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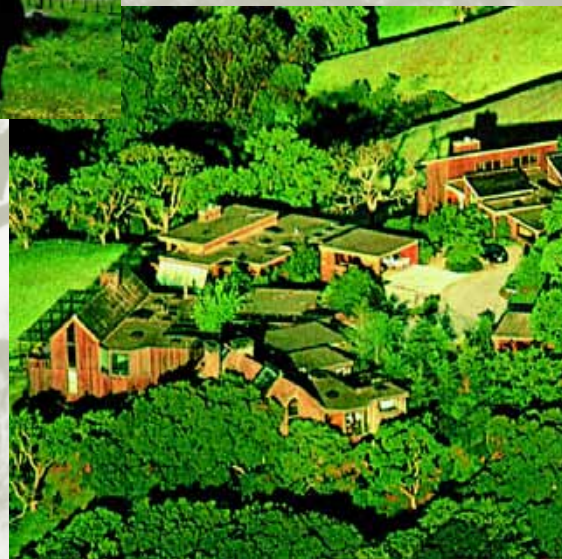
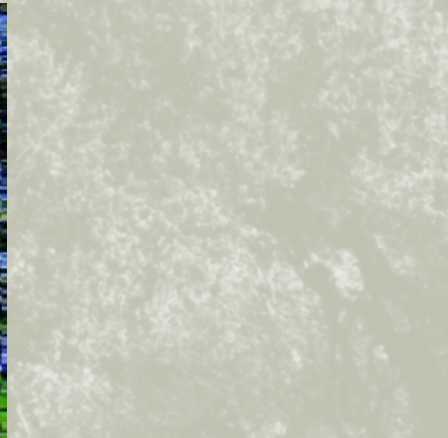
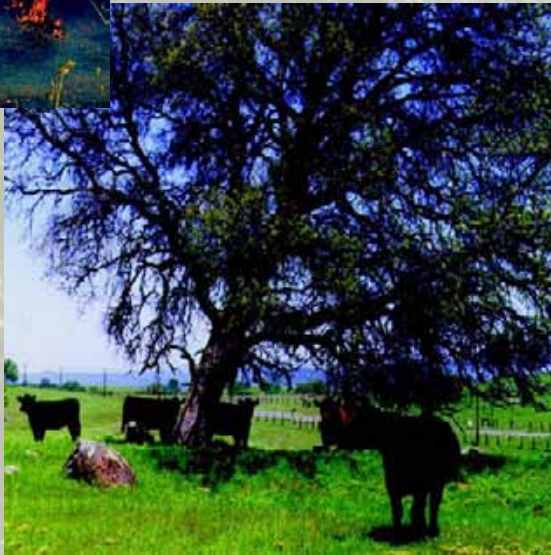
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# Proceedings of a Symposium on Oak Woodlands: Ecology, Management, and Urban Interface Issues

March 19–22, 1996

San Luis Obispo, California



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**Abstract**

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Oak woodlands, the predominant vegetation type in the most inhabitable areas of California, comprise 10 million acres in the State and have been used primarily for livestock production. Today, residential intrusion into oak woodlands results in habitat fragmentation and degradation of economic, esthetic, and ecological values. Decision makers must face up to the population pressures caused by the increasing human population in California and its shift from coastal metropolitan areas into formerly rural areas—especially oak woodlands. Newcomers want roads, schools, housing, shopping centers, and water. How can oak trees compete with these needs and demands?

*Retrieval Terms:* oaks, oak management, range management, regeneration, wildlife, urban interface, restoration, economics, policy

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Norman H. Pillsbury      Jared Verner      William D. Tietje

