



Balancing Property Rights and Social Responsibilities: Perspectives of Conservation Easement Landowners[☆]



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ABSTRACT

Currently, > 20 million acres in the United States are protected through conservation easements. While the role of property rights in enabling conservation easements is well documented, attitudes of landowners living under those property rights regimes have not been thoroughly researched. To address the knowledge gap, landowners in Texas with perpetual conservation easements participated in a mail survey and resulting data were compared with prior research on the property rights perspectives of a group of noneasement-owning rural landowners. Our study indicates that easement and noneasement landowners differ in their attitudes concerning both property rights and social responsibilities with respect to land management. While landowners in both groups agreed that property ownership conveyed certain fundamental rights, noneasement landowners expressed stronger conventional property rights attitudes than easement landowners. Counter to expectations, noneasement landowners were also more likely to express a stronger land stewardship ethic. We also found significant demographic differences between the two groups with easement landowners tending to be younger, having more formal education, being less likely to live on their rural property and owning their property for a shorter period of time. Those demographic differences, combined with differences between the two groups of landowners with respect to dependence on their land for income, locational differences of the two surveys from which data were obtained, and the 9-yr span between the two surveys limited our ability to extrapolate our findings to a broader population of landowners. Intragroup comparisons among easement landowners failed to find differences between easement-granting and successive generation easement landowners with respect to property rights orientations, but we did find some attitudinal differences between male and female respondents. Our research implies that landowners willing to accept substantial property rights adjustments designed to facilitate environmental protection goals may have inherently different attitudes concerning property rights ideals.

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Introduction

Effective natural resource conservation on private lands is essential for protecting the full suite of ecosystem functions required for sustaining life (Scott et al. 2001; Hilty and Merenlender 2003). While private landowners do derive benefit from some of the services provided by the ecosystems on their land (e.g., open space, wildlife habitat, air and water filtration) and incur most of the costs of maintaining them, these benefits also accrue to broader society for little to no cost. In other words, many ecosystem services are nonexcludable public goods (Daly and Farley 2004). Landowners are often unable to maintain publicly important ecosystem services that are negatively affected by land

development (e.g., endangered species habitat), without public payments to cover some of the maintenance costs. More problematic is that landowners are sometimes forced to sell parts of their land to cover increasingly high property or estate taxes. When conservation easements are established, many of the development rights are removed, reducing the value of the land. Conservation easement landowners may benefit from this in one of three ways: they may receive direct payments for the opportunity cost; they may claim the reduced value of their property as a charitable deduction for income tax purposes; and/or they may incur lower property taxes. This creates an incentive for some landowners to grant conservation easements on their land to reduce the pressure to subdivide and/or sell their land for development. In turn, this positively influences the maintenance of ecosystem services by encouraging the retention of large tracts of open space.

Increasingly, conservation easements (or easement) are used as a mechanism to provide compensation for private land conservation and, by extension, the protection of associated ecosystem services. Such compensation is provided to landowners with conservation easements through either direct payments or tax reductions for the conservation

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easement. A conservation easement, called a *conservation covenant* outside of the United States, is a voluntary deed restriction that alters property rights by restricting how the land can be used, specifically by preventing most development and subdivision. In addition, through the establishment of such easements, conservation organizations that assume ownership of the easement can protect more land at a lower cost compared with outright acquisition of the property (Fairfax et al. 2005).

Recent research has begun to empirically evaluate the ecological and economic effectiveness of conservation easements (Newburn et al. 2005; Kiesecker et al. 2007; McDonald et al. 2007; Rissman et al. 2007; Pocewicz et al. 2011; Noone et al. 2012; Iftekhhar et al. 2014). However, since conservation easements are a property rights constraint, they also have social implications and understanding the sociological dimensions of conservation easements is essential for evaluating their overall ability to produce the desired conservation outcomes. Several studies have examined motivational drivers of easement conveyance (Wallace et al. 2008; Miller et al. 2010; Farmer et al. 2011a); however, only limited research has been conducted about landowners' attitudes regarding their conservation easements (Cheever 1996; Rilla 2002; McLaughlin 2005). In addition, while the role of property rights in enabling conservation easements is well represented in the literature (Demsetz 2002; Heltberg 2002; Stoms et al. 2009; Adams and Moon 2013; Rissman 2013), no research has been conducted to illuminate the property rights orientations of landowners with easement-encumbered properties.

Property rights systems in the United States were traditionally established by common law, which is determined by precedent or case law and distinguished from statutory or regulatory laws that are promulgated by legislatures or the executive branch, respectively. Under common law, courts were unlikely to enforce perpetual conservation easements because they are considered a type of "negative easement," meaning that certain actions are not permitted, with the intention that the restrictions will confer a benefit to the wider public. Historically, common law courts would not recognize negative easements unless the primary beneficiaries of the easement were adjacent landowners, not the broader community (Parker 2004). Furthermore, in order to prevent "dead hand control" where the desires of the deceased control the actions of the living, common law courts would not recognize deed restrictions that "run with the land"; in other words, restrictions that transfer to subsequent landowners (McLaughlin 2005). In response to these legal limitations, the National Conference of Commissioners on Uniform State Laws authored a statutory model in 1981, called the Uniform Conservation Easement Act (UCEA) to serve as a model for state statutes enabling permanent conservation easements (Parker 2004). By 2010, most states (all except North Dakota) had adopted conservation easement-enabling statutes, many modeled on the UCEA (Levin 2010). Since then, the application of conservation easements as a conservation tool has increased drastically. Current estimates approximate > 20 million acres in the United States that are protected through conservation easements held by private and public entities (Pidot 2005; Chang 2011; USDA 2013).

