Payments for Ecosystem Services: A California Rancher Perspective

Conservation Economics and Finance Program White Paper

Molly Cheatum, Frank Casey, Ph.D, Pelayo Alvarez Ph.D, and Ben Parkhurst

September 2011

This study can be found online at:
http://www.defenders.org/programs_and_policy/science_and_economics/conservation_economics/incentives/index.php

Suggested citation:
Cheatum, M., F. Casey, P. Alvarez and B. Parkhurst. 2011. *Payments for Ecosystem Services: A California Rancher Perspective*. Conservation Economics White Paper. Conservation Economics and Finance Program. Washington, DC: Defenders of Wildlife. 65pp.

Authors: Molly Cheatum, Conservation Economics Associate, Conservation Economics and Finance Program, Defenders of Wildlife; Frank Casey, Ph.D., formerly the Director of the Conservation Economics and Finance Program at Defenders of Wildlife, currently the Ecosystem Services Theme Leader for the Science and Decisions Center, at the U.S. Geological Survey; Pelayo Alvarez, Ph.D., Conservation Program Director, California Rangeland Conservation Coalition, Defenders of Wildlife; and Ben Parkhurst, Graduate Candidate, Duke University.

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California Cattlemen's Association

Defenders of Wildlife is a national nonprofit membership organization dedicated to the protection of all native wild animals and plants in their natural communities.

National Headquarters
Defenders of Wildlife
1130 17th St. NW
Washington, DC 20036 USA
Tel.: (202) 682-9400; website www.defenders.org

September 2011

This research was supported by the California Conservation Innovation Grant Program through the United States Department of Agriculture (USDA), Natural Resources Conservation Service.

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Acknowledgements

We would like to express our appreciation to the California State office of the United States Department of Agriculture Natural Resources Conservation Service for supporting this research and subsequent report through the Conservation Innovation Grants Program. This program supports the development and adoption of innovative conservation approaches. This report attempts to identify the feasibility of creating ecosystem service payments and markets for California ranchers for enhancing the productivity and ecological viability of rangeland ecosystems. This report would not be possible without the support of The California Rangeland Conservation Coalition (CRCC) along with its members. We would also like to thank the CRCC partners, including the California Cattlemen's Association (CCA), the California Rangeland Trust (CRT), and the California Wool Grower's Association (CWGA) for distributing our survey and encouraging their members to participate. There are several individuals from these groups who assisted us in this research project by lending their valuable time and insight on designing and distributing the survey, including Tracy Schohr (CRCC), Matt Byrne (CCA), Lesa Carlton (CWGA), and Leigh Geren (CRT). We thank them for their input.

During the initial phase of this study we received advice and technical input from an advisory committee that included persons from the ranching, university, and conservation communities. We would like to thank ranchers Mel Thompson and Darrel Sweet, Dr. Lynn Huntsinger from the University of California at Berkeley, Dr. Louise Jackson from the University of California at Davis, Dr Hannah Gosnell from Oregon State University, Belinda Morris of the Environmental Defense Fund, Kelli McCune of Sustainable Conservation, and Ben Higgins of the California Rangeland Trust for reviewing, commenting, and testing the questionnaire we sent to ranchers. In addition, we would like to express our sincere appreciation for the individuals involved in two focus groups that aimed to test the questionnaire and determine potential standards for Payments for Ecosystem Services (PES) programs or markets in California. We are very grateful to Scott Stone, Hank Stone, Casey Stone, Darrel Sweet, Jeff Wiedeman, Clayton Koopman, and Chris Donati for sharing their perspectives and lending their truly valuable time to assist us in making sure the survey would be well received. We are also indebted to Kelli McCune of Sustainable Conservation, Ashley Rood of the Environmental Defense Fund, Andrea McKenzie of the Santa Clara County Open Space Authority, Karen Buhr of the California Association of Resource Conservation Districts, Jeremy Sokulsky of Environmental Incentives, Belinda Morris of Environmental Defense Fund, and Fraser Shilling of the University of California at Davis for sharing with us their expertise and insights on ecosystem markets. Special thanks to Aaron Jenkins from Duke University for assisting us throughout the survey process and approving the use of a survey developed by him and Dr. Randy Kramer at Duke University.

We would like to express our thanks and gratitude to Tim Male, Kim Delfino, Jessica Musengezi, and Clayton Ogg of Defenders of Wildlife for reviewing the final draft of this report and providing recommendations for improving it. Finally, we would like to extend our gratitude to the many California ranchers who donated their time and effort to participate and complete the survey.

Executive Summary

The rancher survey results presented in this report are an important first step in identifying the context of the supply side of ecosystem services provided by California rangelands and exploring the possibility of making Payments for Ecosystem Services (PES) programs or markets a reality for California ranchers. Our analysis describes 158 survey respondent's demographics, their knowledge and attitudes towards current conservation programs, their interest in participating in PES programs, and what attributes of a potential PES are most important to them. Our findings suggest that the environment in California is ripe for implementing alternative PES conservation programs, for the following reasons.

First, the marginal profitability of most ranching operations in California is one of the factors that contributes to land conversion and represents a real threat to California rangelands and the collective societal benefits these lands provide. We found that more than half of respondents were uncertain about whether or not their families would continue ranching. About one third of ranching families who responded to the survey indicated their ranching business either broke even, or lost money in 2009. This suggests there is a serious need for the implementation of successful conservation programs that incentivize the provision of ecosystem services and allow ranchers to avoid further loss and fragmentation of these important ecosystems.

Second, new conservation programs need to be developed or existing ones modified based on rancher's preferences, and at the same time provide measurable conservation benefits while preserving working landscapes for future generations. Among existing land conservation programs, the Williamson Act, also referred to as the California Land Conservation Act of 1965, is by far the most popular among respondents. However, it is important to note that the Williamson Act is an agricultural land conservation program and is not focused on measurable environmental outcomes that would improve valuable ecosystem services such as watershed protection. Satisfaction among participants in the individual Federal natural resource conservation programs remains high. Those Federal programs that offer cost-share and technical assistance (i.e. Environmental Quality Incentives Program (EQIP), Wildlife Habitat Incentives Program (WHIP), Conservation Security Program (CSP), and the United States Fish and Wildlife Partners for Fish and Wildlife (USFW - PFW)) were the most popular suggesting a future PES program or market may fare better if it contains specific practices and assistance.

Third, PES programs or markets should embody certain characteristics that would increase the likelihood of rancher participation and success. According to our choice-based conjoint analysis all three attributes (contract length, payment, and administering agency) were statistically significant and affected rancher's decisions to enter into a PES program or market. Flexibility is essential for increasing rancher participation. Programs that offer a range of options from set-aside programs (i.e. conservation easements) for permanency to performance based programs with shorter contract lengths will be more successful. Programs that enhance productivity of rancher's land and increase wildlife habitat are strongly preferred by ranchers and should be a focus of any future PES program.

New sources of funding (i.e. beneficiaries of ecosystem services) need to be identified and non-profit organizations need to play a key role in the creation and administration of these programs. Our findings suggest that these recommendations would attract ranchers not satisfied with current conservation programs and possibly attract ranchers not currently participating in conservation programs.

Fourth, any future implementation of a PES program will need to contain significant resources for outreach to ensure rancher participation and increase their familiarity with ecosystem services terminology and available programs. Outreach needs to combine new media and traditional channels to be able to reach out to a wide spectrum of ranchers and increase knowledge and participation in PES programs or markets.

In sum, our survey suggests there is an untapped group of ranchers in the Central Valley who are interested in providing ecosystem services framed around wildlife habitat and are comfortable with a non-profit administrator, if financial incentives are adequate and contract length is flexible.

Lastly, through our survey, working groups and the outcomes of a focus group held in March, 2011 we identified some future actions that should be taken into consideration while structuring alternative PES programs or markets in California. More research on and identification of potential public and private sector buyers of ecosystem services in California will be necessary to ensure all perspectives are represented as PES programs or markets are formulated. Top-down and bottom-up outreach approaches need to take place simultaneously. For example, creating a state framework like Oregon has done with Senate Bill 513, and at the same time developing pilot projects that connect buyers and sellers of ecosystem services, would be complementary efforts. At the same time, it will be necessary to identify stable funding streams and develop metrics that can represent measureable outcomes. Finally, we recommend the creation of a PES working group that could initiate conversations between buyers and sellers of ecosystem services. The working group could also be responsible for implementing policy that supports the development of PES programs or markets, leads the effort to aggregate all the players, and makes sure lessons learned and successes are widely shared.

I. Introduction

A. Background

California has more than 18 million acres of rangelands within and encircling the Central Valley and the interior Coast Range. This area is a unique and valuable natural resource for California as it includes a mix of oak woodlands, open grasslands, vernal pools, and wetland habitats. Much of the Central Valley grasslands and foothills are privately owned and managed primarily as rangelands for livestock production. However, these rangelands also produce a myriad of ecosystem services such as wildlife habitat, watershed protection, open space and mitigation to climate change. Many sites on these private rangelands are the last, best remaining habitats for what were previously wider-ranging species such as Swainson's hawk, California tiger salamander, and San Joaquin kit fox. In addition, the majority of the water in California flows through private ranches. By restoring and maintaining healthy grassland and riparian areas, ranchers ensure that Californians enjoy a reliable source of clean water for urban, recreational, and agricultural uses. Ranching is also a vital part of the local economy, providing jobs and a local and wholesome food supply. Some ranches in California have been in existence for more than one hundred years and are part of a rich historical heritage. California's rangelands and oak woodlands are under severe threat from the pressures of land conversion and development.[1] As each acre of rangeland is converted to other uses, vital ecosystem services that benefit ranchers and the general public are lost.

In the summer of 2005, Defenders, along with the California Cattlemen's Association, worked with California ranchers, environmentalists, and agencies to adopt the California Rangeland Resolution. The Resolution is an unprecedented effort to bring together disparate parties to conserve and enhance private working landscapes and wildlife habitat within the Central Valley, surrounding foothills, and interior coast range. Signatories to the Resolution formed the California Rangeland Conservation Coalition ("Coalition"). Today, the Coalition is comprised of more than 100 organizations representing the ranching community, conservation groups, academia, and state and local government entities. They work to ensure the protection of California's private rangelands by supporting the viability of the ranching industry, educating the public on the ecological and socio-economic importance of rangelands, and by encouraging the adoption of sound land and habitat stewardship practices on rangelands.

The development of Payment for Ecosystem Services (PES) programs or markets for ecosystem services has the potential to increase the sustainability of the ranching industry by providing financial incentives to landowners, which could stem the rate of rangeland conversion in California. At the same time payments for ecosystem services provide a sound model to achieve quantifiable conservation goals. The Coalition and its partners are actively involved in the development of these

[1] Grazing lands in California have decreased by more than 385,000 acres between 1984 and 2008. This loss averages 16,000 acres per year, or about 25 square miles every year (State of California Department of Conservation, 2011).

PES programs or markets to ensure that payments are developed with the rancher's perspective (the supply side) in mind, increasing participation of landowners, and ensuring they are aware of all the advantages these opportunities provide.

B. Purpose

The purpose of this report is to present the results of a survey of rancher's perspectives, knowledge, and preferences for current and prospective resource conservation programs based on incentives for conserving or restoring ecosystem services. This information can assist in determining the structure and features that a potential PES program or market in California could embody. The data gathered in this report will be used to develop information for ranchers, environmental organizations and policy makers about potential PES programs or markets and how they can be structured to achieve maximum environmental goals consistent with economically viable production requirements in the Coalition focus area (Figure 1.1).

While similar efforts are underway throughout the United States through support from Conservation Innovation Grants to define and develop ecosystem service markets in the agricultural sector, this is the first such project to investigate the willingness of ranchers to participate in these markets, and the first to be applied to rangelands in the United States. As a result, this project will have wide implications for the development of ecosystem service markets in the western United States.

The following report provides valuable information for the Coalition and other agencies and institutions involved in the development of potential ecosystem services markets. This information will be useful for helping streamline outreach efforts aimed at informing landowners about PES programs or markets. The report also provides policy recommendations to state and federal authorities, including the national Office of Environmental Markets (OEM) regarding how such markets can be effectively structured.

C. Organization of the Report

The next section provides a description of the methodology used to create, distribute and analyze the rancher survey. Section 3 provides a description of the socio-economic characteristics of ranching operations in the Coalition focus area. Section 4 summarizes the rancher's preference for market attributes for a payment for ecosystem services program. Section 5 provides policy recommendations.

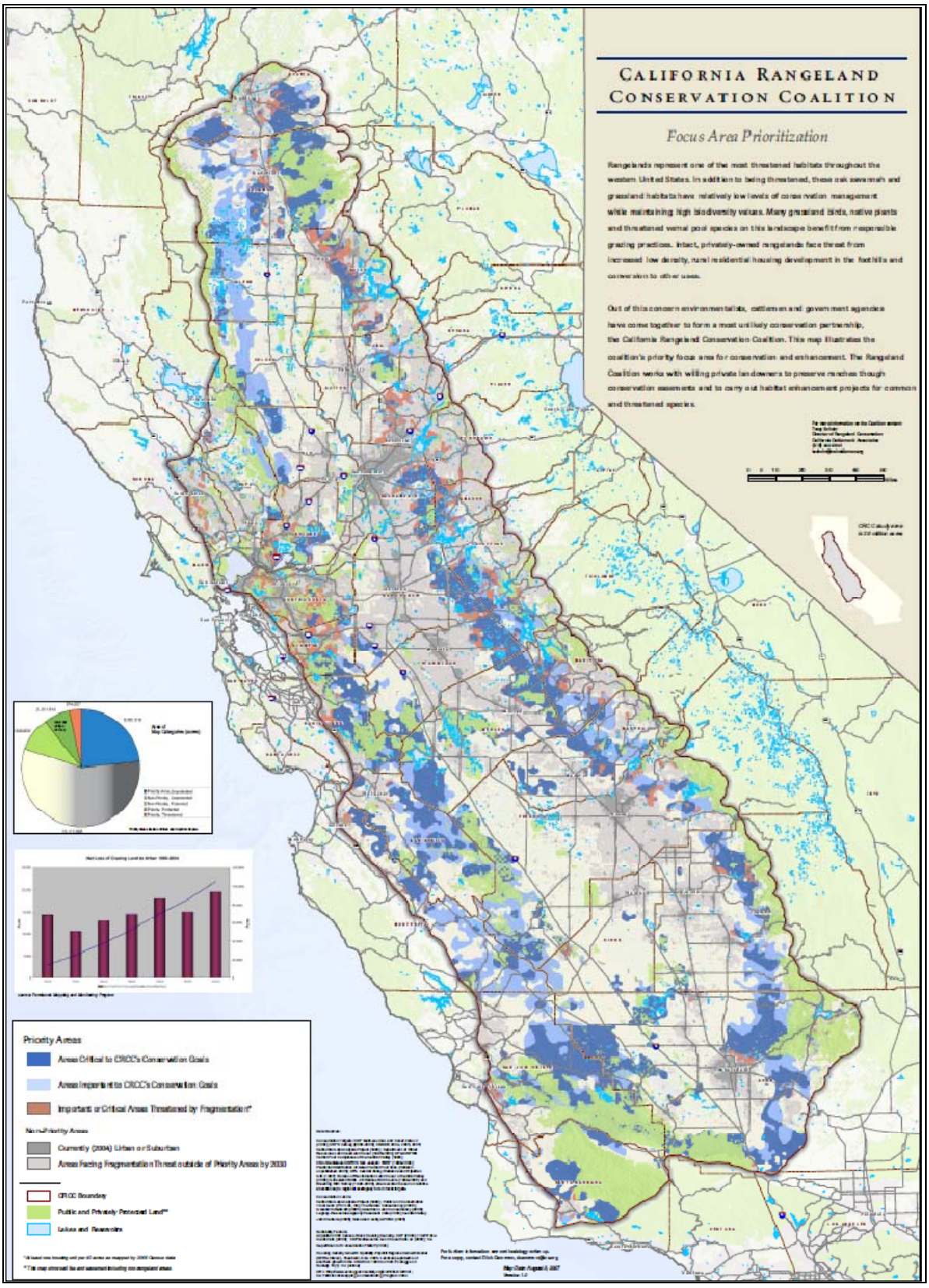


Figure 1.1: California Rangeland Conservation Coalition Priority Areas

II. Research Methods

This chapter defines and describes the design of the rancher survey and the compilation and management of the survey data, and describes the assumptions used in our analysis.

A. Survey Design and Methodology

The survey generated for distribution to ranchers in California was modeled after a survey designed by Duke University for farmers in North Carolina. This original template was designed by Randall Kramer and Aaron Jenkins at the Nicholas Institute for Environmental Policy Solutions, Duke University and focused on similar topics addressed within the rangeland survey - the role of government agricultural agencies, local development priorities, conservation programs, and payment for ecosystem services. An advisory committee composed of academic researchers, ranchers and staff from agricultural and environmental non-profit organizations was formed to guide the modification of the survey for ranchers in California.

In addition, a focus group to pre-test a draft survey was held on February 13, 2010 at the Yolo Land and Cattle Company ranch in Winters, CA (Yolo County). Seven ranchers participated and reviewed the survey to ensure that the questions accurately captured important features of ranching operations and current conservation practices implemented by ranchers in California. The ranchers were from Alameda, Contra Costa, Yolo and Butte County in Northern California. Frank Casey and Pelayo Alvarez served as the focus group moderators.

With the information gained from both the advisory committee and focus group, the draft questions were adjusted to reflect conservation programs and practices unique to California. In addition, a question on stacking and bundling ecosystem service payments[2] was added that asked ranchers their opinion on how this subject should be addressed. A series of choice experiments (also known as choice-based conjoint analysis) were included and designed to estimate the tradeoffs between choosing from various levels of three key program attributes: contract length, program administrator, and payment level in a simulated payment for ecosystem services program. Choice questions were similar to the North Carolina survey, but some questions were modified to reflect conservation payments received by rangeland owners in California.

Once the California survey was modified, it was reviewed by an advisory committee consisting of researchers and representatives from several Coalition partners, including those affiliated with the California Cattlemen's Association and Duke University. These expert reviewers not only provided advice on improving the survey for ranchers, but also on how to organize the printing and mailing of

[2] Stacking and bundling allow a landowner to access multiple sources of revenue from a piece of property that provides ecosystem services such as improved wildlife habitat, carbon sequestration or flood mitigation. Stacking refers to receiving payments for each service provided either in a voluntary or regulatory market and/or simultaneously accessing other forms of payments, such as conservation easements. Bundling refers to merging multiple ecosystem services from a piece of property into one single credit that can be sold through voluntary or regulatory PES programs or markets.

the surveys. On June 1, 2010, three hundred and eighty surveys were mailed to the California Cattlemen's Association (CCA) (200 members), the California Rangeland Trust (CRT) (140 members), and the California Wool Grower's Association (CWGA) (40 members). The members within these groups are all located within the boundaries of the California Rangeland Coalition focus area. The survey included a cover letter from the CCA, CRT, and CWGA explaining the purpose of the survey and encouraging their respective members to participate. A final version of the survey and cover letter are found in Appendix 1 of this report.

