

- Griffith, L.W., G.E. Schuman, F. Rauzi, and R.E. Baumgartner. 1985. Mechanical renovation of shortgrass prairie for increased herbage production. *J. Range Manage.* 38:7-10.
- Marten, G.C., and R.N. Andersen. 1975. Forage nutritive value and palatability of 12 common annual weeds. *Crop Science* 15:821-827.
- Rauzi, Frank. 1975. Severe mechanical and chemical range renovation in northeastern Wyoming. *J. Range Manage.* 28:319-326.
- Rommann, L.M. 1983. Kochia— Forage or Weed? p. 96-97. *In: Proceedings 39th South Post. Forage Crop Imp. Conf.*
- Samuel, M.J., and G.S. Howard. 1982. Botanical composition of summer cattle diets on the Wyoming High Plains. *J. Range Manage.* 35:305-308.
- Sherrod, L.B. 1971. Nutritive value of *Kochia scoparia*. *Agron. J.* 63:343-344.
- Streeter, C.L., D.C. Clanton, and O.E. Hoehne. 1968. Influence of advance in season on nutritive value of forage consumed by cattle grazing western Nebraska native range. *Res. Bul. 227, Nebraska Agricultural Exper. Sta., Lincoln.*
- Wight, J.R., and F.H. Siddoway. 1972. Improving precipitation-use efficiency on rangeland by surface modification. *J. Soil and Water Conserv.* 27:170-174.
- Wight, J.R., and L.M. White. 1974. Interseeding and pitting on a range site in eastern Montana. *J. Range Manage.* 27:206-210.



The Importance of Oak to Ranchers in the California Foothill Woodland

Mitchel P. McClaran and James W. Bartolome

The California foothill oak woodland extends over several million acres along the eastern slope of the Coast Ranges and the western slope of the Sierra Nevada. Tree cover varies from open savannas to dense woodlands dominated by blue oak. Less common associates are interior live oak and digger pine. Annual grassland species are the major understory components throughout this vegetation type (Griffin 1977). More than 80% of the woodland is privately owned and the dominant product of the area is range livestock with firewood, wildlife, and water as secondary products (Plumb 1981).

Located in the central interior of the state, Tulare County covers approximately three million acres. Foothill oak woodland represents more than 15% of the county, most of it is privately owned (Figure 1). Cattle ranching is the dominant land use, although residential pressures are increasing. With respect to these characteristics, the foothill woodland in Tulare County typifies much of California.

The value of oak cover for various land management objectives has generated considerable debate among resource managers (Pillsbury 1983). As is typical in such debates, the ranching landowner has been conspicuously absent from this dialogue. Several authors have suggested that an understanding of the value systems and cultural practices in the ranching community can assist in the development of necessary and acceptable management plans and

policies (Smith and Martin 1972, Simpson 1975, and Houghton 1978). This study describes the importance of oak to the ranching community for various management objectives and relates this importance to ranch characteristics such as size, location, and abundance of oak cover.

In September 1981 a questionnaire was mailed to the 62 members of the Tulare County Cattlemen's Association who owned property in the foothill oak woodland. A second mailing was made in November 1981. A total of 63% of the questionnaires were returned.

Ranch characteristics of interest were: ranch location, ranch size, length of family ownership, amount of oak cover, presence of small trees, and the expected change of oak cover in 20 years (Table 1). The possible management objectives for keeping oaks were: to provide shade, increase property values, increase understory forage production, soil stability, provide browse, and to provide wildlife habitat. The objectives that required tree removal were: firewood income, understory forage production, water yield, access for stock and vehicles, and home use of the wood. To describe the importance of oak for management objectives we asked the rancher to choose one of four responses (very important, fairly important, not very important, and not a reason) that best reflected the importance of oak for each management objective requiring either the maintenance or removal of trees on his ranch (Table 2).

The ranchers showed a great deal of variation in their responses to the importance of oak management objectives. However, length of ranch ownership was the only ranch characteristic that was unrelated to the importance of oak for management objectives.

