

A Resurvey of Oak Woodland Landowners: 1985, 1992, and 2004¹

Lynn Huntsinger,² Martin Johnson,² Monica Stafford,² and Jeremy Fried³

Abstract

Results of a 1985 survey of California hardwood rangeland landowners were used to develop a multi-agency research and extension program, known as the Integrated Hardwood Range Management Program. In 1992 and in 2004, owners of the same properties were re-surveyed, regardless of whether or not the properties had changed ownership. Some highlights of the results are reported here. Although the survey cannot prove the program is the sole or direct agent of change, program-sponsored education and research aimed at encouraging oak rangeland owners to change oak management practices is reflected in changes in key landowner behaviors. Owners were less likely to value oaks for fuelwood, and less likely to cut oaks down. In addition, there was a significant increase in landowners planting oaks. Consultation with Cooperative Extension advisors and specialists about oaks continued to increase. Other changes also reflect the changing times: landowners reported that land trusts were as often consulted about oaks as Cooperative Extension advisors and specialists. About 6.5 percent of them had a conservation easement on their property, and the number of oak woodland landowners engaged in production of crops or livestock continues to decline. On the other hand, the number of landowners, including ranchers, who say they live in the oak woodland to be near natural beauty, for recreation, and to have a different lifestyle, is increasing.

Keywords: Easements, extension, grazing, land use, management, values.

Introduction

A 1985 statewide survey of the goals, characteristics, and management practices of California hardwood rangeland landowners was instrumental in developing the research and extension components of the multi-agency “Integrated Hardwood Range Management Program” (IHRMP) (Huntsinger and Fortmann 1990; Huntsinger and others 1997). As coordinated among the University of California Cooperative Extension, the California Department of Forestry and Fire Protection, the California Department of Fish and Game, and other agencies, program goals at the outset included reducing the loss of oaks in the state and researching ways to encourage appropriate management of the woodlands by landowners. The vast majority of California's hardwood rangelands are privately owned. In order to develop effective research programs and education materials, it was necessary to discern who the owners of hardwood rangelands were, what their goals were, and to what kinds of outreach approaches they would be most receptive. In 1992, and again in 2004, the owners of the same random selection of properties from 1985 were re-surveyed,

¹ An abbreviated version of this paper was presented at the Sixth California Oak Symposium: Today's Challenges, Tomorrow's Opportunities, October 9-12, 2006, Rohnert Park, California.

² Professor and Graduate Student Researchers, Environmental Science, Policy, and Management, University of California, Berkeley, 94720.

³ Research Forester, Forest Inventory and Analysis Program, USDA Forest Service Pacific Northwest Research Station, Portland, OR.

regardless of changes in ownership or land use. This paper highlights some results of a comparison of the results of the third survey to those of the first, comparing responses in 1985 to those in 2004.

Previous surveys identified groups of landowners with quite different interests and characteristics, indicated that ownership of the woodlands was fairly fluid, and showed fragmenting of parcels by subdivision to be a growing problem in the woodlands (Fortmann and Huntsinger 1989, Huntsinger and others 1997; Huntsinger and Fortmann 1990). In the first survey, owners of large and small properties were compared, and two hardwood rangeland landowner archetypes were described, each owning at least a third of the woodlands (*table 1*) (Huntsinger and Fortmann 1990). These archetypes were used to develop education packages targeted to landowners statewide. Re-surveys allow a rare opportunity to examine trends in land ownership, land uses, and management practices since 1985, and to obtain insight into the effectiveness of the IHRMP. The objectives of the 2004 survey were to:

1. Contribute to the further development of the Integrated Hardwood Range Management Program's education and research activities, and provide information for legislators.
2. Examine changes in demographic characteristics, attitudes, management practices, land use, and use of outreach services, of hardwood rangeland landowners in 2004 in order to update the IHRMP clientele profile.

Here we present selected results of relevance to the development of IHRMP programs.