In addition to the mail survey, an online version was created on June 16, 2010, via surveymonkey.com and the link was advertised in electronic newsletters by the California Rangeland Conservation Coalition (1,400 recipients, not all of them ranchers) and the CCA (1,000 recipients, not all of them ranchers). A postcard reminder was mailed out July 21, 2010, to the recipients of the mail survey and a reminder was again sent via the above mentioned e-mail newsletters. The survey was also mentioned during cattlemen meetings and events during this same time period with a total of 250 producers informed verbally of the online survey. During this outreach, 20 surveys were handed out directly to producers. Targeted, personal emails were also sent from CCA staff to ranchers requesting their participation in the online survey or if they received a hard copy to return the completed survey. The personalized targeted email was sent to 105 ranchers. The survey was closed on September 13, 2010.

B. Data Management Process

Ten different versions of the survey were created for the choice questions (Question 24) to ensure that all combinations of the selected attributes were represented for the conjoint analysis. Each survey was identified and given an identification number (1-10). Then each survey was marked with a dot if it was from the CCA and not marked if it was from the CRT. Lastly, the survey was scanned and sent to the Defenders office in Washington DC for data entry and analysis.

The statistical analysis was completed through Excel, data was compiled into a spreadsheet and each question and response was coded. In addition to recording responses on a spreadsheet, we also recorded the date as to when the survey was received and entered, who entered it, and whether it was an online or hard copy version of the survey. If answers were illegible or a respondent put in a comment instead of an answer, the answer was highlighted and staff consulted with a second or third person to resolve the discrepancy. As the data was entered, a second person reviewed every other survey to minimize errors. STATA, a data analysis and statistical software package, was used to complete the conjoint analysis of the choice questions.

Of the 400 surveys mailed and/or given directly to producers, 94 hard copy surveys were received. For the online surveys, 91 recipients opened the survey, 64 started the survey without completing it, and 42 completed the survey in entirety. In total, there were 158 usable surveys used in the analysis. While downloading the data from the online surveys, we encountered difficulties in differentiating between the different survey versions (1-10). We were able to identify 32 online surveys, but had to

exclude another 32 from the conjoint analysis. However, all other responses within the survey were included in the general analysis (Table 2.1). The response rate could not be calculated because of the way the online surveys were distributed, so the results should not be extrapolated to represent the entire ranching community in California. Further research would be needed to corroborate our results.

Table 2.1: Responses used in the Analysis

	Total surveys mailed and given out[1]	Usable Hard Copies returned	Usable Online responses	Total usable surveys
General Analysis	400	94	64	158
Conjoint Analysis	400	94	32	126

[1]This does not include the online surveys that were advertised in newsletters to other groups besides ranchers; therefore, the data should not be construed to represent the entire ranching population within the state of California because the sample size and type is unknown.

C. Data Analysis Assumptions

There are a certain set of assumptions that should be acknowledged when conducting a voluntary survey and running the analyses. We have identified four assumptions that affect how the data is interpreted.

First, within the survey we included choices important to ranchers, but there may be other options that drive a rancher to become involved or not involved with certain conservation programs. Second, respondents are asked to make choices on some programs that only exist in abstraction. The respondents have no concrete basis for comparison except to existing conservation programs that are not similar. Third, if respondents believe they could influence a future program, they may respond to questions differently. For example, a respondent may choose higher payments if they believe they would be compensated with that amount, even though they would participate at lower payment levels. Or, a respondent may respond with a political bias if they want or do not want to see a program created. Fourth, voluntary surveys tend to attract respondents that feel strongly about these conservation programs (i.e. self-selection), whereas respondents who are more moderate in their positions are less likely to respond, potentially skewing the data towards a certain perspective.

III. Socio-Economic Characteristics and Resource Conservation Program Participation By California Ranchers

A. Introduction

This chapter summarizes rancher survey data by describing first, major socio-economic characteristics of ranching in California and second, rancher participation in various resource conservation programs. Section B provides a summary and analysis with respect to demographic characteristics and ranching experience of respondents, land ownership and management, rancher development priorities, the experience and satisfaction with existing conservation programs, and information sources with respect to resource conservation programs. Section C provides a general discussion of the implications of the survey results with respect to the development of payment for ecosystem services (PES) programs or markets.

B. General Survey Results

1. Respondent Demographic Profile

In order to provide a demographic context for rancher participation in resource conservation programs and potential interest in PES or other market-like incentives for the provision of ecosystem services, respondent information was obtained for rancher gender, age, education, income level, length of residency, ranch ownership structure, and off-farm work. Table 3.1 provides selected summary statistics for these variables, followed by more detailed information.

Table 3.1 Summary Statistics of Rancher Demographics

	Gender	Age	Education	Yrs. in resident county	Ownership Structure	Work off ranch?	Household Income
Survey Question	30	31	32	34	7	35	36
	75% Male	86% ≥ 46 yrs.	65%≥ 4-year degree	48.16 yrs. (mean)	54% private individual	71%of respondents	$10,000-$25,000 (median)

Gender and Age

The gender make-up of the respondent group was approximately 75% male and 25% female (Figure 3.1). Nearly 86% of the respondents were 46 years of age or greater, with nearly one-half of all respondents over the age of 60 years (Figure 3.2). Only 2% of all rancher respondents were less than 30 years of age, and about 12% were between the ages of 31 and 45 years.

Figure 3.1 Gender of Survey Respondents

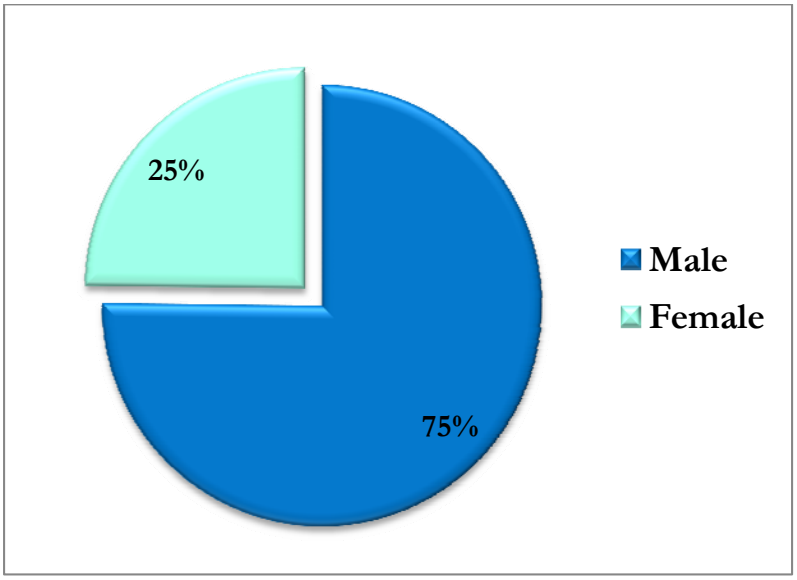
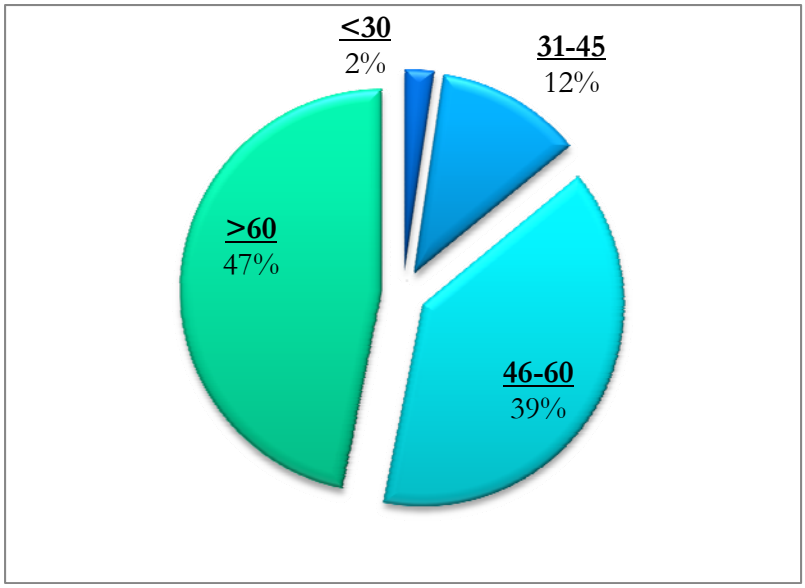


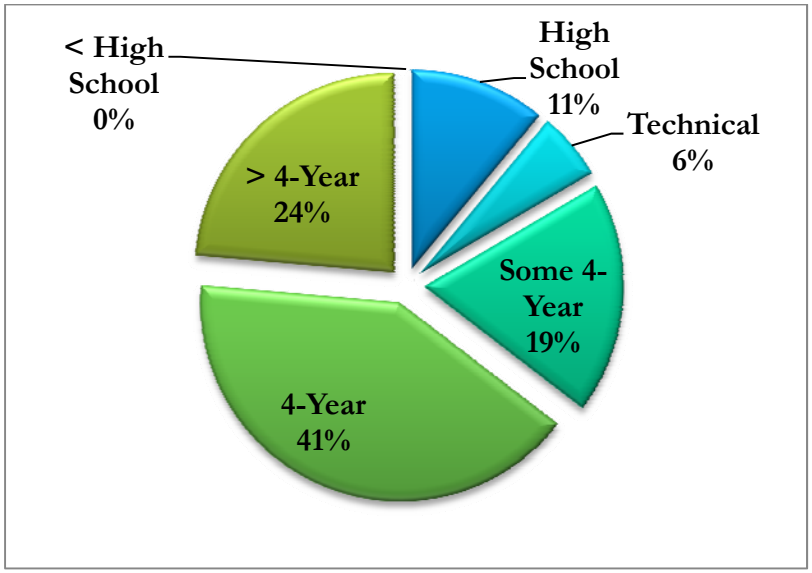
Figure 3.2 Age Distribution of Survey Respondents



Education

Figure 3.3 shows the breakdown in educational levels for the rancher respondents. More than 65% of all respondents indicated they had earned at least a 4-year college degree, and nearly a quarter of all respondents had gone beyond a 4-year degree. Only 11% of the respondents had a high school degree or less.

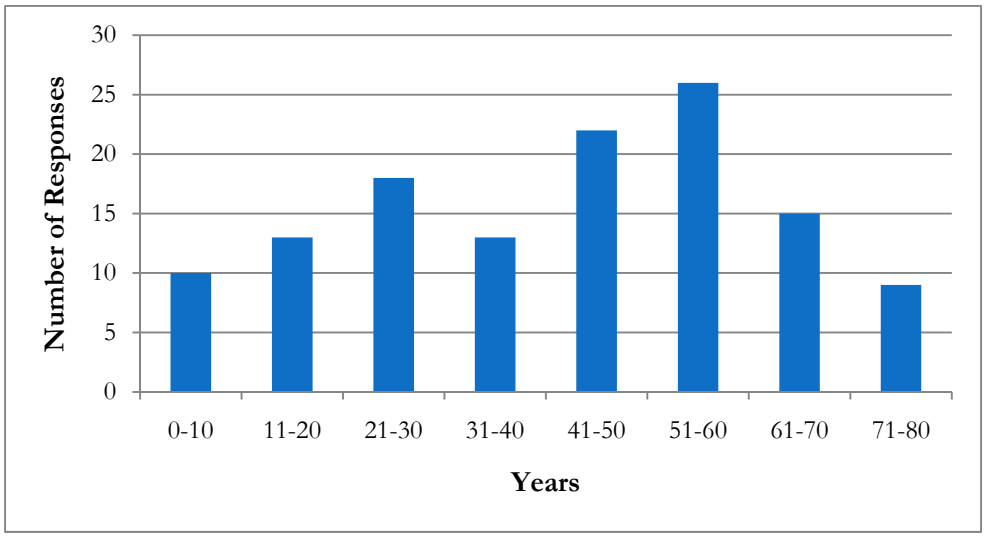
Figure 3.3 Educational Levels of Respondents



Length of Residency

The mean number of years of residency in a single county for ranchers was about 48 years (Table 3.1). However, as shown in Figure 3.4, nearly 48% of all respondents have resided in the same county for 41 years or longer.

Figure 3.4 Years Residing in County

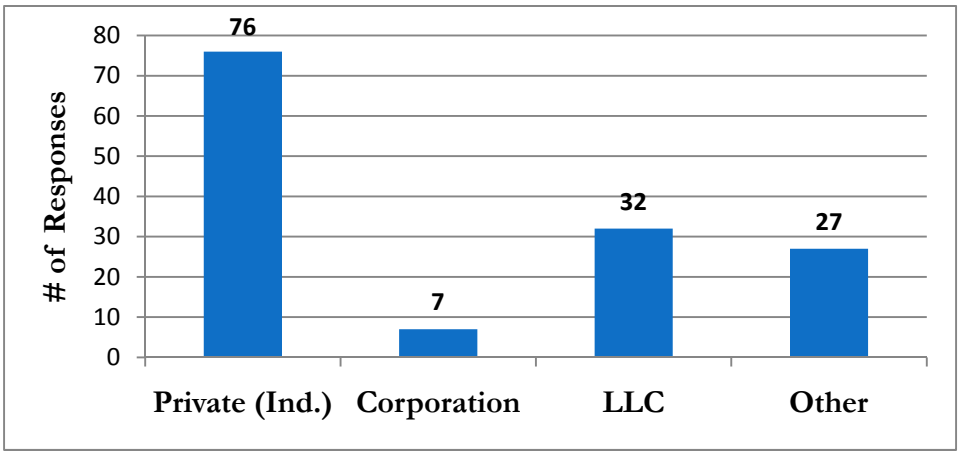


Ownership Structure

Approximately 54% of all ranches surveyed are privately owned (Table 3.1). However, nearly 42% of the ranches surveyed indicated that they had either a limited liability corporation (LLC) or "Other"

type of ownership structure (Figure 3.5). Ownership structure can be a factor when deciding how to participate in payment or market-type programs for ecosystem services.

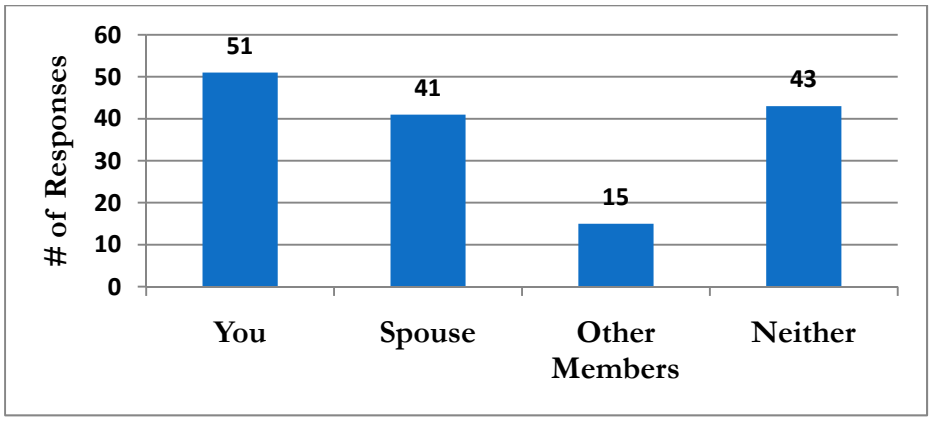
Figure 3.5 Ranch Ownership Structure



Off Ranch Employment

Seventy-one percent of the survey respondents indicated that they or a family member works off of the ranch (Table 3.1 and Figure 3.6). Nearly one-third of all rancher respondents (51) work off-ranch. Only 29% of all respondents indicated that no one in the ranch family works off-ranch.

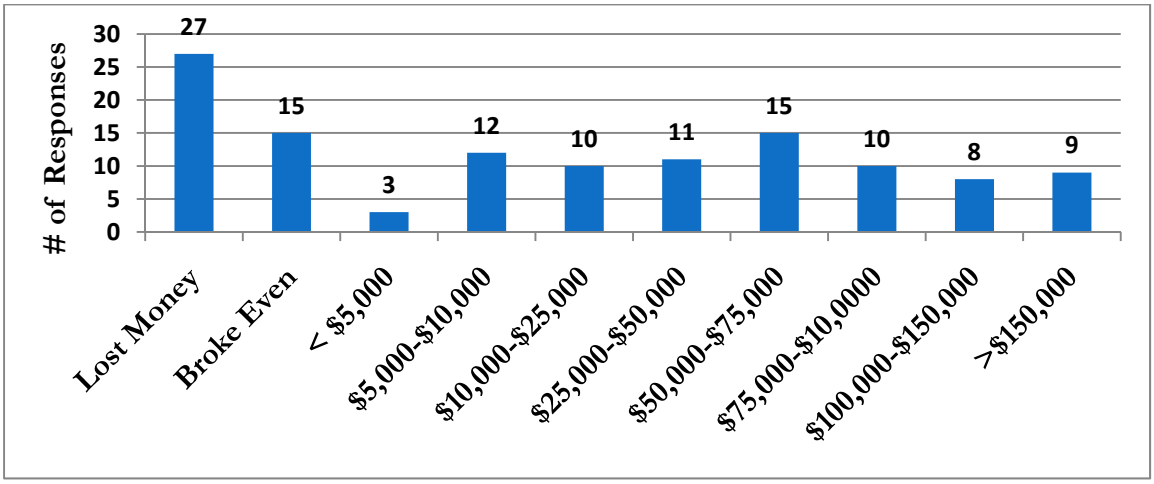
Figure 3.6 Ranchers and Family Members Working Off-Ranch



Household Income from Ranching

The final demographic variable solicited was ***net*** household income from ranching for 2009. The median ***net*** household income from ranching was between $10,000 and $25,000 (Table 3.1). However, the median does not reflect the large variability in incomes among the respondents. For example, 23% of all respondents indicated that their net household income from ranching was actually negative in 2009, and another 13% just broke even (Figure 3.7). About 28% of all respondents had an annual household income from ranching between $5,000-$50,000, and another 28% had incomes between $50,000 and $150,000. Nearly 8% of all respondents indicated a net household income of greater than $150,000.

Figure 3.7 Net Annual Household Income from Ranching (2009)



2. Ranching Experience and Land Ownership

In addition to basic demographic information, we surveyed ranchers with respect to their ranching experience and land ownership and /or land leasing practices. Summary statistics related to ranching experience and land ownership and leasing are provided in Table 3.2. Variables related to ranching experience include the years spent ranching by the respondent, how long his/her family has been in the ranching business, and whether or not there is an expectation that the next generation in the family will continue to ranch. Land ownership variables include overall acres owned and the acres leased in 2009 on both public and private lands.

