Public Incentives for Conservation Easements on Private Land

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Abstract

Habitat destruction and fragmentation resulting from land development has motivated considerable public and private expenditures on land conservation initiatives. In addition to direct expenditures related to the procurement of conservation land, legislators have also put in place incentives aimed at encouraging private landowners to voluntarily donate conservation easements. Many landowners have taken advantage of these incentives, as private land held under conservation easement increased nearly five-fold between 2000 and 2010 (Land Trust Alliance 2010). This research seeks to inform the design and implementation of public incentives for conservation easements by analyzing how the tax incentives already in place have influenced the distribution of conservation easements and behavior of land trusts throughout the United States.

1. Introduction

Fifteen individual states and the Federal government have policies in place that provide tax incentives aimed at encouraging donations of conservation easements on private land. Although many of these incentives have existed for more than a decade, little is known about how they influence land conservation outcomes. Encouraging conservation easement donations has the potential to protect valuable ecosystem services on private land without the need for intrusive regulations or land acquisition, yet the tax incentives provided to those that donate easements represent real costs to taxpayers. The efficiency of the tax incentive policies are determined by both the quantity and quality of land secured by conservation easements. Although incentives for land donation have been shown to increase the quantity of land under easement (Sundberg 2007), it is an open question how incentivizing

donations influences the quality of land that is conserved. The incentives may influence the quality of land conserved for two reasons. First, the tax incentives tend to provide the highest benefits to high-income taxpayers. Unless high-income taxpayers also own land with a proportionally large share ecosystem benefits, this could lead to lower quality land being donated for easements (not to mention the equity implications). Second, the tax incentives may induce more land conservation to occur through donations rather than active acquisition by conservation groups. If most conservation land is secured through donations, it is possible that the lack of intentionality in parcel selection will lead to lower ecosystem benefits being secured under easement than under a situation where conservation organizations like land trusts actively purchase conservation easements.

From a research perspective, the variation in tax incentives across states and the Federal government offers a unique opportunity to assess how the specific details of the incentives that are in place influence conservation outcomes. A complete analysis of the efficiency and equity of tax incentives for conservation easements would require a clear understanding of all of the tax incentive dimensions that vary across states as well as highly detailed data on conservation easement outcomes across states over time. Although the differences in incentives provide important variation, it is not possible to capture the complete spectrum of factors along which the easement incentives vary. For example, there are differences across states in the percentage of the donation value that an individual receives as a tax credit, differences in the maximum value of the credit that an taxpayer can receive, statewide restrictions on the maximum value of credits that can be taken in aggregate in a given year, and differences in whether the credits are available to corporate entities or households or both. In addition, the conservation standards that a parcel must achieve to qualify for a tax incentive as well as the transaction costs associated with certifying a donation vary widely across states.

It would be extremely demanding for any model to appropriately account for all of the dimensions along which the incentives for conservation easement donations vary across states. The

research questions that we address in this research therefore center on three more general questions related to the impact of incentives on observed conservation easement outcomes. First, we assess the relationship between generous tax incentives and the income levels of households that donate easements. Since generous tax incentives have the biggest impact on high-income households, we hypothesize that income is positively correlated to areas with high level of conservation easements. A second research question that we address in this research is the extent to which the type of land that is conserved under easement varies across states. To do this, we overlay spatial conservation easement data from the National Conservation Easement Database (NCED 2013) onto land cover data from the 2011 National Land Cover Dataset (NLCD) (MRLC 2014). This allows for an assessment of how land cover characteristics of conservation easement land varies across states, which provides some initial evidence related to the benefits associated with conservation easements. Finally, our research assesses the extent to which tax incentives influence the behavior of land trusts, who act as the stewards for most conservation easements. One would expect that in areas with relatively generous tax incentives, most conservation easements will be procured by land trusts through donations rather than active purchases. We test this hypothesis and investigate other implications related to the relationship between tax incentives and land trust behavior using data from the Land Trust Alliance's Census of Land Trusts (LTA 2010).

Our preliminary results show that the proportion of land in a county under conservation easement is positively correlated to the incomes of the highest-income households, even after controlling for median income. We also find wide variation across states in the type of land cover on land held under conservation easement. While we are not able to make broad generalizations related to how these land cover outcomes translate to the quality of land conserved, it is clear from the analysis that conservation planners must be careful in assessing the role that easements play in protecting ecosystem services. Our final set of results that pertain to land trust behavior shows that land trusts in

states with tax credit programs are more likely to secure conservation easements through donations and less likely to maintain acquisition budgets and conservation plans. All three of these results suggest that generous tax incentives lead to less intentionality with respect to conservation easement planning.

Previous economics research related to the distribution of conservation easements has primarily focused on improving the tools for prioritizing land conservation decisions, taking into account costs and benefits (e.g., Ando et al. 1998, Messer 2006), risk of development (e.g., Newburn et al. 2006), dynamic considerations (e.g., Costello and Polasky 2004) and parcel connectivity (e.g., Onal and Briers 2006, Conrad et al. 2012). This line of research has helped to provide land trusts and other conservation organizations with tools that allow them to make more efficient acquisition decisions. In reality, however, the majority of conservation easements are donated by private land owners rather than actively acquired by conservation organizations. This paper therefore diverges from the literature on optimal conservation planning by seeking a better understanding of the extent to which tax incentives influence easement donations and how this alters conservation outcomes. The research builds on a limited set of studies that have looked at the impact of incentives on voluntary land conservation decisions by private land owners (Anderson and King 2004) and land trusts (Albers and Ando 2003; Sundberg 2007, 2011). The research that we conduct also draws on studies that evaluate the relationship between easements and local property and income outcomes (Chamblee et al. 2011; Parker and Thurman 2011; Lawley and Towe 2014). We also draw on questions generated in literature related to the design of land conservation incentives and implications on property rights and income that appear primarily in law journals (e.g., Pidot 2005; Wolf 2012).