Table 1—*The hardwood rangeland archetypes identified as characterizing respondents in the 1985 and 1992 surveys.*

Owner of Small Property	Owner of Large Property
doesn't sell products from land	sells products, most often livestock
more often absentee	resident owner
more recent arrival	long term owner
relatively amenable to oak use regulation	anti-regulation
less than half cut living oaks	most cut living oaks
growing in numbers	relatively stable in numbers

Methods

To allow comparison, the 2004 survey was designed to have many questions in common with the previous survey, though questions about conservation easements and land trusts were added because of their high visibility in oak woodland conservation. Surveys were pre-tested with selected landowners not part of the study sample, and then private owners of hardwood rangeland throughout the state were surveyed by mail, using the standard four-wave technique described by Dillman (1978) to achieve a high response rate. The greater the response rate, the less “self-selection” bias influences responses and hence the more representative the sample.

Questionnaires were sent to the owners of land containing the Forest Inventory Assessment plots previously used to assess hardwood volume in California (Bolsinger 1988). The plots were established at the intersection points of a randomly

established 11-square-kilometer grid overlaid on the state. Plots designated as “Hardwood Woodland Type,” (U.S. Department of Agriculture, Forest Service 1981) were selected for this study if there was an overstory of 10 percent or greater canopy cover of *Quercus spp.*, and the plot was on private land. By definition, these lands do not show evidence of ever having had 10 percent or more cover of trees of industrial roundwood species. Plots with these characteristics occurred in 38 of the state's 58 counties, at elevations ranging from 80 to 1,800 m.

Questionnaires were returned by 126 of 166 eligible respondents for a response rate of 76 percent in 1985, 121 of 151 eligible respondents for a response rate of 80 percent in 1992, and 98 of 185 eligible respondents in 2004-2005 for a response rate of 69 percent. These are, the “n” values, with some slight variations, for each year. We believe that our declining sample size is due to the fragmentation of the woodlands, as well as transfer of ownerships that we were unable to track. When properties were divided up and sold, we were not able to discern which of many new smaller properties held the plot. About 30 percent of non-respondents were corporate, compared to 21 percent of respondents, and 11 percent of non-respondents were trusts, compared to 8 percent of respondents. Despite losses from the sample, due to the subdivision of properties that made locating new owners often impossible, 272,624 ha were owned by our respondents, more than 10 percent of California's total hardwood rangelands (CDF-FRRAP 2003). In 2004, every effort was made to locate and survey new owners of properties in the sample. The 2004 respondents include those who purchased, inherited, or took over management of a family property since 1985, and some who did not respond to previous surveys, as well as those maintaining ownership of the property since 1985. Of the 48 non-respondents in 2004, eight were limited holding companies or corporations, four were trusts, and two were land investment companies.

The grid method used to establish Forest Inventory Plots means that larger properties have a greater probability of being selected for the sample (Wensel 1983). While this resulted in a sample with good representation of landowners of each property size, it means that responses about land use practices cannot be directly extrapolated to the hardwood rangeland as a whole. Analysis weighting the sample inversely to the size of property can be used to extrapolate findings to a statewide spatial proportion of the hardwood rangelands meeting our selection criteria (Huntsinger and others 1997). Another consideration is that while a landowner may report that they “cut oaks,” we do not know how many hectares or oaks the landowner cut. What we do know is that a landowner of a certain number of hectares engages in the practice of cutting oaks. The sampling frame and methodology were consistent for all three surveys, facilitating evaluation of changes in landowner characteristics, values, and practices over time. The Chi-square statistic was used to determine significance for categorical variables, with all results of $p < 0.10$ reported as significant, while a t-test was used to compare grouped continuous variables, again using $p < 0.10$ as the cutoff for significance (Spicer 1972). Unless otherwise stated, statistical comparisons are between the 1985 and 2004 samples.