*Technical Coordinators*

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## Contents

<b>Preface</b> .....	viii
<b>Acknowledgments</b> .....	xii
<b>Plenary Addresses</b> .....	1
California's Oak Woodlands: Where We Have Been, Where We Are, Where We Need to Go .....	3
<i>Jack Ward Thomas</i>	
A California Cattleman's Perspective on the Oak Hardwood Issue .....	11
<i>Richard O'Sullivan</i>	
Resolving Oak Woodland Issues in California .....	17
<i>Terry Barlin Gorton</i>	
The Network Solution .....	21
<i>Tharon O'Dell</i>	
Wake Up, California! .....	27
<i>Janet S. Cobb</i>	
Why the System Does Not Work, and How to Fix It .....	35
<i>Richard A. Wilson</i>	
<b>Plenary Presentations</b> .....	39
Oak Woodland Management in the Bureau of Land Management .....	41
<i>Ed Hastey</i>	
The Role of the California Department of Fish and Game in the Conservation of California's Oak Woodlands .....	43
<i>Terry M. Mansfield</i>	
Management of Oaks Within the Pacific Southwest Region .....	45
<i>G. Lynn Sprague</i>	
Ecosystem-Based Planning on a Watershed Approach .....	49
<i>Charles W. Bell</i>	
CCA History and Policy for Hardwood Range Management .....	51
<i>Kenneth J. Zimmerman</i>	
Hardwood Protection Needs to Come from Leadership, Not Regulation . . . .	53
<i>Richard A. Wilson</i>	
Oak Research Needs .....	55
<i>Enoch F. Bell</i>	

**Pacific Southwest  
Research Station**

USDA Forest Service  
General Technical Report  
PSW-GTR-160

**December 1997**

## Technical Papers

<b>SECTION I: Ecology and Regeneration</b> . . . . .	57
<i>Timothy R. Plumb and Charles L. Bolsinger, Section Coauthors and Consulting Editors</i>	
Section Overview—Progress on the Ecology and Silviculture of California Oaks During the Past 17 Years . . . . .	59
<i>Timothy R. Plumb</i>	
Section Overview—Challenges of Inventorying and Monitoring Oak Woodlands . . . . .	61
<i>Charles L. Bolsinger</i>	
Soil Characteristics of Blue Oak and Coast Live Oak Ecosystems . . . . .	65
<i>Denise E. Downie and Ronald D. Taskey</i>	
The Influence of Epiphytic Lichens on the Nutrient Cycling of a Blue Oak Woodland . . . . .	75
<i>Johannes M. H. Knops, Thomas H. Nash III, and William H. Schlesinger</i>	
Woody Root Biomass of 40- to 90-Year-Old Blue Oaks ( <i>Quercus douglasii</i> ) in Western Sierra Nevada Foothills . . . . .	83
<i>Catherine S. Millikin, Caroline S. Bledsoe, and Jerry Tecklin</i>	
Rooting Responses of Three Oak Species to Low Oxygen Stress . . . . .	91
<i>Karel A. Jacobs, James D. MacDonald, Alison M. Berry, and Laurence R. Costello</i>	
Patterns of Geographic Synchrony in Growth and Reproduction of Oaks Within California and Beyond . . . . .	101
<i>Walter D. Koenig and Johannes M.H. Knops</i>	
Patterns and Processes of Adaptation in Blue Oak Seedlings . . . . .	109
<i>Kevin J. Rice, James H. Richards, and Steven L. Matzner</i>	
Genetic Variation in Shoot Growth, Phenology, and Mineral Accumulation of Northern and Central Sierra Nevada Foothill Populations of Blue Oak . . . . .	117
<i>Joe R. McBride, Edward A. Norberg, James L. Bertenshaw, Susan Kloss, and Ahmad Mossadegh</i>	
Gene Flow Among Populations of Three California Evergreen Oaks . . . . .	127
<i>Richard S. Dodd, Zara A. Rafii, and Nasser Kashani</i>	
Effects of Shade and Clipping on Coast Live and Blue Oak Seedling Mortality and Growth in California Annual Grasslands . . . . .	135
<i>Pamela C. Muick</i>	
Stand-Level Status of Blue Oak Sapling Recruitment and Regeneration . . . . .	147
<i>Tedmund J. Swiecki, Elizabeth A. Bernhardt, and Christiana Drake</i>	
Factors Affecting Blue Oak Sapling Recruitment . . . . .	157
<i>Tedmund J. Swiecki, Elizabeth A. Bernhardt, and Christiana Drake</i>	
Growth of Blue Oak on California's Hardwood Rangelands . . . . .	169
<i>Richard B. Standiford</i>	
Blue Oak Regeneration in Southern Sierra Nevada Foothills . . . . .	177
<i>Ralph L. Phillips, Neil K. McDougald, Richard B. Standiford, Douglas D. McCreary, and William E. Frost</i>	
Understory-Canopy Relationships in Oak Woodlands and Savannas . . . . .	183
<i>William E. Frost, James W. Bartolome, and J. Michael Connor</i>	
Fire History of a Mixed Oak-Pine Forest in the Foothills of the Sierra Nevada, El Dorado County, California . . . . .	191
<i>Scott L. Stephens</i>	
Efficacy of Herbicide Application Methods Used to Control Tanoak ( <i>Lithocarpus densiflorus</i> ) in an Uneven-Aged Coast Redwood Management Context . . . . .	199
<i>Douglas D. Piirto, Brenda Smith, Eric K. Huff, and Scott T. Robinson</i>	

