

Evaluating Recreational Hunting as an Incentive for Habitat Conservation on Private Land in California¹

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Abstract

Private land plays a crucial role in the conservation of biodiversity in California, yet these lands are the least protected and most prone to environmental degradation. In 1930, Aldo Leopold recognized the potential to better conserve private land by an incentive scheme where recreational users would pay landowners for access to conserved wildlife habitat. While research has shown that significant funds are spent to utilize large areas of private land for wildlife-associated recreation, this study seeks to specifically understand whether this recreational use actually results in improved conservation practices. I use interviews with private landowners and private land managers in California who owned > 404 ha (1000 ac) to evaluate whether those landowners with recreational utilization are more likely to perform habitat conservation practices. Interviews revealed that while not widely adopted, hunting was the primary recreational use on many private lands surveyed, and that some conservation practices were performed to enhance the hunting enterprise. There appears to be an important role for extension and outreach efforts to better inform landowners of the earning potential from recreational hunting as well as the conservation practices that could enhance both wildlife habitat and revenue for a hunting enterprise.

Key words: biodiversity, recreation, management, ranching, rangelands, wildlife

Introduction

Wildlife-associated recreational use on private land has been shown to be a significant source of income for many landowners in the United States, but its conservation impact is poorly understood (Bagi and Reeder 2012, Brown and Reeder 2007, Carpio and others 2008, George and others 2011; Macaulay, n.d.; Nickerson and others 2001). Many studies have hypothesized that recreational use creates an incentive to perform conservation practices and maintain habitat, but many of these studies rely on theory or anecdotal accounts (Benson 2001a, Rasker and others 1992). Empirical research on conservation practices associated with recreational use has been equivocal, with some authors finding conservation benefits (Butler and Workman 1993, Oldfield and others 2003, Standiford and Howitt 1993), and others finding few differences in practices (Benson 2001b). Furthermore, some practices designed to maximize returns from recreational use may resort to activities that result in short-term gains for particular species of interest, but may degrade habitat for other species (for example, planting food plots, introductions of non-native species) (Macaulay and others 2013). Models evaluating economic drivers of land use change have not explicitly considered the role of income or benefits from recreation as motivating land use decisions (Lubowski and others 2008, Rashford and others 2011). This research seeks to provide 1) a better understanding of the economics of

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recreational use and the type of recreational activities pursued and 2) whether landowners with recreational benefits on their land implement more conservation practices than those without.

To better inform this issue, this study is gathering detailed information from private landowners and managers to specifically determine how recreational use may influence decisions regarding land-use and conservation practices. This information will help to inform how policy, government programs, and Cooperative Extension efforts may be used to encourage practices that not only help to conserve natural resources, but also provide increased recreational benefits on private land.

Methods

A semi-structured interview questionnaire was developed and tested in a classroom and in a focus group of experts and students in rangeland management. Thirty-seven semi-structured interviews were conducted with 27 private landowners or land managers, five commercial hunting operators, three real estate appraisers, and two regulatory personnel in the spring and summer of 2012. The majority of private landowners interviewed were randomly sampled from all individuals owning more than 404 ha (1000 ac) in the Central Coast mountain range of California between Santa Clara County in the north and San Luis Obispo County in the south. I interviewed several landowners who owned or managed land in the southern San Joaquin Valley and in Mendocino County. I acquired regional ownership information from county assessors from the area from which to randomly sample landowners.

Due to the wide-ranging nature of semi-structured interviews, not all questions in the interview questionnaire were fully answered due to either time constraints, lack of immediate knowledge of the answer by the interviewee, or unwillingness of interviewees to answer certain questions. As a result, much of the results presented here are of a qualitative nature and do not constitute a generalizable knowledge of landowners in California. The results have served to inform future survey and interview efforts, which are currently ongoing.

The questionnaire requested information from landowners about revenue earned from their property by various uses, and asked about management practices performed on the property for various business enterprises. Interviews revealed that most landowners did not keep detailed accounting records on the operations of their property. As such, information about net revenue of the property was difficult to assess primarily due to challenges of quantifying expenses such as labor, fuel or depreciation associated with the ranch operation. As such, interviews did not reveal whether land management efforts resulted in net revenue improvements in coming years. The estimates cited in this manuscript are assessments of gross revenue estimates unless expenses are specifically noted. The interview guide also requested information on common rangeland management practices such as planting food plots (usually agricultural crops planted specifically for wildlife to feed on), predator control, brush management, game species introductions, and habitat improvement practices (such as planting oaks or maintaining riparian zones). For a condensed list of questions asked during interviews, please refer to the following questionnaire.

