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Value of Oaks in Rural Subdivisions[1]

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Abstract: The relationship between blue oak crown canopy and property value for rural subdivision was investigated. Photographs were taken of blue oak stands with 0, 40, 100, 200, 300, and 460 trees per acre, and a hypothetical property description was prepared. Thirty rural realtors/appraisers were interviewed in Ukiah and Santa Rosa and asked for their estimate of unimproved property values. Bare land values in Ukiah were $5100 per acre, and $24,000 in Santa Rosa. Areas with 40 trees per acre were worth $6500 per acre in Ukiah (a 27 percent increase over bare land), and $29,000 per acre in Santa Rosa (a 21 percent increase over bare land). There was little change in property value between 40 and 460 trees per acre in Ukiah, and a trend of a slight decrease in property value in Santa Rosa as tree density increased. Ranchers who may subdivide their hardwood rangeland should maintain some tree cover. In high density blue oak stands, thinning to 40 trees per acre will not decrease, and may possibly increase property value.

INTRODUCTION

Over the last decade, the hardwood rangelands of California have become subject to increasing pressure to provide housing in rural areas. With many of the prime agricultural and commercial forest sites in the state falling into protective zoning ordinances such as the Williamson Act and Timber Production Zone, counties with rapid population increases have in many cases concentrated new subdivisions in the hardwood range areas. Often, these subdivisions have resulted in varying degrees of tree removal, ranging from complete to selective. Prior to actually subdividing, the landowner may be driven by a number of economic factors to harvest trees on their hardwood rangelands. Economic factors include the increasing demand for oak firewood for home heating and for other biomass products, as well as tree removal to increase forage production for livestock production. Additional harvesting of the tree cover on these lands is often carried out as a part of the construction of residences and supporting road systems once the land has been subdivided. Doak and Stewart (1986) in a recent report have identified large-scale subdivision as a primary reason for a loss in hardwoods rangelands in the state.

Widescale hardwood removal due to subdivision is of concern in the state for a variety of reasons. There is some evidence to suggest that certain species, especially those in the white oak group, are not adequately regenerating, and any removal creates concern about conservation of the species (Muick and Bartoleme [sic], 1986). Trees on the hardwood rangeland areas in the state also have an important aesthetic appeal to the state's residents. Another important amenity value provided by hardwood trees, is food and cover for wildlife species. Hardwoods also provide visual screening, privacy, and protection from the wind for people who establish residences in these rural subdivisions. It is not clear, however, whether these aesthetic and amenity values of trees on these hardwood rangelands are reflected in the market value of subdivided land.

Previous studies have determined that individual trees and stands of trees can increase the market value of a property. Literature on the valuation of individual trees on urban and suburban property includes work by Neely (1979) and Chadwick (1980). A study in Colorado found that trees and groups of trees in Estes Park, Colorado influence property value and that property value was maximized at 120 to 140 healthy trees per acre (Walsh et al, 1981). This study also found that property value at 275 trees per acre was approximately equal to property value for 10 trees per acre if all other site conditions were held equal. Payne (1973) showed photographs of wooded and open land in Amherst, Massachusetts to real estate appraisers and found that trees increased the appraised value of unimproved land in a suburban setting by 27 percent. For half-acre

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lots with houses, maximum property values were obtained with a tree density of 30 trees per acre. In a later study, Payne and Strom (1975) photographed simulated landscapes of different tree density and spatial arrangements. With a property description and map of an actual site, appraisers in Massachusetts and New Jersey were asked to estimate the market value of lots which were identical in all ways except tree arrangement and density. They found that the presence of trees did increase property value, and that scattered trees were preferred to more concentrated arrangements.

Although it is widely believed that trees on hardwood rangelands, predominantly oaks, follow the same trend observed in these studies and add to the market value of a property, little empirical data has been obtained to support this assertion in California. The objective of this study was to determine the market value which the aesthetic and amenity values of trees on hardwood rangelands contribute to the value of unimproved rural property. This information would help landowners to assess the value of residual hardwood trees in areas where subdivision will be occurring, and assist them in making decisions about tree harvesting.

