livestock grazing; and to ensure continued wildlife, water quality, watershed and open-space benefits to the State of California from livestock grazing. More information on this program can be found at:
http://www.wcb.ca.gov/Rangeland/index.html.

**The Private Lands Management Program**, administered by the California Department of Fish and Game, offers landowners economic incentives to manage their lands for the benefit of wildlife. Benefits to the landowner and wildlife resources are increased by allowing the landowner to maintain wildlife resources without an economic loss. Landowners who enroll in this "ranching for wildlife" program consult with biologists to make biologically sound habitat improvements that benefit wildlife, like providing water sources, planting native plants for food, and making brush piles for cover. In return for these habitat improvements,

landowners can charge fees for wildlife viewing, hunting and fishing. More information on this program can be found at: http://www.dfg.ca.gov/wildlife/hunting/plm.html.

**The Partners for Fish and Wildlife Program**, administered by the United States Fish and Wildlife Service, seeks to efficiently achieve voluntary habitat restoration on private lands, through financial and technical assistance, for the benefit of Federal Trust Species. More information on this program can be found at: http://www.fws.gov/partners/.

**The Williamson Act Program**, which is a state program administered locally by the Humboldt County Planning Division, provides property tax benefits to landowners who maintain large parcel sizes and keep agriculture as a primary use of their land[12]. More information on this program can obtained by calling the Humboldt County Planning Division office or by veiwing their Williamson Act program brochure on the world-wide web at: http://co.humboldt.ca.us/planning/brochure/default.asp?pg=agpresv.htm.

**Conservation Easements**, administered by land trusts and/or public agencies, are voluntary legal agreements that landowners make to restrict certain types of development on their land. Landowners who place a conservation easement on their land may receive tax benefits and/or direct payments as compensation for the development rights being relinquished. More information on conservation easements can be obtained by contacting the Northcoast Regional Land Trust, the California Rangeland Trust, or by visiting their respective websites at: http://ncrlt.org/; http://www.rangelandtrust.org/.

[12] The future of the Williamson Act Program in California is uncertain and as of July 27 2011, the County of Humboldt was not accepting new applications for the program.

# APPENDIX D: CONTRIBUTORS

**Lead authors:**

Shayne Green, Planning Consultant/Northcoast Regional Land Trust

Lindsay Magnuson, Executive Director/Northcoast Regional Land Trust

**Mapping and analysis:**

Ryan Wells, Projects Director/Northcoast Regional Land Trust

**Reviewers:**

Eric Almquist, landowner and business owner/Almquist Lumber

Mark Andre, registered professional forester/City of Arcata

Leonel Arguello, botanist/Redwood National Park

Les Barnwell, owner and operator/Chalk Mountain Ranch

Yvonne Everett, natural resources planning professor/Humboldt State University

Ken Fulgham, rangeland resources professor/Humboldt State University

Todd Golder, rangeland specialist/Natural Resource Conservation Service

Paula Golightly, wildlife ecologist/United States Fish and Wildlife Service

Richard Hansis, landowner and retired professor/Humboldt State University

Lisa Hoover, botanist/Six Rivers National Forest

Wes Moore, rangeland manager and operator/Cottrell Ranch

Tim Pricer, owner and operator/Charles Mountain Ranch

Yana Valachovic, registered professional forester/University of California Cooperative Extension

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## PERSONAL COMMUNICATIONS

Arguello, Leonel A. April 14, 2008 and November 1, 2011. Supervisory botanist. Redwood National Park.

Barnwell, Les. March 17, 2011. Owner and operator, Chalk Mountain Ranch.

Fulgham, Ken. October 25, 2011. Professor of rangeland resources, Humboldt State University.

Giusti, Greg. April 2008. University of California Cooperative Extension.

Hoover, Lisa. March 14, 2011. Botanist, Six Rivers National Forest.

Lee, Chris. April 18, 2008. Sudden Oak Death Program Coordinator, University of California Cooperative Extension.

Moore, Wes. February 20, 2011. Rangeland manager and operator, Cottrell Ranch.

Pricer, Tim. March 29, 2008. Owner and operator, Charles Mountain Ranch.