Research Questionnaire (Luke Macaulay)

- What are the main activities on your ranch and percentage of effort / economic activity from each?
 - Do you have a fee hunting operation: why or why not?
 - What land area of the property is engaged in each productive activity?
 - What management activities do you perform on your property?
 - What government programs do you participate in?
 - What is your stocking rate for livestock?
 - Do you perform wildlife census surveys?
 - Do you perform predator control?
 - Do you track harvest of wildlife on the property?
 - Do you set harvest guidelines and rules?
 - If you have a hunting operation, what is its organizational arrangement? Guided, yearlong, multi-year?
 - What is the number of paying hunters?
 - How many people are allowed to hunt for free?
 - What services and amenities are provided for the hunting operation?
 - What are your motivations for owning/managing this land?
 - How do the various operations on the property affect the stability of revenues?
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Results

Economics of recreational use and the type of recreational activities pursued

In general, the interviews found that much of the recreational activity on private lands greater than 404 ha (1000 ac) was for hunting, although many of those properties, in particular those less than 2023 ha (5000 ac) oftentimes only allowed friends and family on the property for hunting. Overall, 87 percent of randomly sampled landowners had some recreational hunting on their property, with half of those landowners reserving hunting for personal or family use, 31 percent having hunting clubs, and 6 percent with guided operations (fig. 1).

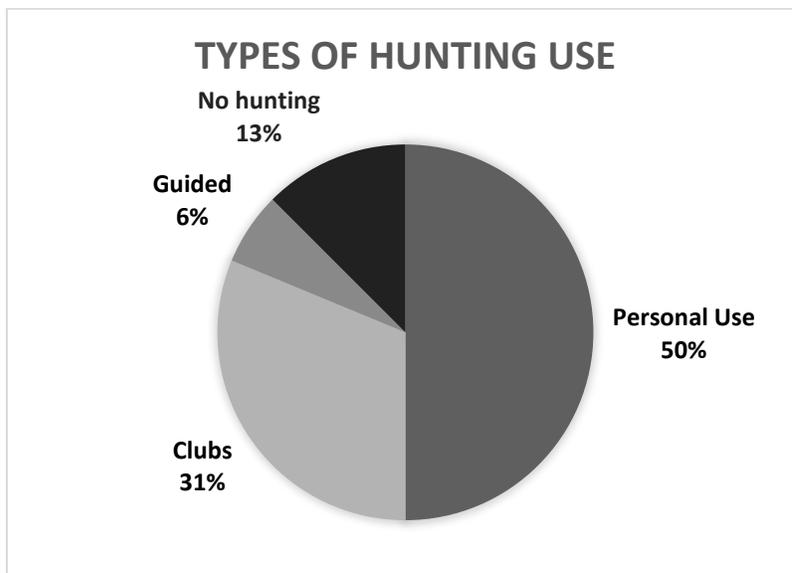


Figure 1—Types of hunting use (or no hunting) on 16 randomly selected properties greater than 404 ha (1000 ac) in the Central Coast of California.

Results from interviews found large variation in earnings from hunting. Several landowners were primarily oriented towards livestock operations and had hunting clubs that earned marginal amounts of money (oftentimes just enough to pay for annual hay expenses or property taxes). Two properties were oriented towards hunting as a primary use, with relatively small or no income from livestock. One operation ran a simple hunting club with yearlong access, and earned gross income of \$10/0.4 ha (1 ac), with minimal expenses that resulted in profitable operations, while the other maintained employees and facilities for the hunting club, which resulted in higher gross income on the property, but also substantial costs which led this property to operate at a loss. One property in particular operated both livestock and hunting operations at high efficiency, using a guide service for hunting, and as a result appeared to earn higher levels of revenue than any other properties. I did not encounter properties earning money from fishing or wildlife watching, although one large property was oriented primarily towards personal horseback-riding recreation.