The rest of the paper is organized as follows. In the next section, we detail the state and Federal tax incentives that are currently in place and describe how the incentives vary as a function of income. In section three, we present an empirical investigation of the relationship between income and conservation easements at the census tract level. Section four provides a presentation of state-by-state

land cover outcomes on conserved land, while section five describes the analysis related to the effects of conservation easement tax incentives on the behavior of land trusts. Section six provides some concluding remarks.

2. Tax incentives for donation of conservation easements

The structure of tax incentives for conservation easements varies dramatically both geographically and across time. For the years 2006 through 2013, the federal tax incentive for conservation easements has provided a tax deduction of up to 50% of the fair market value of the easement, up from 30% prior to 2006. The fair market value is determined with a before and after appraisal that assesses the extent to which encumbering the parcel with a conservation restriction reduces the resale value of the property. The tax deduction can be "carried forward" over 15 years, meaning that a land owner that donates a conservation easement, but does not have an income high enough to take full advantage of the deduction, can receive the 50% deduction on their future federal income taxes for up to 15 years (or until the total value of the deductions is equal to the full market value of the donation). Interestingly, lawmakers have chosen not to extend this tax deduction, and beginning in 2014 the federal tax incentive will revert back to a 30% maximum deduction with a five year carry forward period. The federal incentives also include deductions that can potentially reduce estate and capital gains taxes.

To provide an illustration of how the incentives provided by the Federal tax deduction vary as a function of income, imagine two separate taxpayers, Mr. A with an annual income of $1 million and Mr. B with annual income of $50,000.[1] Suppose both Mr. A and Mr. B choose to donate a conservation easement with a fair market value of $500,000. Mr. A would be able to take advantage of

[1] This illustration draws on that provided by Wolf (2012).

the full tax deduction in the year in which the easement is donated, since $500,000 represents exactly 50% of his annual income. Multiplying the deduction by the marginal tax rate of 39.6% that he would be subject to on that income would reduce his tax expenditures by nearly $200,000.[2] By comparison, 50% of Mr. B's income is only $25,000, meaning that he can take a $25,000 tax deduction this year and each of the next 15 years. Across the 16 years the deductions would amount to a total of $400,000 (still not equal to the fair market value) and given the 15% marginal tax rate that Mr. B would pay on this income, it would reduce his tax expenditures by $60,000 (undiscounted). Therefore the easement donated by Mr. A generates $140,000 (233%) more in Federal tax savings compared to the same donation by Mr. B. It should also be noted that wealthy donors, such as Mr. A are also in a better position to benefit from the estate and capital gains tax advantages afforded by donating an easement (the estate tax only applies to estates valued over $5.2 million).

At the state level, the tax incentives that are offered for conservation vary along a number of dimensions. As opposed to the federal government, which offers income tax deductions, state governments offer state income tax credits. The tax credits represent a direct reduction in taxes owed to the state and are therefore potentially more lucrative than the federal tax deductions, which simply represent a reduction in a taxpayer's taxable income. States allow landowners to take tax credits ranging from between 20 and 100 percent of the fair market value of the easement that they donate, depending on the state. States also vary in terms of how long they allow donors to carry the tax credit forward (between five and an unlimited number of years). Five states (Colorado, Georgia, New Mexico, South Carolina, and Virginia) also have provisions in place that allow donors to sell their tax credit to another taxpaying entity within the state. Table 1 lists the 15 states that provide state income tax credits as well as the specific characteristics of the programs.

[2] The Pease Amendment passed in 2013 reduces itemized deductions by 3% for each dollar a taxpayer earns over $250,000 (LTA 2014). This would reduce Mr. A's $500,000 deduction by ($1 million - $250,000)*0.03 = $22,500.

State conservation tax credits also tend to provide the greatest incentives to high income earners. If a landowner pays only a small amount annually in state income taxes, then a tax credit will be of little value. For example suppose that Mr. A and Mr. B, from the previous example, live in the state of Colorado, which provides a tax credit of 50% of the fair market value of the donated easement. The $250,000 tax credit that each would receive associated with the donation of the easement valued at $500,000 would be much more beneficial to Mr. A (who pays $46,300 annually in Colorado state income taxes) than it is to Mr. B (whose state income tax bill is only $2,315).[3] States with longer carry forward periods extend additional incentives to households with lower incomes, since these households are able to utilize the tax credit over a longer time frame. However, even over the 20 year carry forward period allowed in Colorado, Mr. B would receive less than $50,000 in undiscounted tax credits.