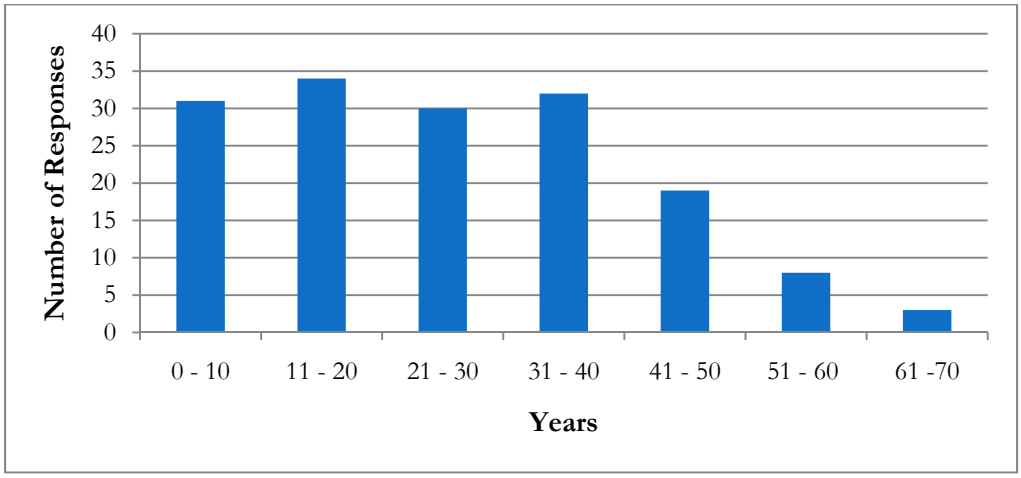
Table 3.2. Ranching Experience and Land Ownership

	Yrs. personally ranched	Yrs family has ranched in area	Believe next generation will farm?	Acres Owned	Public acres leased	Private acres leased
Survey Question	1	2	3	5	6a	6b
Stat	28 years	82 years	Yes 45% No 21% Don't Know 34%	1,000-3,000 (median)	<5,000 (median)	<5,000 (median)

Ranching Experience

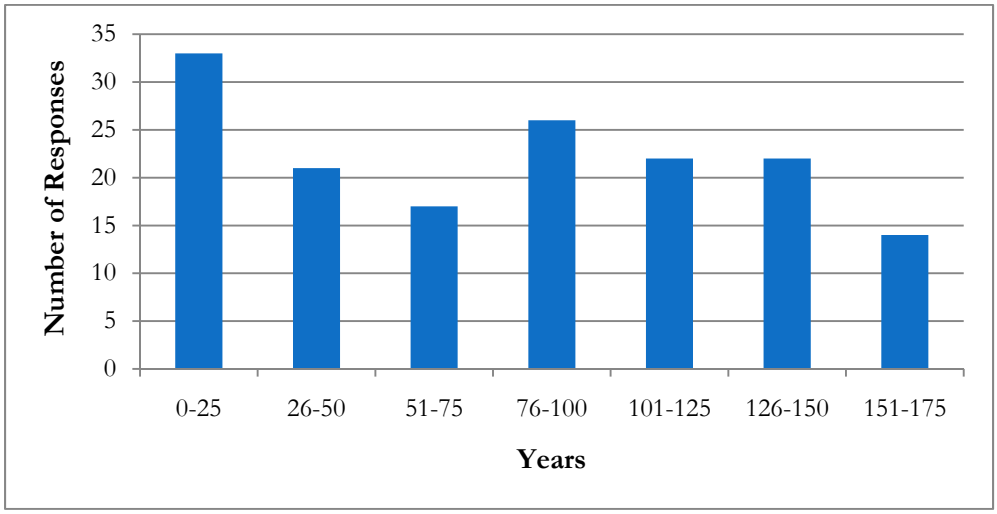
Over all respondents, the *average* number of years individuals spent in ranching in California was 28 years, and their families have been ranching for an average of 82 years (Table 3.2). However, about 20% of respondents indicated that they had been ranching for between 1 and 10 years (Figure 3.8).

Figure 3.8 Individual Years in Ranching



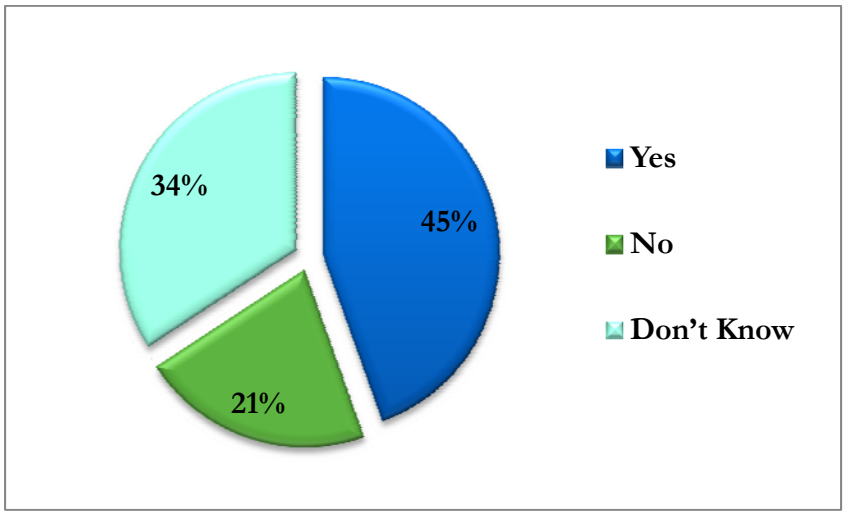
Although respondents indicated that their families had been ranching in the same area for 82 years on average (Table 3.2), almost 22% said that their families have been ranching in the same area for between 1 and 25 years (Figure 3.9).

Figure 3.9 Years Family Has Ranched in the Area



Despite the longevity that individuals and their families have spent ranching in California, there was a significant amount of uncertainty as to whether the next generation would remain in ranching (Figure 3.10). More than half of the respondents (55%) indicated that they either were not sure or did not believe that the ranch would be passed on to a future generation. This does not necessarily mean that all the land maintained by these ranch families would be converted to other uses. Twenty-one percent of rancher-respondents indicated that the family would discontinue ranching, and 34% were unsure. Forty-five percent of all respondents indicated that the family ranching operation would continue.

Figure 3.10 Expectations of Family Staying in Ranching

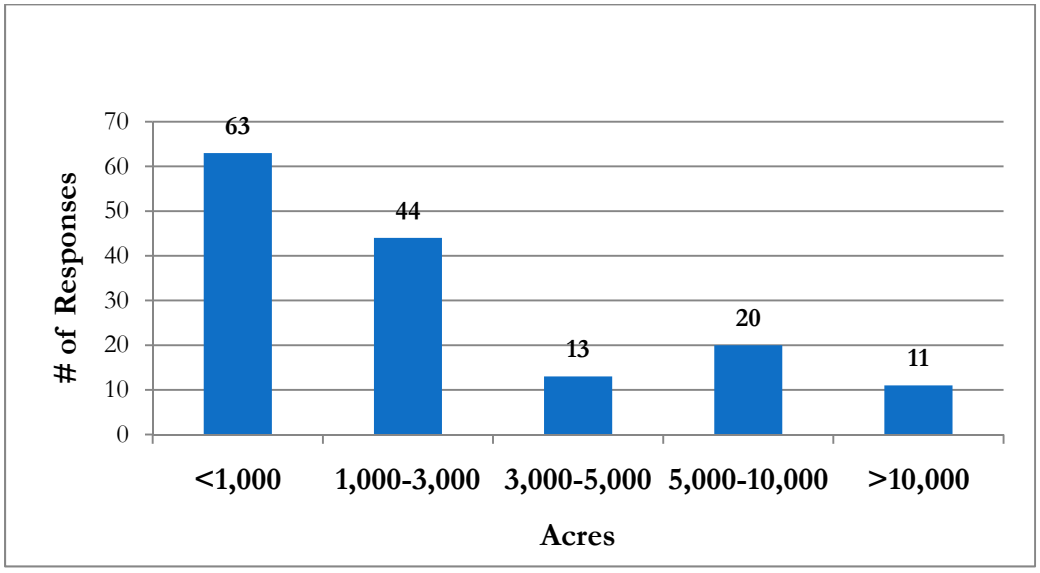


To better inform what the responses illustrated in Figure 3.10 mean for actual land area in ranching we correlated rancher responses to the acreage they own. The 21% of ranchers that indicated that they do not think their family would stay in ranching currently own about 55,000 acres. The 34% of ranchers indicating some uncertainty over whether a ranch will stay in the family currently own about 184,000 acres. These figures are not meant to imply that the nearly 240,000 acres (i.e. 375 square miles) represented by these two categories would be converted to other uses. Other ranchers could acquire some of this acreage. However, it does point to the potential scale of loss in ecosystem services and socio-economic values that could occur even if half this acreage were converted.

Land Ownership

The medium number of acres owned by rancher respondents is between 1,000 and 3,000 acres (Table 3.2). However, there is quite a bit of variability in land ownership within the ranching community (Figure 3.11). Nearly 42% of all ranchers reported owning 1,000 acres or less, and another 30% owns between 1,000-3,000 acres. Thus, most ranches (72%) can be classified as fairly small operations. About 22% of all ranches are between 3,000 and 10,000 acres, with only about 7% owning more than 10,000 acres.

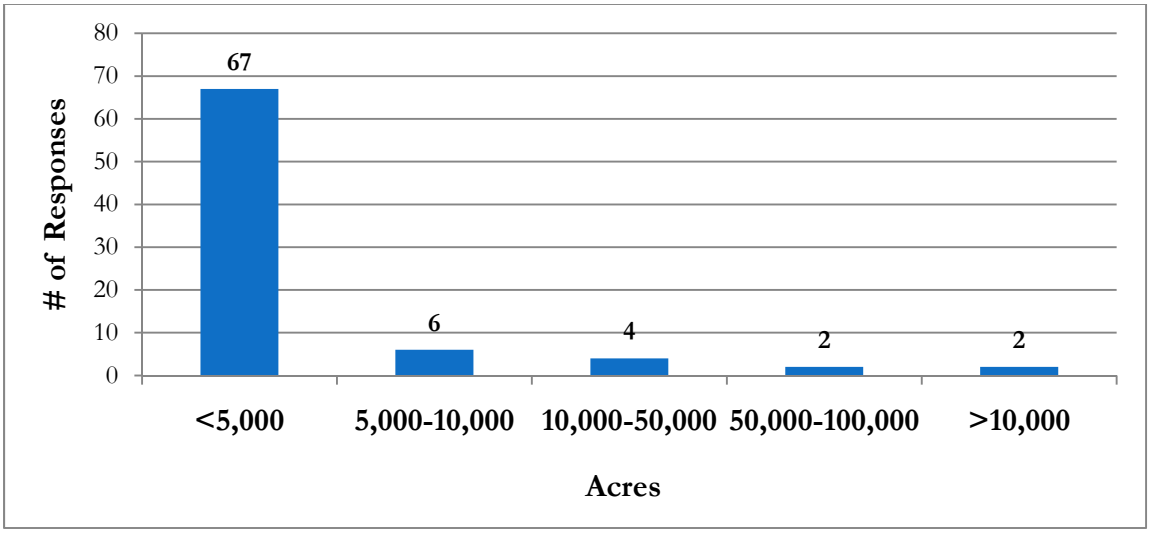
Figure 3.11 Land Ownership in 2009 (Acres)



Land Leasing

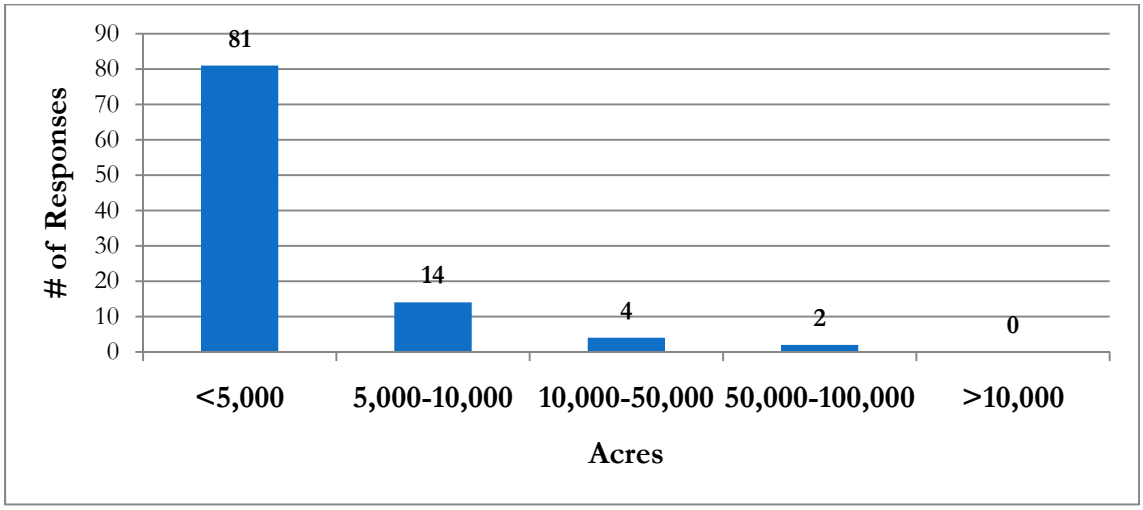
In addition to the outright ownership of land we asked ranchers about the amount of public and private land they leased for grazing in 2009. Fifty-four percent (81 ranchers) of all respondents said they leased some public land. Of these, eighty-two percent indicated that they leased less than 5,000 acres (Figure 3.12).

Figure 3.12 Lease of Public Land by Ranchers in 2009



There were 101 ranchers that indicated that they leased private land for grazing (67% of all respondents). Of these, similar to public land grazing leases, about 80% lease 5,000 acres or less per year (Figure 3.13).

Figure 3.13 Lease of Private Land by Ranchers in 2009



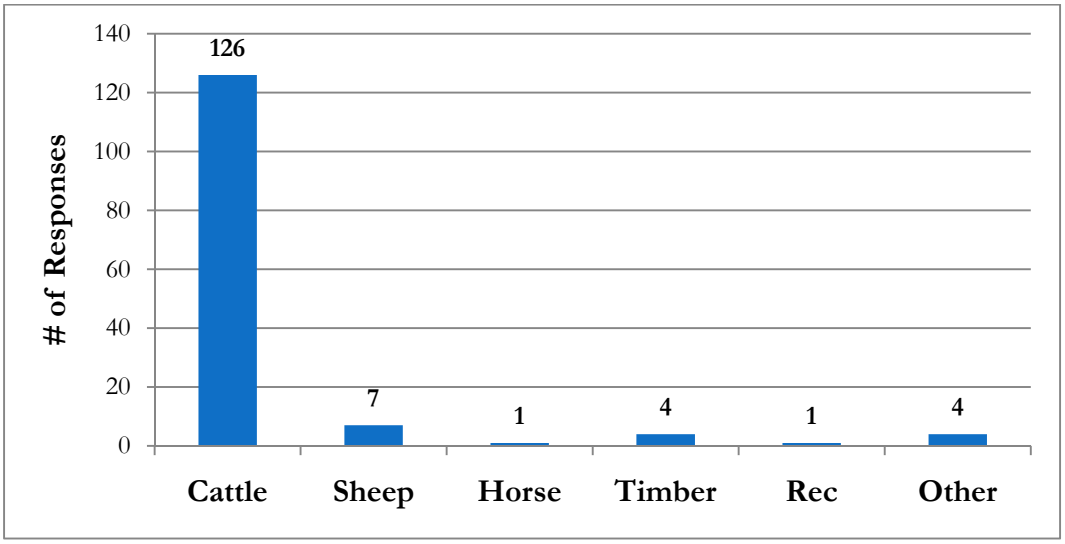
3. Land Management

Table 3.3 provides summary statistics for selected variables related to ranch land management. These include ownership structure, primary productive activities, whether hunting is allowed, and whether the respondent, as both an owner and renter of land, can influence decisions related to enrollment in resource conservation programs. Land ownership structure was already reported in Figure 3.5. The vast majority of respondents (88%) use their land for cattle ranching (Figure 3.14).

Table 3.3 Selected Land Management Characteristics

	Ownership structure	Primary land use	Land used for hunting?	Money from hunting leases	Renter Influence (1=No Influence, 5= Complete Influence)	
Survey Question	7	8	9	10	11	12
Stat	54% private	88% cattle	Yes 67% No 32%	$0 (median)	1.78 (Owner's perspective)	2.67 (Renter Perspective)

Figure 3.14 Primary Land Use by Ranchers



Hunting

In addition to livestock ranching, landowners can also use their ranches for hunting on either a commercial or recreational basis. Annual income levels from hunting ranged between $0 and greater than $10,000. Sixty-seven percent of rancher respondents indicated that they do use their land for hunting (Figure 3.15). However, 67% indicated that they don't make any money from hunting leases, meaning that hunting is limited to the family and/or by friends invited on to the property (Figure 3.16). Still, 26 ranchers reported earnings of at least $2,500 in 2009 from hunting leases, with about half of these making more than $10,000 per year (Figure 3.15).

Figure 3.15 Rancher Land Use for Hunting (2009)

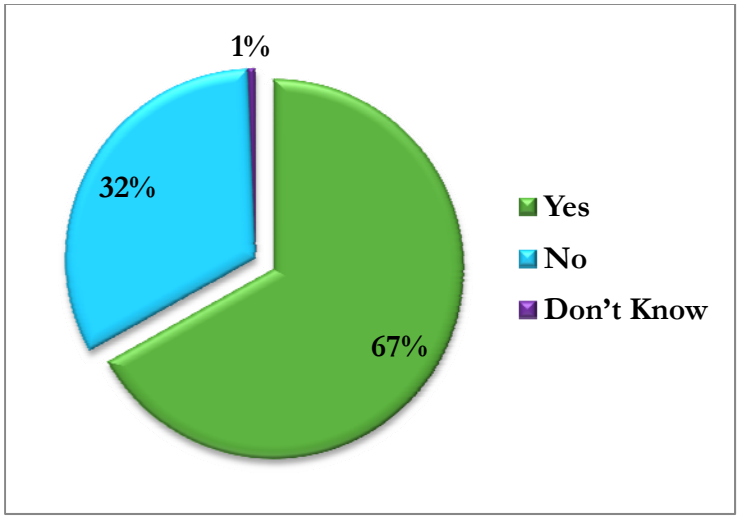
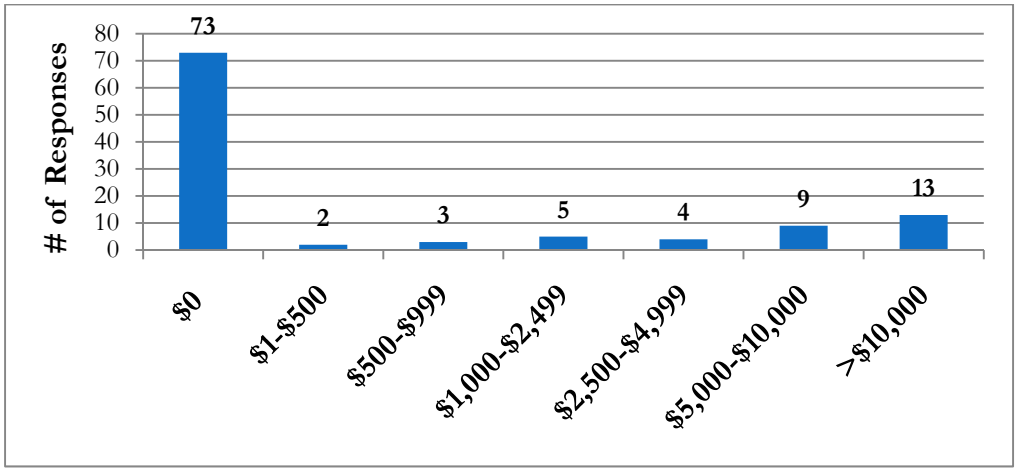


Figure 3.16 Rancher Income from Hunting Leases (2009)



Management and Conservation Program Enrollment

In addition to asking ranchers about their livestock and hunting activities as part of their land management, we inquired about the level of influence that a rancher who leases land had over decisions to enroll leased land in resource conservation programs (i.e. Farm Bill programs). This information was gathered at two levels: asking the land owner about the level of influence (on a scale of 1-5) that a lessee had on conservation program enrollment; and second, the amount of influence perceived by the lessee himself on such decisions. Figure 3.17 shows the amount of influence a lessee has on conservation program decisions, *from the landowner's point of view*. Across all respondents, the average level of influence was only 1.78, indicating that lessee's have very little to no influence of participation in conservation programs. Although the perceived level of influence is higher from the lessee's perspective (2.67), it is still in the range of little to none (Figure 3.18).