The availability of habitat in the form of shrub cover, oak trees and grassland was an important need for the availability of hunting operations. Properties composed of almost entirely of grasslands had little wildlife availability for hunting operations, and generally viewed feral pigs as pests that they sometimes would pay others to help manage. This suggests an interesting shift in perspective about pigs, with some landowners viewing them as a cost to a primarily livestock operation, while those seeking income from all available streams found a source of income from the presence of pigs.

In keeping with rangeland research (Huntsinger and others 1997), many landowners were not focused on earning income from their land and instead utilized the property for personal enjoyment. Others seemed content with their income as it stood from livestock operations alone and did not want to invest the time it would take to set up a hunting operation. The most common reason that landowners did not have hunting on the property was that they did not want hunters disturbing other aspects of their livestock operation.

Interviews confirmed that rangelands were marginal income generating operations when considering the cost of capital that is invested in the land. Operations trying to make income from the property grossed between \$10 to \$30 per 0.4 ha (1 ac), not including costs of labor and management. Land prices for rangelands in the Central Coast region oftentimes range from \$1000 to \$2000 per 0.4 ha (1 ac). Dividing annual gross income by land value only (the primary capital cost for these operations) results in estimated gross returns from operations in the range of 0.5 percent to 3 percent, not including the cost of labor and other expenses. These estimates should be viewed as rough approximations given that interviews did not gather detailed accounting records, but instead relied on landowner's general estimates at the time of the interview. Furthermore, these estimates do not include capital appreciation of land over time. Nonetheless, the results show the relatively small returns that can be expected in annual cash flow from rangelands in the central coast of California.

Are conservation practices incentivized by recreational use?

Interviews found that in many cases landowners were managing for wildlife-associated recreation, but at times utilized practices that could have some negative repercussions for other aspects of the ecosystem. Although some landowners utilized practices that conservation professionals recommend, such as leaving cover for wildlife and minimizing risks of invasive species, many others were interested in attaining benefits for desired wildlife species through more intensive management

actions such as the planting of food plots or introducing or maintaining non-native game animals such as feral pigs and wild turkeys.

I found that most landowners maintained water resources, such as stock ponds and water troughs, which were utilized for both livestock and wildlife populations. It appeared as though the primary motivation for installing and maintaining water sources was for livestock operations, although several of these landowners had implemented wildlife escape ramps into troughs, which helped reduce mortality of wildlife that fell into troughs. At least one landowner implemented water sources at ground level, designed specifically for wildlife access.

Several landowners implemented practices to maintain habitat for wildlife, such as creating and maintaining brush piles for wildlife as well as leaving cover for wildlife by reducing grazing in certain areas. Several landowners conducted some level of brush management as a means of increasing grass and forb production; although, areas where brush was cleared tended to represent very small percentages of property ownership. There did not appear to be a sufficient benefit to justify the expense of widespread clearing of brush. I did not encounter landowners who had implemented any planting of oaks, nor did I find many landowners managing grazing to protect riparian areas.

I found evidence that two landowners purposefully either introduced or maintained exotic game species to improve hunting opportunities as part of the recreational use of the property. In one case, landowners introduced wild turkey (*Meleagris gallopavo*) to their property to establish a population for hunting, and several other properties benefitted from the regular occurrence of wild pigs (*Sus scrofa*) on the property, sometimes taking actions such as planting food plots or limiting harvest to help maintain high populations for the hunting operation.

In several cases, the landowner planted agricultural crops as food plots for wildlife. The most common species planted was barley, which was oftentimes planted to support or enhance feral pig populations. In at least one case, areas that were previously planted had converted to dense infestations of the invasive species, yellow starthistle (*Centaurea solstitialis*), and one patch was planted over a small remnant patch of relatively rare native grassland. At the same time, one landowner was familiar with the risks of invasion of weeds following food plot planting, and as a result carefully selected locations for such plot and restricted these areas to previously cultivated areas.

Most landowners had a lack of knowledge of current harvest ecology recommendations for hunting, which oftentimes recommend the harvest of female deer to enhance production and increase the buck to doe ratio of the deer population. Doe harvest can result in increased deer production through increasing fawn survival due to reduction in competition by other does (known as a density-dependent response) (Macaulay and others 2013). The main exception to this trend was found in landowners and land managers of property enrolled in the Private Lands Management (PLM; see discussion) program, who had a much better understanding of harvest ecology, and at the same time implemented various habitat improvement practices that benefited wildlife. One PLM land manager safeguarded fawning areas from overly intensive grazing and implemented regular deer surveys on his property, allowing him to document changes in deer populations over the years as well as population parameters such as fawn survival rates. Others implemented re-vegetation of riparian zones, reduced grazing intensity on certain pastures, and removed old, unused barbed wire fences from the landscape.