Allowing for the tax credit to be transferable has a much more dramatic impact on land rich and income-poor households. By selling the tax credit to another household or firm that can fully use the credit, the individual that donates the conservation easement is able to immediately capitalize on the tax benefits of their donation. Although tax credits typically sell for lower than face value, they offer the potential for landowners to both receive benefits immediately rather than over many years and, in the case of taxpayers with relatively low tax bills, receive a larger amount of benefits than they would have been received without transferability.

As mentioned previously, provisions that allow for tax credits to be transferred are currently in place in five states. Although there is little public information regarding the volume of tax credits transferred, Colorado and Virginia have both the longest standing (transfers have been allowed since 2000 in Colorado and since2 002 in Virginia) and largest tax credit transfer programs. In these two states, the majority of tax credits taken for conservation easement donations are transferred, amounting

[3] Colorado has a flat income tax rate of 4.63%.

to tens of millions of dollars in tax credits being transferred in each state in a given year (Jody Barbour, personal communication). Interestingly, nearly all of the transactions in the state of Colorado are handled by three tax brokerage firms that focus on conservation easement tax credits. In Virginia the number of brokers is larger (approximately 10). Georgia's conservation easement tax credit became transferrable in 2012 and the market is growing rapidly, while the markets in New Mexico and South Carolina have remained relatively small.

The prices for conservation tax credits in the transfer markets are also interesting to observe. Generally the seller's price and buyer's price remain constant for a given tax year, with prices for sellers hovering between $0.80 and $0.85 per $1 of tax credit that is sold. The brokers typically take a $0.05 commission per $1 transferred, which implies that buyers are able to purchase each dollar of tax credit for between $0.85 and $0.90. The buyers of the conservation easement tax credits are almost exclusively private households, although corporate tax entities participate in the market to a limited extent (Ariel Steele, personal communication). Although the prices are not posted publically by any of the five states, the tax brokers often provide price quotes directly on their publically accessible websites. While it may seem strange that an individual can purchase a tax credit at a discount (i.e., they pay less than one dollar for each dollar of credit), the buyer does take on some risk by purchasing a credit. If the donation was to be audited and found to either have a faulty appraisal or found not to achieve a valid conservation objective, then the owner of the tax credit could potentially lose the value of the credit. Colorado has improved the speed of its easement certification process in recent years, and this has provided buyers with greater certainty in their credit acquisitions (and has also let to increases in the price buyers pay for the credits) (Mike Strugar, personal communication).

3. Relationship between conservation easements and income

In the previous section, we outlined the extent to which Federal and state tax incentives provide differential benefits to taxpayers based on their taxable income. In this section we assess the empirical evidence related to the relationship between conservation easements and income in two ways. First, we evaluate data from the Internal Revenue Service (IRS) related to itemized noncash charitable deductions to assess how take-up of the Federal tax incentives varies across income groups. Second, we use data on the actual distribution of conservation easements across fourteen states and evaluate how the distribution of conservation easements correlates to the distribution of income at the Census tract level in these states.

A summary of data provided by the IRS (IRS 2003-2010) are presented in tables 2 and 3. Table 2 shows both the number of tax returns claiming a charitable noncash deduction and the mean deduction taken for various categories of charitable deductions between 2003 and 2010. The IRS data clearly show that although donations of food and clothing represent the largest categories in terms of the number of households claiming a charitable contribution, the donations made in these categories tend to be relatively small (approximately $500 for food and $1,450 for clothing). Donations of corporate stock and mutual funds are also claimed by a large number of households (average of over 170,000 households annually), and these donations tend to be considerably larger (average of $106,670). By comparison, many fewer households make charitable contributions of conservation easements on an annual basis (average of nearly 2,500 households annually report donations), but the charitable contributions tend to be very large, with a mean of over $500,000 per tax return. The results in table 2 show that despite the fact that charitable contributions of conservation easements are made by a relatively small number of households, the value of the average donation made in this category is larger than for any other category reported by the IRS.

In table 3 we take the analysis of the IRS data a step further by evaluating how the donations made under several categories vary as a function of income. The IRS groups donated real estate and

easements in how it reports these data, and in table 3 we compare these donations to donations of art and collectibles and clothing for the years 2006-2013. The data are broken down by income group, with households making under $25,000 representing approximately 25% of all taxpayers and, at the other extreme, households reporting income of $200,000 or more representing slightly more than 4% of households. Interestingly, although households in the highest income bracket represent only 4% of all taxpayers, they represent the highest share of returns (42%) claiming a deduction for a charitable contribution of real estate and conservation easements. Households earning $200,000 or more also represent more than 87% of the value of deductions claimed for real estate and conservation easements. This is slightly more than the share of value claimed by this same income group for Art and Collectibles (74%) and considerably more than the share claimed by the group for contributions of clothing (17%). Overall, the charitable contribution results suggest that the number and value of contributions are dominated by high income households.

Although the IRS results in tables 2 and 3 provide suggestive evidence that conservation easement donations tend to be taken by taxpayers at the upper end of the income distribution, more detailed evidence is needed to understand how income interacts with the distribution of conservation easements. To undertake this more detailed empirical analysis, we rely largely on the National Conservation Easement Database (NCED 2013), a developing spatial dataset assembled and distributed through a public-private partnership that includes the Trust for Public Land, Ducks Unlimited, Defenders of Wildlife, the Conservation Biology Institute, and the US Geological Survey. The NCED is still a work in progress and complete data on the spatial distribution of conservation easements is not currently available for all states. As such, we restrict our focus to fourteen states that contain coverage of at least 85% of all conservation easements held by private non-governmental

organizations (land trusts).[4] Future work will ideally expand this analysis to a more complete set of states as the data become available.