Figure 3.17 Lessee Influence on Conservation Program Enrollment: Owner Perspective

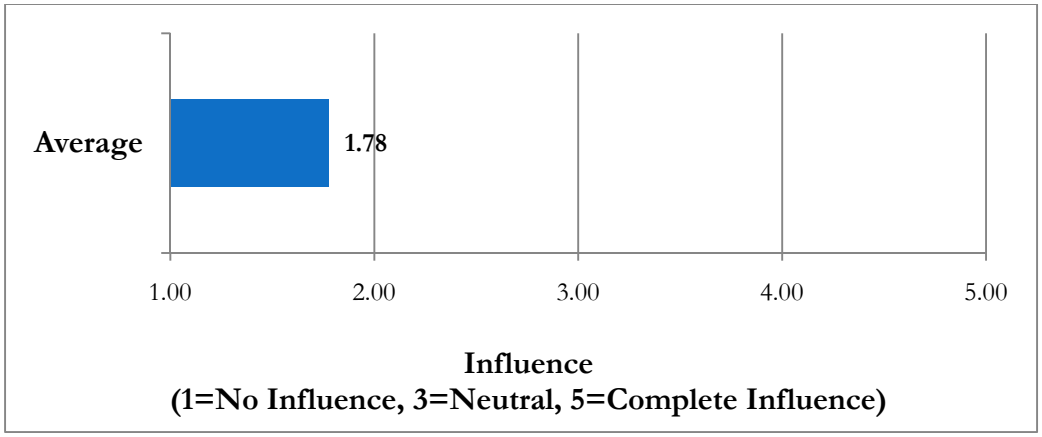
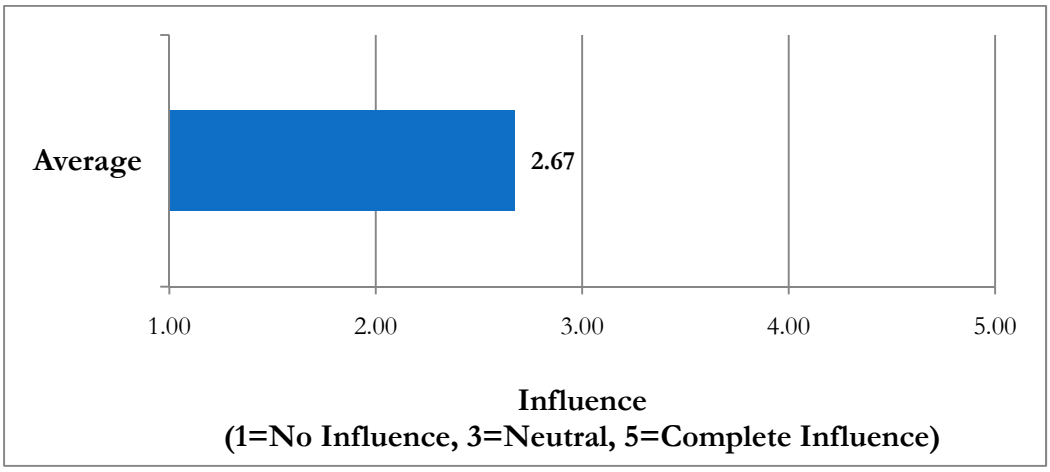


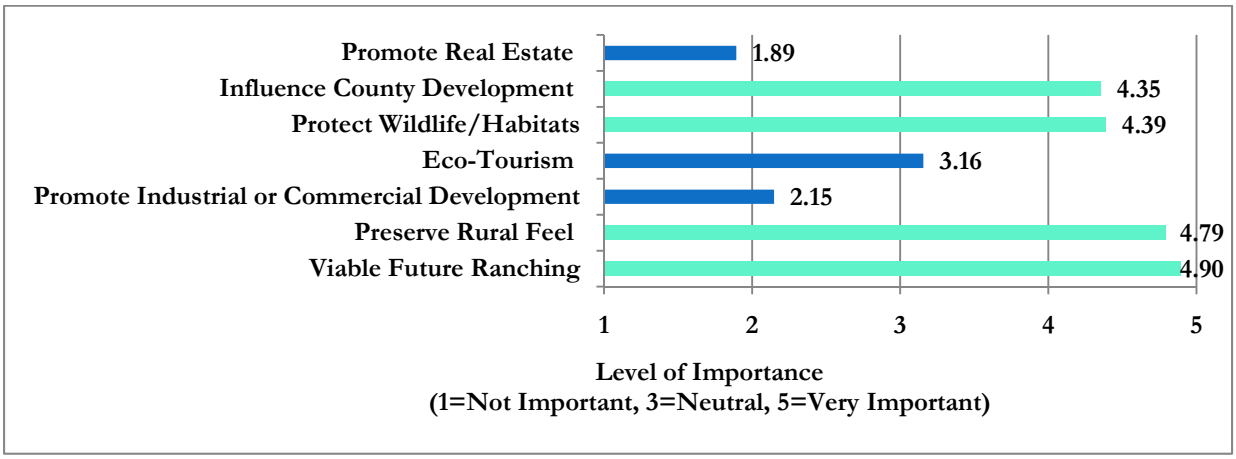
Figure 3.18 Lessees Influence on Conservation Program Enrollment: Lessees Perspective



4. Rancher Perspectives on Local Development Priorities and Issues

In order to have some context in which to consider rancher's demographic and land use characteristics we provided an opportunity for respondents to voice their opinions concerning local land-use priorities and issues related to development. On a scale from 1 (Not Important) to 5 (Very Important), we asked ranchers to rank selected land use priorities for their areas (Figure 3.19).

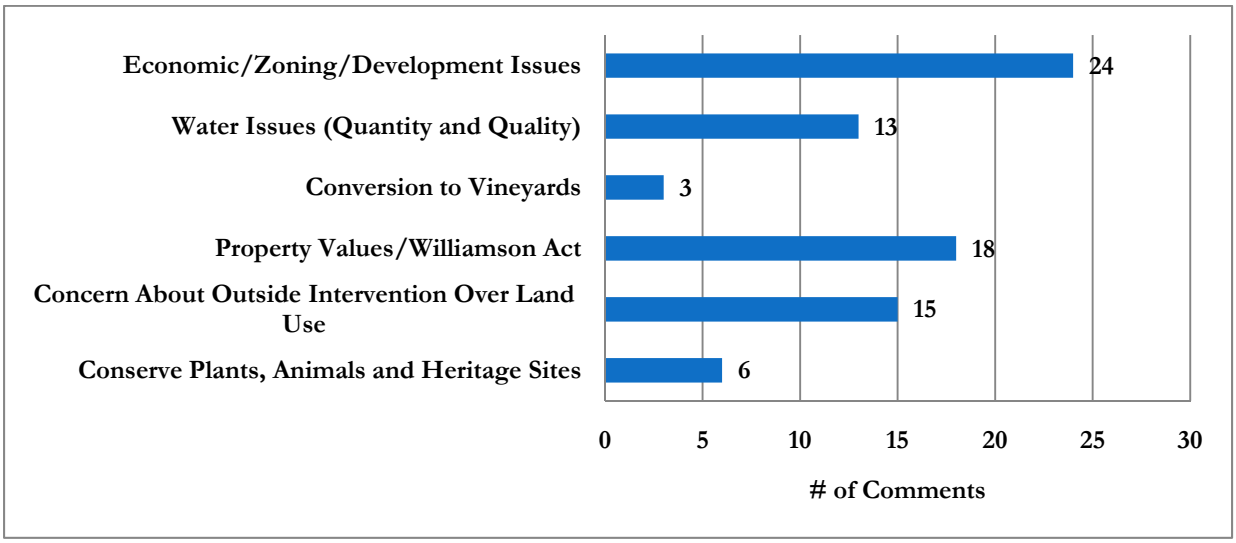
Figure 3.19 Local Land Use Priorities



By far, the most important priorities for ranchers are to keep ranching viable into the future and to preserve the rural feel of the area that they live in. Real estate, industrial, and/or commercial development are clearly not priorities for ranchers and conflict with what is important to them. That said, many ranchers believed that they needed to start having more influence over county land-use zoning and regulations (rank of 4.5). In addition to preserving the rural feel of their communities, ranchers also ranked high the need to protect wildlife and their habitats.

Figure 3.20 shows rancher responses to an open-ended question about what they perceived to be the local development issues in their communities. The issues shown in Figure 3.20 reflect a synthesis of the comment narrative that ranchers provided at the end of the survey. Of the 158 total respondents, 73 (58%) provided comments, which were grouped into 6 common categories (Figure 3.20). Some respondents provided more than one comment.

Figure 3.20 Local Development Issues Important to Ranchers



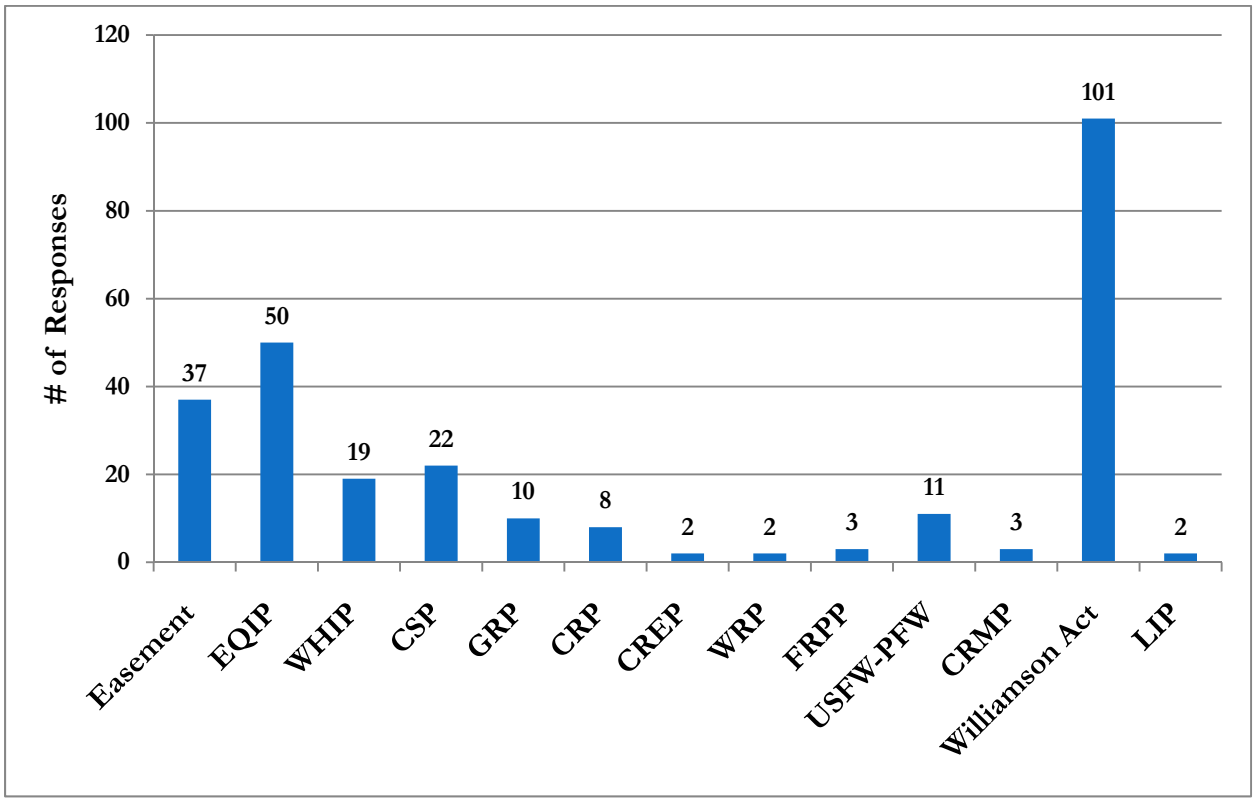
Of the total responses, nearly one-third of all ranchers consider economic development and zoning issues to be of major importance, which also corroborates the findings discussed in relationship to Figure 3.19. Next, the status of the Williamson Act, which allows agricultural land to be taxed in its use for agricultural production, and not at a rate set for "developable lands," is of great concern to many ranchers in light of the uncertainty over the continuation of the Act in the face of the California state budget crises. Other major issues highlighted within the survey include about 20% of ranchers are concerned about outside intervention (i.e. regulation) over land use, with another 17% of ranchers concerned about water issues that they may have to deal with in the future.

5. Participation in and Views Towards Existing Resource Conservation Programs

Before gauging rancher interest in participating in either payment for ecosystem services (PES) or markets, we wanted to get an idea of their current experience with mostly public federal and state conservation programs, their satisfaction level with programs and practices, constraints to participating in programs, and the sources of information used to learn about resource conservation programs.

Figure 3.20 shows the number of respondents who indicated that they participated in selected resource conservation programs, mostly federal[3]. Some respondents participate in more than one program. More than one-hundred respondents participate in the state Williamson Act, which allows a lower property tax payment for lands in agricultural production. In terms of income stabilization, ranchers consider the Williamson Act the most important conservation program offered to them.

Figure 3.21 Rancher Conservation Program Participation



Of the 151 rancher-respondents, 137 (91%) responded to the question about conservation program participation**.** However, some ranchers participate in more than one program. By far, the Williamson Act is the most popular state agricultural land conservation program (73%) in which respondents participate. Thirty-seven respondents (27%) indicated that they have some or all of their ranch under some type of conservation easement.

In general, participation rates amongst respondents in individual Federal natural resource conservation programs are low. Thirty-three percent of respondents indicated that they participate in EQIP, with 15% or less saying that they had enrolled in either CSP or WHIP. However, on the

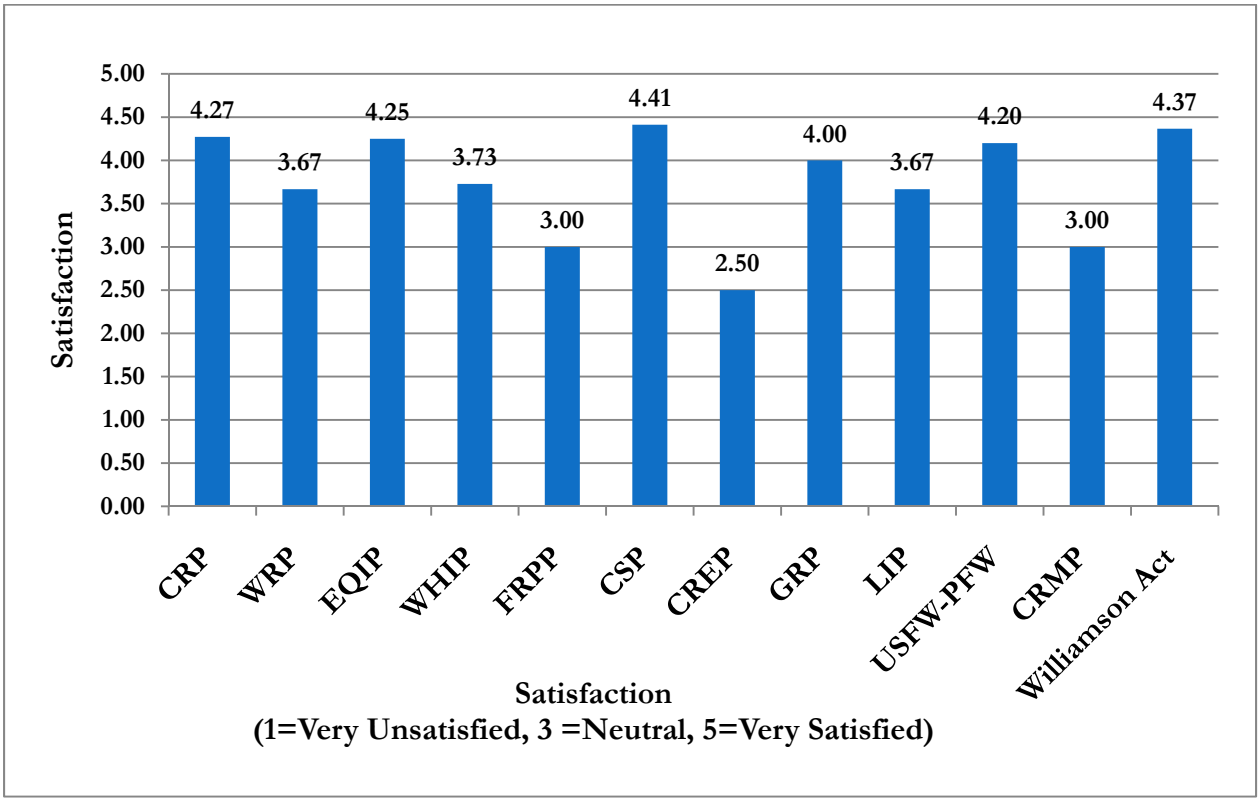
[3] There are eight federal USDA agricultural conservation programs housed either in the Natural Resources Conservation Service or the Farm Services Administration: the Environmental Quality Incentives Program (EQIP), the Wildlife Habitat Incentives Program (WHIP), the Conservation Security Program (CSP), the Grassland Reserve Program (GRP), the Conservation Reserve Program (CRP), the Conservation Reserve Enhancement Program (CREP), the Wetland Reserve Program (WRP), and the Farm and Ranchland Protection Program (FRPP). One other federal program, the Partners for Fish and Wildlife (USFW-PFW) is managed by US Fish and Wildlife Service, respectively. The Landowner Incentive Program (LIP) is managed by the California Department of Fish and Game.

whole, the Federal conservation programs that provide cost share and technical assistance for the implementation of conservation practices on working ranches (EQIP, WHIP, CSP, and the USFW-PFW) appear to be the most popular amongst respondents, with 95 ranchers (69%) participating in these programs. Apparently less popular amongst California ranchers are the so-called land "set-aside" programs (CRP, CREP, WRP, GRP, and the FRPP). There are only 25 ranchers (18%) that indicated participation in these programs. Low participation may be due to the lack of funding for these programs to pay interested ranchers, the low rental rates offered, and/or the lack of a particular landscape feature, i.e. wetlands.

In addition to the rate of participation in various publically funded conservation programs, ranchers were asked about their level of satisfaction with both conservation programs and the conservation practices eligible for public cost share funds within these programs.

