Landowner and Land Trust Agent Preferences for Conservation Easements: Implications for Sustainable Land Uses and Landscapes

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1 **Abstract**

2 Conservation easements offer sustainable land use and environmental conservation through land
3 use restrictions. Opportunities exist to improve the efficiency by which parties interested in
4 conservation easement transactions are matched, which may contribute to the overall protection
5 of agricultural landscapes. This study utilizes stated choice questions to elicit preferences for
6 conservation easements by both landowners, as potential easement suppliers, and land trust
7 professionals as potential easement demanders. A random utility model is estimated for
8 landowners and for land trust professionals. Results indicate both preference overlap and
9 preference divergence between these two sets of respondents. Significant opportunities exist to
10 reduce search and transactions costs, improve easement acceptance, and increase environmental
11 protection via increased transaction frequency of conservation easements in this emerging
12 market. When negotiating with landowners, land trusts need to be aware of concerns related to
13 issues such as managerial control, public access, lack of trust, and financial compensation.
14 Moreover, heterogeneity amongst participants regarding these issues suggests some agricultural
15 landowners may be more or less concerned about these issues.

Introduction

Sustainable land use and environmental conservation of agricultural lands can be achieved through various public and private policies, such as conservation easements (CE). Since agricultural lands have generally improved in the provision of environmental services over time (Moss & Schmitz, 2014), understanding how CEs may be used to keep agricultural lands from conversion could contribute to sustainable agricultural landscapes. Generally defined, CEs are a market-based tool used to protect environmental amenities and ecosystem services that arise on private lands (Bergstrom, Dillman, & Stoll, 1985; Polasky, Johnson, Keeler, Kovacs, Nelson, Pennington, Plantinga, & Withey, 2012). For example, CE agreements often yield economic incentives to agricultural landowners for social benefits provided by their land such as open space, wildlife habitat, and cultural ecosystem services like sense of place (Bergstrom, Dillman, & Stoll, 1985; Cross, Keske, Lacy, Hoag, & Bastian, 2011; Duke & Lynch, 2006; Lynch & Lovell, 2003; Magnan, Seidl, & Loomis, 2012; Merenlender, Huntsinger, Guthey, & Fairfax, 2004; Rissman & Sayre, 2012). CEs may also be enacted to buffer agricultural lands from encroaching residential or industrial land uses and to ensure the availability of agricultural production (Green & Stager, 2002; Inman & McLeod, 2002; Inman, McLeod, & Menkhaus, 2002; Lubowski, Plantinga, & Stavins, 2008; Milder & Clark, 2012).

The use of CEs increased four-fold since 2000 (Chang, 2011). During this time the literature blossomed with studies that evaluate the economic efficiency and expenditures of CE transactions (Bode, Probert, Turner, Wilson, & Venter, 2011; Duke, Dundas, & Messer, 2013; Lerner, Mackey, & Casey, 2007; Milder & Clark, 2012); how effectively the agreements meet conservation targets (Milder, Lassoie, & Bedford, 2008; Rissman, Lozier, Comendant, Karevia, Kiesecker, Shaw, & Merenlender, 2007); and both landowner (see for example Farmer,

Chancellor, & Fischer, 2011) and land trust motivations for entering into CE agreements (see for example Cropper, McLeod, Bastian, Keske, Hoag, & Cross, 2012). There is a paucity of research directly comparing landowner (CE suppliers) and land trust (CE demanders) motivations for entering into easements, however.

This study contributes to the sustainable landscape and land use literature by using a stated choice survey and random utility model analysis to assess both landowner and land trust preferences for CE attributes within the western United States. By analyzing both the landowner “supply” side and the land trust “demand” side of the market utilizing the same stated choice scenarios, insight is provided into attributes that may influence CE negotiations for agricultural lands. Achieving an understanding of potential attributes/conditions that may affect a landowner or land trust agent’s decision entering into a CE agreement could improve the likelihood of CE implementation and CE market efficiency overall. Determining CE attributes and incentives that lead to successful land conservation objectives can also facilitate the sustainable use of rural parcels.

The following background section provides further explanation of CEs, a summary of findings regarding landowner and land trust motivations for entering into easements, and a discussion of associated market issues for CEs.

1. Background

A CE is a voluntary, but legally binding, agreement where the landowner commits to limit residential development and/or future changes in land use, thereby preserving socially desired amenities. CEs are most frequently used in North America, but similar policies have been implemented throughout the world. Landowners may sell a CE, donate a CE to receive tax benefits, or receive a combination of the two. It is common for landowners entering into CEs to

agree to the following: (1) prohibit future building on the parcel; (2) limit future buildings to certain areas on the parcel; and/or (3) restrict land use for which they may receive payment and/or tax benefits. Land under CE remains privately owned and can be transferred, although the agreed upon development rights are effectively “extinguished” (Gustanski & Squires, 2000). Throughout the rest of the paper, the market for CEs refers to transactions negotiated by or between agricultural landowners (as potential suppliers) and land trusts (as potential demanders).

Landowners who supply agricultural lands, may approach conservation organizations—most commonly land trusts—to engage in CEs that will protect the land. Likewise, land trusts also actively seek out landowners or specific parcels for CE transactions. A land trust is defined as a U.S. Internal Revenue Service 501(c)(3) organization whose mission specifically involves CE acquisition or stewardship (Land Trust Alliance, 2015). Land trusts represent the “demand side” of the CE market for the purposes of this study. The market for CEs then is based on the desired attributes and preference motivations of demanders and suppliers.

2.1 Landowner motivations for supplying conservation easements

Place attachment, protecting the environment or wildlife habitat, and financial incentives, including both payment and/or estate tax benefit, are consistently found to be motivations in the literature for landowners placing or considering the placement of easements on their land (Brain, Hostetler, & Irani, 2014; Cross et al., 2011; Farmer, Knapp, Meretsky, Chancellor, & Fischer, 2011; Farmer, Chancellor, & Fischer, 2011; Miller, Bastian, McLeod, Keske, and Hoag, 2011). However, the relative importance of financial incentives seems to vary in the literature. This may be, in part, related to the importance of the land in providing a livelihood for the landowner. Cross et al. (2011) conclude economic dependence on the land negatively affects easement adoption. Furthermore, Farmer, Meretsky, Knapp, Chancellor, and Fischer (2015) find that those

receiving monetary benefits from the land were less likely to place an easement without significant benefits for doing so, but absentee landowners did not weight financial incentives as heavily in choosing an easement. Access to institutions enabling conservation easements and the potential for tradeable tax permits to capture easement benefits also have been attributed to increased frequency of easement transactions (McGaffin, McLeod, Bastian, Hoag, & Hoag, 2012). Concerns over development pressure and protecting land for society or the public good also surface as important motivators for landowners placing easements (Farmer, Knapp, Meretsky, Chancellor & Fischer, 2011; Farmer, Chancellor & Fischer, 2011). Other variables found to be positively related to interest in easements include belonging to environmental organizations, recreational land-use, gathering wild food, and land entitlement (Brenner, Lavallato, Cherry, & Hileman, 2013).