Landowners were asked about their demographic characteristics, attitudes, land tenure, land use, and management practices. Questions are condensed in the tables presenting results. Here we highlight results of most relevance to the IHRMP.

Results

Overall, landowners still fall into the archetypes described as a result of the 1985 study (Huntsinger and Fortmann 1990; *table 1*). Relationships between property size and landowner goals, attitudes, and practices remain consistent with those of the results of the 1985 survey (Huntsinger and Fortmann 1990). There has been no significant change in landowner demographic characteristics, such as residence on property, age, education, income, absentee ownership, or length of ownership since 1985. Owner age averages late 50s to early 60s. More than half are college graduates, more than half have had the land in the family for more than 20 years, and less than a quarter are absentee owners. However, since 1985 changes have been made in land status, owner characteristics, management, and attitudes about oaks.

Declining Livestock Production

Significant changes have occurred in sources of income and production activities since 1985 (*fig. 1*). Significantly fewer owners are earning their income from ranching or farming ($p < 0.08$).

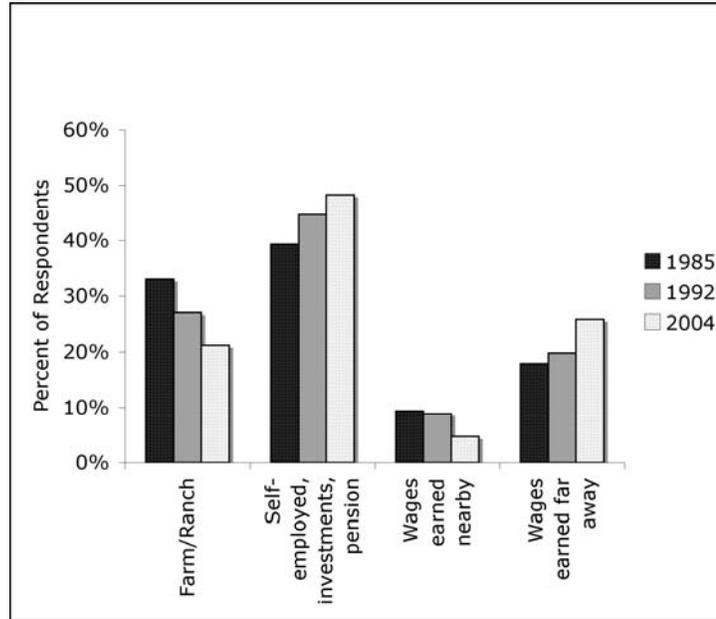


Figure 1—Respondent major source of income, 1985, 1992, and 2004.

Since 1985, the proportion of owners reporting livestock grazing on their property has declined from 73 percent to 62 percent ($p < 0.08$), though this decline has apparently leveled off since 1992. The proportion of landowners reporting that they sell livestock has dropped from 61 percent in 1985, to 55 percent in 1992, and finally to 41 percent in 2004 ($p < 0.00$). A similar decline took place in reported membership in livestock associations or the farm bureau, from 58 to 41 percent since 1985 ($p < 0.06$).

Using the weighted sample, about 42 percent of oak woodlands are owned by those who raise livestock for sale, while another 10 percent of the woodlands are owned by those who produce livestock for their own and guest use only. The

remaining 10 percent of the grazed woodlands are owned by landowners that lease out their land to ranchers. The mean property size of those with grazing on their properties has increased from 30 ha in 1985 to 67 ha in 2004 ($p < 0.03$, t-test). Looking at the larger properties alone, more than 80 percent of woodland parcels larger than 80 ha are grazed by livestock, a proportion that has not significantly changed since 1985. Interestingly, the proportion of landowners using their land for hunting and fishing has also declined significantly ($p < 0.02$) from 1985 to 2004 – from 66 percent to 48 percent, respectively.