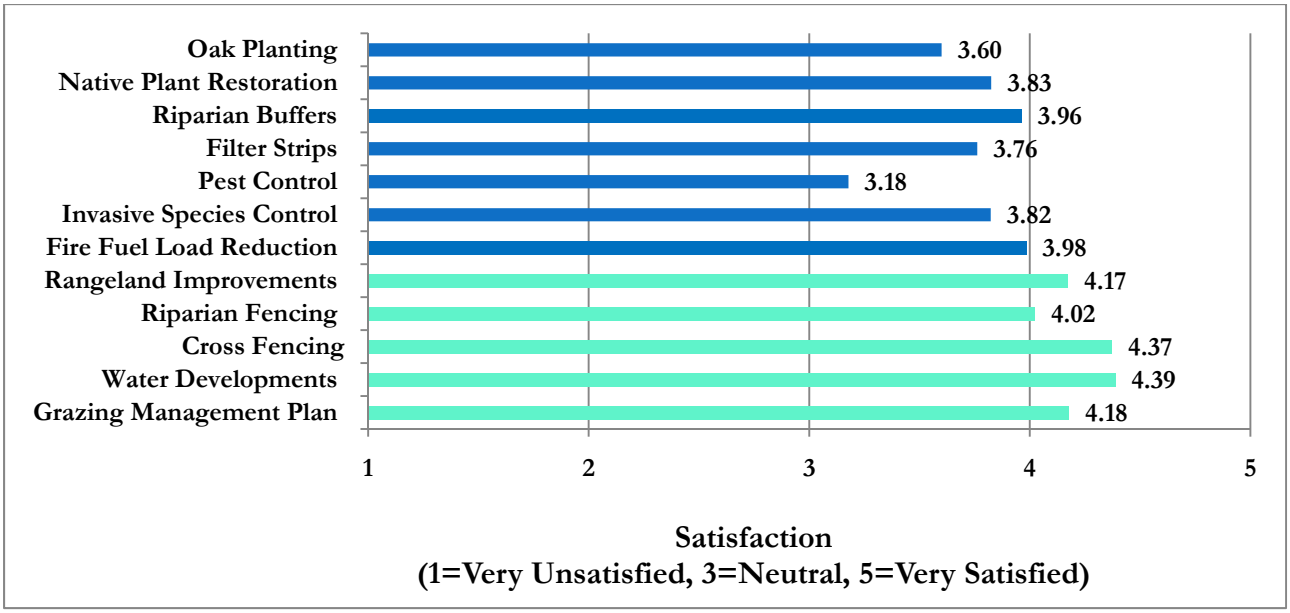
Figure 3.22 provides information on the average level of rancher satisfaction (on a Scale of 1 to 5) with the various conservation programs discussed above. For the most part, on average, ranchers rank themselves between "Satisfied" (4) or "Very Satisfied (5) for the majority of federal and state conservation programs listed. The lowest scoring federal programs amongst ranchers were the Farm and Ranchland Protection Program (FRPP) and the Conservation Reserve Enhancement Program (CREP).

Figure 3.22 Rancher Satisfaction with Resource Conservation Programs



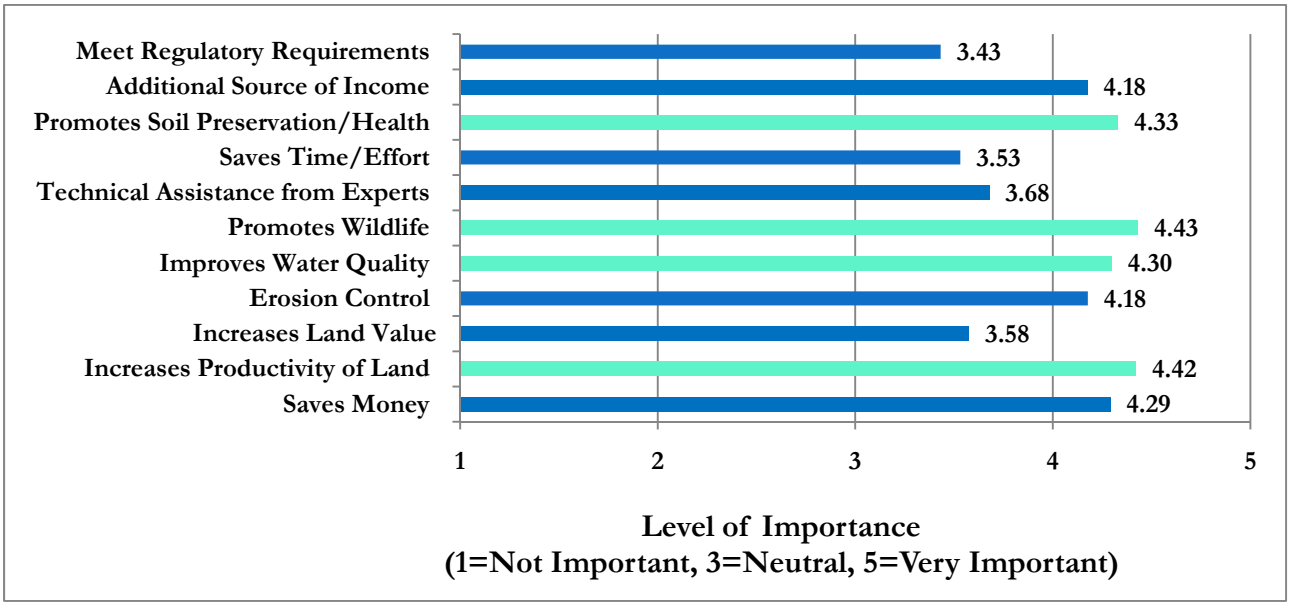
Ranchers were also asked about their satisfaction with specific conservation practices that have been adopted and implemented on California rangelands (Figure 3.23). Those specific practices that ranchers gave high average rankings for satisfaction included water development, cross fencing, grazing management plans, riparian fencing, fire fuel load reduction, and riparian buffers. The lowest average ranking was given to pest control

Figure 3.23 Rancher Satisfaction with Resource Conservation Practices



To complement information on rancher rankings of specific resource conservation programs and practices, we solicited rancher feedback on what technical and economic features of these programs and practices are most desirable (Figure 3.24).

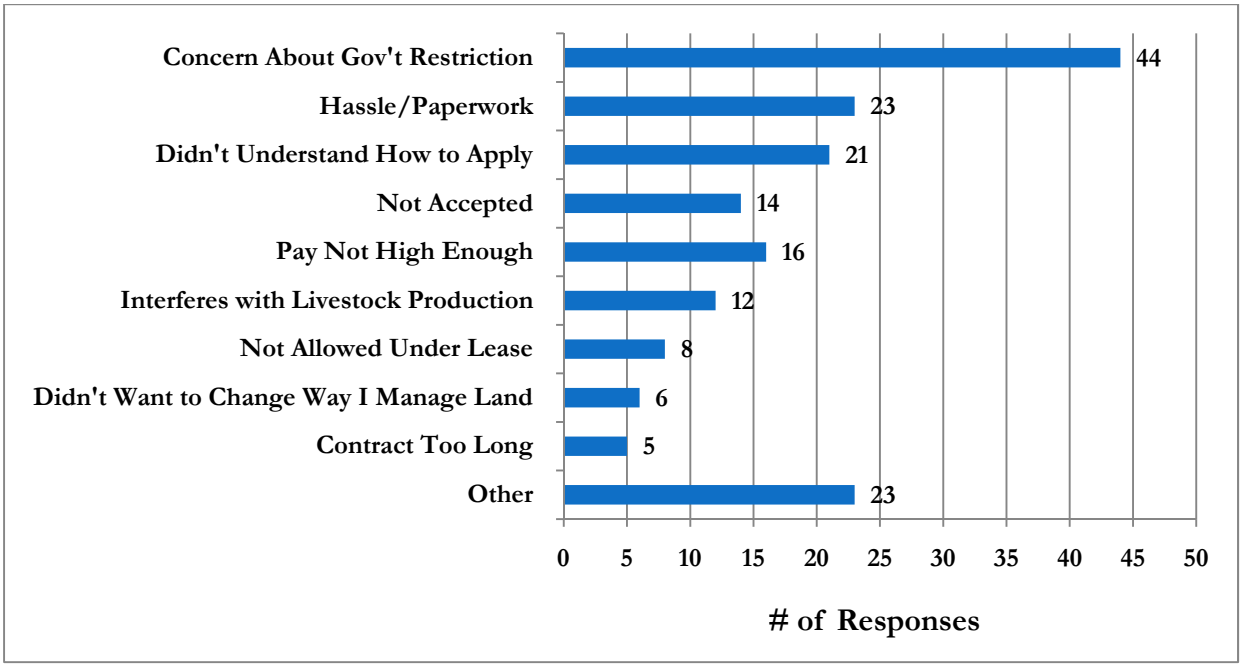
Figure 3.24 Important Features of Resource Conservation Programs



All of the technical features listed (promotion of soil health, improvements in wildlife and water quality, erosion control, and increased land productivity) were, on average ranked between "Important" and "Very Important." Although the economic features (meets regulatory requirements, saves time/effort, increases land values, and saves money) received comparatively lower rankings in terms of importance, ranchers on average ranked them between "Neutral" and "Important."

Rancher respondents were asked to indicate constraints to participating in public resource conservation programs (Figure 3.25). The intent of the question was to help identify the up-front programmatic constraints that any PES program would have to address.

Figure 3.25 Reasons for Non-Participation in Resource Conservation Programs

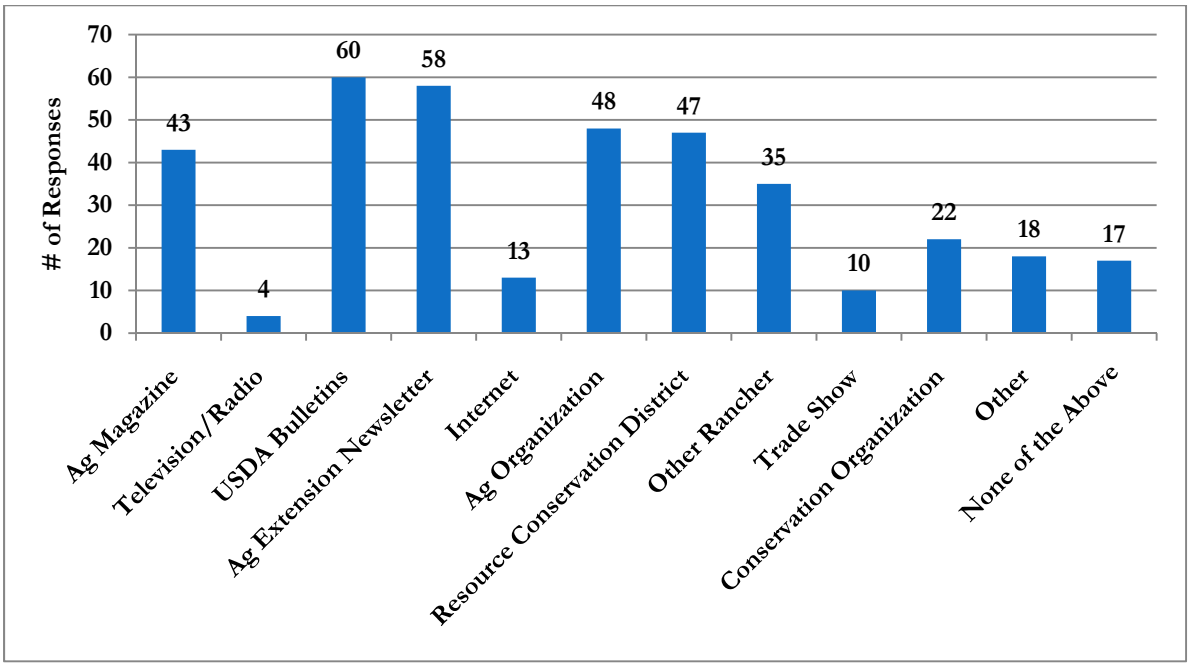


The major issues that ranchers considered as constraints to resource conservation program participation were not necessarily technical or economically based, but mostly administrative. The majority of respondents indicated that their reasons for not participating in conservation programs was "concern about government restriction and/or access on private property", "too much paperwork/general hassle", "didn't understand how to apply", "not allowed under lease" or "not accepted into program". Only 16 ranchers responded that payment levels were not high enough to induce participation, and only 12 ranchers indicated that they believed conservation practices interfered with livestock production. The responses in the "Other" category of Figure 3.26 mostly represent concerns about government intervention, skeptical about where the money comes from, government handouts, and the decline of outreach and extension services.

Effective communication and outreach programs about potential new PES-type programs available to the ranching community will be important for encouraging participation. With this in mind, we

surveyed ranchers according to their current sources of information for traditional conservation programs (Figure 3.26) and the frequency with which they used these various sources (Figure 3.27).

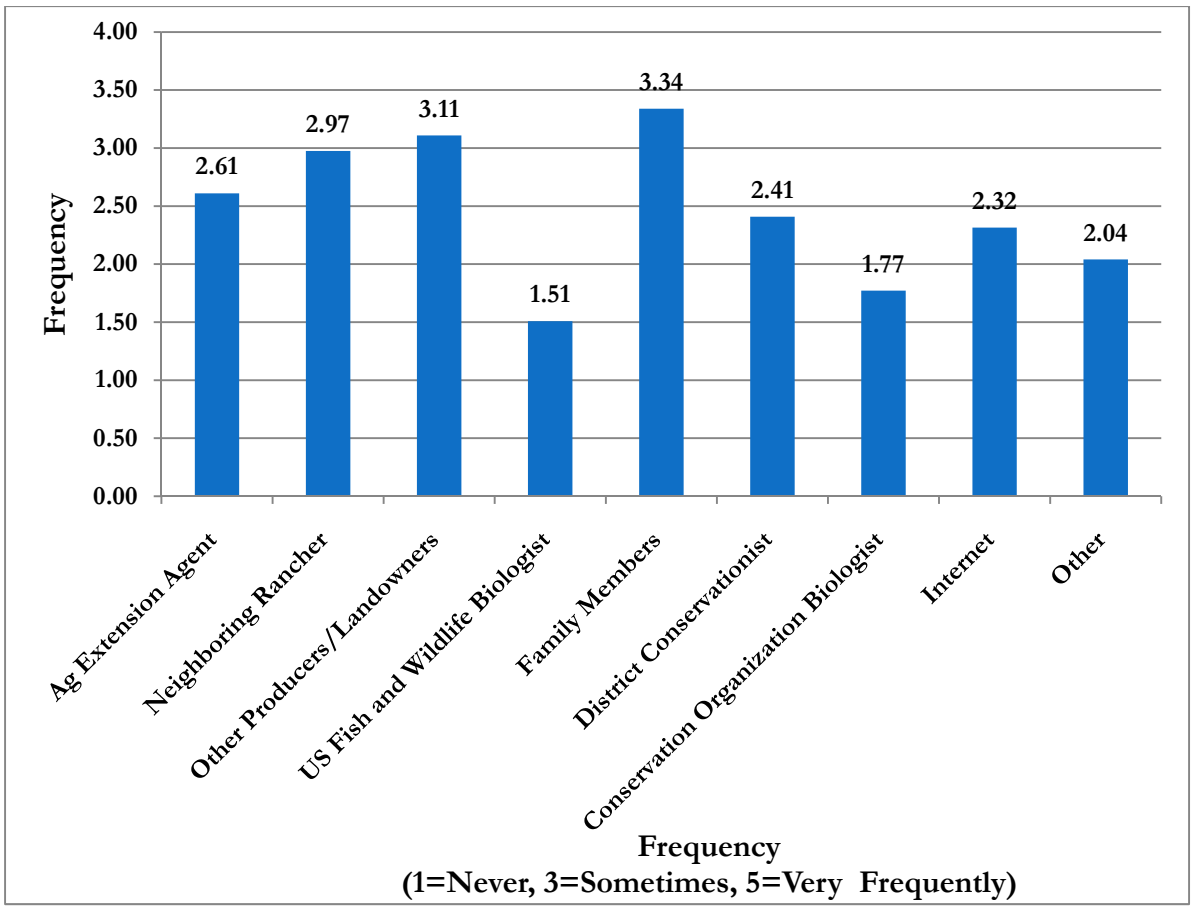
Figure 3.26 Rancher Sources of Information for Conservation Programs



The most frequently cited sources of information on conservation programs included USDA bulletins, extension newsletters, agricultural/ranching organizations, local Resource Conservation Districts, agricultural magazines, and other ranchers. Far less important are electronic media in the form of radio/television and the internet. The choices of information sources may be related to the age of most ranchers surveyed, but further analysis verifying this correlation would need to be carried out.

Figure 3.27 provides information on how frequently ranchers consult various sources of information with respect to conservation programs. The most frequently cited sources include family members, neighboring ranchers, other producers and landowners and agricultural extension agents. Less frequently consulted includes the fish and wildlife agencies and conservation organizations. Communication of future PES programs should take these networks into account when conducting outreach to ranchers.

Figure 3.27 Frequency of Use of Sources for Conservation Information



C. Discussion of Results and Potential Implications for Developing Payment for Ecosystem Service Programs on California Rangelands

In this section we offer some interpretation of the response data that was presented above with respect to the design of PES programs for California ranchers. First, it is important to note that the data reported in Section B represents either average scores or general rankings across the sample of ranchers. For PES programs to be effective, they will have to be flexible to take into account, to the extent possible, the individual circumstances of each ranching operation.

We hypothesized that ranchers with conservation easements may respond differently than those who do not. However, for most of the demographic and land use data, there were no statistically significant differences. The exceptions were that ranchers with easements on their lands were more optimistic about the next generation staying in ranching and that they were more favorable to PES type programs. Table B.1 in Appendix B provides a breakdown of a few key variables by whether or not ranchers hold easements or not.

On the basis of the major demographic data, it would appear that there may be a need to act quickly to develop PES or market-type programs to provide for continued conservation incentives for California ranchers. Given that more than half of respondents indicated that either they didn't expect their family to continue ranching, or didn't know would suggest there is not much interest by a younger generation of continuing or starting up in ranching. This may put the existing land base and the ecosystem services it provides at risk, especially when a significant number of ranchers indicated having low or negative incomes from ranching in 2009. These trends are somewhat counterbalanced by the attitudes of generally highly educated ranchers to want to continue in production and maintain a rural lifestyle, who's families have generally been involved in ranching in California for decades, and who have mitigated low net household incomes from ranching with off-ranch employment. In order to encourage the continued use of land for ranching, PES payments, whether from private markets or public conservation programs, will have to be significant enough to prevent conversion to other uses. This is underscored by the fact that so many ranchers participate in the Williamson Act.