To conduct our empirical analysis on the relationship between conservation easements and income, we overlay the NCED onto a Geographic Information Systems (GIS) coverage of census tract data. We then calculate both the percentage of land area covered by conservation easements for each census tract and an indicator variable for whether a census tract contains a conservation easement. For each census tract we also record both the median income and the percentage of households in the census tract earning more than $200,000 as a proxy for high income households, as reported in the 2012 American Community Survey (ACS 2012).

A set of summary statistics related to the income and conservation easement data are provided in table 4. To investigate the relationship between the distribution of income and conservation easements, we estimate the following linear probability model

$$Easement = f(Pop\ density, land\ area, water\ area, number\ of\ households, \\ pct\ of\ households\ earning\ at\ least\ \$200{,}000, median\ income, state\ dummies). \quad (1)$$

We focus on estimating a linear probability model as the number of census tracts that contain a conservation easement is relatively small and for the tracts that do contain an easement, the percentage of land area within each tract covered by easements also tends to be very small. To investigate the robustness of the model with various sets of control variables, we estimate model (1) with no state-level dummies, model (2) with state dummies but no median income, and model (3), which contains all variables. In each model, the standard errors are clustered by state.

The estimation results of the three models are presented in table 5 and indicate that the coefficient estimates are relatively robust across alternative model specifications. As intuition would suggest, conservation easements are more likely to be found in larger census tracts, as measured by

[4] The states included in the analysis are Arkansas, Colorado, Connecticut, Illinois, Kentucky, Louisiana, Massachusetts, Mississippi, Nebraska, North Carolina, Pennsylvania, South Dakota, Vermont and Virginia.

land area and number of households. The coefficient estimates of the state dummies yield suggestive evidence that states with tax incentives for conservation easements are more likely to contain census tracts that have at least one easement. Arkansas is the dummy variable left out of the model, meaning that all of the state coefficients are relative to this state. Interestingly, Colorado, Connecticut, Massachusetts, North Carolina, and Virginia, which have state-level tax incentives, all have positive and statistically significant coefficients. By comparison, the only states with coefficients that are negative and significant, Nebraska and South Dakota, do not have tax credit programs in place. We are hesitant to read too much into this limited set of evidence, however, both because of the small sample of states and the fact that the tax incentives themselves are not exogenously applied

The coefficients on the two income variables that are included suggest that the percentage of households that earn more than $200,000 is a more significant determinant of whether or not a census tract will contain a conservation easement than is the median income of the census tract. Although the two are positively correlated, the effect of median income is not significantly different from zero in either of the specifications where it is included. The percentage of households earning greater than $200,000 is significantly different than zero and positive in each of the three specifications. The coefficient estimate of 0.005 in model (3) can be interpreted as meaning that if the number of households earning more than $200,000 increases by 1%, this leads to a 0.5% increase in the probability of observing a conservation easement in that census tract, holding median income constant.

The regression results presented in table 5 provide strong evidence in support of the hypothesis that conservation easements are positively correlated with income, especially that of the highest income earners. The model results do not, however, provide decisive evidence on the mechanism for this result. While it may be that higher income households are more incentivized to contribute a conservation easement due to the tax incentives that have been discussed in section 2, it may also be the case that census tracts with a larger percentage of wealthy households are more likely to have land

trusts with the resources to acquire conservation easements directly. We address the behavior of land trusts in section 5, to assess the extent to which incentives influence their institutional decision making. In the next section, we focus on analyzing differences in land cover protected by conservation easements across states.

4. Land cover outcomes associated with conservation easements

In this section we investigate the land cover conserved under easement across the same set of 14 states used in the analysis in the previous section. By focusing on these states, we are again restricting our analysis to areas where the spatial conservation easement data provided by the NCED are relatively complete. While the ideal analysis would allow us to make conclusions about how the quality of land conserved, or the value of ecosystem services protected varies across states, we feel that the information required to make such generalizations are simply too demanding. The value of protecting a particular type of land cover is undoubtedly a function of the geography as well as surrounding natural, human, and economic characteristics. In addition, to appropriately value the benefits of protecting a particular type of land cover, one would also want to have knowledge of the counterfactual land cover, should the parcel not be conserved under easement. Easements on parcels that are unlikely to be developed do not yield the same additionality to expected ecosystem benefits as parcels that are under heavy threat of future development.

Although our analysis does not allow us to make normative statements related to the benefits of conserved land, evaluating variation in land cover protected under easement does provide us with insight on the differences in the scope of protection across states. The land cover on conservation easement land is summarized in table 6 into six categories – forest, shrub/grassland, pasture, row crops, wetlands, and an 'other' category that includes things like land that is partially developed (a

lawn in a residential area for example) or barren. Although forest cover is the largest category on average across the 14 states with approximately 36% of all land under conservation easement, it is interesting to note that all of the categories, with the exception of the 'other' category, represent the largest land cover type in at least one state. It is also noteworthy, that states in the same region tend to have similar predominant land coverage. For example, prairie states such as South Dakota, Nebraska, and Colorado have conservation easements that are primarily classified as shrub and grassland. East Coast states like Massachusetts, Vermont, and Virginia primarily have conservation easements on forest land, while southern states like Louisiana, Mississippi and Arkansas are more likely to have conservation easements on cropland and wetland acreage.