Oak Woodland Ranchers

Because they own so many of the larger properties, livestock producers are of special interest to those concerned with landscape-scale conservation. After isolating livestock producers from the rest of the sample, only about one-fourth of oak woodland ranchers reported that the majority of household income came from ranching, down from 40 percent in 1985 ($p < 0.04$), while 10 percent reported farming as their major source of income. About 22 percent cited off-ranch wages as their major income source, and another 38 percent earned most of their income from other forms of self-employment, including investments, pensions, and so forth.

The vast majority of ranchers produce cattle only. Less than one-fifth of oak woodland landowners grazed goats, sheep, or llamas, and most of those also grazed cattle. Most stockers were reported by ranchers that also have a cow-calf herd, with less than one-tenth of oak woodland cattle producers raising stockers alone in 2004.

The motives ranchers gave for choosing to live in the oak woodland changed dramatically and significantly from those given in 1985, with recreation, natural beauty, getting away from the city, and having a different lifestyle becoming significantly more important to ranchers as reasons to live in the oak woodlands (*fig. 2*; $p < 0.06$). The number saying that a family business or property influenced their choice did not change significantly. Though only asked about in the most recent survey, 59 percent of ranchers stated that hunting and fishing influenced them, and 82 percent said that opportunities to view wildlife influenced their decision to live in the oak woodlands. These patterns are common among non-ranching oak woodland owners as well.

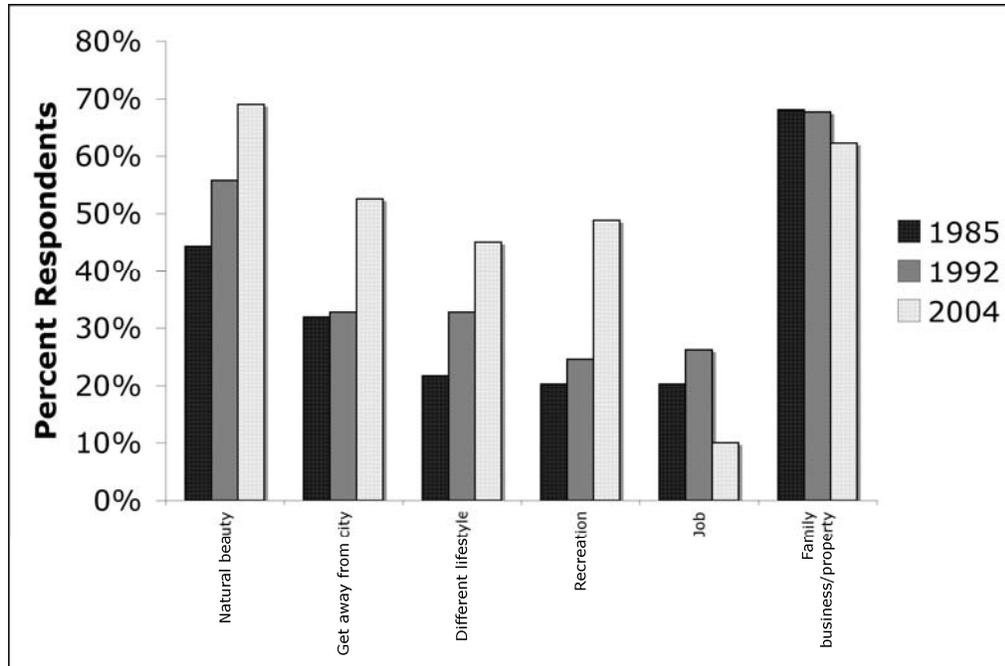


Figure 2—Factors that strongly influenced the oak woodland rancher's choice to live in the oak woodlands, 1985, 1992, 2004 (N=173).