When practice based programs and set-aside programs are combined together, more than 90% of all respondents indicated that they participate in some type of public conservation program (and some more than one). However, there is not one particular program clearly favored by the respondents. For example, only 33% of all respondents participate in the USDA EQIP program. Part of the reason for low participation rates in individual programs may be due to rancher observations that they are concerned with government restrictions on their operations, high transactions costs in applying to programs, and lack of adequate outreach. The Federal programs that offer cost-share and technical assistance for practices have more participation than those that involve some type of land set-aside. Only a quarter of the respondents reported having some permanent protection in the form of easements on their land. These findings may indicate that in order to develop PES programs or markets, there needs to be flexibility to make programs accessible to ranchers interested in conservation practices with shorter contract lengths and also for ranchers who want to engage in some type of long term land protection/conservation program. Additional compensation should be rewarded separately to meet the desirable "permanence" of conservation programs.

Despite low participation rates in individual conservation programs, ranchers generally responded that they were very satisfied with most of the programs and practices that they were involved in. The characteristics of programs and practices that have most appeal to ranchers are those that improve the productive or financial capacity of the operation, and promotes wildlife habitat. Thus, ranchers may be more attracted to PES programs or markets that provide some type of positive externality to enhance production and at the same time directly relates to improving habitat on the ranch.

Significant outreach and education campaigns using appropriate channels targeting ranchers need to be implemented to inform and engage ranchers about potential PES programs and markets. For example, most ranchers indicated that "traditional" means of information (bulletins, extension communications, magazines, and meetings at Resource Conservation Districts) were the dominant sources of communication, with very few relying on the internet. At least in the initial phases of

start-up of potential PES programs or markets, an intensive, on the ground extension education effort may have to be mounted.

Overall, ranchers emphasized how important it was to preserve the rural feel of their environment, maintaining the future viability of ranching, and protecting wildlife habitat. Ranchers increasingly see the need to become involved in local economic and zoning issues and expressed very low priority rates for real estate or commercial development. These may be indicators that the ranching community may be open to participating in new types of conservation incentive mechanisms such as a PES program or market. Chapter IV investigates the level of knowledge ranchers possess about PES programs, the conditions that may affect participation, and the relative tradeoffs ranchers would make between various attributes of a PES program.

IV. Payments for Ecosystem Services and the California Ranching Community

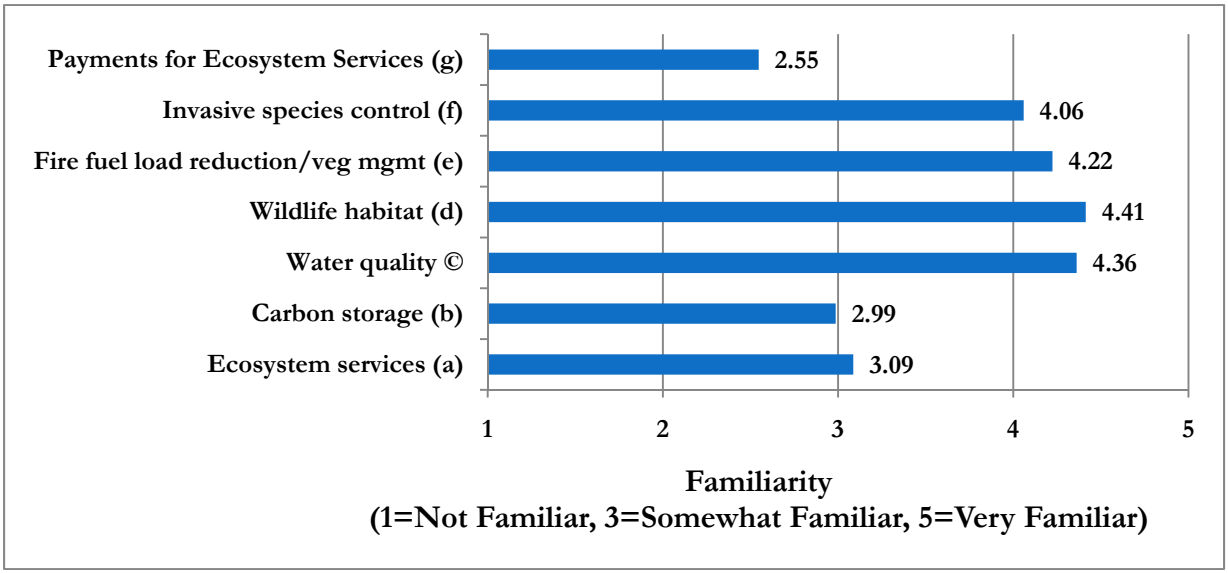
A. Introduction

The description and analysis of the survey data in this section with respect to the application of a generic payment for ecosystem services (PES) program involving the California ranching community is divided into two parts. First, we provide some basic information describing rancher's general interest in potential PES programs, including general familiarity with the terminology of ecosystem services and payments, potential interest in participating in such programs, the importance of selected program and payment features, and the types of ecosystem service payments that ranchers could be interested in. Secondly, we report on the findings from an econometric analysis (Conjoint Analysis) regarding rancher preferences for particular payment attributes for ecosystem services.

B. General Interest in Payment for Ecosystem Services Programs

Figure 4.1 provides responses by ranchers on how familiar they are with the term "ecosystem services" as a general concept as well as their familiarity with specific services such as invasive species control, fuel load reduction, wildlife habitat, water quality, and carbon storage. A scale of 1 (Not Familiar) to 5 (Very Familiar) is used with the scalar values provided in Figure 4.1 representing "average" responses across all ranchers in the survey. In general, ranchers weren't too familiar with the terms "ecosystem services" (mean=3.09), or "payments for ecosystem services" (mean=2.55), but were more familiar with "wildlife habitat," "water quality," "fire fuel load reduction/vegetation management" and "invasive species control." The respondents were also unfamiliar with "carbon storage" (mean=2.99).

Figure 4.1 General Familiarity with Ecosystem Services



In order to develop and implement a successful payment for ecosystem services program it would appear that outreach and education on the meaning of the terms being used will be necessary.

Despite uncertainty over ecosystem services terminology, ranchers are nonetheless interested in seeing programs created and in participating in these programs. The first two columns of Table 4.1 provides summary statistics related to the potential interest of ranchers in participating in PES programs. The majority (77%) of the respondents said they would consider participating in a program in which they would receive payments to improve the quantity and/or quality of environmental benefits that their land provides to society. The reaction to the proposed creation of a program to improve habitat for wildlife was also favorable.

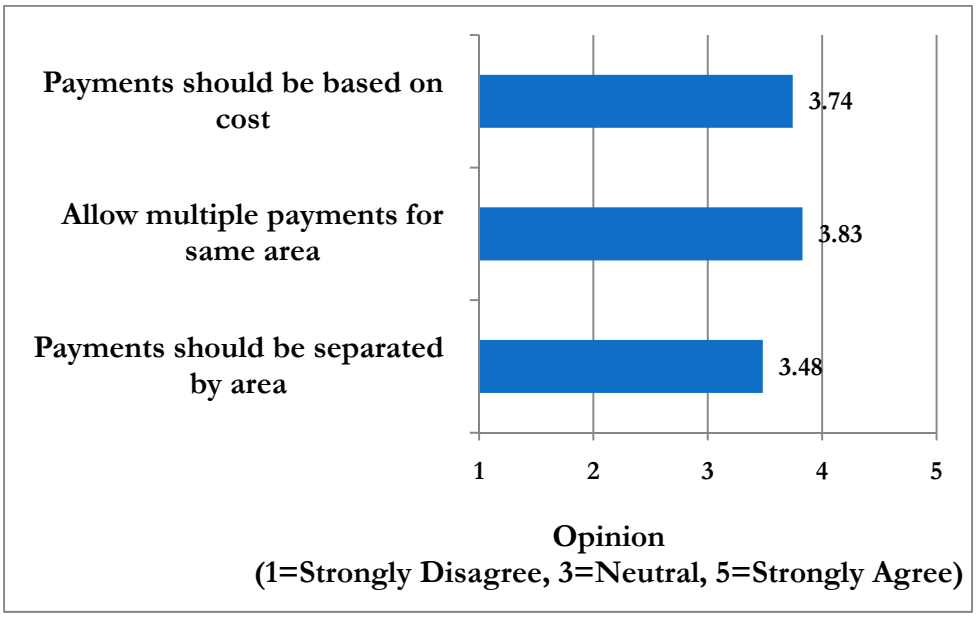
Table 4.1 Potential Rancher Interest in Payment for Ecosystem Services Programs

	Consider participating in PES program?	Initial reaction to the creation of PES programs	Importance of program features (1=Not Important, 5= Very Important)		
Survey Question	22	27	Contract Length	Program administrator	Payment level
Stat	Yes: 77% No: 8% Don't know:15%	4.01 (1=Strongly Oppose, 5=Strongly Favor)	4.13 (mean)	4.16 (mean)	4.42 (mean)

The last three columns of Table 4.1 provides information on how important ranchers considered three salient *program* features (or attributes) of a payment for ecosystem services scheme: contract length, the entity administering the program, and level of payment of compensation for providing and enhancing any particular ecosystem service. More quantitative information on the importance and trade-offs amongst these features are provided in section 4.C. The average responses shown in Table 4.1 illustrates that all three program features are equally important to ranchers in their consideration in participating in a PES program, with payment level being slightly more important than contract length or program administrator.

In addition to obtaining information on potential rancher interest in PES programs, we also asked ranchers to rank the level of importance of selected payment features (Figure 4.2). We selected three types of payment mechanisms: (1) payments based on actual costs of providing a service; (2) allowing multiple payments for discrete ecosystem services for a particular area or (3) providing discrete payments for single ecosystem services for a single area of the ranch. Payment mechanisms (2) and (3) get at the ideas of stacking payments or bundling payments, respectively. Stacking and bundling of payments are two very important concepts currently being discussed by practitioners and policy makers in the Pacific Northwest, Chesapeake Bay region, and the U.S. Department of Agriculture Office of Environmental Markets.

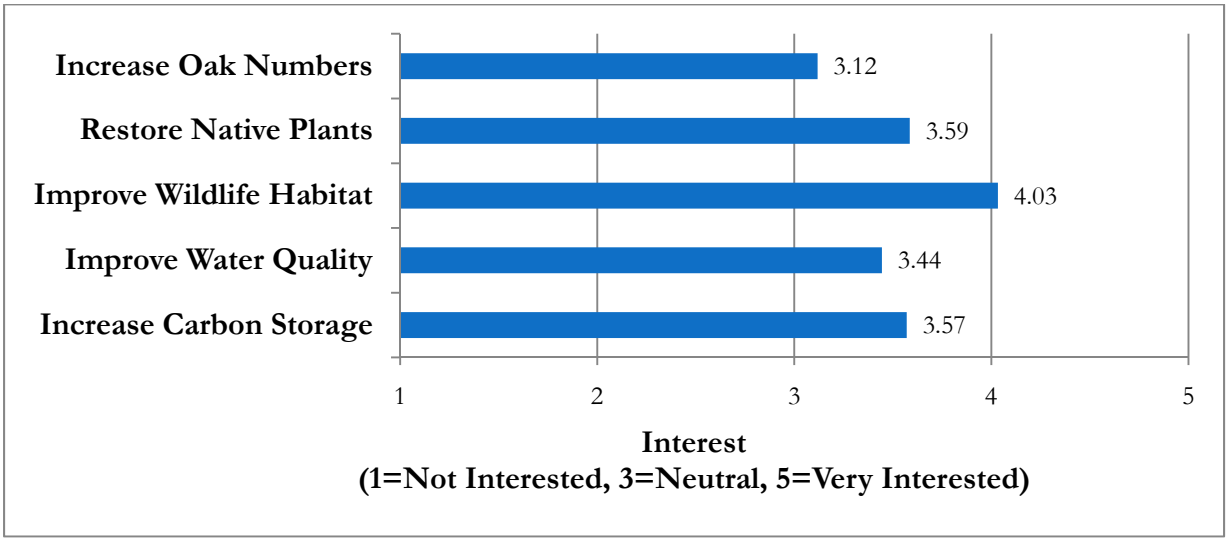
Figure 4.2 Importance of Selected Payment Features



As can be seen from the average scores given in Figure 4.2, ranchers seem somewhat indifferent between the three payment mechanisms, with some slightly favoring stacking over cost-based or bundled payments. However, all three mechanisms are ranked between Neutral and Agree. This could mean that ranchers are either ambivalent over what payment mechanism is used, or that there is some confusion as to how the three mechanisms differ and /or how they would be applied.

Finally, ranchers were asked about their level of interest in implementing specific activities to improve ecosystem services. For ranking the level of interest a scale of 1 (Not Interested) to 5 (Very Interested) was used (Figure 4.3). Ecosystem services and activities included increasing oak tree numbers, restoring native plants, and improving wildlife habitat or water quality, and/or increasing carbon storage. Average responses for all five of these activities ranged between "Neutral" and "Interested". Improving wildlife habitat obtained the highest ranking. The least attractive activity was increasing oak numbers, which might be due to the technical difficulty and low success rates of re-establishing native oak trees.

Figure 4.3 Rancher Interest in Selected Ecosystem Service Related Activities



C. Rancher Preferences for the Design of Payment for Ecosystem Services Programs

This section presents the relative preferences of the ranchers regarding selected PES program attributes. First we discuss the methods and how we conducted the analysis. Second, we analyze the results of the rancher's preferences. Lastly, we provide recommendations on policy implications and the feasibility of a payment for ecosystem services program.

Stated preference studies (of which conjoint analysis is one type) can be used to estimate the relative ranking and economic values of selected program attributes (Alberini et al., 2007; Champ et al., 2003; Louviere et al., 2000). Such an analysis informs policy makers because it not only reveals the preferences of the respondents, but it also shows approximately how much more (or less) respondents would need to be compensated to accept a program with different combinations of attributes. This technique is unique in that it is primarily used to investigate tradeoffs that people must make between different goods and policies.

For example, when deciding whether to enroll in conservation programs, ranchers may face a tradeoff between the payment from enrolling in the program and the potential forgone revenue from continuing their current management practices. If the payment isn't high enough to make up for the increased effort of adopting new land management practices, then ranchers may choose to opt out of a conservation program. Stated preference studies are therefore useful because they break down the influence of the various factors regarding enrollment and then rank them by their relative influence on a decision. In the California Rangeland Survey, specifically, respondents were asked to make tradeoffs between the amount of compensation they would receive, how long the contracts last, and who would administer a PES program. It should be noted that not all conservation programs result in a direct reduction in ranching productivity; in some cases the programs won't affect productivity, or may increase productivity (Kroeger et al., 2010).

1. Methods

The main attributes of a PES program considered in this section are: program administrator, contract length, and payment level. Question 24 was used as the stated choice question in this survey (See Appendix A). This question asked respondents to complete a series of choice questions comparing alternative versions of a potential PES program. In each question, the respondents were given a choice between two sets of options and asked to choose which option they preferred (or "neither" if they didn't like either set of options). Depending on which versions of the program the respondents preferred, the values of the various attributes were determined and subsequently ranked for the total sample of ranchers that responded to the survey. A description of these attributes is provided in Table 4.2.

Table 4.2 PES Program Attribute Descriptions and Levels Used in Conjoint Analysis

Attributes	Description	Levels
Contract Length	Amount of time that land can be enrolled in a PES program	5, 15, 30 years
Program Administration	Organization that would administer the program	Federal Agency State Agency Non-profit Organization Private Company
Payment Level	Rental payment (per acre, per year) for enrolling land in a program	$5, $10, $20, $50

An example menu (from survey version 1) is provided below:

Program Features	Program A	Program B	Neither
Contract length	30 years	15 years	
Program administration	Non-profit organization	State agency	
Payment level (per acre per year)	$20	$5	
Please indicate your preferred program (circle one)	**I would prefer Program A**	**I would prefer Program B**	**I would not participate in either program.**

There were five choice questions on each survey and ten different versions of the survey for a total of 50 different menus that had different combinations similar to the one above. As a result, there is enough variation in the attributes to get a good estimate of rancher preferences.

The results from these questions were econometrically analyzed after the responses were collected. Econometric analysis involves combining statistical tools with economic theory to help analyze economic problems. In this case, the economic problem involves the under-allocation of public goods (i.e. water filtration, wildlife habitat, and air pollution filtration). Public goods typically benefit not only the landowner on whose property they are produced, but also others whom receive these services for free. Because landowners cannot exclude others from enjoying these benefits and charge them for these services, there is no financial incentive to make land use decisions that benefit society as a whole by maximizing the provision of environmental benefits (Kroeger and Casey, 2007). For ranchers to provide more environmental benefits, incentives must be provided. The results from this survey can therefore be used to approximate what payment levels will entice ranchers to participate in PES programs.

The statistical tool used for this type of analysis is called a conditional logit model with fixed effects. This model is intended to examine the influence that program attributes have on a respondent's choice of two hypothetical programs (A and B), and the status quo (Neither). In other words, the model estimates the likelihood that a rancher will participate in a program, given any combination of options. The "status quo" variable is a dummy variable indicating that the respondent selected the "Neither" response, and would *not* participate in either of the programs presented to them. The following section provides the results from this analysis.

2. Analysis of Rancher's Preferences

Several attributes were found to have statistically significant effects (at the 5% significance level) on the respondent's selection of a potential PES programs. To have a statistically significant coefficient shows that the presence of a particular attribute (such as payment level, program administrator, etc) made it either more or less likely that the rancher would participate in the program presented to them. In contrast, attributes that were found to be non-statistically significant *don't* have an influence on the rancher's decision to participate. The following attributes were found to have a *significant* influence on the rancher's decision to participate:

- Status Quo
- Contract length
- Payment level
- Program administration by a state government (But *not* program administration by a private company)

For the contract length and payment level attributes, ranchers showed a preference for shorter contract lengths and higher payment levels. Specifically, for every year added to the contract, the amount paid to the rancher would have to be increased by $.81 per acre per year for each additional year that the contract entails. (Table 4.3). For example, enrollment in a 30 year program would require $24.30 per acre per year in additional compensation. Also, the positive coefficient on the payment level variable (.040) shows that as payment level increases, the likelihood of enrolling in a

program increases. Both of these results are to be expected: ranchers are more likely to enroll in programs if they have short contracts and are paid larger amounts of money.

Lastly, the status quo variable was significant and negative. The status quo variable indicates that the ranchers circled the "neither" response. By circling "neither," the respondents are indicating that they have a preference for their current ranching practices relative to the proposed program alternatives. In this survey, since the status quo coefficient variable was significant but *negative*, this indicates that respondents preferred one of the program alternatives to maintaining the status quo, as long as the program attributes were adequate. This is backed up by the proportion of landowners who said they preferred one of the programs (circled Program A *or* Program B). Specifically, of the respondents who answered the question (~72% filled out the choice questions) 74% said they would participate in one of the programs (circled Program A or B), and 26% circled "neither." Of all the choice sets, 38% of the respondents chose Program A and 36% chose Program B. This last result is important because it shows that there wasn't any bias in how people selected the programs (approximately equal preference for Program A and Program B).

Socioeconomic Variables

Age, education, income, and number of conservation programs currently enrolled in, were variables used to assess the influence of socioeconomic factors on respondents' choice decisions. To determine their influence, the socioeconomic variables had to be interacted with the status quo (SQ) variable because they could not enter into the model on their own since they do not change over choice occasions (Louviere et al. 2000).