METHODS

As a preliminary step in assessing [sic] the value of trees on hardwood rangelands undergoing subdivision, this study was confined to blue oak (*Quercus douglasii* Hook and Arn.) woodlands. These areas represent the largest acreage in the hardwood range region in the state. Furthermore, the study was restricted to the Sonoma and Mendocino county region of the state, to minimize the cost of data collection.

In July of 1986, a series of photographs was taken of several blue oak stands at the Briones Regional Park in Contra Costa County. The areas were photographed to make the trees, grass and slope appear consistent in all photographs. Vistas, steep draws, streams and large-crowned "trophy trees" were intentionally avoided. Tree density as the only variation between the five photographs, and included of blue oak stands with 0, 40, 200, 300 and 460 trees per acre. Complete stand data was collected for each photographed area, including the number of trees per acre, percent crown cover, volume per acre, and basal area per acre and is presented in Table 1. A sixth photograph of similar appearance where the blue oak stand had been thinned to approximately 100 trees per acre was added from the collection of Pamela Muick, Department of Forestry and Resource Management at U.C. Berkeley.

A single hypothetical property description was prepared to accompany the six photographs to give unifying assumptions on parcel size, the availability of water and utilities, soils, topography, zoning, access, and several other

Table 1. Data from the 5 sample blue oak stands at Briones Regional Park, Contra Costa County, California.

Stand #	Trees per Acre	Basal Area per Acre (sq. ft.)	Volume per Acre (cu. ft.)	Crown Cover (percent)
1	0	0	0	0
2	40	52	2258	20
3	200	206	5590	50
4	300	123	1324	40
5	460	223	3872	70

features. These assumptions were pretested in both the Mendocino and Sonoma county areas, and modified to fit with realistic local conditions for hardwood range subdivision properties. These assumptions are shown below in Table 2.

Table 2. Hypothetical property description data for blue oak rural subdivision acreage in Ukiah and Santa Rosa, California.

CITY: Ukiah and Santa Rosa
COUNTY: Mendocino and Sonoma
LOT SIZE: Ukiah--10-acre unimproved square lot
Santa Rosa-- 3-acre unimproved square lot
ROADS: No on-site roads, faces county road
SEWERS: None
WATER: City water unavailable, Must dig 100' well
ELEC. & GAS: Public utility
TELEPHONE: Service available, None now
STRUCTURES: None
NATURAL FEATURES: No streams present, landscape is blue oak woodland
TOPSOIL: Stable for construction, rangeland suitability, no grapes
SLOPE: Gentle, 5 - 10%
DRAINAGE: Good EASEMENTS: None
DEED RESTRICTIONS: None
ZONING: Single-family residential, adjacent areas similarly zoned, Property and adjacent areas not in Timber Production Zone or under Williamson Act
ACCESS & TRANSPORTATION: Good access to downtown, shopping, schools (5 miles), no public transportation

In order to ascertain the value of the hypothetical rural subvision [sic] properties, 15 individuals including both realtors and appraisers were interviewed in Ukiah and another 15 in Santa Rosa. The selection of interviewees was made in two ways. In the smaller rural area of Ukiah, a list of 30 real estate agents and appraisers was found in the classified section of the telephone directory. The Mendocino Board of Realtors was

consulted and indicated that all real estate agents and appraisers listed worked with rural properties. A random selection of 15 was drawn from this population. In the more heavily populated Santa Rosa area, there were approximately 260 realtors and appraisers in the telephone directory. The chair of the Sonoma County Board of Realtors Farm and Land Committee was consulted to determine those realtors specializing in rural acreage sales. A random selection of 15 interviewees was made from this abbreviated list.