Oak Management

The majority of landowners have reported valuing oaks for property values, shade, erosion control, wildlife habitat, natural beauty, and browse throughout the years of the survey. There has been a significant increase in the number of landowners stating that they value oaks for conserving water, from 46 to 62 percent ($p < 0.05$), and a decline in the number who value oaks for fuelwood – from 63 to 37 percent ($p < 0.00$). Changes in values are apparently reflected in changes in behavior. There has been a strong and significant reduction in cutting living oaks for any purpose – from 83 to 61 percent ($p < 0.00$) – while the proportion of landowners reporting that they thin oaks has remained unchanged at about a third. The number of owners engaged in the sale of firewood, whether standing or down, declined by half, to 9 percent ($p < 0.03$), and those cutting oaks for home firewood has declined from 41 to 16 percent ($p < 0.00$). The percentage of landowners cutting oaks to increase forage production, 24 percent, remains significantly lower than in 1985 when it was 39 percent ($p < 0.01$), but has not changed since 1992.

About one-fourth of owners in 2004 reported an inadequate number new oaks coming up to replace the old oaks – 56 percent said there were enough new oaks, and 18 percent reported that they did not know. This question was not asked in previous surveys. The landowner's perception of the abundance and reproduction of oaks is related to whether or not they cut oaks. Landowners who believe there is adequate oak replacement, or have oak canopy cover greater than 50 percent on their property are significantly more likely to cut oaks ($p < 0.01$; *table 2*). Those who have less than 50 percent canopy cover believe oaks are being lost and agree oak harvest should be regulated, are less likely to cut oaks ($p < 0.01$; *table 2*). Cutting oaks to increase forage is also significantly related to perceptions of oak replacement and the belief that oak use should be regulated ($p < 0.01$; *table 2*).

Table 2—Oak cutting and perceptions of woodland condition, 2004.

If the landowner...	Then, % landowners that have cut one or some oaks for <i>any reason</i>	Then, % landowners that have cut one or some oaks to <i>increase forage</i>
Believes there is adequate oak replacement	86%	36%
Believes there is inadequate oak replacement	48%	13%
Has oak canopy > 50%	94%	38% (ns)
Has oak canopy < 50%	57%	22% (ns)
Agrees that oaks are being lost in California	53%	17% (ns)
Agrees oaks should be regulated	39%	7%
EXPECTED (% total sample)	65%	24%

A dramatic and significant change has been made in how landowners manage oaks. The number of landowners planting oaks has increased dramatically ($p < 0.00$; *fig. 3*), while the number spraying, girdling, or poisoning oaks has declined to almost none ($p < 0.01$). More than one-third of oak woodland landowners state that they carry out practices to improve wildlife habitat.

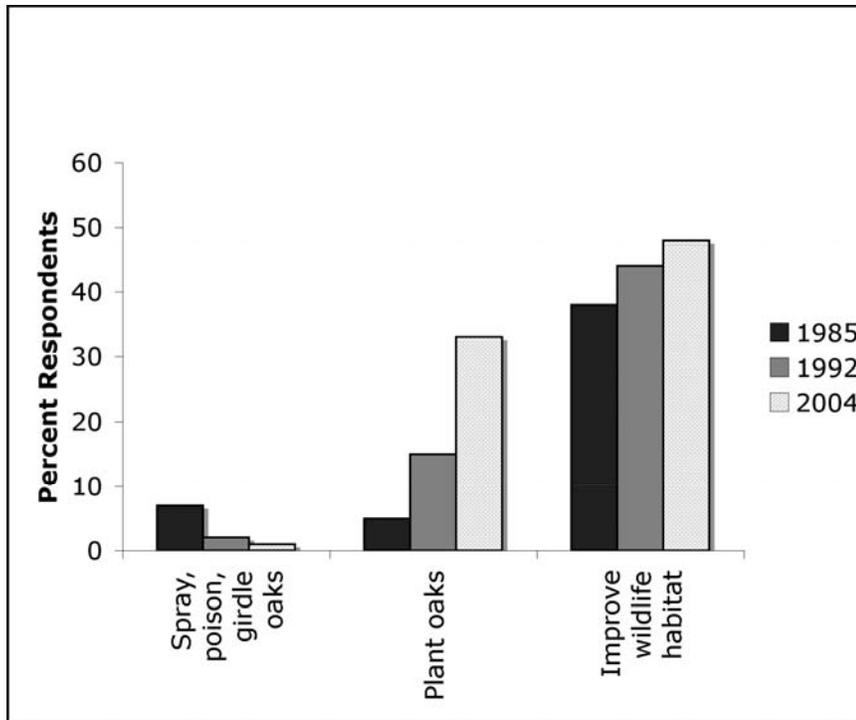


Figure 3—Respondent carried out the following practices in the last five years, 1985, 1992, and 2004 (N = 345).