Property rights are used to define owners' rights, privileges, obligations, and constraints with respect to a resource. Most commonly, the state defines and enforces the nature of property rights but property rights can also be enforced by implicit social institutions (Reynolds 2005). Private property rights are generally perceived as a bundle of rights (synonymous with a "bundle of sticks"). A private landowner may purchase a piece of property but not own all of the rights (or sticks) associated with that specific piece of land. For example, an owner may have the exclusive right to use the surface of the land but may not own the rights to water or subsurface minerals on the property. Similarly, once an easement has been conveyed, some property rights have been effectively split between two owners: the landowner who retains the right to use the land in a restricted manner and the easement-holding organization that owns the rights that have been separated out (e.g., subdivision and development rights).

It is possible that concerns over the loss of property rights may influence landowners' desire to challenge the terms of the conservation easement restrictions. Moreover, understanding conservation easement landowners' property rights orientations is important because attitudes often affect behavior (Lopez-Mosquera and Sanchez 2012; Stern 2000). Opinions concerning property rights have been found to influence landowner willingness to convey conservation easements (Kabii and Horwitz 2006). In addition, Kreuter et al. (2006) found that property rights orientations were better predictors of landowners' use of socially desirable management on their properties than other sociodemographic variables, including age, education, income, or residency on their land. Specifically, they found that landowners who held stronger social responsibility and land stewardship orientations were also more prepared to adopt socially desirable land management objectives including protecting water quality, providing hunting access and protecting endangered species habitat.

To analyze landowner perceptions about their property rights, we compared two data sets. The first data set was derived from a 2011 survey of easement-landowners across Texas. The second data set was obtained via a 2002 survey of a broader range of rural landowners in two counties, Llano and Sutton, located in the Edwards Plateau ecoregion of Texas (Jackson-Smith et al. 2005). In both surveys, landowners were asked about their private property rights attitudes. These two data sets enabled us to compare property rights and responsibilities orientations of landowners with and without conservation easement-related constraints. The two data sets also allowed us to explore how differences in such orientations affect decision making about the management of natural resources on private property in our study area. In this study, we tested four hypotheses:

H1. *Landowners with easement-encumbered properties will express weaker property rights attitudes than other rural landowners.* This is because easement landowners do not enjoy the full suite of traditional private property rights and, therefore, their expectations of strong, inalienable property rights may be diminished compared with other private landowners.

H2. *Compared with other rural landowners, those with easement-encumbered properties will express a greater sense of responsibility toward protecting natural resources on their properties in a way that provides benefits to society.* Previous research investigating motivations for easement conveyance indicated that most easement landowners or potential easement grantors exhibit strong pro-environmental attitudes (Rilla 2002; Ernst and Wallace 2008; Farmer et al. 2011a; Farmer et al. 2011b; Brenner et al. 2013), which we believe will be reflected in their attitudes toward stewardship of natural resources on their property. For the purposes of this paper, we define stewardship as the responsible management of land entrusted to the care of landowners for their benefit and for the benefit of future generations.

H3. *Grantor easement landowners will exhibit weaker attitudes about property rights than successive generation easement landowners.* Previous research suggests that property rights notions influence landowners' decision making with respect to easement conveyance (Kabii and Horwitz 2006; Miller et al. 2010). In conveying the conservation easement, grantor landowners voluntarily surrender some of their property rights, whereas landowners who acquired their properties after the conservation easements were established may be more concerned about the relinquished property rights.

H4. *Women are more tolerant of property rights restrictions and assume a greater social responsibility to manage natural resources for the benefit of others than men.* Previous research found that women are more satisfied than men with conservation easements and the relationship with their easement holding organization (Stroman and Kreuter 2014). In addition, women tend to exhibit more pro-environmental

behaviors than men (Zelezny et al. 2000; Dietz et al. 2002), a finding that may correlate with their property rights attitudes.

Methods

Data for easement landowners were collected in 2011 through a mail survey sent to Texas landowners who own property with a perpetual conservation easement. Every entity holding permanent conservation easements in Texas ($n = 33$) was contacted by mail to request assistance in identifying easement landowners for the study. Ultimately, 16 out of 33 easement-holding organizations provided contact information for 429 landowners. Some organizations indicated that specific landowners were not interested in participating, and they were excluded from our sample. One organization, representing 20 landowners, did not release contact information but did participate in the study by concurrently mailing out survey materials to their easement landowners. The remaining 16 easement-holding organizations, which held an estimated 80 easements, declined to participate. However, using county record searches we were able to obtain contact information for 69 of these 80 landowners. Therefore, our study included almost the whole population of Texas landowners with a conservation easement in 2011. We began the survey with a sample size of 518 landowners.

The survey was initiated in September 2011 and used Dillman's (2000) survey protocol with five coordinated mailings, including a presurvey notification letter (day 1); the survey questionnaire with a cover letter (day 7); a thank you/reminder postcard (day 14); a replacement questionnaire with a second cover letter for nonrespondents (day 28); and a final thank you/reminder card (day 42). Returned survey questionnaires were accepted over a 4-mo period, ending in December 2011.

Comparing Easement and Noneasement Landowners

The first section of the 2011 easement landowner questionnaire asked survey participants about their views concerning private property rights and social responsibilities with regard to natural resource management. The questions used to elicit responses about these views were identical to those included in the survey conducted in 2002 (Jackson-Smith et al. 2005) (Table 1).