<b>SECTION II: Restoration</b> . . . . .	209
<i>Douglas D. McCreary, Section Chair and Consulting Editor</i>	
Section Overview—Restoration of Oak Woodlands . . . . .	211
<i>Douglas D. McCreary</i>	
Oak Seedling Establishment by Artificial Regeneration on California Rangelands . . . . .	213
<i>Theodore E. Adams, Jr., Peter B. Sands, William H. Weitkamp, and Marion E. Stanley</i>	
Constraints on Germination and Emergence of Emory Oak . . . . .	225
<i>Heather L. Germaine, Guy R. McPherson, Karin J. Rojahn, Alicia M. Nicholas, and Jake F. Weltzin</i>	
An Evaluation of Coast Live Oak Regeneration Techniques . . . . .	231
<i>Timothy R. Plumb and Michael D. De Lasaux</i>	
Effects of Seedling Protectors and Weed Control on Blue Oak Growth and Survival . . . . .	243
<i>Douglas D. McCreary and Jerry Tecklin</i>	
Sunshine Canyon Mitigation Oaks—A Success Story . . . . .	251
<i>Ralph S. Osterling</i>	
Status of Transplanted Coast Live Oaks ( <i>Quercus agrifolia</i> ) in Southern California . . . . .	257
<i>Rosi Dagit and A. James Downer</i>	
Rehabilitation of a Blue Oak Restoration Project . . . . .	267
<i>Jerry Tecklin, J. Michael Connor, and Douglas D. McCreary</i>	
Restoration Management of Northern Oak Woodlands . . . . .	275
<i>Marla S. Hastings, Steve Barnhart, and Joe R. McBride</i>	
A California Black Oak Restoration Project in Yosemite Valley, Yosemite National Park, California. . . . .	281
<i>Susan L. Fritzke</i>	
Evaluation of Techniques and Costs for Valley Oak Riparian Forest Restoration on the Sacramento River . . . . .	289
<i>F. Thomas Griggs and Daryl R. Peterson</i>	
<b>SECTION III: Range and Livestock Relations</b> . . . . .	297
<i>William E. Frost, Section Chair and Consulting Editor</i>	
Section Overview—Range and Livestock Relations . . . . .	299
<i>William E. Frost</i>	
Effects of Cultural Inputs on Survival and Growth of Direct Seeded and Naturally Occurring Valley Oak Seedlings on Hardwood Rangeland . . . . .	301
<i>Elizabeth A. Bernhardt and Tedmund J. Swiecki</i>	
Effects of Livestock Grazing on Blue Oak Saplings . . . . .	313
<i>Henricus C. Jansen, Richard R. Snow, Gregory A. Treber, and Fremont L. Bell</i>	
Effects of Blue Oak Canopy on Annual Forage Production . . . . .	321
<i>J. Michael Connor and Bob L. Willoughby</i>	
The Influence of Cattle Grazing on California Ground Squirrels in a Blue Oak Savanna . . . . .	327
<i>James W. Bartolome</i>	
Preliminary Results from the Evaluation of Different Seasons and Intensities of Grazing on the Erosion of Intermittent Streams at the San Joaquin Experimental Range . . . . .	331
<i>Royce E. Larsen, Melvin R. George, Neil K. McDougald, Kenneth W. Tate, and Kenneth O. Fulgham</i>	