Using a scale developed by summing the frequency of carrying out four oak-promoting management practices, we can compare the behavior of those who value oaks for certain purposes to those who do not. The three practices are planting oaks, maintaining a fixed oak stocking level, and cutting mistletoe out of trees. Landowners who value oaks for shade ($p < 0.01$, t-test), wildlife habitat ($p < 0.01$, t-test), wildlife and livestock browse ($p < 0.04$, t-test), and beauty ($p < 0.00$, t-test) are

significantly more likely to carry out oak-promoting activities. Valuing oaks for soil protection, shade, forage, fuelwood, property values, or water conservation did not show this relationship.

Advice: Extension and Land Trusts

Also using the scale of oak-promoting practices, landowners receiving advice about oaks from University of California Cooperative Extension advisors or specialists within the last two years ($p < 0.03$, t-test), and in fact from any public advisory service, were significantly more likely to carry out oak promoting practices ($p < 0.00$, t-test).

Consultation with advisory agencies increased overall, with significantly more landowners consulting about oaks with the Natural Resource Conservation Service and University of California Cooperative Extension specialists and advisors at each survey point (*table 3*). Though not asked about on the previous two surveys, 17 percent of landowners reported getting advice from or discussing oaks with a land trust.

Table 3—Chi-square test results ($df = 2$) for landowner consultation with advisory services in last two years, 1985-2004.

Landowner consulted with the following in last 2 years:	% landowners			P-value
	1985	1992	2004	
Cooperative Extension	4	13	16	.00
Natural Resources Conservation Service	6	6	15	.02
California Dept. of Fish and Game	7	7	12	ns
U.S. Forest Service	5	4	5	ns
California Department of Forestry	11	8	8	ns
Any public advisory service	19	21	25	ns
Private oak expert	10	12	7	ns
Book	--	--	23	--
Land Trust	--	--	17	--

The number of land trusts in California has been increasing rapidly in recent years (Land Trust Alliance 2005). In a 2001 three-county survey of ranchers (Liffmann and others 2000) 4 percent reported having a conservation easement on their property. In this survey, 6 percent said they had a conservation easement on their property, while 10 percent reported that they did not know whether they did or not. Considering the entire sample of landowners, 30 percent had an easement or would consider one, 43 percent are not interested in a conservation easement, and 26 percent don't know about them or enough about them. When asked if they had ever been approached about selling or donating an easement, 26 percent said yes.

Though only asked about in 2004, two-thirds of landowners reported that they planned to keep their land intact for the next 10 years, while 11 percent reported that they planned to sell or give away all or part of their property within the next 10 years. The proportion with land in the Williamson Act has remained steady at slightly more than half. Significantly more hardwood rangeland landowners reported living “less than 5 miles from a subdivision” ($p < 0.09$), from 52 percent in 1985 to 61 percent in 2004.

Attitudes About Regulation

At least three-fourths of all landowners have agreed on each survey that regulation leads to a loss of liberties and freedom. At the same time, more than 80 percent of landowners agreed each time that protection of water quality should be a state responsibility, and more than three-quarters have agreed that oaks are being lost since 1992—significantly more than in 1985 ($p < 0.02$). The number agreeing with the statement that “citizens should be able to use natural resources on their own land without asking state permission” has decreased significantly at each survey point ($p < 0.00$), from 90 to 72 percent between 1985 and 2004. Nonetheless, the number agreeing that oak use should be regulated has not increased significantly, ranging from 32 percent in 1985 to 43 percent in 2004.