The land cover statistics in table 6 do provide some suggestive evidence of systematic differences in the mechanisms driving conservation easements across states, through comparison of states in the same region. For example, the states of Pennsylvania and Kentucky are geographically very similar, yet exhibit stark differences in land cover types on land under easement. In Pennsylvania, nearly 60% of conservation easement land is covered by forest, while approximately 30% of land under conservation easement could be consider farmland (either pasture or cropland). By comparison, only 22% of conservation easement land in Kentucky is forested, while nearly 70% is farmland. Similarly, neighboring states of South Dakota and Nebraska have very different quantities of cropland (1% SD, 8% NE) and wetland (1% SD, 11% NE). These states do differ for a number of reasons despite being in close proximity, but at least part of the differences are likely driven by the priorities of the conservation community. Given that there are not sufficient differences in conservation easement tax incentives across neighboring states in our sample of 14 states, we cannot make strong arguments related to how these incentives might influence conservation outcomes. To more directly tackle the question of how tax incentives influence conservation easement outcomes, we turn in the next section

to an analysis of how incentives influence the behavior or land trusts in the extent to which they exhibit intentionality related to the land that they hold under easement.

5. Effect of conservation easement incentives on land trust activities

Although state tax incentives for conservation easements have a direct impact on the households that choose to donate, it is land trusts that serve as the stewards of the easements that are donated. States and the Federal government require that in order for an easement to qualify a taxpayer for tax advantages, the easement itself must be donated to a public or non-profit organization certified to act as a steward for the land. As a result, the tax laws that are in effect indirectly influence the conservation landscape in which land trusts operate. Land trusts can obtain stewardship over conservation easements either by providing direct compensation to a landowner in order to secure the easement or by agreeing to accept the easement as a donation. In situations where a land trust actively pays property owners to secure conservation easements, one would expect them to be more proactive in acquiring easements that fulfill specific conservation objectives. In situations where a land trust primarily accepts donations of conservation easements, they have less of an ability to select the characteristics of the parcels on which the easements are located. They can of course refuse to serve as the steward for a particular easement donation or target their outreach to specific types of potential donors, but one could generally expect land trusts to have less intentionality in the land conservation process when they primarily accept donated easements.[5]

Tax incentives for conservation easements are in place with the expectation of encouraging conservation easement donations. One would therefore expect that states with sufficiently generous tax credit programs would see higher levels of donated conservation easements relative to states without

[5] Land trusts can also agree to pay some of the transaction costs associated with securing appraisals and completing the necessary legal documentation for the donation to be certified.

specific tax incentives. In addition, if land trusts rely primarily on donations of conservation easements, one would also expect these land trusts to be less likely to have a specific conservation plan or set of objects and also less likely to have a conservation easement acquisition budget. The implication of a land trust relying exclusively on donations, not having an acquisition budget and not having a conservation plan is then that conservation easements are acquired with less intentionality compared to a land trust that actively pursues the purchase of conservation easements. This would then suggest that these donation driven land trusts would not have as much of an opportunity to secure conservation easements on land with the highest ecosystem service benefits.

To test the extent to which state-level conservation easement tax credits influence the behavior of land trusts, we estimate three separate models using land-trust specific data provided by the 2005 and 2010 Census of Land Trusts (LTA 2005, 2010). Each of the models maintains the same set of independent variables, but varies the dependent variable. In model one, the dependent variable is a binary variable that indicates whether a land trust maintained an active acquisition budget in either 2005 or 2010. In model two the dependent variable is an indicator for whether the land trust had a conservation plan or map that guided its acquisitions of conservation easements in either 2005 or 2010. Finally, model three utilizes as a dependent variable an indicator for whether the land trust relied exclusively on donated conservation easements in 2005 or 2010. Each of the models then includes as independent variables separate dummy variables for whether the state in which the land trust engaged in acquiring conservation easements had a tax credit for easement donations that was not transferable (nine states) and a dummy for whether the land trust acquired land in a state that offered a transferable tax credit for conservation easement donations (five states). As control variables, we also include the age of the land trust and the region of the country in which the land trust is located.

The three models described above were estimated using probit regressions with the standard errors clustered by state. Table 7 includes the coefficient estimates and standard errors for each of the

models as well as the marginal effect of each coefficient (estimated at the means). The results provide strong evidence that state-level tax credits influence the institutional behavior of land trusts. Based on the results of the acquisition budget model, land trusts in states with tax incentives are nearly 10% less likely to maintain an acquisition budget for conservation easements and more than 25% less likely to maintain an acquisition budget in states that offered transferable tax credits. The results of model two suggest that land trusts are also approximately 10% less likely to maintain a conservation plan in states that offer non-transferable tax credits for conservation easements (although the dummy for states with transferable tax credits is not significantly different from zero). These results also carry over to model three, which shows that tax-incentives (particularly transferable tax credits) tend to increase the probability that a land trust relies exclusively on donations. The marginal effects suggest that a land trust being in a state with transferable tax credit increases the likelihood that it will rely fully on donated conservation easements, rather than actively paying to secure conservation easements, by more than 20%.