The variables that were shown to make respondents *more* likely to choose the "neither" option were age and education. As age increased, the likelihood of circling "neither" increased, and increasing amounts of education also increased the likelihood of circling "neither". The variable that made respondents *less* likely to choose "neither" was the total number of conservation programs currently enrolled in, that is as the number of programs enrolled in increased, the likelihood of circling "neither" decreased. The income variable was insignificant, showing that income level is not, at least amongst the respondents, a good predictor of future enrollment in PES programs.

Program Administrator

The respondents revealed the following preferences (in order of most preferable to least preferable) for program administration:

1. Non-profit organization
2. Private Company
3. Federal Agency
4. State Agency

The non-profit organization was shown to be the most preferred administrator, and was therefore used as the baseline to compare the other administrators. The preference for a non-profit organization implies that ranchers would require higher payment levels if a private company, federal agency, or state agency were the administrator. However, given that the private company variable was not statistically significant, respondents were relatively indifferent between administration by a private company and a non-profit organization. The state and federal agencies, in contrast, *were* statistically significant, indicating that ranchers *would* prefer a private company over a federal or state agency, given a choice between the three.

Price of Attributes

To calculate the approximate amount of additional compensation that would be required (per acre of land enrolled in the program) for administration by the different agencies, the marginal values (or implicit prices) were calculated by dividing the negative of the coefficient on each attribute by the coefficient on the payment variable. This gives the additional amount of money rancher's require to be indifferent towards administrating agencies (Alberini et al., 2007). The additional compensation required for each administrator (beyond that of the non-profit organization) is as follows: administration by a private organization would require $2.28 per acre per year in additional compensation, administration by a federal agency would require $11.50 per acre per year of additional compensation, and administration by a state agency would require $25.22 per acre per year in additional compensation.

The complete results from the econometric evaluation of the conjoint analysis can be found in Table 4.3.

Table 4.3 Conditional Logit Model of Responses to Choice Questions

Variable	Coefficient	Z-Value	[1]P-Value	Marginal Value
Dependent Variable: Respondent Choice				
Status Quo	**-5.03*** **	**-3.9**	**0.000**	
Contract Length	**-.033*** **	**-4.03**	**0.000**	**$0.81**
Federal Agency	**-.465** **	**-1.90**	**0.058**	**$11.50**
Private Company	**-.092**	**-0.43**	**0.668**	**$2.28**
State Agency	**-1.02*** **	**-4.50**	**0.000**	**$25.22**
Payment Level	**.040*** **	**8.17**	**0.000**	
SQ * Age	**.70*** **	**2.83**	**0.005**	
SQ * Education	**.296*** **	**2.31**	**0.021**	
SQ * Currently Enrolled in Programs	**-.478*** **	**-5.31**	**0.000**	
SQ * Net Income	**-.05**	**-1.02**	**0.306**	

Note: *** Significant at the 1% level; ** Sig. at 5% level; * Sig. at 1% level

[1]The P-value indicates the probability that the coefficient from the population of Californian ranchers has a significant impact (the coefficient ≠ 0) on a rancher's choice to enroll in a program. For example, if you did 100 more mailings to 100 more random samples of ranchers, the status quo variable would be significant (different from zero) for about 99 of the samples, contract length would be significant for all 100 samples, federal agency would be different for about 75 of the surveys, private company would be different for about 50 of the samples, state agency would be significant for all 100 of the samples, and payment level would be significant for all 100 of the samples.

Table 4.3 can be used to calculate the increased compensation required for any combination of the above attributes. Increased compensation is defined as the annual compensation required for contracts more than one year and administered by a non-profit organization (the baseline case). For example, a program administered by a federal agency that required a 10 year contract would require ($11.50 + [10 * $.81]) = $19.60 per acre per year in additional compensation compared to the baseline case. Additionally, a program administered by a state agency that lasted 20 years would require ($25.22 + [20 * $.81]) = $41.42 per acre per year in additional compensation when compared to the baseline case. These types of calculations can be made for any combination of attributes to determine how much additional compensation would be required for ranchers to enroll in a program.

D. Discussion of Results

In this section we attempt to summarize the implications of the survey results and the conjoint analysis in terms of how one might structure a new PES program for California ranchers.

The data suggests that ranchers are ready and willing to improve the environmental benefits their lands provide, especially wildlife habitat. This preference for wildlife habitat implies that ranchers enjoy the presence of wildlife on their ranches and recognize their role as land stewards. Conservation practices that improve wildlife habitat usually provide additional benefits like improved water quality, carbon sequestration, and pollination. When designing payments for other ecosystem services such as water quality or carbon sequestration emphasis should be placed on the co-benefits for wildlife. If the conversation is structured around the benefits of wildlife habitat and how they can be paid for these additional benefits, it is likely there will higher participation in a program. As stated throughout this study, the economic and environmental pressures facing ranchers is great and providing financial incentives for the public benefits they provide would counter the factors that force ranchers to sell their land or convert it to other uses, and help preserve the rural landscape.

It is important to emphasize that most ranchers were not familiar with the terms used when talking about ecosystem services, carbon sequestration, or payments for these services. The effective implementation of a program is dependent on the participation of California ranchers. This suggests that either the language used regarding these services needs to be reframed, or substantial educational outreach through the information sources ranchers are most likely to use, as discussed in Section III, needs to be done. A study conducted by The Nature Conservancy (TNC) determined that the term "nature's benefits" or "nature's values" was far more appealing to voters than "ecosystem services" suggesting a potential future framework for talking about these payments (Metz and Weigel, 2010).

Additionally, rancher's responded somewhat favorably and equally to the concept of stacking and bundling payments suggesting they either did not have a preference or were unfamiliar with the terms. These concepts will also need to be more thoroughly explained as programs begin forming to ensure landowner's interests and perspectives are included.

What kind of program would ranchers prefer? The broad implications from the econometric analysis are intuitive: ranchers are more likely to participate in programs with *shorter* contract lengths and *higher* payment levels. Any increase in the contract length should be accompanied by $.81/acre in additional compensation. Also, higher payments will increase the likelihood that a rancher will participate in any given program.

For the program administrator, it is important to note that the non-profit organization was the preferred administrator and that administration by a federal agency, a private company, or a state agency would require additional compensation above what would be paid to a non-profit organization. The state agency was by far the least preferred administrator, and respondents were indifferent between whether a non-profit organization or a private company was the administrator. Each type of ecosystem service would likely have a different baseline payment, therefore the findings can only be used to roughly approximate the *additional* amount of money required over and beyond the baseline payment for each type of service. The baseline payment for each type of service should be based on a variety of factors, most importantly the increased costs associated with implementing the new land management practice. To better understand the factors that influence rancher decisions to participate or not in PES programs or markets we recommend conducting more regression and correlation analyses with the existing data.

V. Policy Recommendations for Implementing Payment for Ecosystem Services or Markets on California Rangelands

The rancher survey results presented here are a step towards determining the context of the supply side of potential ecosystem service payments or markets on California rangelands. This report provides useful information for both government agencies and conservation organizations designing or implementing PES programs by providing insight into California rancher attitudes towards current conservation programs and their level of interest in participating in PES programs or markets, and by outlining the most important attributes of a potential PES program.

Our findings suggest that the environment in California is ripe for implementing alternative conservation programs such as PES programs or markets, for the reasons outlined below.

(1) Conversion of California rangelands to other uses is a real threat

California rangelands are unique and valuable natural resources that support the viability of the ranching industry as well as wildlife habitat, watershed protection, open space, pollination, and carbon sequestration. The strong cultural and biodiversity heritage within this landscape is important to keep intact. However, there is currently a real threat of conversion to this landscape. A little over half of the ranching families responded that they were uncertain or did not expect their family to stay in ranching; and approximately a third of respondents indicated that their net household income from ranching was negative, or broke even in 2009. Nearly three quarters of the respondents reported that they worked off ranch themselves, or had a spouse or other family member who worked off ranch to supplement their income. In the survey many respondents noted land conversion pressure coming from residential and commercial developments. Not only does development encroach on the natural landscape of ranches and farms, but it also drives up the property values, creating a greater incentive to sell the land to developers. Many ranchers are land rich but cash poor, so even though they do not want to sell the land, they may be forced to if ranching becomes unviable. Our survey indicates there is a serious need for the implementation of a successful conservation program that pays ranchers for the ecosystems services their lands provide.

(2) Current conservation programs need to be improved to increase participation and to produce measurable conservation outcomes

The Williamson Act allows a lower property tax payment for lands in agricultural production, in exchange for a ten-year agreement that the land will not be converted to an alternative use. This agricultural land conservation program was by far the most popular among the respondents; almost three quarters participate in this program. However, the Williamson Act does not focus on conservation practices and those enrolled are not required to support or enhance valuable ecosystem services such as watershed protection. There was not one specific Federal natural resource conservation program favored by ranchers. Among the individual Federal programs, those that offer cost-share and technical assistance (EQIP, WHIP, CSP and the USFW-PFW), were the most popular with approximately seventy percent of respondents participating in these programs. In addition, these programs reported the highest level of rancher satisfaction, with most reporting a "Satisfied" (4) or

"Very satisfied" (5) rating. A future PES program or market is likely to fare better if it contains specific practices and technical assistance. The most common reasons for not participating in resource conservation programs were concern about government restriction, confusing paper work, and not understanding how to apply. This suggests that in order to increase rancher participation in conservation programs there needs to be sensitivity around government intervention, a streamlined process that lowers transaction costs, and an extensive outreach effort through "traditional" means of information outreach (bulletins, extension communications, magazines, and meetings at Resource Conservation Districts).

(3) Ranchers are strongly interested in PES programs or markets, especially those that enhance both the productivity of the land and wildlife habitat.

Three quarters of respondents indicated that they would consider participating in PES programs and are strongly in favor of creating a program that would provide financial incentives to improve the quantity and/or quality of environmental benefits their land provides to society. According to our survey, the characteristics of programs and practices that have the most appeal to ranchers are those that improve the productive or financial capacity of the operation, and promote wildlife habitat. Hunting emerges as an important ecosystem service that is already being provided by ranchers in the Coalition focus area although a great proportion of ranchers do not derive any income from it. Helping those ranchers interested in deriving income from hunting could add an additional incentive for them to implement conservation practices that are beneficial to all types of wildlife.

(4) Outreach needs to be a significant component of a California PES program or market

Outreach is an important component for the success of any PES program or market. For example, The Willamette Partnership has been working since 2004 to make PES programs and markets a reality in Oregon. This diverse coalition of conservation, city, business, farm, and science leaders in the Willamette River basin are creating a framework for PES programs and markets for the entire Willamette Basin (http://willamettepartnership.org/). Since 2005, The Florida Ranchlands Environmental Services Project (FRESP) has been successful in working with cattle ranchers in the Lake Okeechobee watershed to capture water and reduce the amount of phosphorus that drains into the Northern Everglades (http://fresp.org/). Both of these programs required collaboration between diverse organizations and groups and included intensive outreach.

There are several indicators within our survey that suggest ranchers would be receptive to outreach focused on introducing a PES program or market in the Central Valley. First, there is not one specific conservation program preferred by California ranchers, indicating a need to design a program that would attract participation. Second, ranchers emphasized not only a need to protect wildlife habitat and preserve their cultural heritage, but also a desire to be involved in local economic and zoning issues, which indicates that ranchers are interested in and desire to be more actively engaged in programs that affect land use. Third, the terms "ecosystem services" do not resonate with ranchers and they should either be used more frequently in outreach materials, or replaced with more familiar terms (e.g. nature's benefits, etc). Terms such as invasive species control, fuel load reduction, wildlife

habitat, water quality, and vegetation management scored high in terms of familiarity; whereas, payments for ecosystem services, carbon storage, and ecosystem services scored low. This suggests that language is a crucial element in structuring a potential PES program or market. Programs presented to ranchers with a focus on describing practices and outcomes might be more successful than programs presented using unfamiliar terms. Fourth, it is important to note that although precise guidance for a targeted marketing approach would require further analysis (and a larger sample size), it appears that targeting *younger* segments of the ranching community who are already enrolled in conservation programs is the best strategy. A similar effort could be led by the California Rangeland Conservation Coalition partners.

(5) Survey results suggest there are ranchers in the Central Valley interested in providing ecosystem services framed around wildlife habitat and would be comfortable with a non-profit organization as a program administrator, if there is sufficient financial incentive and flexibility in contract length.

The conjoint analysis showed that an increase in payment levels would ensure an increased interest in enrolling in a future PES program. Raising payment levels is an effective way to encourage participation. As ranchers face more economic uncertainty, PES payments could become a stable source of income. However, the payment level is not the only factor that could affect participation. For example, there are tradeoffs between payments and contract length; with shortened contract lengths ranchers would be willing to accept lower payment levels. Shorter contact lengths can provide flexibility to ranchers to offset financial risk and also help to establish trust in the early stages of a new PES program. An example of this is the FRESP where ranchers were given fixed-length contracts with assurance that they could return land to its pre-existing condition after the contract ended if they chose not to renew. California ranchers prefer a non-profit or private organization as a program administrator as opposed to a state or federal organization. The complex regulatory environment created by state and federal agencies that manage environmental programs, regulations, and policy is difficult for ranchers to understand and navigate. Simple streamlining of enrollment and participation processes can go a long way in encouraging participation in a PES program.

Based on our survey and the outcomes of a focus group held in March, 2011 we offer the following recommendations for the development and implementation of PES programs or markets on California rangelands:

Structuring PES programs for California rangelands:

- The success of a PES program or market depends on both buyers and sellers participating. While this report concentrated on the perspectives of sellers, there is little research on the perspectives of buyers and how a program could be structured to decrease risk and increase participation. In general, the majority of PES programs that have been considered successful include buyers from the public sector. There is potential for California to encourage participation through both the public and private sector, which might include public utility districts, land trusts, and conservation

organizations. There are incentives for public water utility districts in California to participate in innovative finance mechanisms. For example, paying landowners upstream to better manage their lands avoids potential costs for upgrading facilities to manage an increase in pollutant loads caused by development or conversion to other uses. Conducting research on potential public and private sector buyers in California will ensure that all perspectives are represented as these programs or markets are designed.

- Survey results suggest that PES programs or markets should not only be associated with the improvement of wildlife habitat, but also should maintain the culture and values of the ranching community, preserve the rural feel of communities, and align with ranchers commitment to environmental stewardship. These programs should also focus on practices that improve land productivity and simultaneously provide other ecosystem services (i.e. wildlife habitat, pollination, and carbon sequestration) while allowing for flexibility of contract lengths and payment levels to maximize rancher's participation.

- To advance the creation of PES programs or markets in California, there needs to be simultaneous top-down and bottom-up approaches. Creating a state framework like Oregon's through Senate Bill 513 and House Bill 3109, which define and encourage the adoption of an ecosystem services framework to address land use, management, and infrastructure decisions, would be useful. At the grassroots level, pilot projects should be developed that connect buyers and suppliers of ecosystem services thereby providing a laboratory to explore and showcase new approaches and share lessons learned. The Ecosystem Commons website, http://www.ecosystemcommons.org/, an online community dedicated to discussing ecosystem services could be a resource for sharing experiences. Integrating conservation priorities of different entities (such as Integrated Water Resource Management Plans (IWRMP), Habitat Conservation Plans (HCPs), or Natural Communities Conservation Plans (NCCPs)) under the framework of ecosystem services could achieve multiple conservation priorities of different entities (local, state, federal, and non-profits).

- Although the Williamson Act is still in place the program is no longer being funded by the State of California. Individual counties can opt to continue the program locally provided that they have identified alternative sources of funding. In its current form, the Williamson Act does not provide funding specifically for payments for ecosystem services; however, counties who choose to fund property tax incentives through the Williamson Act could expand the program to include payments for ecosystem services. For example, by stacking payments for ecosystem services on lands enrolled in the Williamson Act, additional conservation funds could be available to ranchers. The familiarity and popularity of the program with ranchers could facilitate a transition to a more dynamic program that doesn't just offer tax incentives, but also could provide a central mechanism through which to aggregate county funds for resource protection.

- PES programs or markets should be designed at a scale appropriate to the targeted ecosystem service. For example, if the ecosystem service is water quality, then the watershed is an

appropriate scale, whereas carbon sequestration may be best addressed at the state level. There should be discussion on creating three broad categories - biodiversity, carbon sequestration and water - and how to develop different metrics and protocols for measuring outcomes depending on local conditions, important conservation priorities, or resources of concern.

- Develop outcome metrics and measurement protocols that are a compromise between accuracy and practicality. Using existing metrics and protocols from the Willamette Partnership as models that deliver measureable ecosystem services to guarantee accountability and can aggregate different sources of demand is a starting place. The development of metrics should be an iterative process between buyers of ecosystem services and sellers. Ecosystem service credits should be specific to local needs and priorities.

- Create a working group that initiates conversations between relevant players and is responsible for implementing policy that supports ecosystem services, takes the lead on aggregating all the players, and makes sure lessons learned and successes are shared. Existing efforts to develop PES programs need to be coordinated. For example, the Mokelumne Watershed initiative in California is working on water quality and water availability metrics and the Air Resources Board in California is considering the development of protocols for carbon offsets for rangelands. Other objectives of the working group should be to improve permitting efficiency, define baseline and additionality for California rangelands, determine protocols for incentivizing ranchers who are and continue to be good stewards, and develop a monitoring and evaluation framework.

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VII. Appendices

Appendix A.
Version 1: A Survey on Conservation Payments on California Rangelands

A Survey on Conservation Payments on California Rangelands

A Survey from the California Rangeland Conservation Coalition

This survey should only be filled out by the person to whom it was addressed. If this person is not available, please check here and return the survey in the enclosed postage-paid envelope: ☐

Introduction

Dear Respondent,

Your input is extremely important for understanding what the potential is for developing payments for the ecosystem services (i.e. environmental benefits such as carbon sequestration, water quality improvements, wildlife habitat, etc.) that ranchers provide. These results will allow us to structure markets that are designed with rancher's preferences in mind and that are simple, transparent and easily accessible to ranchers. These ecosystem services markets have the potential to provide additional sources of income for ranchers while achieving conservation goals.

This survey is for the owners or renters of rangelands used for producing livestock. All individual information collected and analyzed as part of this survey will be held as strictly confidential and will not be shared outside of the research team. Responses will not be attributable to individual ranchers. Data analysis and reporting will be limited to aggregation across all respondents.

In addition to some optional demographic information, the sections of this survey cover two major topics. The first is to learn about rancher involvement in conservation programs. The second is to determine the potential for using ecosystem service payments and/or markets as an incentive mechanism to keep land in ranching, and the wildlife habitat benefits those ranches provide.

In advance, thank you very much for your cooperation and your help. Once our data analysis is complete, the final results will be available to you and the public.

If you need assistance or have any questions about the survey please e-mail Pelayo Alvarez palvarez@defenders.org.

If you prefer to respond to the questions over the phone or online please send an e-mail to Pelayo Alvarez at palvarez@defenders org

- This project is a collaboration between Defenders of Wildlife, Duke University, California Rangeland Trust, and the California Cattlemen Association and it is funded by a Conservation Innovation Grant from the California office of the USDA Natural Resources Conservation Service. -

Photo Source on cover page:
Natural Resources Conservation Service

Do you use rangelands and/or pasture for producing livestock? (circle ONE)

YES—please continue to fill out the survey.