To maximize comparability of the two data sets, we limited our analysis to the response data from landowners in the Edwards Plateau ecoregion; specifically, we compared the 2011 responses from the easement landowners in the Edwards Plateau with the responses of the 2002 rural landowners in the same ecoregion. Preliminary between-group comparisons of property rights attitudes were tested using the Wilcoxon-Mann-Whitney (M-W) test, a nonparametric test designed to compare ordinal response data between groups (Acocck 2006).

Furthermore, to control for demographic differences between the two landowner groups, we developed ordinal logistic regression models ($n = 12$) for each tested survey question. Regression models were developed using Akaike Information Criterion (AIC) in order to determine goodness of fit for potential included demographic predictors.

Examining Intragroup Differences of Conservation Easement Landowners

To test for attitudinal differences among conservation easement landowners, we first examined whether the responses to questions were correlated. While we separated property rights and responsibilities into a series of statements, previous research results indicate that people often do not think about property rights as individual concepts but rather as multidimensional constructs (Heltberg 2002; Jackson-Smith et al. 2005; Kreuter et al. 2006). To test for collinearity, we conducted a principal components analysis (PCA) with varimax rotation on the 12 response variables listed in Table 2. After the initial PCA analysis, orthogonal varimax rotation was applied to create indices without intercorrelated components. Cronbach's alpha (α) was used to assess the internal reliability of the summative rating scales composed of the specified variables. We relied on an α threshold of 0.700, which is widely considered the minimum for reliability in social science research (Cortina 1993; UCLA Academic Technology Services 2012). We then used the resulting latent indices as dependent variables to create ordinal logistic regression models to test our hypotheses. AIC was again applied to determine the best models to use for interpretation. Independent variables used in the regressions included those necessary for hypothesis testing (grantor landowner, gender), variables found in previous research to influence property rights attitudes (residency on property, age, and education) and length of property ownership (Jackson-Smith et al. 2005). Independent variables were tested for potential multicollinearity using both pairwise correlation testing and correlation tests of regression coefficients post modeling.

Results

Respondent Profiles from 2011 and 2002 Surveys

Of the 518 questionnaires sent to easement landowners in the 2011 survey, 18 were returned due to incorrect addresses, resulting in an effective survey sample size of 500. Of these 500, we received 251 completed survey questionnaires representing an effective response rate of 50%. From the 251 responses, only 4 were received from Llano and Sutton County, the two counties sampled in the 2002 noneasement landowner survey. However, 101 survey responses came from the same ecoregion (the Edwards Plateau). Therefore, we used the response

Table 1
Property rights and responsibilities attitudinal survey questions

Survey questions	Variable label
Landowner rights	
My landowner rights include the <i>right to exclude</i> others from access to my land	Right to exclude
My landowner rights allow me the <i>exclusive use</i> of the natural resources provided by the land	Exclusive use
My landowner rights include the <i>right to transfer ownership</i> of my land to others without restriction	Right to transfer ownership
My landowner rights include the <i>absolute right</i> to do whatever I want with my land without regard for what others prefer	Absolute right
My landowner rights allow me to do anything with my land so long as my actions <i>do not infringe upon my neighbors' rights</i>	No neighbor impact
My landowner rights allow me to do anything with my land so long as my actions <i>do not conflict with the interests and values of the local community</i>	No community conflict
My rights as a landowner have become <i>increasingly restricted</i> over time	Rights more restricted
Landowner responsibilities	
My landowner rights place <i>no obligations</i> on me	No obligations
My landowner rights obligate me to be a <i>good steward of my land</i> and to maintain it in good condition for future generations	Good land steward
My landowner rights should obligate me to <i>leave the land in better shape</i> than when I acquired it	Improved condition
Natural resources on my land <i>belong to society</i> , which allows the public to restrict land uses that cause damage to natural resources	Societal resources
My landowner rights should obligate me to <i>take into account the values and interests of society at large</i>	Societal values and interests

Responses are based on 7-point scale: 1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = neutral, 5 = slightly agree, 6 = agree, 7 = strongly agree.

Table 2
Comparative demographics of Edwards Plateau survey respondents in the 2011 easement landowner and the 2002 noneasement landowner surveys

	2011 Survey (n = 101)	2002 Survey (n = 192)	Significance test	Variable description
Age (yr)	M = 62 SD = 9.88	M = 68 SD = 11.5	t-test $P < 0.001$	Continuous (yr)
Gender				
Male	77%	70%	$\chi^2 P = 0.388$	Binary (1 = male, 0 = female)
Female	23%	30%		
Formal education				
Less than high school	1%	4%	$\chi^2 P = 0.033$	Categorical
High school	7%	16%		
Some post-secondary	14%	18%		
Bachelor's degree	32%	33%		
Graduate/professional degree	46%	29%		
Live on property				
Yes	42%	46%	$\chi^2 P = 0.048$	Binary (1 = yes, 0 = no)
No	58%	54%		
Length of property ownership				
< 3 yr	9%	5%	$\chi^2 P < 0.001$	Continuous (yr)
3–10 yr	29%	11%		
11–25 yr	35%	8%		
25 + yr	27%	76%		
Proportion of income derived from rural (or CE) property ¹				
0%	65%	—	n/a	Categorical
<10%	—	51%		
1–25%	30%	—		
11–50%	—	17%		
>50%	4%	29%		
No response	1%	3%		

A long dash (—) indicates that the category is not represented in the questionnaire.

¹ Income derived from rural property question used different categories between 2002 and 2011 surveys.

data from this group of respondents for our comparative analysis (Fig. 1).

