



Research, part of a Special Feature on [Private Land Conservation – Landowner Motives, Policies, and Outcomes of Conservation Measures in Unprotected Landscapes](#)

## Perpetual private land conservation: the case for outdoor recreation and functional leisure

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**ABSTRACT.** As natural areas, agricultural lands, and open spaces continue to be developed at unprecedented rates, it is important for land conservation professionals to understand the individuals who might play a role in permanently protecting these lands and their ecological services. Many factors have been shown to influence land protection decisions among private owners, including land-use activities, demographic characteristics, and environmental intention and behavior. With the hypothesis that individuals already involved in land conservation programs would be candidates for permanent protection, we set out to model conservation easement decisions within a group of participants in southern Indiana's Classified Forest and Wildlands Program (ICFWP). We used a mailed questionnaire to survey 500 landowners, garnering 308 responses, about their interest in conservation easements. Our results indicated significant positive relationships between interest in conservation easements with variables representing perception of landscape change, outdoor recreation behavior as an adult, and environmental organization membership. By better understanding the ways these factors promote permanent land-use decisions, land conservation professionals can better allocate limited resources through strategic investments in targeting and outreach.

**Key Words:** *conservation easements; functional leisure; Indiana Classified Forest and Wildlands; land trusts; land use; private land conservation*

### INTRODUCTION

Scientists estimate that because of population growth and urban expansion, global urban land-cover will increase by 1.2 million km<sup>2</sup> in the near future, threatening habitats, biodiversity, and carbon sequestration (Seto et al. 2012). In addition, low-density residential development (Suarez-Rubio et al. 2011) and the conversion of wetlands to farmland (Van Asselen et al 2013) and rangeland to tillable acreage (Byrd et al. 2015) are becoming increasingly important issues. These land cover changes will diminish the vital ecosystem services provided by intact natural areas (Lee 2005). Because many of these areas are privately owned, governmental land acquisition can be only one part of a comprehensive conservation solution (Norton 2000, Butchart et al. 2010), and its role has decreased in recent decades. Private land conservation (PLC) mechanisms, on the other hand, are becoming an increasingly important way to address these new challenges (Farmer et al. 2015). In the United States, where private ownership accounts for 65% of land in the contiguous 48 states and 82% in the eastern part of the country (128.7 million ha; U.S. Forest Service 2001), PLC is perhaps the most promising avenue for protecting open space, natural areas, and ecosystem services on a large scale (Trombulak and Baldwin 2010).

One PLC mechanism that works to permanently protect privately owned open space and natural areas is a conservation easement. Conservation easements represent negotiated, legally binding agreements between private property owners and conservation organizations, and they are often used to protect landscapes with ecological, historical, cultural, or recreational significance (Gustanski and Squires 2000, Farmer et al. 2011a). Conservation easements are a permanent, private land protection mechanism that divides and distributes certain property rights as agreed upon by the landowner and a third-party land conservation organization. Land is protected perpetually from development,

and often times other rights are sold or given to the third party, rights such as timber, hunting, and mineral extraction (Gustanski and Squires 2000). Land protected through conservation easements remains privately owned while state and local governments continue to receive revenue from property taxes (Land Trust Alliance [LTA] 2011). Conservation easement holders can be governmental bodies, but most often they are nonprofit land trusts (LTA 2011).

In this study we specifically follow two other studies in examining how various landowner attributes, behaviors, and land-use activities predict interest in conservation easements (Brenner et al. 2013, Farmer et al. 2016a). Brenner et al.'s (2013) early work on private landowners in the Finger Lakes Region of upstate New York utilized an efficient single page survey to relate independent predictor variables such as landowner attributes, land uses, and behaviors to interest in conservation easement adoption. Their resulting analysis determined that participation in environmental organizations, recreation, gathering of wild edibles, and land entitlement (amount of land owned) positively predicted interest in conservation easements. Following this in replication in southern Indiana's Brown County, Farmer et al. (2016a) found that landowners who (1) are relatively older (around 59 years), (2) are members of an environmental organization, (3) have land already enrolled in a private land conservation mechanism (in this case the Indiana Classified Forest and Wildlands Program or ICFWP), and (4) are not hunters or anglers were most likely to have an interest in placing a conservation easement. A key difference between these two studies was participation in the ICFWP, a program specific to Indiana that seeks to conserve private forest and other natural areas, albeit nonpermanently. Given the significance of participation in the ICFWP in predicting interest in conservation easements (Farmer et al. 2016b), we elected to explore interest in conservation easements

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further by surveying landowners who had already enrolled property in the ICFWP. The importance of the ICFWP has been well documented, as Mayer and Tikka (2006:620) noted it as the oldest U.S. program to encourage “forest owners to manage or restore their forests to a “healthy” condition.” The State of Indiana reports that > 15,463 enrolled parcels total > 302,000 ha that are enrolled in the program (State of Indiana 2014).