Each realtor was interviewed in-person in their office, and were given a brief explanation of the study and its objectives. The interviewees were told to treat each photograph they were shown as a separate piece of property, and to apply the same property description to each area. In this manner, all conditions were presented as the same for each photographed stand with the exception of density of tree cover. They were then handed 8 inch by 10 inch glossy color photographs in a random order. All photographs could be inspected before they were asked to estimate the market value for the entire property. The term "market value" as used in this study refers to the "highest price in terms of money which a property will bring in a competitive and open market under all conditions requisite to a fair sale, the buyer and seller each acting prudently, knowledgeably and assuming the price is not affected by undue stimulus" (Boyce, 1975).

RESULTS

Mean property values were calculated for each stand and expressed on a per acre value for both Ukiah and Santa Rosa. Outlying observations were deleted if they were greater or less than four times the standard error from the mean value for the stand. Tables 3 and 4 below shows the mean market value of the six different stand structures shown in the photographs for Ukiah and Santa Rosa respectively. Figures 1 and 2 show these results graphically. The mean values are bracketed by plus and minus one standard error (SE) of the mean. Bare rangeland value was worth $5100 per acre in Ukiah, and $24,000 per acre in Santa Rosa for an unimproved subdivision lot. In contrast, stands with as few as 40 trees per acre, were worth $6500 per acre in Ukiah, a 27 percent increase over bare land value, and $29,000 per acre in Santa Rosa, a 21 percent increase over bare land value. These property values were significantly different from the bare land value at the 5 percent level.

Referring back to Table 1, and assuming that there are 85 cubic feet of firewood in a cord, then the stand with 40 trees per acre has almost 27 cords of firewood in it. If a landowner who saw an opportunity for subdivision were to clear the blue oak trees prior to selling the subdivision acreage, then they would be giving up $1400 per acre in the more rural Ukiah area, and $5000 per acre in the more densely populated Santa Rosa area. This means that the sale of firewood would have to generate a stumpage value (standing tree value net of harvesting, processing and transportation costs) of $52 per cord in Ukiah, and $185 per cord in Santa Rosa. Both of these are well above the reported statewide average stumpage value for hardwood firewood of $15 per cord (State Board of Equalization, 1986). Thus, it appears that the market value for the amenities associated with the blue oak trees on hardwood rangelands exceeds the value which can realistically be obtained for firewood stumpage at this time.

Table 3 shows that for the more rural Ukiah location, that there was no statistically significant difference in the per acre property value between 40 and 460 trees per acre. Table 4 also shows no significant difference in property value in the Santa Rosa location between 40 and 460 trees per acre. However, a trend of decreasing property value can be seen in the Santa Rosa location as oak density increases from 40 to 460 trees per acre ($29,000 per acre at 40 trees per acre, versus $26,300 per acre at 460 trees per acre). Further study is needed to see if this trend holds up. However, it can be hypothesized that with the smaller parcel size in the more urbanized Santa Rosa setting (3 acres versus 10 acres for the Ukiah sample), dense tree cover actually represents an increased cost to subdivision. On these smaller parcels, there would

Table 3. Mean property value per acre for 10 acre lots of unimproved blue oak stands, 5 miles outside of Ukiah, California.

# Trees per Acre	$ per Acre
0	$5118 b
40	$6514 a
100	$6255 a
200	$6573 a
300	$6482 a
460	$6395 a

Note: Means followed with different letters are significantly different at the .05 level using Duncan's Multiple Range Test.

Table 4. Mean property value per acre for 10 acre lots of unimproved blue oak stands, 5 miles outside of Santa Rosa, California.

# Trees per Acre	$ per Acre
0	$23,820 b
40	$29,097 a
100	$26,972 ab
200	$27,445 a
300	$26,639 ab
460	$26,333 ab

Note: Means followed with different letters are significantly different at the .05 level using Duncan's Multiple Range Test.