Livestock Grazing and Riparian Habitat Water Quality: An Examination of Oak Woodland Springs in the Sierra Foothills of California . . . . .	339
<i>Chris G. Campbell and Barbara Allen-Diaz</i>	
Influence of Supplemental Feeding Sites on Use of Hardwood Rangeland Riparian Areas by Cattle . . . . .	347
<i>William E. Frost and Neil K. McDougald</i>	
<b>SECTION IV: Wildlife Habitat Relations and Habitat Fragmentation . . .</b>	<b>351</b>
<i>Barrett A. Garrison and Frank W. Davis, Section Coauthors and Consulting Editors</i>	
Section Overview—Wildlife Habitat Relations and Habitat Fragmentation in California's Hardwood Rangelands . . . . .	353
<i>Barrett A. Garrison and Frank W. Davis</i>	
Characteristics of California Spotted Owl Nest Sites in Foothill Riparian and Oak Woodlands of the Southern Sierra Nevada, California . . . . .	355
<i>George N. Steger, Gary E. Eberlein, Thomas E. Munton, and Kenneth D. Johnson</i>	
Characteristics of Red-tailed Hawk Nest Sites in Oak Woodlands of Central California . . . . .	365
<i>William D. Tietje, Peter H. Bloom, and Justin K. Vreeland</i>	
Small Nocturnal Mammals in Oak Woodlands: Some Considerations for Assessing Presence and Abundance . . . . .	373
<i>William F. Laudenslayer, Jr., and Roberta J. Fargo</i>	
Bird Communities in Grazed and Ungrazed Oak-Pine Woodlands at the San Joaquin Experimental Range . . . . .	381
<i>Jared Verner, Kathryn L. Purcell, and Jennifer G. Turner</i>	
Relative Abundance and Habitat Associations of Vertebrates in Oak Woodlands in Coastal-Central California . . . . .	391
<i>William D. Tietje, Justin K. Vreeland, Nancy R. Siepel, and JoAnn L. Dockter</i>	
Developing a Conservation Strategy for Southern California Forests and Woodlands . . . . .	401
<i>John R. Stephenson, Devere A. Volgarino, Greg A. Nichols, and Thomas C. White</i>	
A Post-Hoc Assessment of the Impacts to Wildlife Habitat from Wood Cutting in Blue Oak Woodlands in the Northern Sacramento Valley . . .	411
<i>Barrett A. Garrison and Richard B. Standiford</i>	
Contribution of Downed Woody Material by Blue, Valley, and Coast Live Oaks in Central California . . . . .	423
<i>William D. Tietje, Tristan C. Berlund, Sergio L. Garcia, Christopher G. Halpin, and Wayne A. Jensen</i>	
Design Recommendations for Point Counts of Birds in California Oak-Pine Woodlands: Power, Sample Size, and Count Stations Versus Visits . . . .	431
<i>Paul A. Aigner, William M. Block, and Michael L. Morrison</i>	
<b>SECTION V: Wood Products and Utilization . . . . .</b>	<b>441</b>
<i>John R. Shelly, Section Chair and Consulting Editor</i>	
Section Overview—Wood Utilization . . . . .	443
<i>John R. Shelly</i>	
An Examination of the Oak Woodland as a Potential Resource for Higher-Value Wood Products . . . . .	445
<i>John R. Shelly</i>	

California Black Oak—From Firewood to Lumber, the Lumber  
Recovery Story . . . . . 457  
*Eni C. Lowell and Marlin E. Plank*

Tree Volume Equations for 10 Urban Species in California . . . . . 465  
*Norman H. Pillsbury and Jeffrey L. Reimer*

A Literature Review of California Domestic Cork Production . . . . . 479  
*William H. Brooks*

**SECTION VI: Urban Forestry Interface Issues** . . . . . 485  
*Rowan A. Rowntree, Section Chair and Consulting Editor*

Section Overview—California Oaks in the Urbanizing Forest Ecosystem. . . . . 487  
*Rowan A. Rowntree*

Using Population Distribution Forecasts and GIS Technology to  
Assess Potential Hardwood Loss in the Northern Sacramento Valley . . . . . 491  
*Charles W. Nelson and Mark Radabaugh*

A Development in Harmony with Nature? . . . . . 499  
*James R. Vilkitis*

Monitoring Survival and Vigor of Specimen Valley Oaks Influenced  
by Urban Development Sites . . . . . 515  
*Douglas V. Nickles*

Managing Development in California's Oak Woodlands . . . . . 521  
*Bruce W. Hagen*

Improved Methods to Evaluate the Impact of Subdivisions on  
Wildlife in Oak-Dominated Woodlands in California . . . . . 527  
*Dale Sanders and Michael Baefsky*

**SECTION VII: Damaging Agents and Protection** . . . . . 539  
*Tedmund J. Swiecki, Section Chair and Consulting Editor*

Section Overview—Damaging Agents and Oak Ecology:  
Management Implications . . . . . 541  
*Tedmund J. Swiecki*