Based on the prominence of this private land conservation program in previous research and the researchers’ recent published results, three specific questions guided the present work:

1. What are the differences between ICFWP participants who show interest in conservation easements and those who do not?
2. Within this group of temporary PLC participants, which variables best predict interest in permanent PLC through conservation easements?
  - H<sub>1</sub>: Individuals engaged in land uses that account for no monetary gain would be more apt to declare interest in or grant conservation easements.
  - H<sub>2</sub>: Individuals who are members of an environmental organization are more apt to have an interest in conservation easements.
3. How might outdoor recreation as an adult help explain private landowner interest in conservation easements?
  - H<sub>3</sub>: Individuals who more often visit natural areas for recreation would be more apt to show interest in conservation easements.

### Background literature

Although conservation easements have existed in the United States since the late 19th century (Gustanski and Squires 2000), their popularity as a PLC mechanism began to increase in the 1980s with changes to the federal tax structure, which occurred following the Unified Conservation Easement Act (UCEA; Gustanski and Squires 2000). This coincided with a decline in governmental procurement of private land and a growth in land trusts (King and Fairfax 2006). In 2011, state and local land trusts nationwide held 3.57 million ha under conservation easements (LTA 2011). Fundamental to understanding the potential of land trusts in PLC is research on the factors that might predict and promote adoption of conservation easements among private landowners (Brenner et al. 2013, Drescher 2014, Farmer et al. 2015). Understanding how these factors figure into land conservation decisions could help land trusts and other conservation professionals relate and reach out to prospective easement donors.

In recent years, scholarship has uncovered a host of variables that contribute to private landowners’ decisions to place conservation easements, including environmental values, financial incentives, land use activities, membership in environmental organizations, and participation in other PLC programs (Elconin and Luzadis 1998, Kabii and Horowitz 2006, Kilgore et al. 2007, Cross et al. 2011, Farmer et al. 2011a,b, 2016a, Brenner et al. 2013). Protecting

the environment (Erickson et al. 2002) is another oft-cited nonmonetary benefit of land ownership that can motivate conservation behavior. Proenvironmental behavior can be influenced by environmental attitudes, beliefs, and values (Kaiser et al. 1999, Schultz et al. 2005, Farmer et al. 2011b). Many studies have supported the claim that environmental values are a key motivator for the adoption of conservation easements (Elconin and Luzadis 1998, Jacobson 2002, Ryan et al. 2003, Farmer et al. 2015). Brenner et al. (2013) found that being an active member of an environmental organization was a strong predictor of interest in adopting a conservation easement, as did Farmer et al. (2016a). Table 1 organizes and highlights variables discussed in this literature review and used to test interest in conservation easement placement.

**Table 1.** Variables used to evaluate and predict interest in conservation easements in accordance with the literature on previous conservation easement and related private land conservation scholarship.

Variables	Citation
Land use (LU): residency	Rickenbach and Kittredge 2009, Petrzelka et al. 2013
LU: recreation (hiking/ATV riding, etc.)	Bliss 1989, Koontz 2001, Brenner et al. 2013
LU: hunting/fishing	Brenner et al. 2013
LU: timber harvesting	Koontz 2001, Farmer et al. 2016b
LU: wild food gathering for personal consumption	Robbins et al. 2008, Brenner et al. 2013
LU: wild food gathering for market sale	Robbins et al. 2008, Brenner et al. 2013
LU: firewood harvesting	Koontz 2001
Visitation to state park(s)	Wilson 1984, Bixler and James 2005
Visitation to state forest(s)	Wilson 1984, Bixler and James 2005
Visitation to national forest(s)	Wilson 1984, Bixler and James 2005
Acreage owned	Farmer et al. 2016a,b
Outdoor recreation - as youth	Bixler and James 2005, Farmer et al. 2011c
Outdoor recreation - as adult	Bliss 1989, Theodori et al. 1998
Perception of landscape change	Brenner et al. 2013
Env. organization membership	Brenner et al. 2013, Farmer et al. 2016a

Central to the issue of PLC program participation is whether or not landowners depend on their land for their livelihood. Farmer et al. (2015) found that landowners who receive monetary benefits from their land were less likely than others to consider conservation easements without financial incentives. This finding has been supported in other studies where the most important motivators for placing conservation easements were financial incentives or land-based income (Kabii and Horwitz 2006, Cross et al. 2011). Conversely, some studies have reported that financial incentives did not influence conservation-based management decisions (Kilgore et al. 2007). In addition, Koontz (2001) found that respondents with lower incomes were more likely to use their land for financial return, i.e., harvesting timber or nonforest timber products for market sale, while respondents with higher incomes were more likely to engage in active protection, citing recreation and aesthetics as important benefits of land ownership.