The ranchers expressed considerable insight into the rela-

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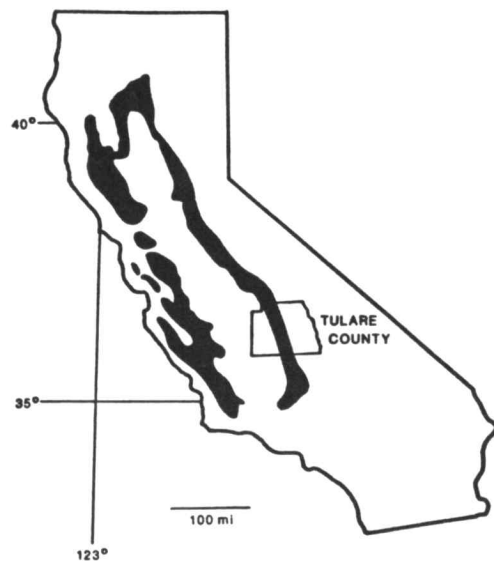


Fig. 1. Distribution of the California foothill oak woodland and the location of Tulare County.

tionship of oak overstory to the production of understory forage, especially in light of the confusing and contrasting results from published research. Holland (1981) found more production under the tree canopy than in open areas, while others (Murphy and Crampton 1964, Heady and Pitt 1979, and Kay and Leonard 1981) have shown that forage production increases with tree removal. The ranchers' responses showed that the importance of removing oak for forage production was positively related to the abundance of oak cover and small trees. Therefore, the more abundant oaks were, the more important it was to remove them, and vice versa. This relationship clearly explains the contrasting results in the scientific literature: Holland's positive findings were secured in savanna settings with little cover, whereas the contrasting work was done in denser woodlands.

The abundance of small oaks was also associated with the importance of oak for shade. The value of shade for livestock production was expressed by Ittner, et al. (1958), and the significant use of oak shade by cattle in the foothill oak

Table 1. Ranch characteristics responses.

Ranch characteristic	Response	%
Ranch location in Tulare County	North	28
	Central	31
	South	41
Ranch size (acres)	<2,000	33
	2,000-5,000	31
	5,001-10,000	21
	>10,000	15
Length of family ownership (yrs)	<10	10
	10-30	31
	31-60	31
	>60	28
Amount of oak cover (%)	<25	15
	25-50	23
	51-75	26
	>75	36
* Presence of small oaks (1" diameter)	Rare	54
	Somewhat rare	30
	Common	16
* Expected change in oak cover in twenty years	Increase	8
	No change	43
	Decrease	49

Asterisks indicates that the distribution is different ($p < 0.05$) from an even distribution (all categories equal) using a Wilcoxon Rank Sum Test.

woodland was documented by Wagon (1963). Shade was important to ranchers in general, but when small trees are abundant they typically represent shrubby live oaks, which may explain the negative association between the abundance of small trees and the importance of shade.

Ranch size often has been cited as a major factor dictating farm and ranch management practices and objectives (Gray 1968). In the foothill oak woodland ranch size was related to the importance of removing oak for water production and home use of oak wood. Water yield has been shown to increase with the removal of tree cover in California (Pitt et al. 1978). Removing trees for this objective was important to most ranchers and was positively associated with larger ranches. This size relationship is likely due to an economy of scale present in watershed management practices. The negative relationship between ranch size and home use of wood

Table 2. Responses (%) of the importance of oak for management objectives.

	Very important	Fairly important	Not too important	Not a reason
Objective for removing oak				
* Firewood income	16	16	32	35
* Understory production	38	24	19	19
* Water yield	47	32	13	8
* Access	29	26	21	24
* Home use of wood	29	37	24	11
Objective for keeping oak				
* Shade	58	32	11	0
* Property value	24	29	34	13
* Understory production	8	11	21	61
* Soil stability	32	29	13	26
* Browse	8	11	43	38
* Wildlife	16	49	22	14

Asterisks indicate that the distribution is different ($p < 0.05$) from an even distribution (25:25:25:25) using a Wilcoxon Rank Sum Test.

can be interpreted in relation to the profitability of ranching and the reasons for ranching. Gray (1968) illustrated the need for a minimum herd size to obtain a profit. Therefore small ranchers are less likely to show a sufficient profit than their larger counterparts. Smith and Martin (1972) have described short-on-profit ranching in Arizona as consumptive ranching that is financed by off-ranch employment. The products being consumed in these situations are the characteristics of a ranching lifestyle: self-sufficiency, a positive child rearing atmosphere, and land based activities. The greater importance for home use of wood to smaller ranchers may be explained by this consumptive ranching phenomenon.