Most landowners practiced some form of predator control, and several complained that government regulation had hampered their ability to control

predators. Much concern was directed towards state laws implemented since 1972 that have significantly limited the ability of landowners to use lethal control of mountain lions, culminating in the passage of Proposition 117 in 1990 (CDFW 2007). Predator control can be a controversial practice, and landowners noted that many state Department of Fish and Wildlife biologists advocated that game species populations were only minimally affected by predation. However, at least one landowner performed regular November deer census surveys and documented an improved fawn survival rate from .28 fawns per doe to 1.1 fawns per doe as a result of an intensive 2-year effort to reduce coyote populations, which is consistent with studies of coyote control on white-tailed deer fawn survival (Beasom 1974). Although the practice of predator control of coyotes is opposed by various environmental groups (Project Coyote 2014), no landowners were able to eliminate coyote populations on their property despite years of intensive efforts in control. As such, it appears that the persistence of coyotes on the landscape is not threatened, and that control efforts serve to temporarily reduce the density of coyotes on the landscape.

Discussion and conclusion

Interviews with landowners and land managers in California, uncovered large variation in earnings from recreational hunting operations, which suggests that there is an inefficient market where the value of recreational hunting rights is not well established or known. Although some landowners were implementing habitat improvement practices on their property, I found that most did little habitat improvement and instead either harvested game that was already occurring on the property, or focused on planting food plots and performing predator control. This suggests a high potential for government efforts through Cooperative Extension to inform and educate landowners about the market potential as well as best practices for wildlife management for recreational hunting enterprises. Because the most often cited reason for not allowing hunting on the property was concern about hunters disturbing livestock operations, there appears to be a significant opportunity to educate hunters about how to minimize disturbances to ongoing ranching operations.

With the exception of properties enrolled in the PLM program, there appeared to be a lack of knowledge of many wildlife management practices that are currently recommended, such as deer census counts, estimation of fawn survival, and collection of information about age of harvested deer. The PLM program, administered by the California Department of Fish and Wildlife (CDFW), is a government program that has the potential to improve conservation outcomes associated with recreational use. This program was developed in the 1980s and allows landowners greater flexibility over seasons and harvest in return for improved conservation practices. Yet, despite the potential for benefits for both landowners and natural resources, it has relatively low adoption rates with 101 landowners currently enrolled in the program statewide, representing just over 404 686 ha (1 million acres) of private land (approximately 2 percent of private land in California) (CDFW 2014). Although participation has increased over the years, (in 1988, 54 landowners covering 284 494 ha (703,000 ac) were enrolled) there appears to be a large potential to expand this program, which appears to result in increased implementation of conservation practices. One concern for future expansion that may need to be addressed is the cap on elk tags, which is currently set at 250 tags per year. Expanded adoption of the PLM program could also result in increased ability of ranchers to

maintain their livestock operation by diversifying income streams (Huntsinger and others, 2014)

In addition, results confirm the findings of Smith and Martin (1972), which showed that land prices for rangelands are far higher than would be expected given the income that can be made from ranching operations. This is likely due to the non-monetary enjoyment and benefits that landowners gain from the property, as well as anticipated capital appreciation in the value of the land in the future. The lack of detailed accounting by land managers of the expenses associated with management practices and the difficulty in attributing revenue benefits from particular management practices makes an economic analysis of management practices difficult. Furthermore, the time lag between the implementation of management practices and the potential for increased returns to recreation further complicates making direct connections between management practices and recreation benefits.

In conclusion, while landowners and managers implemented some conservation practices to enhance the recreational values on their properties, there appeared to be many opportunities to enhance this work. There also appeared to be a lack of knowledge about the income-earning potential of hunting, as well as significant distrust of hunters by landowners. Ongoing outreach efforts could serve to improve relationships between hunters and landowners and increase the conservation practices performed on properties, which could improve the potential to earn revenue from recreational use.

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