There is similar disagreement in the literature on the influence of recreational land use and conservation behavior, with some studies identifying recreational benefits as key drivers of conservation behavior (Bliss 1989, Koontz 2001, Brenner et al. 2013) and others finding it to be inconsequential (Bourke and Luloff 1994). Often, recreational benefits are cited in the context of nonmonetary benefits of land ownership and can include preserving forest land for hiking (Koontz 2001), wildlife viewing (Campbell and Kittredge 1996, Koontz 2001), and landscape aesthetics (Koontz 2001, Erickson et al. 2002, Ma et al. 2012).

Another important factor is residency. The sparse research on residency and participation in voluntary PLC programs suggests that individuals living on their land are more likely to participate in voluntary PLC programs than absentee landowners (Petrzelka et al. 2013). Additionally, resident landowners are more likely to engage in land protection (Rickenbach and Kittredge 2009), active land management (Kendra and Hull 2005, Finely and Kittredge 2006, Knoot et al. 2009), and governmental forest stewardship programs (Finley and Kittredge 2006).

Most of these studies focused on recreational activities on privately owned land itself, but few, if any, considered landowners' overall outdoor recreation pursuits as adults or youth. Brenner et al. (2013) and Farmer et al. (2016a) attempted to account for outdoor recreation in their research on interest in conservation easements by asking questions about visitation to nearby protected natural areas. Neither study found these variables to be significant predictors. However, links have been drawn between outdoor recreation with environmental socialization and significant life experiences in the context of PLC. Based on the early significant life experience work of Tanner (1980) and Chawla (1998), as well as the environmental socialization research of Bixler and James (2005), scholars have posited that early life experiences in nature that include unstructured free play and adult mentoring are common variables amongst individuals engaged in proenvironmental behaviors. Farmer et al. (2011c) found these experiences to have been present for many Indiana landowners who had opted for permanent land protection with conservation easements. Although much outdoor recreation research has focused on youth experiences, little is known about adult outdoor recreation pursuits and environmental behaviors, particularly in the realm of landowner decision making.

The majority of the aforementioned conservation easement studies were able to extract explanations for why people opted to place a conservation easement; however, only Brenner et al. (2013) and Farmer et al. (2016a) compared landowners who were interested versus those who were not interested. Accordingly, the current study builds on this work to further explore the linkage between participation in a nonpermanent PLC program (ICFWP) and interest in conservation easements as a permanent PLC mechanism.

## METHODS

### Study area

Today, Indiana's land cover is dominated by herbaceous species and nonwoody vegetation such as lawns, grasses, cropland, and pastureland. Within these land cover types, cropland is dominant, covering 65% of the state (Farmland Information Center 2014). Forests cover 19% of the state.

Indiana was 85-93% forested prior to European settlement in the early 19th century (Jackson 2004, Smith et al. 2004). By 1920, because of the harvesting and exportation of its valued hardwood timber, Indiana had reduced its canopy cover to approximately 6% (Nelson 1998). According to the state's first forester, Charles C. Deam, Indiana was overharvested because of its quality hardwoods and would be treeless by 1935 (Deam 1920). Consequently, Deam proposed and developed the Indiana Classified Forest Program (the precursor of ICFWP). The program and legislation "encouraged proper timber management and watershed protection on private forests. The incentive for landowners to enroll their lands in the program was a reduction in property taxes. Property taxes on qualifying land was determined by assessing the land at \$1.00 per acre then applying the county tax rate resulting in a 90% or more tax reduction" (Nelson 1998). This tax rate holds today.

Lands qualified to be enrolled in the ICFWP include those that total 4.05+ ha of forest, wetland, shrubland, and/or grassland. Activities not allowed include: grazing of domestic livestock; buildings such as houses, barns, and homes; intentional burning unless written into the management plan; and areas for the growing of Christmas trees. Landowners must develop a land management plan with a state district forester, file annual reports, and allow inspection of the property every five years. Enrollment in the program can be discontinued at any time, but removing land from the program requires payment of a fee: seven-years of back taxes based on the current zoning rate of the county, plus an additional 10% interest charge (Bennett et al. 1995). Land enrolled as of December 31, 2014, totaled 302,039 ha.

### Survey sample, instrument, and data collection

This study is part of a larger international project comparing data from participants in state/provincial tax-incentivized conservation programs in Indiana, the United States and Ontario, Canada. The population of interest in this study includes a sample from approximately 10,000 Indiana landowners who have their property enrolled in the ICFWP. A stratified sample of 500 names/addresses of these individuals was acquired from the Indiana Department of Forestry. Accordingly, the instrument was developed collaboratively with scholars from the University of Waterloo, Canada (see Appendix 1 for the Indiana-based questionnaire). This paper reports on specific components of the research based on results from Indiana.