Concern over an increase in firewood harvests and poor natural tree regeneration statewide have prompted the discussion of state regulations to limit the extent of oak harvesting on private lands. The State Board of Forestry is considering recommendations from its subcommittee, the Hardwood Task Force, to require harvesting permits and retention standards for large scale oak harvests (Pillsbury 1983). This concern appears to be justified by the ranchers' responses which indicate that tree cover will decrease in 20 years and that small trees are rare. The future decrease in cover is related to forage and water production objectives. However, a built-in retention standard of sorts is evident in the ranchers' responses. This is especially true for clearing to increase forage production because trees apparently are maintained as they become less abundant. Unfortunately, the relationship between various overstory levels and tree regeneration, as well as other products and values is not known.

The woodland contains an abundant wildlife resource (Barrett 1980); however the lack of strong rancher opinions about oaks and wildlife may reflect the inability of the rancher to directly benefit economically from wildlife management because the animals are publicly owned. New legislation (Cal. Fish and Game Code 1983) provides an opportunity to test this hypothesis. This law enables the landowner to apply for additional and extraordinary hunting permits for the ranch if wildlife populations and habitat improvements justify a deviation from the typical animal harvest. These permits will likely have a resale value that exceeds improvement costs. We predict that this program will increase the importance of retaining oak for wildlife management among ranchers in the future. We also predict that as with water production, this effect will be most pronounced for the larger ranchers because of the inherent economies of scale related to wildlife habitat improvements.

The greater importance of maintaining oak to increase property values expressed by ranchers in the northern part of the county alludes to a serious competing land use. The contribution of oak trees to property values is shown by classified advertisements from local newspapers stressing the presence of oaks in the listing of ranchette and subdivision properties. These 20-100 acre parcels are most strongly represented in the northern part of the county between the towns of Three Rivers and Badger. This conversion of land use is occurring statewide and presents serious problems for the future of the range livestock industry is the foothill oak woodland (Oltjen et al. 1982).

The importance of maintaining oaks was also expressed in terms other than for suggested management objectives. The ranchers were asked to express in their own words any additional reasons for keeping oak. Of the eleven detailed responses, five expressed aesthetic reasons and three expressed a philosophical objection to cutting trees. Perhaps a more common, underlying reason why ranchers keep oaks was expressed by a large established rancher with a moderate amount of oak cover: "So that it looks like a ranch and not a farm!"

In summary, abundance of oak cover and small oaks, and ranch size best describe the importance of oak for management objectives among ranchers in the foothill woodland. These relationships should be considered by resource managers when prescribing management practices and initiating research and regulatory programs. Specifically, managers should consider when, where, and how much cover should be removed or maintained for various objectives and what will be the likely response of the individual rancher, as well as the ranching community.