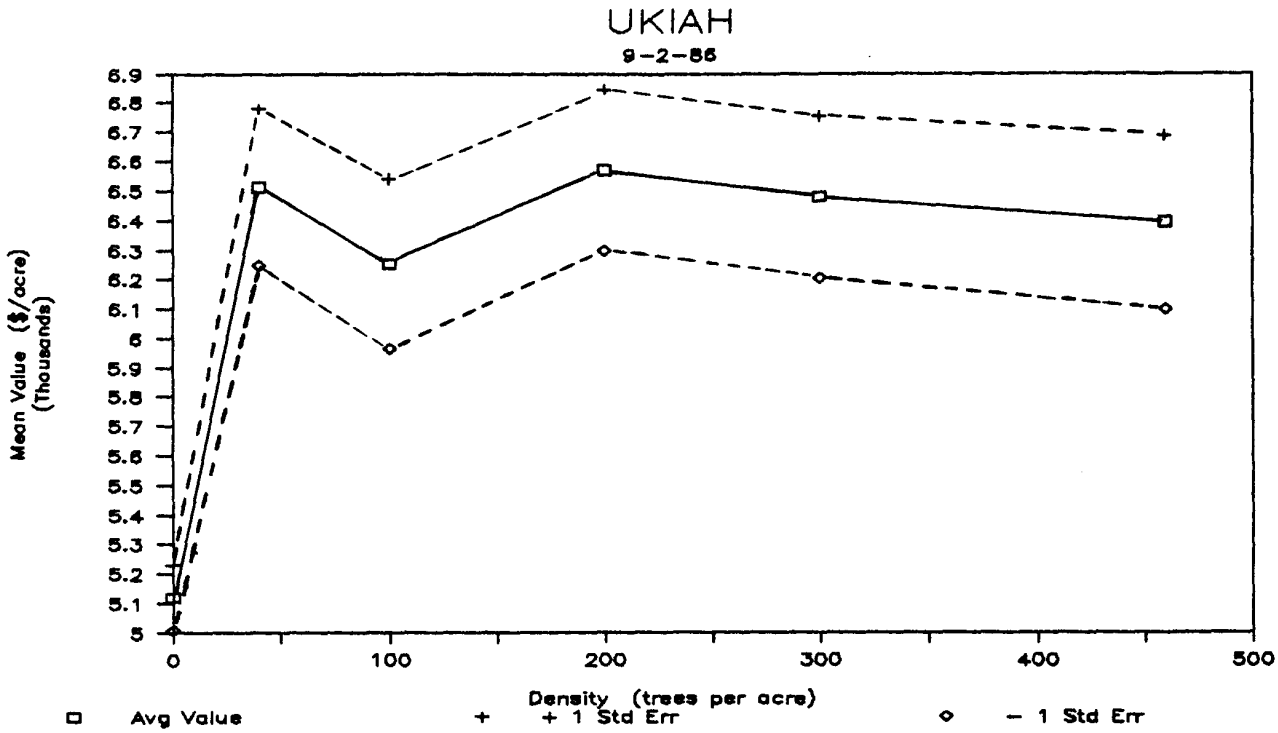

Figure 1--Property value per acre for 10 acre lots of unimproved blue oak stands 5 miles outside Ukiah, California for different trees per acre.