The 2002 initial survey sample consisted of 500 Llano and Sutton County landowners in Texas who owned a minimum of 100 acres of rural land (see Fig. 1). However, of those, only 277 (55%) derived at least some portion of their annual income from their land, which was a criterion for inclusion in the 2002 study. A total of 192 sufficiently completed surveys were received and used for comparison in our study. Jackson-Smith et al. (2005) reported a smaller useable sample

size of 177 in their study because they required information from questions not used in our comparison (notably enterprise characteristics and property size) that were not adequately answered by 15 survey respondents.

Table 2 highlights demographic differences between the two data sets. On average, the 2011 easement landowners were 6 years younger, had more formal education, were less likely to live on their property, had owned their properties for less time, and were less likely to have generated > 50% of their income from activities on their rural conservation easement property.

Given that the primary interest of our 2011 survey was to elucidate perspectives of conservation easement landowners (and the 2002 survey respondents were used as a control group for the property rights orientation component of our study), a more detailed respondent description is provided of the conservation easement respondent group in the Edwards Plateau ecoregion. Their easement landholdings ranged in size from 4 to 19 900 acres (median = 400 acres, $M = 1\ 560$ acres and standard deviation [SD] = 3 596.6) with 25% being 1 000 acres or more. With respect to the duration of property ownership, the median and

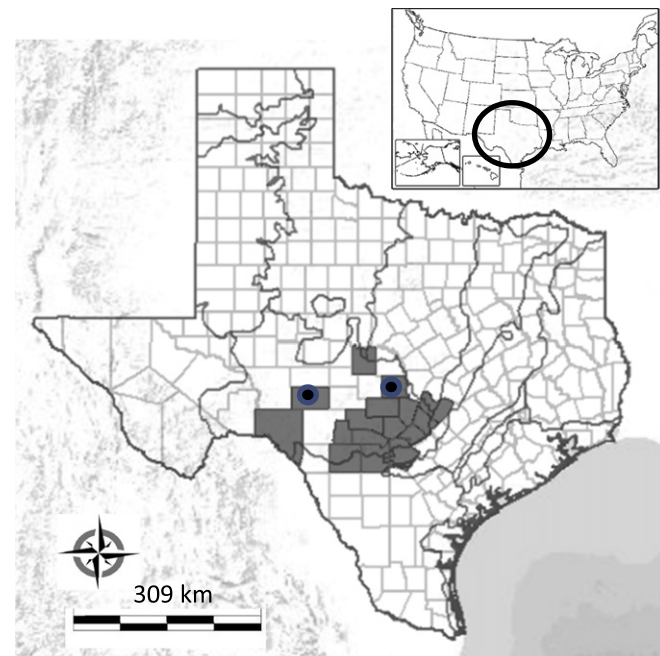


Figure 1. Map of study area with county and ecoregional boundaries. Shaded counties indicate locations of conservation easement survey respondents within the Edwards Plateau ecoregion. Counties with a dot indicate location of 2002 noneasement landowner survey participants.

Table 3
Overview of survey respondent's conservation easement holding organizations

Type of easement holding organization	% of easements held	Name of easement holding organizations represented in respondent sample (n = number of easements in respondent sample)
Nongovernmental organization	64%	Texas Land Conservancy (21)
		The Nature Conservancy (18)
		Hill Country Land Trust (9)
		Cibola Conservancy (7)
		Hill Country Conservancy (4)
State/Local government organization	33%	Guadalupe Blanco River Trust (3)
		Green Spaces Alliance (1)
		Wimberley Valley Watershed Association (1)
Federal government organization	3%	City of San Antonio (22)
		City of Austin (8)
		San Antonio Water System (3)
		Natural Resources Conservation Service (3)

mean years of ownership of easement properties were 12 and 20 (SD = 23.9) yr, respectively. Almost two-thirds (65%) of the respondents indicated they did not derive any income from their easement properties, approximately one-third (30%) generated between 1% and 25% of their income from their property, and only 5% relied on their easement properties for $\geq 25\%$ of their annual income. In contrast, all of the 2002 noneasement respondents earned some income from their land. However, 51% of those respondents earned $< 10\%$ of their annual income from their property and only 29% reported earning $> 50\%$ of their annual income from activities on their farm or ranchland property. Just over one-third of the respondents (42%) lived on the easement property full time, 18% used their land as a weekend residence, and 40% were absentee landowners.

Most of the easement survey respondents (82%) were the original grantors of the conservation easement, while the others had acquired their easement properties through purchase or inheritance. Of the respondents, 64% indicated that their easements were held by a nongovernment organization (NGO), while the others were divided between federal agency (3%) and state or local governmental agency – owned easements (33%) (Table 3). The grantor landowners ($n = 85$) were also asked to list their motivations for easement conveyance. Among their primary motivations were prevention of development (32%), protection of the environment (29%), financial gain (27%), social responsibility (7%), and cultural protection (3%).

Property Rights and Social Responsibility Perspectives of Conservation Easement and Noneasement Landowners

This section provides the results of the analyses conducted to address our first two hypotheses related to differences in property rights and social responsibility orientations between conservation easement and noneasement landowners. We wanted to see if conservation easement landowners held fundamentally different attitudes concerning property rights (H1) and responsibilities for protecting natural resources (H2) than a more inclusive (noneasement) rural landowner group. Because easements, by definition, alter property rights, the 2011 survey participants were asked to evaluate their attitudes about property rights outside of easement protected property. In other words, we wanted to know how they felt, in general, about their property rights and responsibilities. This allowed us to compare the data sets from the 2011 conservation easement survey and the survey conducted in 2002 (Tables 4–5).