Positive relationships with land trusts comes out as an important dimension impacting easement choice and overall satisfaction of placing an easement in the literature. Rissman and Sayre (2012) study conservation easement agreements and interview both land trust and landowners in two ranchlands areas. They conclude that relations between landowners and easement holders affect both complexity of agreements and satisfaction associated with easement choice. Stroman and Kreuter (2014) conclude that frequency of contact between landowners and easement holders and the type of agency or organization (federal, state, local or non-governmental agency) holding the easement significantly affected the level of landowner satisfaction with the easement and perceived relationship with the easement holder. Brain, Hostetler, and Irani (2014) find Florida cattle ranchers were more likely to enter into a conservation easement (CE) agreement if they had a positive attitude about CE outcomes, felt

107 influential others would be supportive of CEs, and indicated higher trust in conservation
108 organizations.

109 Several issues emerge in the literature that adversely affect landowner acceptance of
110 easements. Easements in perpetuity and the potential for outside influence on managerial
111 decisions negatively impact landowners' attitudes about easement choice (Miller et al., 2011;
112 Sorice et al., 2013). Sorice et al. (2013) conclude highly controlling programs, permanent
113 conservation easements, and programs that put landowners at risk for future regulation reduced
114 landowner participation. The authors indicate that greater levels of compensation and landowner
115 autonomy to make land management decisions could increase participation in conservation
116 programs. The requirement of public access also may detract from placing an easement (Miller et
117 al., 2011). Concerns over liability and negative impacts on agricultural activities likely explain
118 much of the undesirability of this attribute (Miller et al., 2011). Overall, the literature seems to
119 suggest that specific easement attributes, conservation values, respondent characteristics, positive
120 land trust relationships, and financial incentives impact the willingness to supply CEs.

121 2.2 *Land trust motivations for entering into conservation easements*

122 Research indicates that conservation values and preserving sense of place often motivate
123 land trusts to enter into conservation easements. Keske (2008) identifies protection of habitat,
124 biodiversity, natural areas, ecosystems, prime agricultural lands, proximity to other protected
125 lands, historic lands, public access, nature based recreation scenic beauty, open space, cultural
126 uses, hunting rights, educational opportunities and water conservation as being important to land
127 trust agents when considering conservation easements. Keske (2008) asserts these conservation
128 values are often part of a larger goal or objective to preserve sense of place. Rissman (2010)
129 states that increased agreement complexity and specification over time came about due to

potential concerns over inflexibility in changing original easement agreements and to address more specific conservation goals.

Other dimensions affecting land trust motivations include aspects that may impact public acceptance of conservation easements and related support of land trust activity. Lieberknecht (2009) determines from a national survey of land trust executives that 78% of land trusts allow public access to some or all of their lands and view this as an important way to improve support for their conservation efforts. Gerber and Rissman (2012) find the Nature Conservancy prefers obtaining of properties or property rights over engaging in land-use planning as such acquisitions are viewed as voluntary.

While the literature seems to indicate some consistent factors impacting land trust motivations, other research suggests that preference heterogeneity across land trusts likely affects conservation easement transactions. Cropper et al. (2012) segment land trust agents by sense of place scores and preferences for providing ecosystem services and find different weightings of factors affecting easement choice. Those land trust respondents ranking high on provision of ecosystem services weighted provision of public access on easements, increased benefits paid to landowners, and concerns regarding local development growth pressure as negatively impacting placement of an easement. The results for that segment ranked having control over agricultural practices, and provision of wildlife habitat as positively impacting easement choice. The results for the segment ranking low in sense of place scores indicated wildlife habitat, and managerial control positively impacted easement choice, but benefits paid to landowners and public access were not significant in explaining easement choice. Results for all land trust segments indicated easements in perpetuity positively impacted easement choice. Overall, the literature suggests that mutual interests overlap at times, but that there is also potential divergence, between landowner

and land trust agent preferences when entering into conservation easements. Thus, our proposed study that directly compares these supply and demand motivations should further illuminate potential issues and improvements for conservation easement transactions.

2.3 Market considerations for conservation easement transactions

While preferences ultimately impact both suppliers' and demanders' motivations for entering into an easement, other economic issues may well affect easement transactions too. High transaction and search costs (i.e., the more it costs to develop and come to an agreement, and the harder it is to find a party interested in the same type of easement attributes) can ultimately cause market failure (Davidson & Weersink, 1998). The increase in transactions over the past decade suggests that the market is evolving towards efficiency (i.e., the most and best parcels under easement for the least cost) (Keske, Hoag, & Bastian, 2009). However, inconsistent price or benefit signals in the CE market (Anderson & Weinhold, 2008; Geoghegan, Lynch, & Bucholtz, 2003) and in CE appraisals (Boykin & McLaughlin, 2006; Keske, 2008) are strong indicators that market inefficiency continues (Keske, Hoag, & Bastian, 2009). Hence, changes to improve both the number and quality of easements (efficiency) and to reduce both search and transaction costs could lead to practical and lasting impacts to how conservation land is acquired through CEs. Achieving an understanding of land trust and landowner preferences for easement attributes could, at least in theory, improve opportunities for landowners and land trusts to successfully negotiate an agreeable CE. This could increase the number and quality of CEs resulting in an increase in acreage under CE protection at a more efficient market value, thereby improving overall market efficiency.

2. Methodology

Our overall research objective is to compare preferences of landowners and land trust agents regarding conservation easements. We do this by conducting stated choice surveys and random utility model analyses across samples of agricultural landowners and land trust agents in the intermountain west.

3.1 Data Collection

3.1.1 Questionnaire

Contracts for CEs are often negotiated privately in order to maintain landowner confidentiality for sensitive information such as annual income (Keske, 2008). As a result, landowner preferences may not be directly observed, and socio-economic data may not be readily available. Thus, for the purposes of this study, stated choice questions are used to obtain preferences for the CEs (Louviere, Hensher & Swait, 2000), as well as socio-economic data.

The stated choice questionnaires were developed from a qualitative research phase that consisted of semi-structured interviews of landowners and land trusts during 2005 and 2006. Interested readers may consult Keske (2008) and Keske et al. (2011) for specifics about qualitative research results from the land trust interviews and Miller et al. (2011) for results from the landowner focus groups.

The stated choice portion of the questionnaires was developed from analyses of the landowner and land trust agent focus group interviews. Five CE attributes were identified for inclusion in the stated choice questions. These five attributes were: 1) Easement length or duration; 2) Public access; 3) Inclusion of wildlife habitat; 4) Restricted managerial control of landowner by land trusts; and, 5) Financial benefit provided to landowner in exchange for the CE. These qualitative findings regarding important CE attributes to both landowners and land trust agents led to the development of two (demand and supplier) parallel questionnaires.