The California Oak Disease and Arthropod (CODA) Database . . . . . 543  
*Tedmund J. Swiecki, Elizabeth A. Bernhardt, and Richard A. Arnold*

The Effect of Low Oxygen Stress on *Phytophthora cinnamomi* Infection  
and Disease of Cork Oak Roots . . . . . 553  
*Karel A. Jacobs, James D. MacDonald, Alison M. Berry, and  
Laurence R. Costello*

Wildfire and Oak Regeneration at the Urban Fringe. . . . . 559  
*Joan L. Schwan, Herb Fong, and Hilary K. Hug*

**SECTION VIII: Economics, Policy, and Planning** . . . . . 565  
*Richard P. Thompson, Section Chair and Consulting Editor*

Section Overview—Economics, Policy, and Planning . . . . . 567  
*Richard P. Thompson*

The Integrated Hardwood Range Management Program: Education  
and Research as a Conservation Strategy . . . . . 569  
*Richard B. Standiford and James W. Bartolome*

An Ecosystem-Based Approach to Valley Oak Mitigation. . . . . 583  
*Marcus S. Rawlings and Daniel A. Airola*

Factors Contributing to Land-Use Change in the Hardwood Rangelands  
of Two Central Sierra Nevadan Counties. . . . . 593  
*Sharon G. Johnson*

Management of California Oak Woodlands: Uncertainties and Modeling . . . .	603
<i>Jay E. Noel and Richard P. Thompson</i>	
Estimating Value Contribution of Tree and Stand Condition . . . . .	613
<i>R. Joss Hanna, Richard P. Thompson, Douglas D. Piirto, and Jay E. Noel</i>	
<b>Poster Papers . . . . .</b>	<b>623</b>
<i>John M. Bryant, Technical Chair</i>	
Overview—A Bird's-Eye View of the Poster Papers . . . . .	625
<i>John M. Bryant</i>	
California's Oak Woodlands Revisited: Changes in Owners, Use, and Management, 1985 to 1992 . . . . .	626
<i>Lynn Huntsinger</i>	
Profile of the California Hardwood Industry . . . . .	631
<i>John R. Shelly</i>	
The Utilization of Nontimber Forest Resources to Create Special Forest Products . . . . .	636
<i>Dorothy Mockus Lubin</i>	
Mortality and Growth Rates of Seedlings and Saplings of <i>Quercus agrifolia</i> and <i>Quercus engelmannii</i> : 1990-1995 . . . . .	642
<i>Dawn M. Lawson, Paul H. Zedler, and Leslie A. Seiger</i>	
Monitoring Fire Injury in Canyon Live Oak with Electrical Resistance . . . . .	646
<i>Marcia G. Narog, Timothy E. Paysen, Bonni M. Corcoran, and Miguel A. Zavala</i>	
Seeds That Fly on Feathered Wings: Acorn Dispersal by Steller's Jays . . . . .	648
<i>Marilyn A. Fuchs, Pam G. Krannitz, Alton S. Harestad, and Fred L. Bunnell</i>	
Competitive Effects of Alfalfa on Survival, Growth, and Water Relations of <i>Quercus lobata</i> Seedlings . . . . .	651
<i>Jean G. Hubbell</i>	
The Effects of Native Soils on Engelmann Oak Seedling Growth . . . . .	657
<i>Thomas A. Scott and Nanette L. Pratini</i>	
Conservation Reserve Program (CRP) Oak Regeneration Study . . . . .	661
<i>William H. Weitkamp, Sally L. Yoshida, and William D. Tietje</i>	
<i>Quercus wislizenii</i> Growth Rings . . . . .	664
<i>Scott D. White</i>	
Pruning Oak Resprouts to Enhance Growth . . . . .	667
<i>Sheila J. Barry, Ronald S. Knight, and Douglas D. McCreary</i>	
Assessment of a Prescribed Burning Project: 1987-1995 . . . . .	671
<i>Neil K. McDougald and William E. Frost</i>	
Acorn Collection, Storage, Sorting, and Planting for the Establishment of Native Oaks Without Supplemental Irrigation . . . . .	678
<i>Ronald W. Motz</i>	
The Diet of California Spotted Owls in Riparian Deciduous and Oak Habitats of the Southern Sierra Nevada . . . . .	683
<i>Thomas E. Munton, Kenneth D. Johnson, George N. Steger, and Gary E. Eberlein</i>	
<b>Poster Abstracts . . . . .</b>	<b>689</b>
<i>John M. Bryant, Technical Chair</i>	
Overview—A Bird's-Eye View of the Poster Abstracts . . . . .	691
<i>John M. Bryant</i>	