Examination of mean response scores between the two landowner groups (see Table 4) indicated significant differences for every tested

questions except for two (no obligations and societal values and interests). However, given the observed demographic differences between these two groups, we also developed ordinal logistic regression models allowing us to control for those differences.

As shown in Table 5, trends observed using M-W tests (which did not consider demographic differences) were corroborated in the subsequent regression analyses. Both easement-encumbered landowners and noneasement landowners expressed strong to very strong attitudes concerning property rights, particularly the concepts of exclusion, exclusivity, and transferability.

However, in comparing odds ratios of the two survey respondent groups (see Table 5), those respondents with conservation easements expressed significantly less strong property rights orientations in every category tested (47.9%–79.3% less likely to agree with property rights statements), thereby broadly corroborating our first hypothesis [H1]. Noneasement landowners were more likely to agree (60.2%) that their property rights include the “absolute” right to do anything with their land without regard for the preferences of others. On the other hand, the noneasement landowners were also more likely (77.7%) to agree with the idea that their property rights allow them do anything on their land, so long as it does not infringe on their neighbors’ rights.

With regard to landowner responsibilities, respondents in both surveys disagreed almost equally with the statement, “my landowner rights place no obligations on me,” suggesting they feel some responsibility to manage their land in a manner that does not harm others. However, respondents from both groups also disagreed with statements that *natural resources belong to society* and that resource management on their land should *consider the needs of society at large*.

Easement landowners, on average, were less opposed to the idea that natural resources are social assets. In contrast to this, the noneasement landowner group was significantly more likely to agree than conservation easement landowners that their property rights confer a responsibility to be a *good land steward* (64.7%) and should obligate landowners to *leave the land in better shape* (71.3%) than when they acquired it. These latter two findings were contrary to our expectations. Therefore, we did not find consistent evidence to support our second hypothesis [H2] that easement landowners would express a greater sense of responsibility than noneasement landowners toward protecting natural resources on their property.

Some demographic characteristics also seemed to influence property rights and responsibilities orientations. Specifically, older landowners were more likely to agree (39.8%) that landowner decisions should not conflict with community values and that landowners are obligated to leave their land in better shape for future generations (52.9%).

Table 4

Mean response scores from the 2011 conservation easement landowner survey and the 2002 broader landowner survey conducted in Texas

Property rights characteristic	Mean ¹		% diff. in mean	M-W sig ³
	2011 ($n = 101$)	2002 ($n = 192$)		
Landowner Rights²				
Right to exclude	6.57	6.83	3.8%	< 0.0001
Exclusive use	5.86	6.58	11.0%	< 0.0001
Right to transfer ownership	6.20	6.75	8.1%	< 0.0001
Absolute right	4.15	5.35	22.4%	< 0.0001
No neighbor impact	5.14	6.39	19.6%	< 0.0001
No community conflict	4.62	5.32	13.2%	0.0033
Rights more restricted over time	4.65	5.54	16.1%	0.0002
Landowner Responsibilities²				
No obligations	2.18	2.35	7.2%	0.8978
Good land steward	6.21	6.67	6.9%	< 0.0001
Improved condition	4.80	6.14	21.8%	< 0.0001
Societal resources	3.16	1.89	– 67.2%	< 0.0001
Societal values and interests	4.12	3.87	– 6.5%	0.3291

¹ Answers based on 7-point scale: 1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = neutral, 5 = slightly agree, 6 = agree, 7 = strongly agree.

² See Table 1 for questions representing each characteristic.

³ Bolded values are significantly different at $P < 0.05$, based on Mann-Whitney (M-W) rank test.

Table 5
Ordinal logistic regression models of factors influencing property rights orientations. Bolded/shaded results indicate significance at $P < 0.01$

Independent variables	Landowner type ¹		Land residency ²		Landownership (yr)		Formal education		Age (yr)		Gender ⁴		Model significance	
	P value	% Δ in odds	P value	% Δ in odds	P value	% Δ in odds	P value	% Δ in odds	P value	% Δ in odds	P value	% Δ in odds	Prob > χ^2	McFadden's pseudo R ²
Right to exclude	0.00	−79.3	0.63	20.9	0.61	−9.0	0.306	−15.1	0.75	−7.8	0.185	74.3	0.0027	0.0701
Exclusive use	0.00	−75.3	0.89	4.3	0.53	−8.3	0.01	−28.5	0.32	−18.2	—	—	0.0000	0.0646
Right to transfer ownership	0.00	−76.2	0.77	−9.4	0.80	4.3	0.33	−12.4	0.38	−18.5	—	—	0.0005	0.0579
Absolute right	0.00	−60.2	0.67	10.1	0.57	6.4	0.42	−6.4	0.68	−6.0	—	—	0.0013	0.0216
No neighbor impact	0.00	−77.7	0.17	43.2	0.90	−1.6	0.04	−18.9	0.80	4.4	—	—	0.0000	0.0689
No community conflict	0.01	−47.9	0.31	−21.0	0.94	−0.9	0.11	−13.3	0.03	39.8	0.08	54.9	0.0014	0.0249
Rights more restricted	0.00	−66.2	0.08	51.9	0.22	−12.0	0.37	−7.2	0.96	0.8	0.01	98.0	0.0001	0.0328
No obligations	0.28	33.8	0.85	−4.2	0.04	27.0	0.50	−5.5	0.20	22.0	0.12	54.4	0.1969	0.0111
Good land steward	0.02	−64.7	0.49	23.5	0.30	−13.9	0.28	−11.6	0.44	16.3	0.01	−68.7	0.0002	0.0574
Improved condition	0.00	−71.3	0.13	46.0	0.89	−1.6	0.15	−12.3	0.01	52.9	0.12	−35.7	0.0000	0.0635
Societal resources	0.00	387.9	0.30	−23.1	0.37	11.2	0.98	0.2	0.17	26.3	0.62	−13.1	0.0000	0.0494
Societal values and interests	0.71	10.1	0.79	−5.8	0.65	−4.9	0.12	13.3	0.78	4.1	0.19	−28.2	0.5341	0.0051