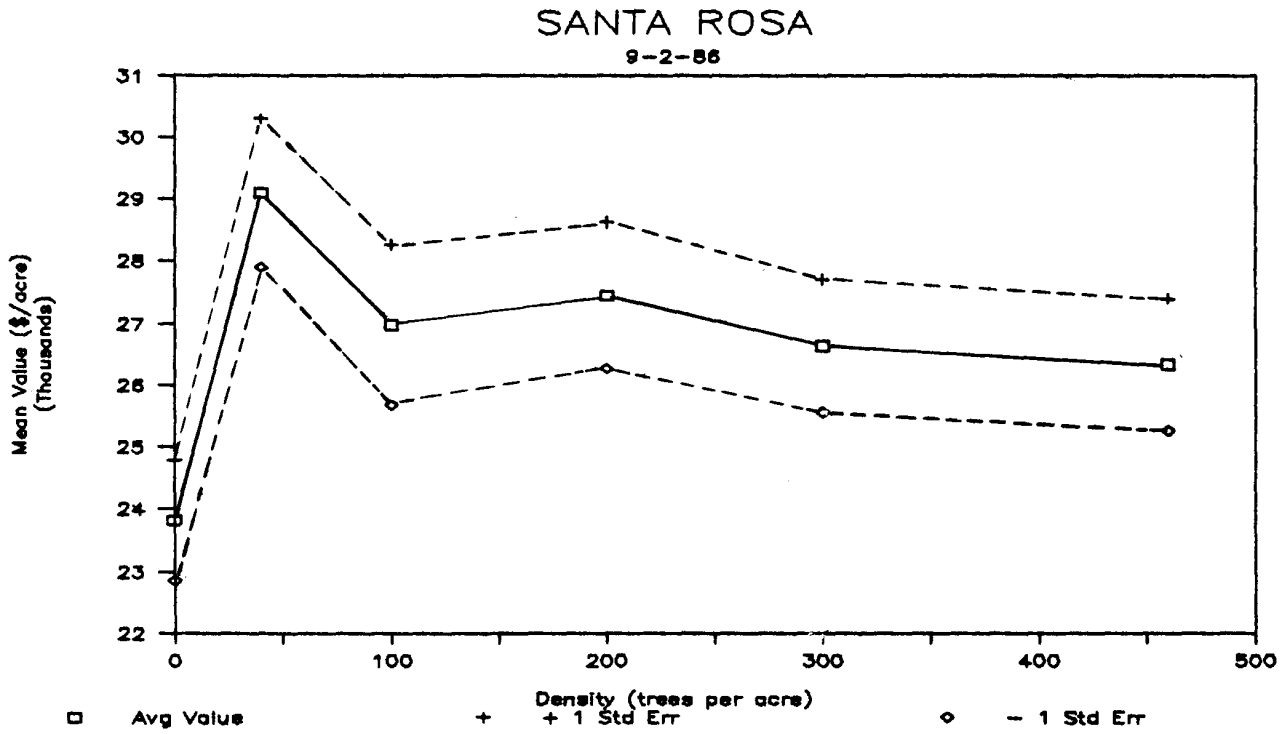

Figure 2--Property values per acre for 3 acre lots of unimproved blue oak stands 5 miles outside Santa Rosa, California for different trees per acre.

actually be less room to place a home on the subdivision acreage and hence, property values would be expected to decrease at high tree densities.

DISCUSSION

This study was an initial attempt to quantify the value of oaks on hardwood rangelands where rural subdivision will be occurring. The results suggest that landowners who are interested in receiving the maximum value for parcels they sell, should not clear all the oaks prior to subdivision. The aesthetic and amenity values from 40 blue oak stems per acre contributed a 21 to 27 percent increase in land value when compared to acreage with no trees present. The lack of a statistical difference in property value between 40 and 460 stems per acre suggests that a landowner could very likely selectively thin their stand and not decrease, and possibly increase property value for subdivision.

This study needs to be expanded to include other areas of the state where subdivision pressure in hardwood rangelands poses serious concerns about loss of hardwood species. However, these preliminary results do suggest that an understanding of market values for hardwoods by landowners may provide adequate protection of the hardwood cover in the event of subdivision. Maintenance of a hardwood tree cover alone does not ensure that other concerns about subdivision will be alleviated, such as the impact on wildlife species. Nonetheless, attention to spatial arrangement of subdivision lots and minimum lot size by county planning departments working with wildlife biologists, coupled with market driven values for oak stands in rural subdivisions, can help to minimize future concerns.

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