Oak Woodlands and Prescribed Burning—An American Indian Perspective . . . . . 692  
*Linda Moon Stumpff*

Effect of Forest Soil Inoculum on Mycorrhizal Root Development and Growth of Valley Oak Seedlings . . . . . 692  
*Jennifer Berman and Caroline Bledsoe*

Soil Water Potentials Provide Evidence of Hydraulic Lift and Oak Root Activity in a California Blue Oak Woodland . . . . . 693  
*Caroline S. Bledsoe and Catherine S. Millikin*

Effects of Tree Shelters on Growth Rates of Directly Seeded California Oaks . . . . . 693  
*Herb Fong, Robin Bayer, and Joan L. Schwan*

Comparisons of Water Stress and Stomatal Conductance in Different Size Classes of *Quercus douglasii* from Different Sites . . . . . 694  
*Steven L. Matzner, Kevin J. Rice, and James H. Richards*

Population Structure and Clonal Variation in *Quercus chrysolepis* Liebm. . . . . 694  
*Arlee M. Montalvo, Susan G. Conard, M. Thompson Conkle, and Paul Hodgskiss*

Practical Methods of Regenerating Oaks on a Cattle Ranch . . . . . 695  
*George R. Work*

A Model Nonpoint Source Management Plan for Hardwood Rangeland . . . . . 696  
*J. M. Connor and Melissa Joyce*

Restoration of California Walnut Woodlands at the Urban-Wildland Interface in Southern California . . . . . 697  
*Steve Narwath, Ronald D. Quinn, James Roberts, and Gabor Bihari*

Pacific Gas and Electric Company's Vegetation Management Program . . . . . 698  
*Heidi Lian*

Conserve Oak Woodlands . . . . . 698  
*M. Christine Lomas, Norman H. Pillsbury, and Amy Larson*

The Effect of Sociological Factors, Attitudes, and Beliefs on Private Oak Woodland Management . . . . . 699  
*Barbara S. Kruger and Richard P. Thompson*

**Symposium Wrap-Up** . . . . . 701

    The New California . . . . . 703  
        *Daniel R. Walters*

**Author Index** . . . . . 711

**Index** . . . . . 717

## Preface

These proceedings concern California's 10 million acres of oak woodlands—the predominant vegetation type in the most inhabitable areas of the most populous and fastest-growing state in the nation. Oak woodlands encircle the Central Valley and extend southward along the coast to our border with Mexico. They occur in 54 of California's 58 counties, and 22 counties include at least 100,000 acres of oak woodlands. Since European settlement, the oak woodlands have been managed primarily for livestock production. Currently, about 80 percent are privately owned, and their primary use remains livestock production. But this enterprise is being threatened because greatly increased value has been placed on the woodlands within the past 20 years for esthetics, wildlife habitat, watershed functioning, maintenance of water quality, erosion and sediment control, outdoor recreation, and production of wood and specialty products.

During the first three quarters of this century, the primary change in extent and composition of oak woodlands was a result of conversion to rangeland and agricultural production. More than one million acres were thinned or cleared of oaks to enhance areas for grass production for livestock or to increase water yield. These practices may have been misguided. In the mid-1980's, residential development, which may fragment formerly contiguous woodlands, replaced rangeland conversion as the primary cause for loss of oak woodlands. Recent concern in coastal California has focused people's attention on the conversion of oak woodlands to vineyards. During the past several years, increased demand for wine grapes has driven up their value, resulting in unprecedented vineyard development. Demands on the oak-covered valleys and foothills are expected to continue—even to accelerate—as a result of demographic pressure and the social and economic needs of more than 30 million Californians. Population and economic expansion will continue to fuel concern for the well-being of the woodlands.

This is the fourth in a series of statewide symposia to focus attention on oak woodlands. The first was held at Claremont, California, in 1979. Each symposium has attempted to synthesize the state of our knowledge at the time. The second symposium, convened in San Luis Obispo in 1986, focused on issues of oak regeneration and the potential effects of land use on the oak resource. That symposium served as a springboard for the newly formed University of California's Integrated Hardwood Range Management Program (IHRMP), charged with the mission of maintaining California's oak woodlands through applied research and public outreach and education. The third symposium, held in Davis in 1990, provided the latest knowledge on the inventory, ecology, uses, and management of oak woodlands. The potential effects of habitat fragmentation and the role of local policy and planning efforts in maintaining oak woodlands were new research and education directions emphasized at that symposium. Building on the past three symposia and continued development of research information and education programs, this—the 1996 symposium—hosted nearly twice the attendance as the first symposium and was held once again on the campus of California Polytechnic State University in San Luis Obispo.