The five CE attributes, identified previously, were represented in twenty-four choice set pairs with varying levels of attributes. The literature suggests respondents are able to judge and compare alternatives across repeated choices, but increased complexity, number of attributes, altering order of attributes, and large numbers of attribute levels can affect respondent burden and preference weightings (Thurstone, 1927; Louviere, Hensher & Swait, 2000; DeShazo and Fermo, 2002; Day, Bateman, Carson, Dupont, Louviere, Morimoto, Scarpa, & Wang, 2012). For these reasons we used relatively simple, realistic levels for our five CE attributes (Easement length – 2 levels; Public access – 2 levels; Inclusion of wildlife habitat – 2 levels; Restricted managerial control – 2 levels; and, Financial benefit – 5 levels). We used a computer generated design that maximized a D-efficiency criterion in order to have the least number of choice pairs with the greatest chance of minimizing the variance and covariance of the parameter estimates (see Kuhfeld, Tobias & Garratt, 1994). This design was determined using the Optex procedure in SAS (1990) and had a diagonal efficiency equaling 95%. Survey participants were tasked with answering multiple stated choice questions (two for landowner surveys and four for land trust agent surveys). The questionnaires contained the same stated choice question design for both the landowners and land trust professionals. Twelve versions of the questionnaire were developed for landowners, using two stated choice questions each (for example, version 1 used choice sets 1 and 2, version 2 used choice sets 3 and 4, etc.). These twelve versions were mailed to an equal number of potential respondents in the sample. Six versions of the survey, containing four choice questions each (version 1- choice sets 1 through 4, version 2 – choice sets 5-8, etc.) were developed for the land trust professionals, and again each version was equally distributed across potential respondents. A larger number of stated choice questions (four instead of two) appeared on the land trust surveys in order to obtain sufficient responses across the stated choice

questions. Louviere, Hensher and Swait (2000) indicate that respondents have analyzed up to 32 choice profiles successfully. Day et al. (2012) analyze responses from 17 stated choices per respondent and conclude no fatigue effects were present. We believe our design should provide stable preference weighting results across respondents. The sections that follow provide summarization of the respective supplier and demander questionnaires.

The landowner questionnaire had four parts. Part A presented Likert scale questions regarding knowledge and attitudes about land use and conservation in their area. This section included questions regarding different dimensions of community attachment or “sense of place”—a cultural ecosystem service and multi-dimensional concept involving emotional attachment, satisfaction, and identity (Hummon, 1992; Jorgensen & Stedman., 2001). Part B asked respondents about the best estimate of what their land would sell for on the market (average price per acre), characteristics of their land using Likert scale questions, a description of land use on percentage of their deeded acres, and whether their lands bordered a subdivision, had a CE on it or bordered lands with a CE. Part C asked our stated choice questions, and questions regarding their views about CEs and conservation organizations. Part D of the survey asked questions about demographic characteristics of respondents.

The land trust agent questionnaire had five parts. Part A asked respondents about their organization’s use of CEs. Part B asked respondents about their attitudes and those of their organization regarding land use and conservation in their area including questions about different dimensions of community attachment or sense of place. Part C asked respondents about their estimates of the average market price per acre for lands in the area and attitude questions about obstacles to conserving lands in their area. Part D asked stated choice questions regarding

conservation easements, and Part E asked demographic information about the respondents and about their organization (such as number of employees and operating budget).

Whenever possible, the survey was identical for landowners and land trusts, with minimal variation in question phrasing. For example, the landowner survey had the following statement regarding the importance of conserving nature on their land followed by a Likert scale indicating their level of agreement: *“I have a responsibility to conserve nature (wildlife, open space) on my land.”* The related land trust agent survey question was worded as follows: *“Our organization has a responsibility to conserve natural amenities (wildlife, open space).”* The section for the stated choice questions in the landowner questionnaire indicated we were trying to understand their perspectives on conservation easements and included a definition of a conservation easement. Prior to the stated choice question involving the appropriate stated choice pair (see example in Figure 1) the following statement was made: *“Assume you are negotiating with an organization to place a conservation easement on a parcel (i.e., this can be a portion) of the land that you own or manage. Indicate which easement you would choose below. (Check the most appropriate answer).”* The land trust agent questionnaire indicated we wanted to understand their preferences for conservation easements from the perspective of a land trust and then stated the following just prior to the stated choice pairs (see example in Figure 1): *“Assume you are negotiating with a landowner to place a conservation easement on a parcel. Please complete the following four scenarios and carefully review the following conservation easement choices, which have been described by five features. Given the description of each, please determine which features you would choose when negotiating an easement and check the appropriate box.”*

3.1.2 Landowner Survey Design, Sample and Response Rate

The Wyoming and the Colorado Agricultural Statistics Service offices provided a random sample of agricultural producers in Wyoming and Colorado, stratified by agricultural sales levels. The sample drawn was representative of producers in Wyoming and Colorado as a region based on the latest agricultural census proportions for acres owned and dollars of sales. Producers owning less than fifty acres and/or receiving less than \$1,000 in agricultural sales annually were not included in the sample. The total sample size was 4,555 potential respondents for the stated choice question versions of the survey. Each version of the survey was mailed to an equal number of potential respondents in the sample.

The survey was delivered by the National Agricultural Statistics Service. A modified Dillman (2000) design was employed. Approximately two weeks after the final mailing, approximately 10 percent of the non-respondents were sampled via the telephone. Telephone respondents were asked the entire survey, not a sub-sample of questions. The overall response rate to the survey, including phone respondents, was 46 percent (for a total of 2,101 completed surveys, of which 323 were obtained by phone). Miller (2007) compared respondents to agricultural census statistics and compared phone respondents to mail respondents across demographic variables such as age, education, and gender. It was concluded that the sample was representative of the intended population and that non-response bias was not an issue for the landowner survey.

3.1.3 Land Trust Survey Design, Sample and Response Rate

Sixty-four prospective land trusts were identified as potentially holding conservation easements in Colorado and Wyoming. These conservation organizations were identified through a review of the 2007 Land Trust Alliance (LTA) member database made available on-line to the

public. The sampling frame ensured basic consistency of conservation easement acquisition and implementation practices as recommended by LTA. In order to increase the sample size and potential number of responses across all six versions of the survey, another 35 land trusts in the intermountain West (ID, UT, MT, and NM) also were approached for study participation. Those land trusts which held conservation easements in Colorado and Wyoming but had headquarters in another intermountain state and an interest in participating in the study were then part of the overall sample. Qualifying organizations included regional and national land trusts, as well as local, state, and national non-profit and governmental organizations. Phone calls were made to the LTA point of contact (usually an executive director) to verify that the organization held conservation easements in the study region, and to inquire about the organization's willingness to participate in the study.

Organizations were queried about the roles of those who were actively engaged with their organization's conservation acquisition process. In the case of small land trusts, sometimes only the executive director made decisions about conservation easement acquisitions. For larger land trusts, multiple staff members and board members were involved in acquiring conservation easements. Hence, the number of surveys distributed to each land trust reflected the number of participants (defined here as "land trust agents") engaged in the conservation easement decision making process.

Questionnaires were mailed directly to the point of contact, who distributed them to the other land trust agents. Although the various roles of land trust agents were noted, the names of the participants were not revealed to the researchers or requested on the survey given expressed concerns for anonymity. The surveys were assigned a three digit number, whereby the first number reflected the survey version (1-6). The six versions of the survey were distributed

312 randomly but evenly across land trusts. Although the three-digit survey numbers were recorded
313 and associated with land trusts in order to track response rates, the surveys did not otherwise
314 contain identifying information that would be associated with individual responses.