¹ Binary variable 1 = CE landowner, 0 = noneasement landowner.
² Binary variable asking if landowner lives on their rural property 1 = yes, 0 = no.
³ See Table 1 for questions representing dependent variables.
⁴ Gender (binary variable 1 = male, 0 = female, - = excluded in model based on AIC analysis).

Women were more likely to believe (68.7%) that landownership conveys an obligation to be a good land steward while men were more likely (98.0%) to believe that their landowner rights have become increasingly restricted.

Intragroup Conservation Easement Landowner Differences

After analyzing intergroup differences between easement and noneasement landowners, we examined differences among easement landowners only to test the last two hypotheses, which relate to property rights orientation differences between easement-granting landowners and subsequent easement landowners [H3] and between women and men [H4]. First, we tested for potential collinearity between the survey items listed in Table 1 using PCA analysis. Of the four potential factors identified in the preliminary PCA analysis (Table 6), only two of them (Factor 1—responsible rights and Factor 3—land stewardship) produced a Cronbach's score > 0.700, which is the minimum value to justify their use as latent dependent variables in the subsequent regression models (UCLA Academic Technology Services 2012). The remaining variables in Factors 2 and 4 and one variable (no obligations) did not load on any factor. Thus, they were incorporated as standalone

Table 6
Principal components analysis of easement landowner property rights and responsibilities response variables

	Rotated factor loadings	
	Factor 1 ($\alpha = 0.7582$)	Factor 2 ($\alpha = 0.4896$)
Landowner rights		
Right to transfer ownership	0.5182	0.4464
Absolute right	0.5873	0.5218
No neighbor impact	0.6855	0.4664
No community conflict	0.7447	0.0608
Rights more restricted	0.7051	−0.0583
Right to exclude	−0.0537	0.8142
Exclusive use	0.2980	0.7546
	Factor 3 ($\alpha = 0.8300$)	Factor 4 ($\alpha = 0.6015$)
Landowner responsibilities		
No obligations ¹	−0.5864	−0.1285
Good land steward	0.9102	0.0642
Improved condition	0.6924	0.3392
Societal resources	−0.0222	0.8889
Societal values and interests	0.3536	0.7518

¹ Variable did not load on either factor and was therefore excluded from the PCA analysis for this section and used as a stand-alone variable in regression modeling.

dependent variables in the subsequent analyses. Multicollinearity tests on the independent variables used in the regression models failed to detect and significant collinearity between them.

The two latent variables (Factor 1—responsible rights and Factor 3—land stewardship) and the five standalone variables (right to exclude, exclusive use, no obligations, societal resources, societal interest) were used as dependent variables, respectively, in seven ordinal logistic regression models to test the two hypotheses about intragroup differences among easement landowners. Only two of the seven regression models (land stewardship—Factor 3 and no obligations) were found to be statistically significant (Table 7).

None of the seven regression models detected statistically significant response differences between grantor and successive generation landowners with regard to their property rights orientations. Therefore, our third hypothesis [H3] was not corroborated.

By contrast, in both of the statistically significant regressions, gender was a significant explanatory variable, indicating that female and male respondents in the 2011 easement landowner survey differed significantly in terms of attitudes regarding property rights. Women were 70% more likely to agree than men with the idea that landownership obligates them to be good land stewards. By contrast, men were 295% more likely than women to agree with the statement, “my landowner rights place no obligations on me.” This finding corroborated our fourth hypothesis [H4].

Part-time residency was also found to be positively correlated with a strong land stewardship ethos; specifically, weekend residents were

Table 7
Demographic factors influencing easement landowners' property rights and responsibilities attitudes. Bolded results are significant at $P < .05$

Explanatory variables	Good land steward model		No obligations model	
	P value	% Δ in odds	P value	% Δ in odds
Grantor landowner (1 = yes, 0 = no)	0.228	−33.8	0.432	33.3
Gender (1 = male, 0 = female)	0.001	−69.5	0.001	294.8
Weekend CE resident¹	0.026	109.3	0.076	−46.5
Full-time CE resident ¹	0.290	36.5	0.137	57.4
Respondent age	0.995	−0.1	0.506	−0.8
Yr of education	0.164	−5.7	0.639	2.0
Yr owned rural property	0.770	0.2	0.226	−0.8

¹ Absentee landowner is reference group.

109% more likely than absentee landowners to agree with statements about an obligation to be a good land steward. None of the other independent variables were found to be significant explanatory variables for differences in our regression models.

Discussion

The results of this research confirmed our first hypothesis that landowners with conservation easements would hold different attitudes concerning property rights compared with noneasement landowners. Landowners with easement-encumbered property have intentionally relinquished some of the rights associated with their land. They have, in essence, transferred “sticks” from their bundle of rights to another owner—the easement holding entity. This transference of rights alters the right of exclusivity (exclusive use) contained within traditional property rights. One of the more interesting findings from our results is that noneasement landowners were more likely than easement landowners to believe that their landowner rights have become increasingly restricted over time even though conservation easements are, by definition, a restriction of property rights.