Since the first symposium, we have made great advances in our understanding of the functioning of the woodland ecosystems and in developing sound management strategies for woodland owners and managers. But this important work is not done. California added 6 million people to its population during the 1980's. Further increases of 6 million per decade are projected well into the next century. Accompanying this phenomenal growth has been a substantial movement of the state's population from large metropolitan centers to formerly rural areas. As a result, challenges at the urban-wildland interface

have been accelerating for years; these promise to be among the toughest issues that we must address in our future management of the woodlands.

Statewide, many groups and agencies are seeking solutions to the issues associated with oak woodlands. They face the challenge of maintaining the ecological values of the woodlands while maintaining the livelihood of the present owners and a way of life for California's residents. Several partnerships have developed in this process. The **Integrated Hardwood Range Management Program (IHRMP)** has worked directly with the California Department of Forestry and Fire Protection and the California Department of Fish and Game on research and education programs. Research funded by this partnership has produced more than 150 technical papers and 50 extension education leaflets. **California Polytechnic State University, San Luis Obispo**, has a long and productive history of work on oak woodlands, especially on oak distribution, growth, and yield. Its Natural Resources Management Department teaches the only course devoted to the ecology and management of oak woodlands in the western United States. **Humboldt State University (Arcata, Calif.)** has given attention to wildlife issues in oak woodlands and, recently, **Chico State University (Chico, Calif.)** began a geographic information systems (GIS) program on detecting change in oak woodlands. The **California Oak Foundation** assists people working to improve oak conservation policies; enables youth to become responsible stewards of California's oak woodlands; and has reported on financial burdens, such as estate taxes, that landowners and their heirs face in keeping rural land in the family through the generations. The **USDA Forest Service's Pacific Southwest Research Station (PSW)** has increased its emphasis on research into ecological relations in oak woodlands. Recently, the **Station's Forest Fire Laboratory in Riverside, California**, began a program to address the effects of wildfire and prescribed burning in oak woodland. All of these organizations have worked in partnership to produce workshops, symposia, meetings, and one-on-one contacts to increase the awareness of oak woodland values among landowners, land managers, and city and county planners. Continued attempts are needed to develop other partnerships that seek amicable solutions to issues arising over oak woodlands.

This symposium attempted through the plenary presentations to educate the public about the diverse views on oak woodlands that are represented by different groups and management agencies. Themes of the plenary papers emphasized the need for (1) developing partnerships to address common goals, rather than creating obstacles that lead to divisive viewpoints, (2) financial relief for woodland owners to protect their way of life and the public's interest, in return for assurances of long-term land use and stewardship, and (3) better science and education to demonstrate to the public the multiple values of the State's oak woodlands.

Technical sessions provided a forum for researchers, land managers, and land-use planners to share their latest research about oak woodland ecosystems in California. The technical papers, all critiqued by peers, are presented here in eight topical sections. In addition, 15 poster presentations are presented as summary papers and 11 others are presented in abstract form.

**Section I—Ecology and Regeneration.** The 17 technical papers in this section deal with the role of oaks and associated plant species in nutrient cycling and factors that affect regeneration, including soil characteristics, shade, and herbivores. Several new lines of research are included.

**Section II—Restoration.** This section emphasizes efforts to restore stands of oaks in areas from which they have been eliminated. It is clear that restoration

has gone beyond research and experimentation to direct implementation. Information is included on restoration of Engelmann, blue, valley, black, and Oregon white oaks.

**Section III—Range and Livestock Relations.** Seven papers discuss the influence of livestock grazing on ground squirrels, water quality in oak woodland riparian habitats, and the effects of season and intensity of grazing on erosion in intermittent streams.

**Section IV—Wildlife Habitat Relations and Habitat Fragmentation.** Presenters of nine papers report results of studies on the ecology and management of oak woodland amphibians, reptiles, birds, and mammals. Some papers show that we are now entering a phase of controlled experiments on the effects of management practices on wildlife in the oak woodlands. Habitat fragmentation is a new and emerging research area in the oak woodlands, an area that will be markedly enhanced by advances in geographic information systems (GIS) and spatial statistics.