Discussion

Since 1985, significant changes have occurred in the goals and practices of those who own hardwood rangeland. Although this type of survey cannot “prove” that the IHRMP caused people to act differently, changes in values and behavior reflect program goals. Fewer landowners are cutting oaks and fewer value oaks for fuelwood or sell fuelwood. More owners are planting oaks, and more landowners, ranchers and others, believe that an important reason to live in the woodlands is for their beauty. Valuing oaks for beauty is linked to protecting and promoting them. Only one respondent reported spraying, girdling, or poisoning oaks. Overall, there seems to have been a real shift to caring for oaks. On the other hand, there is no consensus that oak use should be regulated. Landowners remain unfavorably inclined toward regulation, while recognizing that there is a valid state role in some aspects of natural resource management.

A landowner's beliefs about the status of oak woodlands, as well as the number of oaks on the property, influence behavior. Landowners with an oak canopy cover greater than 50 percent, and landowners who believe there is adequate oak replacement, are more likely to have cut down one or more oaks. Research has shown that an oak canopy of 50 percent or less does not reduce forage production, and in some cases, can extend the availability of green feed by increasing the species and phonological diversity of the grassland (Frost and McDougald 1989; McClaran and Bartolome 1989). A smaller proportion of those who agree that oak use should be regulated cut oaks.

An increasing number of oak woodland landowners are getting advice from Cooperative Extension advisors and specialists, and from NRCS, and this is apparently linked to practices that favor oaks. An important trend is that land trusts also are now commonly acting as sources of advice, an indication that it is valuable for extension and IHRMP to work with land trust managers and scientists. As most oak woodlands are privately held, it makes sense that advisory services oriented to private lands are most often consulted.

The majority of owners have livestock grazing on their property, especially in the larger ownership categories, but fewer of them are selling livestock themselves. The proportion of land used for grazing has not changed since 1992, a possible indication of an increase in leasing of private lands by the remaining producers. In a 2002 survey in the fast-growing central Sierra, foothill ranchers reported that leasing was an important source of forage for them, and many used multiple leases, public and private, to get through the year (Sulak and Huntsinger, 2002).

A landowner may choose to lease land for grazing for income, fire hazard reduction, and weed control, among other reasons. Working with land trusts, private owners, and homeowner's associations interested in leasing land for grazing might be considered for emphasis by IHRMP, to protect hardwood resources and to help encourage sustainable ranching. Striving to reach “non-production” landowners will continue to be an important part of oak woodland outreach; however, encouraging woodland conservation on the larger parcels still means reaching those producing and grazing livestock. Recent research has linked ranch sustainability in high-growth regions of the state to forage and pasture availability, including availability of leased public and private lands (Sulak and Huntsinger 2002). Exploring this relationship further will be important to conservation of working oak woodlands.

Conclusions

Twenty years ago, the IHRMP took on the challenge of conserving hardwood rangelands in California through education and research. The fact that most hardwood rangelands are privately owned was a particular challenge to conservationists, natural resource academics, and environmentalists long focused on public lands. A research and extension program initially centered on the technical aspects of how to improve grazing, wildlife, and oak management expanded to include planning and policy projects. At the same time, things were happening outside the program. Non-profit conservation organizations, notably land trusts, have become increasingly prominent participants in private land conservation. The development and growth of conservation easement programs, and in many cases, a decades-long process of mutual education has improved communication between groups like the Nature Conservancy and diverse types of private landowners. Landowner groups have successfully sought and created land trusts that reflected their own ideas about private lands conservation, such as the California Rangeland Trust. Public funds have been allocated to these groups for the creation of conservation easements. The Natural Resource Conservation Service and the Department of Fish and Game have invested in oak conservation through use of various incentive and advisory programs. The Natural Resource Conservation Service in particular has emphasized collaborative programs, and has been well-received in many areas.