315 The survey distribution process followed a modified Dillman design (Dillman, 2000).
316 Participating land trusts received individually prepared survey packets containing a cover letter,
317 written instructions, and questionnaires reflective of the number of land trust agents identified by
318 the point of contact. Questionnaires were returned directly to the Colorado State University
319 Department of Agricultural and Resource Economics through a postage paid stamped envelope.
320 After six weeks, a follow-up phone call was made if less than 50 percent of questionnaires were
321 received from a specific land trust; however, no additional phone calls were made when at least
322 50 percent of the surveys were received from that organization. The follow-up phone call
323 ensured that questionnaires were received by the land trust, and the number of land trust agents
324 participating in the study was verified. The actual survey was not conducted by phone during
325 follow-up calls. Approximately one half of the land trusts received a follow-up phone call.

326 In summary, of the 99 land trusts approached, 89 land trust organizations met the
327 qualifying criteria of holding conservation easements in Colorado and Wyoming. Of these, 74
328 land trusts (83.15%) agreed to participate in the study. A total of 417 questionnaires were
329 distributed to land trust agents identified by each conservation organization and there was an
330 overall response rate of 69.8%. The responses were evenly distributed across the six versions of
331 the survey. Further phone follow-up administering the survey might have increased the response
332 rate for land trusts with a response rate between 50%-100%. However, it was decided that land
333 trust cooperation and agent anonymity would be better preserved in these situations if no further
334 follow-up occurred, even if the overall response rate was lowered slightly.

The survey data were analyzed using random utility models as described below.

3.2 Analysis

3.2.1 Random Utility Theory and Model Overview

In the choice survey, respondents choose between scenarios with differing types and levels of attributes (Figure 1). Thus, variables affecting the respondent's choice to enter into a CE can be obtained or observed and compared across landowners and land trust agents. Choices are depicted using random utility theory assuming that individuals make choices that maximize their utility (i.e., satisfaction gained) on a given choice occasion (Louviere, Hensher & Swait, 2000). The overriding assumption is that if someone interested in transacting a CE were faced with a choice between CE alternatives they would choose the CE that maximizes their utility (satisfaction) at that time. This is represented as follows:

$$U_i = V_i + \varepsilon_i > U_j = V_j + \varepsilon_j \quad (1)$$

where the utility function for an individual contains both a deterministic component (measured by observable variables in V) and an unobservable stochastic component (ε). Thus, an individual is expected to choose CE alternative i over CE alternative j for this choice occasion. The researcher measures, in our case, such things as CE attributes, attitudes toward conservation, and so on (i.e., variables in V) that may impact utility.

The indirect utility functions identified in equation 1 can be estimated as:

$$V_i = \beta_k X_i \quad (2)$$

where X is a vector of k attributes (variables) associated with alternative i and β parameters.

Thus, when presented with several choices, i.e., easement A (CE A), easement B (CE B) or neither easement, by observing the respondent's choice, the impact of variables potentially affecting that decision can be revealed through statistical analysis of the indirect utility functions

for each potential choice on a given choice occasion using a random utility model (McFadden 1976). Estimation of the resulting elasticities demonstrates the sensitivity of choice to model variables.

The dependent variable is selected for a given choice occasion: respondents must pick CE “A”, CE “B” or “neither” for each stated choice scenario faced (Figure 1). The probability of choosing CE “A”, CE “B”, or neither (i.e., alternative i) in a multinomial logit random utility model can be represented as follows:

$$P_{i:At} = \frac{e^{V_{it}}}{\sum_{j=1}^J e^{V_{jt}}} \quad (3)$$

Where j = the number of choice alternatives; t = a given choice occasion; A = the set of available alternatives for choice occasion t ; e = base of the natural logarithm; and V = is the indirect utility equation as presented earlier. Thus, each random utility model includes j (in our case, three) indirect utility equations to explain P_i represented in equation 3.

Direct elasticities are also evaluated to determine the sensitivity of choice probability to a particular variable in the model. The direct elasticity is given by the following equation:

$$E_i = (1 - P_i) X_{ki} \beta_k \quad (4)$$

The nonlinearity of the random utility model impacts how elasticities should be estimated. Thus, the reported elasticities are estimated for each individual observation and then averaged across the observations. This improves accuracy of the elasticity estimates compared to estimating elasticities at the averages of the variables (Louviere, Hensher & Swait, 2000).

The literature suggests that different landowners or land trust agents may weight easement attributes differently in their decision regarding easement choice. This means that each individual might have a different “coefficient” on the easement attribute of interest on a given choice occasion. Thus, if preference heterogeneity exists, a multinomial logit (MNL) model

incorrectly represents the intercept and slope parameters as being homogeneous across respondents (Daniels and Hensher, 2000). For this reason, the model is estimated as a mixed logit formulation where parameters for the easement attributes, found to be statistically significant in an MNL model of choice, are estimated as random parameters while other variables in the model are estimated as non-random parameters. This approach addresses potential serial correlation in the error terms and Independence of Irrelevant Alternative (IIA) violations if the presence of heterogeneity exists (Daniels and Hensher, 2000; Hensher, Rose, & Greene, 2005). The mixed logit approach tests for dispersion (quantifiable variation of estimates for respondents) around the parameter of interest by simulating different parameters for each observation and estimating a standard deviation parameter associated with each random parameter (Hensher, Rose, & Greene, 2005). The model is estimated specifying the distributions around the random parameters as normal (others were tested) and one thousand Halton draws are used for the simulated maximum likelihood procedure in LIMDEP using NLOGIT (see Hensher, Rose, & Greene, 2005). The error terms are i.i.d. extreme value (Hensher & Greene, 2003).

3.2.2 Indirect Utility Equations, Variable Descriptions, Expected Signs

Overall model development was based on past results reported in the literature, our focus group results and economic theory. The model for the landowner, consisting of three indirect utility equations (as per equation 3 for choice probability), is specified as follows:

$$U_{\text{ease a,b}} = \beta_1 * \text{easement length} + \beta_2 * \text{public access} + \beta_3 * \text{wildlife habitat} + \beta_4 * \text{control} + \beta_5 * \text{benefit} + \beta_6 * \text{state} + \beta_7 * \text{productivity} + \beta_8 * \text{ecosystem} + \beta_9 * \text{community (sense of place)} \quad (5)$$

$$U_{\text{neither}} = \text{ascn} + \beta_{10} * \text{years} + \beta_{11} * \text{college} + \beta_{12} * \text{votech} + \beta_{13} * \text{graduate} + \beta_{14} * \text{agsales} + \beta_{15} * \text{offfarm} + \beta_{16} * \text{Easmentever} + \beta_{17} * \text{trust} + \beta_{18} * \text{currentlyCE} \quad (6)$$

The indirect utility equations (5 and 6) for the supply side or landowner model included the following variables for CE choice (Table 1): length of CE; public access; wildlife habitat included under CE; managerial control; payment as a percent of perceived average market value in addition to any potential tax benefits; state; ag productivity; ecosystem; community. Variable descriptions, descriptive statistics and hypothesized signs of the variables are reported in Table 1.