Rissman (2013) makes the argument that paying for conservation easements or other ecosystem service incentive programs has the potential to erode the importance of social values in land conservation. Rather, she suggests that property rights should be considered, in the context of conservation easements in particular, as a bundle of duties or obligations between ownership interests. However, currently, most conservation easements do not impose any affirmative obligations on either the landowner or conservation easement holder. From a policy perspective, it is possible that land management decisions of easement landowners are affected not only by the restrictions contained in the conservation easement but also by landowner attitudes about their diluted rights and about their relationship with their easement-owning partner. It is therefore imperative that easement holders critically examine how to best structure conservation easements in a way that maximizes landowners’ retained rights while encouraging continued land management activities that enhance the conservation values easements are supposed to protect.

Because of the shared nature of property rights between conservation easement landowners and holders, understanding and applying lessons learned from other successful natural resource management models have the potential to enhance both the management and governance of conservation easements (Schlager and Ostrom 1992). An examination of other studies describing variables common to successful socioecological systems (SES) can provide valuable insights applicable to easement landowner/easement holder relationships. Two in particular: 1) Shared knowledge of SES and 2) predictability of system dynamics are often cited as important for successful management and are easily incorporated into conservation easement programs (Ostrom 2009). Shared knowledge of SES requires two-way communication between easement landowners and easement holders sharing information about the current state of the SES that their shared interest in a property represents and how any prescribed actions may affect the property. In addition, users (i.e., landowners and conservation easement holders) need to be able to estimate the effects of any land management actions. Conservation easement landowners and easement holders working together on knowledge deficiency and system predictability issues could potentially not only strengthen social networks but also enhance management of the easement-protected resources. This would increase the conservation outcomes of conservation easements and minimize potential conflicts between landowners and easement holders.

Given that easement landowners have relinquished a significant portion of their property rights in a way that provides significant conservation benefits to society at large, it may seem counterintuitive that easement landowners scored lower than noneasement landowners in the social responsibility categories, particularly in categories measuring their land stewardship obligations conferred by their property rights.

These attitudinal differences may be attributable to landowners with easement-encumbered properties feeling that they have already contributed to their community via the easement restrictions. Several previous studies have shown altruism is a strong motivator for conservation easement conveyance (Rilla 2002; Ernst and Wallace 2008; Wallace et al. 2008; Farmer et al. 2011b; Brenner et al. 2013). Upon closer examination, it appears that while conservation easement landowners do feel obliged, particularly with respect toward managing natural resources in a socially responsible manner, they also feel strongly that the resources on their land ultimately belong to them. It is possible that paying landowners (via the conservation easement) for partial interests in their property strengthens their attitudes concerning their dominion over the retained rights. It is also possible that the concept of protecting natural resources occurring on their private land for the benefit of society as a whole may cause “compassion fade,” whereby a perceived increasing need for environmental protection causes flattening or decreasing concern for environmental conservation (Markowitz et al. 2013). Our results seem to corroborate findings from Jackson-Smith et al. (2005) that found stewardship orientations were not correlated to social responsibility scales, leading the authors to conclude that personal moral values influenced stewardship more than a desire to provide benefits to society. Nevertheless, the responses reported by conservation easement landowners are important because Kreuter et al. (2006) found a direct correlation between landowners attitudes on these same land stewardship questions and landowner willingness to conduct a variety of important land management activities, including protecting endangered species habitat and improving water quality. Most conservation easements do not require ongoing land management once a conservation easement is in place, yet management is often necessary to ensure long-term protection of the resources the easement is designed to protect. However, Stroman and Kreuter (2015) found that many conservation easement landowners, particularly amenity or recreation focused landowners, were not implementing any significant land management activities on their protected properties.

In addition, previous research on easement landowners has focused on NGO easement programs (Farmer et al. 2011b; Rissman and Sayre 2012). However, given the prevalence of government-held easements throughout the United States, including them in conservation easement research is important in order to provide a robust understanding of perpetual easement programs. The respondent sample in this study included a significant proportion (~35%) of government-held easements, which are usually purchased by the agency from the landowner rather than being donated by the landowner. Financial considerations were cited by almost one-third of our respondents as their primary motivation for easement conveyance. It is possible that including purchased easements in the study shifted the underlying motivations of the sample away from altruism and toward monetary incentives, which may account for their lower societal responsibility scores (Ernst and Wallace 2008; Cross et al. 2011). Unfortunately, our survey of conservation easement landowners failed to differentiate between purchased and donated easements, making comparison between these two forms of easement acquisition impossible.