Are all these efforts a substitute for regulation? Have oak woodlands been adequately conserved? These are questions that deserve more investigation. There is good evidence, some presented here, that landowners are being more careful of their oaks, and in fact many report planting them. Urban sprawl continues to fragment and destroy oak woodlands, but has the rate slowed, or have development patterns been influenced by the program in positive ways? Though conservation easements preclude conversion on easement lands, funding for easements is limited, and without some sort of coordinated effort protection of large contiguous areas is difficult to plan. If clean air, wildlife habitat, watershed, carbon sequestration, viewshed, and other values from oak woodlands could be better quantified, as “ecosystems services,” it would no doubt make more clear what is lost when land is paved and converted and improve public decision making. But a “market” for these services that would result in actual landowner compensation is less clear, though conservation easements do represent one such existing “market.” It is apparent that landowner values and public values for oak woodlands are in many ways convergent and converging. Protection of natural beauty and wildlife is valued by both landowner

and the public. There is great opportunity to work with landowners to assure continued production of amenity values for public and private consumption, if values can be captured to help landowners keep their assets in extensive agriculture.

References

- Bolsinger, C. 1988. **The hardwoods of California's timberlands, woodlands, and savannas.** U.S. Forest Service, Pacific Northwest Forest and Range Experiment Station Research Bulletin PNW-RB-148. Portland, OR.
- CDF-FRRAP [California Department of Forestry and Fire Protection, Fire and Resource Assessment Program]. 2003. **The changing California forest and range 2003 assessment.** California State Resources Agency, Sacramento, CA. <http://frap.cdf.ca.gov/assessment2003/>
- Dillman, D.A. 1978. Mail and telephone surveys: the total design method. Wiley and Sons, New York.
- Fortmann, L.P.; Huntsinger, L. 1989. **The effects of non-metropolitan population growth on resource management.** Society and Natural Resources 2(1):9-22.
- Frost, W.E.; McDougald, N.K. 1989. **Tree canopy effects on herbaceous production of annual rangeland during drought.** Journal of Range Management 42:281-283.
- Huntsinger, L.; Buttolph, L.; Hopkinson, P. 1997. **Ownership and management changes on California hardwood rangelands: 1985 to 1992.** Journal of Range Management 50 (4):423-430.
- Huntsinger, L.; Fortmann, L.P. 1990. **California's privately owned oak woodlands: owners, use, and management.** Journal of Range Management 42(3):147-152.
- Land Trust Alliance. 2005. <http://www.lta.org/census/>, accessed 12/10/2006
- Liffmann, R.H.; Huntsinger, L.; Forero, L.C. 2000. **To ranch or not to ranch: home on the urban range?** Journal of Range Management 53 (4):362-370.
- McClaran, M.P.; Bartolome, J.W. 1989. **Effect of *Quercus douglasii* (Fagaceae) on herbaceous understory along a rainfall gradient.** Madroño 36:141-153.
- Spicer, C.C. 1972. **Calculation of power sums of deviations about the mean.** Applied Statistics 21:226-227.
- Sulak, A.; Huntsinger, L. 2002. **Sierra Nevada grazing in transition: the role of Forest Service grazing in the foothill ranches of California.** In A report to the Sierra Nevada Alliance, the California Cattlemen's Association, and the California Rangeland Trust. Place Published: Sierra Nevada Alliance website. <http://www.sierranevadaalliance.org/publications> (accessed August 9 2006).
- U.S. Department of Agriculture, Forest Service. 1981. **Resource evaluation field instructions for California, 1981-1984.** Pacific Northwest Forest and Range Experiment Station, Portland, Ore.
- Wensel, L.C. 1983. **Estimators for use in California forestland ownership studies.** University of California Department of Forestry and Resource Management, Biometrics Note #8. Berkeley, CA.

Continue