The indirect utility equation for the “neither” choice (equation 6) included (Table 1): constant; years; college education; votech training; graduate education; (6); ag sales; off farm; CE consideration; trust; and, currently easement in place. Please see Table 1 for summary explanations, descriptive statistics, and expected signs of the associated variables in the landowner model.

The land trust model, also consisting of three indirect utility equations, is as follows:

$$U_{\text{ease a,b}} = \beta_1 * \text{easement length} + \beta_2 * \text{public access} + \beta_3 * \text{wildlife habitat} + \beta_4 * \text{control} + \beta_5 * \text{benefit} + \beta_6 * \text{community (sense of place)} + \beta_7 * \text{ecosystem} + \beta_8 * \text{growth pressure} + \beta_9 * \text{economic attachment} \quad (7)$$

$$U_{\text{neither}} = \text{ascn} + \beta_{10} * \text{holdCE} + \beta_{11} * \text{budget} + \beta_{12} * \text{graduate} + \beta_{13} * \text{votech} + \beta_{14} * \text{years} \quad (8)$$

The indirect utility equations for the demand side or land trust model included the following variables for easement choice (equation 7; Table 2): a vector of CE attributes all with the same wording and attribute levels as described previously for the landowner model - length, public access, wildlife habitat, managerial control and benefit as perceived average per acre value of land in area; community attachment; ecosystem; growth; economic attachment. Table 2 reports descriptions, descriptive statistics and hypothesized signs of the variables.

The indirect utility equation for the “neither” choice (equation 8; Table 2) included the following variables: constant; hold CE; budget; graduate education; votech training; years.

Please see Table 2 for definitions and descriptive statistics of variables used in the land trust model.

4 Results

4.1 Landowner Results

Overall, the chi-square statistic and a pseudo- R^2 measure of 0.364 indicate the model is statistically significant and does a reasonably good job in explaining choice (see Table 3). Pseudo- R^2 values between 0.2 and 0.4 are considered to be indicative of good fits for these models (Domencich and McFadden, 1975). Only contract length and public access were found to have significant dispersion. Contract length (Easement Length) was negative and significant, and it had the second largest marginal effect in the CE equations. This suggests that a CE with length less than perpetuity decreased and had a relatively large impact on the probability of CE acceptance for landowners, overall. However, a significant and broad range of dispersion or variation exists for this parameter suggesting different weighting of this variable across respondents.

The requirement of public access on the parcel under CE decreased the probability of acceptance of the CE scenario by landowners and had the largest marginal effect and impact of the CE equation variables (Table 2). The mixed logit formulation indicates a wide and significant dispersion on the weighting of this variable though. The inclusion of wildlife habitat was not significant in explaining acceptance of a CE scenario by landowners. Potential loss of managerial control (Control) to land trusts had a negative sign but was not statistically significant in explaining easement choice. Consistent with *a priori* expectations from economic theory, the higher the percent of perceived market value of their land for which landowners were

compensated (Benefit), the more likely landowners were to choose a CE. This variable had a smaller marginal effect than public access or CE length, however.

Model results indicate that the state in which the landowner resided was significant and had the third largest marginal effect of the CE equation variables, suggesting that Wyoming landowners were less likely to choose a CE (Table 3). The more productive the landowner felt his or her land was (Productivity), the less likely he or she was willing to accept a CE scenario. The higher the summated Likert score related to ecosystem service questions or community attachment, the higher the probability the landowner would accept a CE (Table 3).

Considering the estimation for neither CE choice, the higher the level of agricultural product sales the less likely the respondent chose “neither” and conversely more likely chose a CE (Table 3). However, this had a lower marginal effect on probability of choice than some of the other variables. Off-farm employment for the respondent also was negative and significant in explaining the “neither” choice. The longer a landowner had lived in either Colorado or Wyoming (Years), the more likely they were to choose “neither” as their response (Table 3). Post-secondary education, vocational training, or graduate education was not significant in explaining respondent choice. Those who indicated they would not consider placing CEs on their land (Easement Ever) were more likely to choose “neither” and this had the second highest marginal effect, indicating an important weighting in preferences. Those respondents indicating they would trust land trusts to manage the lands under CE (Trust) were less likely to choose neither. This had the highest marginal effect in the “neither” equation. It is interesting to note, however, that only 29% of the respondents indicated they trusted land trusts (Table 1). This suggests the vast majority landowners do not trust land trusts to protect their interests on their property. If the landowner already had a CE in place (Currently CE), they were less likely to

choose “neither”, indicating landowners that had some experience with CEs were more likely to consider other CEs on their land.

4.2. Land Trust Results

As with the landowner model, the chi-square statistic and a pseudo- R^2 measure of 0.235 indicates the land trust model is statistically significant in explaining land trust agent choice (Table 3). Interestingly, the mixed logit results do not indicate significant dispersion for any of the easement attributes, suggesting some stability in preference weightings overall across our land trust respondents. Land trust personnel also were more likely to choose a CE that was in perpetuity (Easement Length), and this variable had the highest marginal effect suggesting its relative importance compared to the other variables. This result provides a bit of internal validity, as most policies require the implementation of conservation easements in perpetuity in order for landowners to qualify for financial benefits. Inclusion of wildlife habitat in the CE was positive and significant in explaining a land trust respondent’s acceptance of a CE scenario (Table 3). Moreover, this variable had the second highest marginal effect in the land trust model. Potential for land trusts to have input in agricultural operation practices for land under CE (Control) was also positive and significant in explaining acceptance of a CE scenario.

The price of the CE (benefit) was negative and significant (Table 3). This is consistent with expectations regarding demand for CEs. If land trust agents perceived that lands in their area with CE potential were considered under growth pressure, respondents were less likely to choose a CE scenario (Table 3). A perception of landowners’ economic dependence on their lands was not a determinant to land trust agent CE choice. The respondent’s summated Likert score related to their perception that lands in their portfolio provided ecosystem services had no

effect on their CE choice. Interestingly, the composite variable measuring an individual's community attachment was significant in explaining CE choice, suggesting the higher the individual's community attachment score the more likely they chose a CE. Operating budget, in the neither equation, was not significant in land trust professionals' choice of conservation lands. Number of years in the Intermountain West, the current holding of CEs, and whether a respondent reported vocational training were not significant in explaining choice in the model for land trust personnel. The possession of graduate education meant that land trust professionals were less likely to choose "neither." This had one of the larger marginal effects in the model, suggesting education level had a relatively important impact on probability of choice.