NO---please return this survey in the enclosed postage paid envelope so that we do not send further mailings

Section 1: Land use

1. **How many years have you <u>personally</u> managed ranchland in California? (please fill in NUMBER OF YEARS)**

   _____ years

2. **How many years has <u>your family</u> managed ranchland in California? (please fill in NUMBER OF YEARS)**

   _____ years

3. **Do you expect that the youngest generation in your family will stay in ranching? (Please check ONE)**

   ____ Yes ____ No ____ Don't know

.

4. **In what County or Counties do you operate your ranch?**

   _____
   _____
   _____

5. **How many acres do you *own?***

   _____ Less than 1,000
   _____ 1,000 to 3,000
   _____ 3,000 to 5,000
   _____ 5,000 to 10,000
   _____ More than 10,000

6. **How many acres of public and private land do you currently *rent?***

Public land		Private land	
_____	Less than 5,000	_____	Less than 5,000
_____	5,000 to 10,000	_____	5,000 to 10,000
_____	10,000 to 50,000	_____	10,000 to 50,000
_____	50,000 to 100,000	_____	50,000 to 100,000
_____	More than 100,000	_____	More than 100,000

7. **If you own land, what is the ownership structure of that land?** (Check ONE)

____ Private individual
____ Corporation
____ Partnership (e.g., LLC)
____ Other. Please specify _____

8. **What is the <u>primary</u> use of your owned/rented land? (Check ONE)**

____ Cattle Grazing
____ Sheep Grazing
____ Horse Grazing
____ Timber
____ Recreation
____ Other. Please specify _____

9. **Is your owned/rented land used for hunting by you, your family, and/or people outside your family?** (check ONE)

____ Yes ____ No ____ Don't know

10. **If you use your land for hunting, approximately how much money do you earn from hunting leases each year?** (Check ONE)

____ $0
____ $1 - $500
____ $500-$999
____ $1,000-$2,499
____ $2,500-$4,999
____ $5,000-$9,999
____ More than $10,000

11. **If you are a landowner who rents or leases out land, how much influence do your renters have on which land conservation programs you participate in?** (Please circle one number that most closely matches the level of renter influence)

No influence	***Neutral***	***Complete influence***	***Don't know***	***Not applicable***
1 2 3 4 5			DK	NA

12. **If you rent land, how much influence or control do you have over whether the land that you rent can be placed into a conservation program?** (Please circle one number that most closely matches *your* level of control)

No influence	***Neutral***	***Complete influence***	***Don't know***	***Not applicable***
1 2 3 4 5			DK	NA

13. **We would like to get your opinion on how you would like to see your county in the future. For each statement listed below, please indicate how important each one is to you <u>personally</u> by circling one number for each statement.**

	Not important	***Neutral***		***Very important***	***Don't know***
Keeping the ranching industry viable	1 2	3	4	5	DK
Preserving the rural, countryside feel of the area	1 2	3	4	5	DK
Promoting industrial or commercial development	1 2	3	4	5	DK
Encouraging nature-based tourism	1 2	3	4	5	DK
Protecting habitat for wildlife	1 2	3	4	5	DK
Influencing county development plans	1 2	3	4	5	DK
Promoting real estate development	1 2	3	4	5	DK

14. **Are there any other local issues, <u>not</u> listed above, that are important to you?**

_____ _____

_____ _____

15. **We would like to find out what you know about the following terms. Please indicate your degree of familiarity by circling the number that most closely matches your level of experience.**

	Not familiar	***Somewhat familiar***		***Very familiar***	***Don't know***
Ecosystem services	1 2	3	4	5	DK
Carbon storage	1 2	3	4	5	DK
Water quality	1 2	3	4	5	DK
Wildlife habitat	1 2	3	4	5	DK
Fire fuel load reduction / vegetation management	1 2	3	4	5	DK
Invasive species control	1 2	3	4	5	DK
Payments or Markets for Ecosystem Services	1 2	3	4	5	DK

Section 2: Conservation Program Participation

We would like to ask you about your involvement in conservation payment programs. These include federal and state programs that provide financial and technical assistance to landowners and ranchers who voluntarily conserve soil, water, wildlife habitat and other natural resources on their land. Examples include the Environmental Quality Incentives Program, the various reserve programs, the Conservation Stewardship Program, the Williamson Act, etc.

16. **On your owned/rented land, do you currently participate in conservation programs? If you do, please indicate, if relevant, how many acres of rangelands do you currently have in the following conservation programs?**

	Yes	**No**	**Acres**
- Acres in a permanent conservation easement	___	___	___
Federal conservation programs:			
Practice Based Programs			
- Environmental Quality Incentives Program (EQIP)	___	___	
- Wildlife Habitat Incentives Program (WHIP)	___	___	
Acreage Based Programs			
- Conservation Stewardship Program (CSP)	___	___	___
- Grassland Reserve Program (GRP)	___	___	___
- Conservation Reserve Program (CRP)	___	___	___
- Conservation Reserve Enhancement Program (CREP)	___	___	___
- Wetlands Reserve Program (WRP)	___	___	___
- Farm and Ranchland Protection Program (FRPP)	___	___	___
- U.S. Fish and Wildlife Partners for Fish and Wildlife	___	___	___
- Coordinated Resource Management Program (CRMP)	___	___	___
State conservation programs:			
- Williamson Act	___	___	___
- CA Dept. of Fish and Game Landowner Incentives Program (LIP)	___	___	___

17. **If you currently participate in a conservation payment, rental, or easement program, please indicate your level of satisfaction with each program below by circling number that best reflects your level of satisfaction. (**Please **DO NOT** circle a number if you have **NOT** participated in a given program)

	Very unsatisfied		***Neutral***		***Very satisfied***	***Don't know***
Conservation Reserve Program (CRP)	1	2	3	4	5	DK
Wetland Reserve Program (WRP)	1	2	3	4	5	DK
Environmental Quality Incentives Program (EQIP)	1	2	3	4	5	DK
Wildlife Habitat Incentives Program (WHIP)	1	2	3	4	5	DK
Farm and Ranchland Protection Program (FRPP)	1	2	3	4	5	DK
Conservation Stewardship Program (CSP)	1	2	3	4	5	DK
Conservation Reserve Enhancement Program (CREP)	1	2	3	4	5	DK
Grassland Reserve Program (GRP)	1	2	3	4	5	DK
CA Dept of Fish and Game Landowner Incentives Program (LIP)	1	2	3	4	5	DK
U.S. Fish and Wildlife Service Partners for Fish and Wildlife	1	2	3	4	5	DK
Coordinated Resource Management Program (CRMP)	1	2	3	4	5	DK
Williamson Act (CLCA)	1	2	3	4	5	DK
Other:	1	2	3	4	5	DK

18. **If you do *not* currently participate in a conservation payment, rental or easement program, what are the reasons you do not to enroll or have not continued participation in these programs** (Check all that apply)

____ Too much paperwork/general hassle
____ Applied, but not accepted into program
____ Application/enrollment process takes too long
____ Payments not high enough
____ Contract length was too long
____ Concern about government restriction and/or access on private property
____ Did not know about or understand how to apply for a program
____ Did not want to change the way I manage my land
____ Interferes with livestock production/management
____ Not allowed under lease
____ Other. Please specify _____

19. **How important are the following aspects of conservation programs to you?**

	Not important	***Neutral***		***Very important***	***Don't know***
Saves money	1 2	3	4	5	DK
Increases productivity of the land	1 2	3	4	5	DK
Increases land value	1 2	3	4	5	DK
Erosion control	1 2	3	4	5	DK
Improves water quality	1 2	3	4	5	DK
Promotes wildlife	1 2	3	4	5	DK
Technical assistance from experts	1 2	3	4	5	DK
Saves time/effort	1 2	3	4	5	DK
Promotes soil preservation/health	1 2	3	4	5	DK
Another source of income	1 2	3	4	5	DK
Meet regulatory requirements	1 2	3	4	5	DK
Other (please specify):	1 2	3	4	5	DK

20. **If you have applied conservation practices to your land, please indicate your level of experience and satisfaction with the practice by circling one number or letters next to the practice.** (Please DO NOT circle a number if you have not used a given practice)

	Very unsatisfied	***Neutral***		***Very satisfied***	***Don't know***	***Never Tried it***
Grazing management plan	1 2	3	4	5	DK	NA
Water developments	1 2	3	4	5	DK	NA
Cross fencing	1 2	3	4	5	DK	NA
Riparian fencing	1 2	3	4	5	DK	NA
Rangeland improvements	1 2	3	4	5	DK	NA
Fire fuel load reduction	1 2	3	4	5	DK	NA
Invasive species control	1 2	3	4	5	DK	NA
Pest control	1 2	3	4	5	DK	NA
Filter strips	1 2	3	4	5	DK	NA
Riparian buffers	1 2	3	4	5	DK	NA
Native plant restoration	1 2	3	4	5	DK	NA
Oak planting	1 2	3	4	5	DK	NA
Other practice:	1 2	3	4	5	DK	NA
Other practice:	1 2	3	4	5	DK	NA
Other practice:	1 2	3	4	5	DK	NA

21. **Have you gotten information about conservation payment programs from any of the following sources?** (Please check all that apply)

I have received information about conservation payment programs from:

____ Agricultural magazine
____ Television/radio
____ USDA bulletins
____ Ag Extension newsletter
____ Internet
____ Agricultural organization
____ Resource Conservation District
____ Other rancher
____ Trade show
____ Conservation organization (e.g., Ducks Unlimited)
____ Other. Please specify _____
_____ None of the above

Section 3: Conservation Benefits

There is a growing awareness that ranchlands provide many environmental benefits or services to society, such as purifying air and water, renewing soils, providing habitat for wildlife, and helping to stabilize the climate. Often, ranchers are not compensated for these services.

22. **If there were a public or private conservation program that offered you a payment for improving the quantity and/or quality of environmental benefits your land provides to society, would you consider participating in such a program?** (Check ONE)

____ Yes
____ No
____ Don't know

23. **Please indicate your level of interest with the following statements** (Circle one number that most closely matches your interest level or "DK" for "don't know"):

I would be interested in enrolling in a conservation payment program that would:

	Not Interested	***Somewhat Interested***	***Very Interested***	***Don't know***
Increase carbon storage (i.e. grazing management plan)	1 2 3 4 5			DK
Improve water quality (i.e. fence riparian areas)	1 2 3 4 5			DK
Improve wildlife habitat	1 2 3 4 5			DK
Restore native plants	1 2 3 4 5			DK
Increase oak numbers	1 2 3 4 5			DK

The 2008 Farm Bill takes a first step towards encouraging landowner/operator participation in emerging private markets for ecosystem services. Guidelines are being developed to inform new ways to provide payments for ecosystem services. These include programs that would be voluntary and would give landowners the opportunity to receive payments for applying conservation practices on their property. The potential programs are described by the following three features:

Contract Length – Programs offer landowners several different options for the length of time that land can be enrolled in them. Contract length options are 5, 15, and 30 years.

Program Administration – The organization administering the program enrolls the land, works with the landowners, and distributes the payments to participating landowners. Organization options are Federal agency (e.g., USDA-NRCS, US Fish & Wildlife Service), State agency (e.g., CA Department of Conservation, CA Department of Fish and Game), Non-profits (e.g., RCD's, Land Trust, Cattlemen's), or a Private for profit company.

Program Payment – Landowners receive a payment for enrolling land in a program. Payment level options are $5, $10, $20, and $50 per acre per year

24. **<u>Directions:</u> In each of the following five choice decision tables we ask you to select your preferred option from Programs A or B or Neither. Please assume that these programs would apply to <u>your</u> owned/rented land. *In each case, also assume that the options in each table are the only ones available to you and do not consider programs shown in the other decision choice tables*. Given the description Program A and B please decide which one you would choose by circling the box on the last row *only* for the program that you would most prefer, or circle Neither if neither choice interests you.**

Choice Table 1.

Program Features	Program A	Program B	Neither
Contract length	30 years	15 years	
Program administration	Non-profit organization	State agency	
Payment level (per acre per year)	$20 $5		
Please indicate your preferred program (circle one)	**I would prefer Program A**	**I would prefer Program B**	**I would not participate in either program.**

Choice Table 2.

Program Features	Program A	Program B	Neither
Contract length	15 years	5 years	
Program administration	Federal agency	Non-profit organization	
Payment level (per acre per year)	$10 $5		
Please indicate your preferred program (circle one)	**I would prefer Program A**	**I would prefer Program B**	**I would not participate in either program.**

Choice Table 3.

Program Features	Program A	Program B	Neither
Contract length	15 years	5 years	
Program administration	Non-profit organization	Federal agency	
Payment level (per acre per year)	$5 $10		
Please indicate your preferred program (circle one)	**I would prefer Program A**	**I would prefer Program B**	**I would not participate in either program.**

Choice Table 4.

Program Features	Program A	Program B	Neither
Contract length	5 years	5 years	
Program administration	State agency	Federal agency	
Payment level (per acre per year)	$20 $5		
Please indicate your preferred program (circle one)	**I would prefer Program A**	**I would prefer Program B**	**I would not participate in either program.**

Choice Table 5.

Program Features	Program A	Program B	Neither
Contract length	15 years	5 years	
Program administration	Federal agency	State agency	
Payment level (per acre per year)	$50 $20		
Please indicate your preferred program (circle one)	**I would prefer Program A**	**I would prefer Program B**	**I would not participate in either program.**

25. **When you were considering the Program A and B alternatives just presented, how important were each of the following program features to your decision?** (Please circle one number that most closely matches the level of importance)

	Not important	***Neutral***	***Very important***	***Don't know***
Contract length	1 2	3 4	5	DK
Program administration	1 2	3 4	5	DK
Payment level (per acre per year)	1 2	3 4	5	DK

26. **How frequently do you consult with the following sources about land management decisions?**

	Never	***Sometimes***	***Very frequently***
Agricultural extension agent	1 2	3 4	5
Neighboring rancher	1 2	3 4	5
Other producers/landowners	1 2	3 4	5
U.S. Fish & Wildlife biologist	1 2	3 4	5
Family members	1 2	3 4	5
District conservationist	1 2	3 4	5
Conservation organization biologist	1 2	3 4	5
Internet	1 2	3 4	5
Other:	1 2	3 4	5

27. **A number of organizations recognize the important role that private landowners play in wildlife conservation and are considering the creation of voluntary programs in which landowners could receive payments to apply conservation practices that improve habitat for wildlife. What is your initial reaction to such programs?** (Please circle the number that most closely matches your response)

Strongly oppose	***Oppose***	***Neutral***	***Favor***	***Strongly favor***	***Don't know***
1 2		3	4	5	DK

28. **Please give your opinion on the following statements:**

A. Payments for ecosystem services such as water quality, carbon sequestration, wildlife habitat, etc., should be separated by ***different*** areas on the ranch.

Strongly Disagree	***Disagree***	***Neutral***	***Agree***	***Strongly Agree***	***Don't know***
1	2	3	4	5	DK

B. Multiple payments for different multiple ecosystem services (i.e. wildlife habitat and carbon sequestration from oak restoration) should be provided for the ***same*** land area on the ranch.

Strongly Disagree	***Disagree***	***Neutral***	***Agree***	***Strongly Agree***	***Don't know***
1	2	3	4	5	DK

C. Payments for ecosystem services should be based on the cost of conservation practices that generate those services.

Strongly Disagree	***Disagree***	***Neutral***	***Agree***	***Strongly Agree***	***Don't know***
1	2	3	4	5	DK

29. **At this time, please feel free to provide any information, opinion or comment you may have on efforts to promote wildlife conservation on California rangelands. Remember, your response is completely anonymous.**

_____

_____

_____

Section 4: Personal Background

This information will only be used for statistical purposes and will not be associated with you. All responses will be held as strictly confidential.

30. **Are you (please check one):** ____ male _____ female

31. **How old are you?** _____ <30 _____ 31-45 _____ 46-60 _____ >60 years

32. **What is the highest level of education that you have achieved?** (Check ONE)

_____ Less than high school diploma _____ Some college at a 4-year institution
_____ High School diploma or GED _____ 4-year college degree
_____ Technical/vocational degree _____ Ad vanced degree beyond 4-year degree

33. **In what county is your primary residence?** _____ _____ County

34. **How long have you lived in that County?** _____ years

35. **Please indicate if you and/or other members of your household work off the property to support the household, even if only part-time.**

_____ You _____ Spouse _____ Other members _____ Neither

36. **What is your approximate *NET (after production expenses)* annual household income after taxes last year?** (Check ONE)

_____ My ranching operation lost money last year.
_____ I roughly broke even last year.

_____	Less than $5,000	_____	$50,000 to $75,000
_____	$5,000 to $10,000	_____	$75,000 to $100,000
_____	$10,000 to $25,000	_____	$100,000 to $150,000
_____	$25,000 to $50,000	_____	Over $150,000

Thank you very much!

Please fold the survey in half, place it in the postage-paid envelope provided, and drop it in the mail.

Use the space below to write any comments you have about this survey or our research.

Appendix B.

Table B.1. Comparison of Survey Results Between Ranchers who Hold Easements and Do Not Hold Easements

Question #	Description	Easement	Non-Easement
1	Years personally farmed	26 years	28 years
2	Years family has farmed in area	85 years	100 years
3	Believe next generation will farm?	Yes 62% No 14% Don't Know 24%	Yes 40% No 24% Don't Know 36%
5	Acres Owned	1,000-3,000 (median)	1,000-3,000 (median)
6a	Public acres leased	<5,000 (median)	<5,000 (median)
6b	Private acres leased	<5,000 (median)	<5,000 (median)
7	Ownership structure	47% private	55% private
8	Primary land use	95% cattle	77% cattle
9	Land used for hunting?	Yes 68% No 32%	Yes 65% No 34%
10	Money from hunting leases	$0 (median)	$0 (median)
11	Renter Influence (1=No Influence, 5=Complete Influence)	1.75 (Owner's Perspective)	1.63 (Owner's Perspective)
12		2.88 (Renter's Perspective)	2.55 (Renter's Perspective)

Question #	Description	Easement	Non-Easement
22	Consider participating in PES program?	Yes: 81% No: 8% Don't know:11%	Yes: 75% No: 8% Don't know:17%
27	Initial reaction to the creation of PES programs	4.26 (1=Strongly Oppose, 5=Strongly Favor)	3.90 (1=Strongly Oppose, 5=Strongly Favor)
Importance of program features (Q25) (1=Not Important, 5 = Very Important)	Contract Length	4.00 (mean)	4.19 (mean)
	Program Administrator	4.19 (mean)	4.16 (mean)
	Payment Level	4.38 (mean)	4.44 (mean)
30	Gender	76% Male	74% Male
31	Age	86%≥ 46 years	86%≥ 46 years
32	Education	59%≥ 4-year degree	66%≥ 4-year degree
34	Years lived in resident county	50.75 years (mean)	51.13 years (mean)
7	Ownership Structure	47% private individual	55% private individual
35	Work off farm?	72% of respondents	71% of respondents
36	Household Income	$10,000-$25,000 (median)	$10,000-$25,000 (median)