Literature Cited

- Barrett, Reginald A. 1980. Mammals of California oak habitats-management implications. p. 275-291. *In: Ecology, management, and utilization of California oaks.* Timothy R. Plumb (ed.). USDA Forest Service Gen. Tech. Rep. PSW-44.
- California Fish and Game Code. 1983. Division 4, Part 1, Chap. 2, Sect. 3400, Article 5.
- Gray, James R. 1968. Ranch Economics. Iowa State Univ. Press, Ames, Iowa. 534 p.
- Griffin, James R. 1977. Oak woodland. p. 383-416. *In: Terrestrial Vegetation of California.* Michael C. Barbour and Jack Major (eds.). Wiley-Interscience, New York.
- Heady, Harold F., and Michael D. Pitt. 1979. Reactions of northern California grass-woodland to vegetation type conversions. *Hilgardia* 47:51-73.
- Holland, V.L. 1981. Effect of blue oak on rangeland forage production in central California. p. 314-318. *In: Ecology, management, and utilization of California oaks.* Timothy R. Plumb (ed.). USDA Forest Service Gen. Tech. Rep. PSW-44.
- Houghton, Ruth M. 1978. Sociocultural research for planning and management of a Nevada Bureau of Land Management Grazing District. p. 87-89. *In: Donald N. Hyder (ed.). Proceedings of the First International Rangeland Congress.* Denver, Colorado. August 14-18, 1978.
- Ittner, N.R., T.E. Bond, and C.F. Kelly. 1958. Methods of increasing beef production in hot climates. *Calif. Agric. Expt. Sta. Bull.* 761. 85 p.
- Kay, Burgess L., and O.A. Leonard. 1981. Effect of blue oak removal on herbaceous forage production in the north Sierra foothills. p. 323-328. *In: Ecology, management, and utilization of California oaks.* Timothy R. Plumb (ed.). USDA Forest Service Gen. Tech. Rep. PSW-44.
- Murphy, Alfred, and Beecher Crampton. 1964. Quality and yield of forage and affected by chemical removal of blue oaks. *J. Range Management* 17:142-144.
- Oltjen, J.W., A.C. Bywater, C.R. Benson, and J.W. Clawsen. 1982. An analysis of the California beef cattle industry. Cooperative Ext., Div. Agric. Sciences, Univ. of California. Special Publ. 3281. 36 p.
- Pillsbury, Norman (Chair). 1983. California's hardwood resource. Preliminary report of the Hardwood Task Force. State Board of Forestry, Sacramento, Calif. 67 p.
- Pitt, Michael D., Robert H. Burgy and Harold F. Heady. 1978. Influences of brush conversion and weather patterns on runoff from a northern California watershed. *J. Range Management* 3:23-27.
- Plumb, Timothy R. (ed.). 1981. Ecology, management and utilization of California oaks. USDA Forest Service Gen. Tech. Rep. PSW-44. 368 p.

Simpson, Peter K. 1975. The social side of the cattle industry. p. 39-50. In: James H. Shideler (ed.). Agriculture in the Development of the Far West. Agricultural History Society, Washington D.C.

Smith, Arthur H., and William E. Martin. 1972. Socioeconomic behavior of cattle ranchers, with implications for rural development. Amer. J. Agric. Econ. 54:218-225.

Wagnon, Kenneth A. 1963. Behavior of beef cows on a California range. Calif. Agric. Expt. Sta. Bull. 799. 58 p.

Basin Wildrye—It's More than Just Another Forage

Charles M. Jarecki

Are you searching for a native range plant that will produce abundant winter forage and livestock shelter and is also capable of producing a good yield of hay as an alternative use? If your ranch is in the bunchgrass region of the Northern Rocky Mountains and Northwest or in the Great Basin, then look no more. Basin wildrye (*Elymus cinereus*) is what you need.

In Montana, Basin wildrye is found throughout the state, generally on flood plains or areas receiving additional moisture. It is tolerant of alkali soils. The mature plants may have a basal diameter of 2 to 3 feet with leaves up to 18 inches long. On very productive sites plants often reach a height of 6 feet.



Basin Wildrye provides an abundance of forage and offers good winter protection from the wind and cold.

Basin wildrye is sensitive to repeated grazing in the spring when it is also most palatable. However, winter snows and frost soften the mature plants, making for a fairly palatable winter forage despite its large, coarse stems and leaves.

The author is a rancher in Polson, Mont.



Penny Jarecki shows that Basin wildrye does grow head high to a tall horse.

Basin wildrye fields are only grazed in the fall and winter on our ranch.

Most of the Basin wildrye that we have on our ranch is the result of seeding. The soils are moderately fine textured glacial soils with an abundance of rocks. Elevation is 3,100 feet; annual precipitation is 14 inches with July and August generally being dry months.

Seeding was done on summer fallow in early spring using a standard double disc grain drill with 14-inch row spacing. Seeding rate was 4 pounds of pure live seed per acre. An agitator is necessary in the grain box.

Cattle were permitted to graze the area in late fall and winter from the first year since the seeded areas were co-mingled with native bluebunch wheatgrass rangeland and