5 Discussion and Conclusions

Overall results suggest that landowners and land trusts have some similar preferences (or at least not inconsistent preferences) toward conservation. Both landowners and land trusts were more likely to choose CEs that were in perpetuity and the marginal effects for both models suggest probability of choice is relatively sensitive to this attribute. This result was somewhat unexpected for landowners as both Miller et al. (2011) and Sorice et al. (2013) indicate concerns with permanent conservation easements. However, the mixed logit formulation does indicate significant dispersion for this parameter, likely indicating a wide range of preferences related to this attribute. The basis for this overall finding may be linked to policies related to the financial benefits associated with CEs. Conservation easements must be in perpetuity in order to qualify for federal tax benefits (IRS §170). It was indicated in the stated choice scenarios that CEs must be in perpetuity to be eligible for tax benefits, in addition to any other remuneration. Our significant dispersion result may well be pointing toward landowners being conflicted about the

tradeoff between perpetuity and potential tax benefits when considering an easement. As land trusts are interested in permanently conserving various attributes, this suggests perpetuity may be less of an issue during CE negotiations than previously thought. However, our results also suggest there is likely heterogeneity amongst landowners related to this attribute.

Both landowners and land trust agents were found to be positively motivated by community or place attachment when choosing an easement. This is consistent with the literature for both sides of the market as previous findings suggest both landowners and land trusts seem to feel area lands positively contribute to “place”(Farmer et al., 2011; Cross et al., 2011; Keske, 2008; Keske et al., 2011). Moreover, this finding is consistent with results from the qualitative phase of the study that indicated land trusts are seeking to preserve their community’s sense of place (Keske, 2008; Keske et al., 2011). Inclusion of wildlife habitat in the CE had a significantly positive impact on easement choice for land trust agents, but it was insignificant in explaining landowner easement choice. The literature as well our focus group results support the importance of habitat and or biodiversity preservation to land trusts (Keske, 2008; Keske et al., 2011). Previous literature as well as our focus group results suggests landowners are often concerned about habitat or nature preservation (Farmer et al., 2011; Miller et al., 2011). Though our model results do not find wildlife habitat as being a significant variable for landowners, it is important to note that for landowners that agreed their land provided important ecosystem services easement acceptance increased. Overall, the literature and our own model results indicate provision of wildlife habitat and conservation of natural amenities are something both CE demanders and suppliers should be able to agree on during negotiations, potentially reducing search costs in this market for this attribute. These results indicate

communication and education regarding the ability to conserve wildlife habitat via CEs could be an important message for land trusts to relay.

Public access had a significant and negative impact on choice in the landowner model. The mixed logit formulation indicates significant heterogeneity may exist among landowners regarding this attribute. Even though it had a negative sign, it was insignificant in the land trust model. These results are consistent with landowner focus group findings overall (Miller et al., 2011). Interestingly, previous research indicates this is often important to land trusts (Keske 2008; Liberknect, 2009). However, other research suggests that land trusts may be hesitant to enter into a CE agreement that offers open access, due to concerns about long-term stewardship and conservation issues with publicly accessible property (Boykin & McLaughlin, 2006). Cropper et al. (2012) conclude those land trusts whose mission focuses more on habitat or biodiversity preservation may find public access as negatively impacting their goals. Overall, these results indicate most of our respondents do not generally want public access as part of a CE transaction. While public access is considered part of the IRS qualifying criteria for a CE, the statistical insignificance to land trusts indicates that public access is not one of the primary deciding factors for implementing a CE across our land trust respondents. This could be related to the overall mission of many land trusts in the study area as being focused on nature preservation. During focus groups (Miller, 2007) many landowners indicated a perception that land trusts often require public access, and the landowner community would likely benefit from the understanding that this is not on the main agenda for many land trusts. Similarly land trusts need to be sensitive to the negative import that access has for landowners in the pursuit of CE transactions. This understanding may open up doors for future CE dialogue. Overall, this

suggests potential for reduced search costs related to either side of this market finding agreement over this attribute.

Our results indicate land trusts generally want to have some control over agricultural operations on CE lands, consistent with our focus group findings (Keske, 2008). This was not a significant factor in the landowner model, however, even though our focus group results as well as previous literature suggest loss of managerial control creates concern (Miller et al., 2011; Sorice et al., 2013). While this finding may be consistent with land trust obligations related to stewardship, these results could be indicative of a potential conflict between landowners and land trusts when negotiating CEs.

Landowners were more likely to choose an easement when offered a higher benefit. This is consistent with past research indicating the importance of financial incentives for landowners to enter into conservation easements as well as economic theory (Farmer et al., 2011; Miller et al., 2011). However, some literature has suggested this may be weighted less heavily by some landowners (Farmer et al., 2011). Our results did not indicate significant dispersion on this parameter, suggesting preferences were relatively stable across landowners. Also, as expected from economic theory related to the demand side of this market, results indicate higher offered benefits negatively impacted land trust agents' easement choice. Overall, this indicates consistent price signals and the ability to discover price is important for this market as with any other. This emerging market is characterized by transactions largely negotiated privately, potential information asymmetry and adverse selection related to transacted CEs. Thus, inconsistent price signals could be an important problem causing inefficiency (inappropriate quantities and values of CE transactions) in this market. Moreover, these results coincide with the focus group findings that landowners expect some financial support for their contribution

(Miller et al., 2011), but that land trusts also expect some level of sacrifice from landowners (Keske, 2008).

One limitation of this analysis is that the results do not reflect the degree to which landowners or land trusts actually sacrifice financial benefits to keep their lands in CE. Another limitation is that welfare estimates could not be generated due to a high non-response rate among land trust respondents (39.5%) regarding land values. Given actual point estimates for land values could not be calculated for many land trust respondents, only ordinal weightings associated with price are elicited from both the models. However, landowner sacrifice is well-documented in the literature and the significant, positive finding of the community attachment and ecosystem services variables may be indicating landowners' commitment to provision of amenities to their communities.

Our results offer some evidence that landowners with more agricultural sales and or off farm income potential are more likely to choose a CE and perhaps more willing to signal some sacrifice to do so. This suggests respondents who have more income potential are more likely to consider a CE. This may be related to cash rich and land rich landowners being more likely to consider a CE than those who are cash poor, and it is related to previous findings suggesting landowners with higher economic dependence were less likely to have an easement (Cross et al., 2011). These results suggest cash poor landowners are more likely to not choose a CE so they can maintain the option value for added income from development of housing on their land. Flexibility to choose what to do with the land in the future was expressed as a concern by landowners in the focus groups (Miller et al., 2011). This suggests much higher benefit values may need to be offered to entice landowners in this situation to consider a CE.

Other variables seem to affect landowner choices. Consistent with conclusions from McGaffin et al. (2012) model results indicate that Wyoming landowners were less likely to choose a CE. This supports the notion that institutions and tradeable tax permits (in Colorado) are important considerations for the CE market and policy makers. Landowners perceiving their land to be more productive had a negative relation to CE choice. This may represent a perceived opportunity cost associated with flexibility of using the land or less concern that productive land would be converted. Those landowners who lived in either Colorado or Wyoming longer were less likely to choose an easement. This is consistent with previous research (Brenner et al., 2013), and it may suggest longer term landowners are more resistant to changing the nature of their property rights.