Taken together, the results from the land trust behavior models provide consistent evidence that the state-level tax credits that are in place alter the conservation landscape in which land trusts participate. Although generous tax incentives likely increase the quantity of conservation easements donated, they may also serve to reduce the intentionality with which land trusts pursue specific conservation objectives. While we cannot put a normative estimate on the potential efficiency losses that come about due to this lack of intentionality, it is a result that deserves additional attention as conservation planners asses the role that tax incentives play in generating conservation outcomes.

6. Conclusion

Tax incentives for conservation easements have been adopted by 15 states in addition to the Federal government. These incentives vary widely along a number of dimensions and little previous research has been done to assess how these dimensions influence land conservation outcomes. In this research we seek to address several important factors that contribute to the overall effects of these incentives. The results from our analysis provide strong evidence that the distribution of conservation easements across the landscape is significantly correlated with income, a result that is likely at least partially a result of the fact that the tax benefits of conservation easement donations accrue disproportionally to high-income households. Our analysis also shows that the land cover secured under conservation easement varies greatly across states. While we are not able to attribute this variation directly to the incentives in place, the implication is that an analysis of the benefits associated with conservation easements is challenging because different regions clearly have different land conservation priorities. Finally, our analysis shows that the tax incentives that are in place do have an impact on the institutional behavior of land trust organizations. Specifically, land trusts in states that provide generous tax incentives are more likely to secure all of their conservation easements through donations, less likely to have an active conservation plan, and less like to maintain an acquisition budget for purchasing conservation easements.

Taken together, our analysis shows that conservation planners must be aware of the effects that tax incentives have on both the quality and quantity of conservation easements. While generous incentives may help to secure a greater quantity of land, it seems likely that there are tradeoffs in the quality of land secured by easements. This result may be due to the fact that easements are secured primarily on land owned by high income earners, who likely do not also have all of the land with the highest ecosystem service benefits, and due to the fact that more conservation is induced through donations rather than intentional acquisition of land with high ecosystem benefits.

This research provides some preliminary evidence on the relationship between tax incentives, income, and conservation easements. As more detailed data on the distribution and characteristics of land held under conservation easement becomes available, this analysis can be expanded to more accurately account for the tradeoffs with respect to the quality and quantity of land conserved to render a more complete understanding of the efficiency of the tax incentives that are offered. In addition, future would should look at the relationship between public land conservation measures such as the acquisition of public park land and the effect this has on private conservation outcomes through conservation easements.

References:

H.J. Albers, and A.W. Ando. 2003. Could state-level variation in the number of land trusts make economic sense? *Land Economics*, 79(3): 311-327.

American Community Survey. 2012. 2012 ACS 5-year estimates. Available: http://factfinder2.census.gov/faces/nav/jsf/pages/download_center.xhtml

C. Anderson, and J. King. 2004. Equilibrium behavior in the conservation easement game. *Land Economics*, 80(3): 355-374.

A.W. Ando, J. Camm, S. Polasky, and A. Solow. 1998. Special distributions, land values, and efficient conservation. *Science*, 279(5359):2126-2128.

J.M. Conrad, C.P. Gomes, W. van Hoeve, A. Sabharwal, J.F. Suter. 2012. Wildlife corridors as a connected subgraph problem. *Journal of Environmental Economics and Management*, 63:1-18.

J.F. Chamblee, P.F. Colwell, C.A. Dehring, C.A. Depken. 2011. The effect of conservation activity on surrounding land prices. *Land Economics*, 87(3):453-472.

C. Costello and S. Polasky. 2004. Dynamic reserve site selection. *Resource and Energy Economics*, 26(2): 157-174.

Internal Revenue Service. 2003-2010. Individual Noncash Charitable Contributions. Available: http://www.irs.gov/uac/SOI-Tax-Stats-Special-Studies-on-Individual-Tax-Return-Data#noncash

Land Trust Alliance. 2010. National Land Trust Census Report. Available: http://www.landtrustalliance.org/land-trusts/land-trust-census/2010-final-report

Land Trust Alliance. 2014. Will Congress Limit Charitable Deductions? Available: http://www.landtrustalliance.org/policy/tax-matters/campaigns/charitable-deduction

C. Lawley and C. Towe. 2014. Capitalized costs of habitat conservation easements. *American Journal of Agricultural Economics*, 96(3) 657-672.

K.D. Messer. 2006 The conservation benefits of cost-effective land acquisition: a case study in Maryland. *Journal of Environmental Management*, 79(3):305-315.

Multi-Resolution Land Characteristics Consortium (MRLC). 2014. National Land Cover Database 2011. Available: http://www.mrlc.gov/nlcd2011.php

National Conservation Easement Database. 2013. Available: http://nced.conservationregistry.org/

H. Onal, R.A. Briars. 2006. Optimal selection of a connected reserve network. *Operations Research*, 55(2):379-388.

D. A. Newburn, P. Berck, and A. M. Merenlender. 2006. Habitat and open space at risk of landuse conversion: Targeting strategies for land conservation. *American Journal of Agricultural Economics*, 88(1):28-42.

D.P. Parker and W.N. Thurman. 2011. Crowding out open space: the effects of federal land programs on private land trust conservation. *Land Economics*, 87(2):202-222.