**Section V—Wood Products and Utilization.** Four papers focus attention on the many uses of oak wood and oak woodlands: firewood, lumber, and specialty forest products, including cork from the introduced cork oak. Papers do not advocate the harvesting of large numbers of trees from the oak woodlands nor the need to investigate all woody materials as potential sources for wood products. The ultimate goal is to encourage sustainable use of the oak woodlands.

**Section VI—Urban Forestry Interface Issues.** Five papers provide information on the effects of development on oak trees and oak woodlands and highlight the need for long-term monitoring to evaluate the success of mitigation efforts. Several spatial scales of planning are needed to preserve oaks and associated habitats at the urban-wildland interface.

**Section VII—Damaging Agents and Protection.** Three technical papers provide information on wildfire, oak tree infection and disease, and the California Oak Disease and Arthropod (CODA) database. Since the last symposium, research has not emphasized the role of damaging agents, diseases, and insects on oaks, although this should not be interpreted as a lack of importance of these agents. Diseases are a major source of natural mortality among mature oaks. Insects, important as damaging agents, constitute the largest component of biological diversity in oak woodlands.

**Section VIII—Economics, Policy, and Planning.** Five papers represent the diversity of planning, legislation, and value approaches to managing oak woodlands. One important message that emerged: through research and education, we can help our elected officials conserve oak woodlands. Work is under way to provide policy makers a tool to understand the effectiveness of policy decisions on the economic forces that are affecting oak woodlands.

Information presented at this symposium indicates that concerns about the status of oak woodlands and solutions to the challenges are not static. Instead, they have been and will continue to be driven by California's demographic, economic, social, and political events, and by our understanding of the ecology of oak woodland ecosystems. We are presently less concerned about regeneration of blue oaks than we were in 1979, at the first oak symposium. We have developed regeneration techniques to apply where human intervention is needed. We also have realized that the apparently low level of regeneration by blue oaks in some areas may be in accord with nature's strategy to maintain this species. The same cannot be said about the state of valley oak regeneration, however. We now know much about what constitutes good habitat for wildlife species that use oak woodlands, but we know less about where and how much of that habitat is needed to sustain the ecological system and maintain its full spectrum of biological diversity. We are more concerned today about residential intrusion

into oak woodlands and associated habitat fragmentation, and the degradation of economic, esthetic, and ecological values. The recent increase in conversion of oak rangelands to vineyards, driven by the increasing value of wine grapes, brings new challenges for the maintenance of wildlife populations, soil stability, riparian integrity, and watershed functioning. This shift in the use of oak woodlands again calls for developing new partnerships, information, and applications for minimizing and mitigating environmental degradation.

What does the future hold for California's oak woodlands? To paraphrase the views of Dan Walters, who presented the closing address for the symposium: The great story of California today is the explosion of the state's population, accompanied by the shift of population from coastal metropolitan areas into formerly rural areas—especially oak woodlands. Newcomers want roads, schools, housing, shopping centers, and water. Ironically, the impetus for this movement is to escape the crush of metropolitan life, but the newcomers then want to reestablish in their new surroundings the selfsame conditions they sought to escape. How can oak trees compete with these needs and demands? And will decision makers ever face up to the population pressures that created the threats to California's ancient oaks in the first place?

One fact seems abundantly clear to us. The economic, social, political, and natural resource issues addressed in this symposium, and the three that preceded it, will not disappear soon. We are making progress, but much remains to be done.

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*Jared Verner*

*William D. Tietje*

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### *Student Symposium Team*

Students from the Forestry and Natural Resources Leadership class (Norman H. Pillsbury, instructor) and the Recreation Administrative Events Planning and Management class (Carolyn B. Shank, instructor) at Cal Poly served as on-campus organizers and liaisons for the transportation, dining, advertisement, facilities, multi-media, agenda publications, session chair correspondents, student volunteer organizers, and a myriad of responsibilities associated with the production of a symposium of this magnitude. We thank these dedicated students for their hundreds of hours of class and volunteer time.

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Eleven scientists were responsible for technical review and editing of the papers presented at the Symposium (and subsequently published in these proceedings) and for following up with authors. These Consulting Editors moderated the sessions at the Symposium.

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