Landowners indicating they would not consider placing CEs on their land were more likely to not choose an easement, and this was weighted relatively high in that choice. This indicates some landowners do not view CEs as a viable alternative for their land. Those respondents indicating they would trust land trusts to manage the lands under CE were less likely to choose neither. This is consistent with previous research suggesting trust and more frequent visits by easement holders positively impacted landowner satisfaction with easements (Rissman and Sayre, 2012). However, the majority (71%) of landowners did not indicate they trusted land trusts in our sample. Given the impact of this variable on probability of choice, this suggests distrust of land trusts could be an important barrier to CE transactions. If the landowner already had a CE in place, they were less likely to choose “neither”, indicating that landowners having some experience with CEs were more likely to consider other CEs on their land.

If land trust agents perceived that lands in their area with CE potential were considered under growth pressure, respondents were less likely to choose a CE scenario. This could be

related to concerns regarding potential opportunity costs to obtain the easement on the land or having such lands in their current portfolio. Land trust agents with graduate education were more likely to choose easements.

Overall, our results indicate potential issues related to differences between landowners and land trusts that may lead to less successful CE negotiations. Sticking points seem to be managerial control, public access, and distrust of land trusts in general. Land trusts may attract more interest in CE transactions by making their priorities and CE attribute preferences known to landowners. Concerns about heterogeneous (or unclear) land trust conservation priorities were articulated within the landowner focus groups. Landowner trust of land trusts is clearly an issue for respondents as indicated in the landowner model. Conversely, landowners who indicated they already had a CE or trusted land trusts were more likely to choose CEs. Moreover, concern that public access is required by many land trusts could be negatively influencing landowners' willingness to consider conservation easements. Yet our results indicate this may be less of an issue for many land trusts than landowners might think. These results point to potential information asymmetry issues for landowners with little CE experience compared to land trust agents. Land trusts need to better articulate their conservation priorities and community attachment to landowners, so that landowners can more easily identify an organization with similar values. This would likely reduce search costs for landowners seeking an easement transaction. However, before engaging in a communication campaign, it may be worthwhile for trusts to ensure that they are clear, internally, on their conservation priorities to avoid exacerbating potential trust issues. Moreover, they need to be consistent with their actions regarding their priorities. This may be even more important when approaching landowners in areas with less history, information and institutions regarding easements.

Land trusts could also benefit from developing strategic plans and screening criteria to more easily identify landowners who share the same conservation priorities as a way to address potential adverse selection problems. For example, focus group results indicated that landowners acknowledged land trust interest in entering into CEs for wildlife protection (Miller et al., 2011). The focus groups indicated that landowners were also interested in protecting wildlife, but that they didn't necessarily need a CE in place in order to do so. These results were somewhat validated in our quantitative results. Land trusts whose interest is in wildlife habitat protection may benefit from creating a screening tool to identify landowners with similar motivations, or whose land is conducive to achieving this conservation priority.

These results suggest that opportunities for reduction in search and transactions costs among demanders and suppliers, improvement in CE acceptance, and increased transaction frequency may hinge on education related to CE opportunities available to landowners from land trusts. Land trusts need to be aware of concerns related to issues such as managerial control, public access, lack of trust, and financial compensation when negotiating with landowners. Moreover, heterogeneity amongst participants regarding these issues suggests some landowners may be more or less concerned about these issues. Overall, these results indicate the need for addressing potential information asymmetries between landowners and land trusts. Education and information aimed at reducing asymmetries should reduce matching costs associated with finding the right land trust and the right parcel. Our research suggests understanding and addressing the issues found could provide improvements in this emerging environmental market and ultimately improve sustainable land use and agricultural landscapes conservation.

Despite the contribution of this article and the growing body of literature regarding conservation easements, issues requiring further investigation remain. Understanding the

676 economic value or welfare associated with landowner decisions to enter into conservation
677 easements would provide important information about benefits received as well as what may be
678 needed to attract additional CE transactions. While our results, and of others, indicates distrust
679 of land trusts is a barrier, relatively little is known about the root causes and potential remedies to
680 address this problem. Overall, the literature regarding landowner motivations seems to be more
681 complete than for land trusts. Further research understanding motivations and issues for land
682 trusts could enhance the body of knowledge as well the functioning of this evolving market.

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Table 1. Descriptive statistics of explanatory variables for the landowner model.

Variable	Indirect utility equation for neither choice	Mean (Std. dev.)	Expected sign
Variable	Description	Mean (Std. dev.)	Expected sign
EASEMENT LENGTH	Perpetuity- (0) or 20-25 years – (1)	0.5582 ^a (0.4966)	+ F,L ^b
PUBLIC ACCESS	Public access required. No – (0) or Yes – (1)	0.4809 (0.4997)	- F,L
WILDLIFE HABITAT	Habitat included under easement. No – (0) or Yes – (1)	0.4986 (0.5000)	+ F, L
CONTROL	Restricted managerial control of landowner. No – (0) or Yes – (1)	0.5220 (0.4996)	- F
BENEFIT	Varied between 0, 25, 50, 75, or 100% of the property's average market value. Landowner's estimate of average market value per acre asked prior to stated choice question. Scenarios listed as being in perpetuity were listed as being eligible for potential income or estate tax benefits. Those not in perpetuity did not indicate this potential benefit.	51.2079 (36.0219)	+ F, E, L
STATE	Landowner state of residence – Colorado (0) or Wyoming (1)	0.2520 (0.4342)	- L
PRODUCTIVITY	Landowner's agreement with statement “productive capacity of my land is excellent for this area” with Likert scale response ranging from strongly disagree (1) to strongly agree (5).	3.6121 (1.0500)	- L
ECOSYSTEM	Summated Likert scale from eight questions regarding provision of habitat and ecosystem services provided by the respondent's lands. (range 8 to 40)	26.6778 (6.9906)	+ F, L
COMMUNITY	Summated Likert scale from twenty questions regarding dimensions of community attachment or sense of place. (range 20 to 100)	77.1396 (12.8366)	+ F, L

YEARS	The number of years the respondent had lived in Wyoming or Colorado (0 to 93)	50.1952 (18.9743)	?
COLLEGE	1 to 4 years of college after high school – No (0) or Yes (1)	0.4513 (0.4976)	- L
VOTECH	Vocational or Technical education after high school – No (0) or Yes (1)	0.0993 (0.2991)	?
GRADUATE	At least some graduate school education – No (0) or Yes (1)	0.1817 (0.3856)	- L
AG SALES	Last year's annual ag sales (based on ag census ranges ranging from less than \$1000 to over \$500,000) coded as midpoint of category	84780.99 (131726.10)	+ L
OFF FARM	Respondent employed off farm – No (0) or Yes (1)	0.4403 (0.4964)	+ L
EASEMENT EVER	Respondent would <u>not</u> consider putting a conservation easement on their property – No (0) or Yes (1)	0.4496 (0.4975)	+ F
TRUST	Respondent trusts land trusts to protect their interest if they hold easement on their property – No (0) or Yes (1)	0.2862 (0.4520)	- F
CURRENTLY CE	Respondent currently has a conservation easement on a parcel of land they own or manage – No (0) or Yes (1)	0.1051 (0.3067)	- F

Table 1. Descriptive statistics of explanatory variables for the landowner model (continued).