J. Pidot. 2005. Reinventing conservation easements: a critical examination and ideas for reform. *Lincoln Institute of Land Policy Working Paper*, WP105JP1.

J.O. Sundberg. 2007. Measuring the effects of state income tax incentives on land conservation. *Lincoln Institute of Land Policy Working Paper*, WP07JS1.

J.O. Sundberg. 2011. State income tax credits for conservation easements: do additional credits create additional value? *Lincoln Institute of Land Policy Working Paper*, WP11JS1

E.G. Wolf. 2012. Simultaneously waste and wasted opportunity: the inequality of Federal tax incentives for conservation easement donations. *Stanford Environmental Law Journal*, 31(2) 315.

Figures and Tables

Table 1: State tax credit details

State	Value of tax credit as pct of fair market value	Individual maximum tax credit allowed	Transferability	Carry forward period (years)
Arkansas	50%	$5,000	No	9
California	55%	-	No	8
Colorado	50%	$375,000	Yes	20
Connecticut	50%	-	No	25
Delaware	40%	$50,000	No	5
Georgia	25%	$250,000	Yes	10
Iowa	50%	$100,000	No	20
Maryland	100%	$80,000	No	15
Massachusetts	50%	$50,000	No	10
Mississippi	50%*	$10,000	No	10
New Mexico	50%	$250,000	Yes	20
New York	25%*	$5,000	No	-
North Carolina	25%	$250,000	No	5
South Carolina	25%	$52,500	Yes	Unlimited
Virginia	40%	$50,000	Yes	13

* Mississippi's tax credit only applies to transaction costs associated with the easement donation. New York's tax credit applies to the property tax paid on the land on which the easement is located.

Table 2: Summary of Federal itemized charitable contributions (2003 – 2010)

	Corporate Stock, Mutual Funds, and Other Investments		**Real Estate and Land**		**Easements**		**Art and Collectibles**		**Food**		**Clothing**	
	Number	Mean ($1,000)	Number	Mean ($1,000)	Number	Mean ($1,000)	Number	Mean ($1,000)	Number	Mean ($1,000)	Number	Mean ($1,000)
2003	184,353	83.52	23,607	249.69	2,179	684.68	88,488	9.37	166,436	0.48	4,051,990	1.44
2004	182,150	90.87	25,356	122.75	1,948	468.13	108,554	8.56	194,369	0.54	4,386,808	1.43
2005	193,781	95.90	17,537	233.75	2,186	830.66	110,632	11.25	195,807	0.54	4,692,990	1.50
2006	201,613	129.33	17,578	205.01	3,402	437.86	108,374	11.28	156,081	0.62	4,295,574	1.46
2007	220,394	122.93	16,363	363.29	2,231	875.90	69,762	14.31	204,943	0.48	5,283,547	1.44
2008	131,646	112.92	18,446	127.15	3,095	380.53	92,518	14.61	233,128	0.50	5,431,988	1.46
2009	120,837	91.95	8,062	195.94	2,013	483.46	88,593	10.11	205,782	0.41	5,219,681	1.45
2010	134,571	125.91	14,149	95.03	2,933	261.01	84,600	12.47	214,827	0.46	5,695,243	1.46
Mean	**171,168**	**106.67**	**17,637**	**199.08**	**2,498**	**552.78**	**93,940**	**11.49**	**196,422**	**0.50**	**4,882,228**	**1.45**

Table provides both the number of returns reporting a charitable contribution within each category as well as the mean contribution as reported on the Internal Revenue Service "Individual Noncash Contributions" worksheets.

Table 3: Share of returns reporting deductions and mean deduction value by income (2006 – 2010)

Income Bracket		Real estate and Easements		Art and Collectibles		Clothing	
	Share of households	Share of returns	Share of deduction value	Share of returns	Share of deduction value	Share of returns	Share of deduction value
Under $25,000	25.1%	6.2%	3.5%	4.9%	4.9%	3.7%	3.7%
$25,000 under $50,000	24.9%	7.0%	0.9%	8.3%	1.4%	11.4%	11.9%
$50,000 under $75,000	17.6%	11.3%	1.1%	14.3%	2.5%	16.8%	15.4%
$75,000 under $100,000	11.5%	11.0%	2.2%	15.7%	4.3%	18.0%	16.7%
$100,000 under $200,000	16.8%	22.3%	5.2%	32.7%	12.9%	35.8%	35.0%
$200,000 and higher	4.2%	42.2%	87.1%	24.1%	74.0%	14.3%	17.3%

Source: Internal Revenue Service "Individual Noncash Contributions" worksheets.