Despite finding no significant difference between grantor and successive generation easement landowners with respect to property rights orientations, there is some reason to expect that, over time, those differences may become more apparent. Previous research has found significant levels of dissatisfaction with conservation easements among successive generation landowners (Stroman and Kreuter 2014). Results from this study and others suggest that one of the root causes of that dissatisfaction may not be due to incompatible property rights orientations but other factors such as a lack of management flexibility (Rissman et al. 2013; Stroman and Kreuter 2014). That is not to say that attitudes concerning property rights and responsibilities should not be an important consideration for easement holding organizations. Grantor landowners voluntarily relinquished their property rights to a third party. Nevertheless, for successive generation landowners, the

sense of “voluntariness” or conservation-related intentions driving the original transaction may diminish significantly over time (Cheever 1996). Easement landowners with strong property rights orientations, as expressed in our study population, may feel increasingly disenfranchised by the rights restrictions imposed by conservation easements, which may lead to increasing conflict between landowners and easement holders and ultimately undermine the effectiveness of the land protections that conservation easements provide (Cheever 1996). One recent study found that the rate of easement violations was increasing and that successive generation landowners were involved in the majority of conservation easement legal challenges (Rissman and Butsic 2011). In response to potential litigation over easement restrictions, land trusts have developed strategies to deal with the financial costs of future legal challenges, such as the Land Trust Alliances’ TerraFirma conservation easement defense insurance program (Land Trust Alliance 2009). However, conservation easement holding organizations also need to address the possible social consequences of increasing easement conflicts, which could effectively undermine the viability of easement programs everywhere. Understanding property rights attitudes of both grantor and successive generation landowners can help easement holders incorporate this information into their strategies to help build strong relationships with their partner landowners. For example, allowing landowners greater autonomy in making adaptive management decisions may not only foster land management investments but also increase landowners’ sense of control over their retained rights. In addition, easement holders need to better formalize education and outreach efforts toward successive generation landowners in order to clarify the roles, retained rights, and responsibilities of both parties in maintain their conservation easement.

Previous research has shown that women tend to be more satisfied with both their conservation easement and the relationship with their easement holding organization (Stroman and Kreuter 2014). The research presented here provides additional evidence that women’s attitudes concerning socially responsible natural resource management may translate into greater acceptance of using property rights adjustments (e.g., conservation easements) as a long-term land protection mechanism. This suggests that outreach efforts designed specifically to include women may prove more successful, and it highlights the need for more research about the role of women in conservation.

Although this report provides evidence of how adjustments in private property rights interact with attitudes and beliefs about such rights, several limitations should be addressed for future studies. Most importantly, while we used identical attitudinal survey questions to obtain property rights and responsibilities data, the comparability of the two mail survey samples may have limitations. First, the two data sets used for comparison were obtained 9 yr apart (2002 and 2011) and property rights are a social construct that may change over time. Second, our survey included only easement landowners, whereas the 2002 survey by Jackson-Smith et al. (2005) covered almost exclusively noneasement landowners who depended, at least partly, on their land for income. It is unlikely that the 2002 group included any easement landowners because 9 yr ago there were no recorded conservation easements in either of the two sampled counties (Texas Land Trust Council 2012). Nevertheless, it is possible that our study does not strictly compare the perspectives of easement and noneasement landowners across the 9-yr span. Additionally, we found that the two survey sample data sets differed significantly in distribution with respect to respondents’ age, level of education, place of residence, and period of property ownership, variables we attempted to control for in our modeling. Previous research has found that all of these same demographic indicators affect property rights and responsibilities attitudes (Jackson-Smith et al. 2005). These limitations highlight the need for a geographically broader and more inclusive study incorporating more direct comparisons between landowners with and without conservation easements.

Implications

It is worth noting that the 2002 survey of noneasement landowners only included those landowners who generated some income from their land while the easement landowners within the same study area were less likely to use their land as a significant source of income. However, looking at current public investments in conservation easement programs, many of the purchase easement programs seem to be targeted toward landowners who derive income from their land. Currently the largest and most well-funded conservation easement program is the Agricultural Conservation Easement Program (ACEP), administered through the Natural Resources Conservation Service (NRCS). The ACEP merged several previous programs including the Wetland Reserve Program, Grassland Reserve Program, and Farm and Ranchland Protection Program. In fiscal yr 2014, this program had > \$328 million allocated toward the purchase of new conservation easements. Our research is particularly important in this policy context because it provides information that is applicable for targeting potential program enrollees and for restructuring program restrictions in a way that allows for increased retained rights for landowner participants. Some of the programs within ACEP, specifically the Wetland Reserve Easements, contain particularly strict easement covenants, essentially restricting almost all of a landowners’ private use rights (including all land management), unless the landowner first obtains a temporary conditional use permit (Rissman et al. 2013). It is also worth noting that Stroman and Kreuter (2014, 2016) found significantly higher dissatisfaction with conservation easements among landowners who participated in these federal CE programs, particularly in the NRCS programs. It is possible that one of the root causes of this reported dissatisfaction stems from the severe property rights restrictions imposed. This finding highlights the need for broader research into taxpayer-funded conservation easement programs.

While conservation easements provide strong legal protections against land fragmentation and infrastructural development, maintaining landowner support for and engagement with the intended conservation goals of these easements are critical for the long-term sustainability of this useful conservation tool. Property rights attitudes and beliefs have been found to influence easement conveyance (Kabii and Horwitz 2006), but they may also influence landowners’ support for easements already in place. Easement holders should consider the property rights orientations of current and potential future owners of easement-encumbered properties, as these may change over time, and incorporate that information into their programmatic decision making and outreach efforts. If easements do not succeed in meeting both societal needs for mainlining ecosystem integrity and the goals of landowners living with easements, public perception of conservation easements may become increasingly negative. The implications of this are potentially far reaching. If current easement landowners are increasingly dissatisfied with the property rights restrictions in their easements, it is likely that the frequency of easement violations and associated legal challenges will continue to increase, costing both landowners and easement holders significant expenditures in legal fees, staff time, mitigation, and restoration work. Furthermore, increasing easement conflicts may depress the willingness of additional landowners to convey new conservation easements in the future, thereby reducing the effectiveness of this conservation tool in efforts to retain intact functional ecosystems.

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