^a Means for categorical variables were calculated as simple averages across observations used to estimate the model. For easement attributes, means near 0.5 for those variables with only 2 levels are expected indicating that about half the respondents received 1 of 2 potential attribute levels. The midpoint level for the price variable is near 50, again indicating approximately equal distribution of the levels across respondents in the stated choice design.

^b Expected sign of variable in model based on expectations from focus group findings (F), existing literature (L), economic theory (E).

Table 2. Descriptive statistics of explanatory variables for the land trust agent model.

Variable	Description	Mean (Std. dev.)	Expected sign
EASEMENT LENGTH	Perpetuity- (0) or 20-25 years – (1)	0.5535 ^a (0.4972)	- F, L ^b
PUBLIC ACCESS	Public access required. No – (0) or Yes – (1)	0.4842 (0.4999)	+ F, L
WILDLIFE HABITAT	Habitat included under easement. No – (0) or Yes – (1)	0.4967 (0.5001)	+ F, L
CONTROL	Restricted managerial control of landowner. No – (0) or Yes – (1)	0.5353 (0.4989)	+ F
BENEFIT	Varied between 0, 25, 50, 75, or 100% of the property's average market value. Land trust agent's estimate of average market value per acre in the area asked prior to stated choice question. Scenarios listed as being in perpetuity were listed as being eligible for potential income or estate tax benefits. Those not in perpetuity did not indicate this potential benefit.	50.1163 (35.8778)	- F, E
COMMUNITY	Summated Likert scale from nine questions regarding various dimensions of community or place attachment worded similarly to landowner questions. (9 to 45)	38.3117 (4.7663)	+ F, L
ECOSYSTEM	Summated Likert scale regarding land trust level of ecosystem preservation focus from four questions. (4 to 20)	15.5888 (2.6984)	+ F,L
GROWTH PRESSURE	Summated Likert scale regarding growth pressure where land trust wishes to protect land from five questions. (5 to 25)	18.3262 (2.9740)	+ F,L
ECONOMIC ATTACHMENT	Summated Likert scale regarding land trust agent's view of landowners as economically attached to their lands from three questions. (3 to 15)	9.6962 (2.3472)	- F, L

Table 2. Descriptive statistics of explanatory variables for the land trust agent model (continued).

Variable	Indirect utility equation for neither choice	Mean (Std. dev.)	Expected sign
HOLD EASEMENTS	Does your organization currently hold conservation easements? No (0) or Yes (1)	0.9268 (0.2605)	- F, L
BUDGET	Operating budget of land trust. Ranging 50,000 to \$5,750,000 at midpoints of categories.	881503.2 (1457490)	- F
GRADUATE	At least some graduate school education – No (0) or Yes (1)	0.6887 (0.4631)	+ L
VOTECH	Vocational or Technical education after high school – No (0) or Yes (1)	0.0113 (0.1058)	?
YEARS	How many years have you lived in your current state of residence?	25.6670 (18.8563)	?

^a Means for categorical variables were calculated as simple averages across observations used to estimate the model. For easement attributes, means near 0.5 for those variables with only 2 levels are expected indicating that about half the respondents received 1 of 2 potential attribute levels. The midpoint level for the price variable is near 50, again indicating approximately equal distribution of the levels across respondents in the stated choice design.

^b Expected sign of variable in model based on expectations from focus group findings (F), existing literature (L), economic theory (E).

Table 3. Estimated landowner and land trust agent models with marginal effects.

Variable	Parameter Estimate	Marginal Effect ^a	Variable	Parameter Estimate	Marginal Effect
Indirect utility equations for easement choice					
Landowner model			Land trust model		
EASEMENT LENGTH	-1.0047*** (1.9843)*** ^c	0.0123	EASEMENT LENGTH	-2.0194*** (0.0005)	-0.1460
PUBLIC ACCESS	-1.6080*** (1.5593)***	-0.0183	PUBLIC ACCESS	-0.2063	-0.0141
WILDLIFE HABITAT	0.0520	0.0024	WILDLIFE HABITAT	1.4702*** (0.1532)	0.1335
CONTROL	-0.1767	-0.0080	CONTROL	0.5440*** (0.0737)	0.0472
BENEFIT	0.0131*** (.00754)	0.0733	BENEFIT	-0.0047** (0.0091)	-0.0320
STATE	-0.3696***	-0.0072	GROWTH PRESSURE	-0.0832**	-0.2355
PRODUCTIVITY	-0.1273**	-0.0412	ECONOMIC ATTACHMENT	-0.0430	-0.0639
ECOSYSTEM	0.0184*	0.0450	ECOSYSTEM	0.0126	0.0305
COMMUNITY	0.0242***	0.1702	COMMUNITY	0.0452*	0.2691
Indirect utility equation for neither choice					
CONSTANT	3.3683***		CONSTANT	-0.1077	
YEARS	0.0120***	0.0733	YEARS	0.0037	0.0061
COLLEGE	0.0717	0.0040	HOLD EASEMENTS	0.0390	0.0162
VOTECH	0.2732	0.0034	VOTECH	0.1434	0.0005
GRADUATE	-0.2848	-0.073	GRADUATE ^b	-0.4595**	-0.0524
AG SALES	-0.143-05***	-0.0165	BUDGET	0.0000	0.0000
OFF FARM	-0.4538***	-0.0281	----	----	----
EASEMENT EVER	1.3596***	0.0605	----	----	----

TRUST	-1.6931***	-0.0789	----	----	----
CURRENTLY CE	-0.6080**	-0.0089	----	----	----
Log Likelihood	-1991.322			-609.140	
Pseudo-R ²	0.364			0.235	
Chi-square	2266.836			374.71	
N	3684			1075	

*** Significant at $\alpha=.10$; ** Significant at $\alpha=.05$; *** Significant at $\alpha=.01$**

^a Total direct effect elasticity is estimated as average over observations.

^b Correlation coefficient between College and Graduate education variables was very high for the land trust agents >0.90. Only Graduate education was included to address collinearity between these two variables in the land trust model.

^c Estimated standard deviation of parameter reported (*,*). Significant dispersion around parameter estimate, *** indicates $\alpha = 0.01$. Only those easement attribute variables that were statistically significant in the multinomial logit formulation were estimated as random parameters.

Figure

Features	Easement A	Easement B	Neither
Contract Length of Easement	Perpetuity	Perpetuity	No conservation easement is granted. Right to develop fully the land for housing is unaffected in any way.
Access Provided to the Public	Yes	No	
Habitat on the parcel would be placed under protection from development (e.g. wildlife)	Yes	No	
Alternative production practices or enterprises must be approved by the land trust before implementation	Yes	No	
Payment for easement expressed as a percent of the average land market value (as expressed in section B question 1) in addition to any tax benefits	Income and estate tax benefits plus 50% of average market value of land	Income and estate tax benefits plus 25% of average market value of land	
Given the above attributes which easement would you prefer?	A ☐	B ☐	I choose Neither A Nor B ☐

Figure 1. Example of stated choice scenario attributes and levels.