Table 4: Summary statistics for Census tract data model

State	Mean	Standard Deviation	Minimum	Maximum
Population density	0.00060	0.00149	0	0.461
Water area (sq meters)	3,710,040	48,600,000	0	2,410,000,000
Land area (sq meters)	90,700,000	344,000,000	0	12,400,000,000
Number of households	1,572.94	688.35	0	9,180
Pct income above 200k	4.576	7.378	0	68.90
Median income ($)	56,771.74	28,738.72	4,265	246,500

Table 5: Regression results for census tract income model

	(1)		(2)		(3)	
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
Constant	0.00918	0.02934	-0.034	0.019	-0.047*	0.026
Population density	-24.347*	12.137	-24.400	15.575	-23.668	15.364
Water area	0.0000003	0.0000004	0.0000003	0.0000002	0.0000003	0.0000003
Land area	0.0000001***	0.0000000	0.0000002***	0.0000000	0.0000002***	0.0000000
Num of households	0.00003**	0.00001	0.00003***	0.00001	0.00002**	0.00001
Income above 200k	0.00441***	0.00120	0.00641***	0.00175	0.00501***	0.00109
Median income	0.00096	0.00057	-	-	0.00047	0.00048
Colorado	-	-	0.076	0.007	0.071***	0.012
Connecticut	-	-	0.249	0.014	0.245***	0.019
Illinois	-	-	0.013	0.015	0.008**	0.017
Kentucky	-	-	0.037	0.005	0.036***	0.005
Louisiana	-	-	-0.008	0.006	-0.009***	0.006
Massachusetts	-	-	0.153	0.017	0.147***	0.021
Mississippi	-	-	0.011	0.000	0.012***	0.001
Nebraska	-	-	-0.025	0.008	-0.030**	0.010
North Carolina	-	-	0.130	0.006	0.129***	0.007
Pennsylvania	-	-	0.128	0.012	0.124***	0.013
South Dakota	-	-	-0.093	0.028	-0.097***	0.028
Vermont	-	-	0.737	0.004	0.735***	0.008
Virginia	-	-	0.092	0.011	0.085***	0.017
	N = 18,353		N = 18,384		N = 18,353	
	R^2 = 0.063		R^2 = 0.144		R^2 = 0.145	

Note: ***, **, * indicate variables significantly different from zero at the 0.001, 0.01, and 0.1 levels of significance respectively.

Table 6: State-level land cover summary

State	Forest	Shrub/ grassland	Pasture	Crops	Wetlands	Other
Arkansas	1.43%	0.10%	0.34%	*51.30%*	39.98%	6.84%
Colorado	19.79%	*61.00%*	9.61%	2.20%	5.62%	1.78%
Connecticut	*70.29%*	1.61%	5.83%	0.87%	15.13%	6.28%
Illinois	*34.43%*	2.07%	17.45%	22.60%	8.58%	14.88%
Kentucky	22.91%	2.23%	*62.80%*	4.60%	1.86%	5.60%
Louisiana	4.52%	4.71%	0.96%	36.49%	*44.38%*	8.95%
Massachusetts	*62.75%*	4.46%	7.79%	1.62%	16.60%	6.78%
Mississippi	8.07%	2.36%	1.89%	24.00%	56.48%	7.21%
Nebraska	6.74%	*71.27%*	0.53%	7.77%	10.96%	2.74%
North Carolina	*63.54%*	5.58%	6.27%	3.20%	18.01%	3.40%
Pennsylvania	*57.51%*	2.75%	16.98%	12.71%	3.73%	6.32%
South Dakota	16.07%	*81.14%*	0.52%	0.77%	0.93%	0.57%
Vermont	*59.01%*	2.70%	18.73%	9.95%	6.74%	2.87%
Virginia	*49.93%*	5.82%	15.05%	7.27%	17.29%	4.63%
Average	*34.07%*	17.70%	11.77%	13.24%	17.59%	5.63%

Note: The results presented in this table are derived by overlaying spatial data on conservation easement locations from the NCED onto land cover data from the 2011 NLCD.

Table 7: Probit regression results for land trust behavior models

	(Dep var=Acq. budget)		(Dep var=Conservation plan)		(Dep var=100% voluntary)	
	Coeff.	Mar. Eff.	Coeff.	Mar. Eff.	Coeff.	Mar. Eff.
Constant	-0.301**	-	0.800***	-	-0.518***	-
	(0.140)	-	(0.102)	-	(0.113)	-
Tax incentive	-0.215*	-0.083	-0.293***	-0.086	0.056	0.021
	(0.119)	(0.045)	(0.104)	(0.031)	(0.109)	(0.042)
Transferability	-0.765***	-0.257	-0.082	-0.024	0.517**	0.203
	(0.210)	(0.058)	(0.166)	(0.050)	(0.21)	(0.083)
Age of LT	0.010***	0.004	0.005**	0.001	-0.001	0.000
	(0.003)	(0.001)	(0.002)	(0.001)	(0.003)	(0.001)
NE	-0.139	-0.054	0.015	0.004	0.124	0.047
	(0.115)	(0.044)	(0.087)	(0.025)	(0.094)	(0.036)
MW	-0.149	-0.057	-0.036	-0.010	0.318**	0.124
	(0.156)	(0.058)	(0.139)	(0.041)	(0.154)	(0.061)
South	0.042	0.016	-0.122	-0.036	0.276**	0.107
	(0.243)	(0.095)	(0.146)	(0.045)	(0.139)	(0.055)
Rocky	0.359	0.142	0.409	0.100	0.067	0.026
	(0.255)	(0.101)	(0.288)	(0.057)	(0.179)	(0.069)
	N = 1575		N = 1575		N = 1458	
	R^2 = 0.027		R^2 = 0.017		R^2 = 0.015	

Note: ***, **, * indicate variables significantly different from zero at the 0.001, 0.01, and 0.1 levels of significance respectively.