Data analyzed for this paper were gathered from questions in Parts B, E, and F of the survey instrument (Appendix 1). Section B was focused on land stewardship, landscape features, and conservation management practices. Part E was based on Brenner et al.'s (2013) and Farmer et al.'s (2016a) instrument on land use, perception of landscape change, and interest in a conservation easement, as well as additional variables regarding participation in outdoor recreation as a youth and adult. Part F included demographic details.

The survey was administered on the basis of a modified Dillman Tailored Design Method (Dillman et al. 2009), which included the provisioning of a \$2 bill as a prepaid cash incentive. In the U. S., \$2 bills are rarely received in circulation so they are novel and, we hoped, intriguing enough to inspire a response. Questionnaires were sent to 500 sampled ICFWP participants. After 68 were returned for insufficient addresses 432 recipients remained.

Mailing 1 included an informational letter alerting participants to the ensuing survey. Mailing 2 included the survey and the \$2 bill. Mailing 3 was a follow-up postcard reminder that we were still collecting data. Data from returned questionnaires were entered into a Qualtrics online survey to minimize input error while generating the dataset in a downloadable SPSS file.

### Survey data analyses

Analysis took place in SPSS 21.0. First we created descriptive statistics for the demographic, land use, acreage, visitation to protected areas, outdoor recreation levels, and environmental organization membership variables based on the dichotomy of no interest versus some interest in a conservation easement. We then conducted Chi-square analyses on categorical variables and t-tests on the continuous variables to test for differences between the two groups. Pearson Chi-square tests were used to compare the percent of respondents showing interest in conservation easements and those not having an interest. Independent Samples T-tests were used to compare means between the “none” vs “some” interest groups on continuous measures (area owned, area in ICFWP, number of visits per year to protected areas, perceptions of landscape change, and outdoor recreation activity). Area owned, area in ICFWP, and number of visits per year to protected areas were all log-transformed before including in the T-tests to achieve normally distributed data. These analyses were used to answer our first research question.

To answer the second research question and to test hypotheses, we used a stepwise logistic regression model that included the seven land uses, visitation to three types of protected areas, and total acreage owned (Brenner et al. 2013). We also included total acreage enrolled in the ICFWP based on the outcomes of Farmer et al. (2016a,b), outdoor recreation activity levels as a youth (Bixler and James 2005) and as an adult (Bliss 1989), perception of landscape change (Brenner et al. 2013), membership in environmental organizations (Brenner et al. 2013, Farmer et al. 2016a), as well as four demographic variables: age, gender, educational attainment, and household income, all of which are well discussed as important variables in the conservation easement literature (Cross et al. 2011, Farmer et al. 2015). The dependent variable was a dichotomous indicator of whether individuals had placed a conservation easement or were interested in a conservation easement for their land (1), or were not interested and had not placed a conservation easement (0). Within this dichotomous dependent variable, we included those who had placed a conservation easement on their land in the same group as those who expressed interest in doing so. Although these two behaviors (stated interest and revealed behavior) are not equivalent, they both stand apart from having no interest, which in turn produced no revealed behavior. The stepwise regression model automatically removed variables that were insignificant. Finally, we used correlation analysis to explore the linkage of adult outdoor recreation activity level and conservation management activities, which seemed warranted based on results from the regression analysis.

The final research question, which sought to understand how might outdoor recreation as an adult help explain private landowner interest in conservation easements, was quantified by asking participants about their level of outdoor recreation as an adult. Participants were asked to rate their level of outdoor

activity (examples given include: hiking, camping, boating, etc.) as an adult using a Likert scale (1 = inactive, 2 = somewhat inactive, 3 = somewhat active, and 4 = active). Both analyses ran for research questions 1 and 2 contributed to answering this research question. Additionally, we conducted correlation analysis between adult outdoor recreation level and 10 conservation management activities collected in section 2 of the questionnaire.

## RESULTS

### Response rate and participant profile

Of the 432 questionnaires sent, 308 (71%) were returned. After removing incomplete questionnaires, 281 (65% of the original set) were suitable for analysis. Demographically, respondents were predominantly older (mean age 63), white (100%), and male (81%). Twenty percent had at minimum a bachelor's degree. In terms of livelihoods, 43% were employed full-time while 41% were retired. Seventy-three percent noted a 2013 household income of about \$50,000; 29% listed household income above \$100,000. Over 45% of respondents described their property as a commercial farm, while 27% described it as a residential lot with surrounding land, 24% as a hobby farm, and 4% as a nonfarm rural business.

The median land area owned was 33.6 ha (mean 92.7 ha) and the median land area enrolled in the ICFWP was 17.4 ha (mean 31.9 ha). Of the respondents, 61% indicated that their land was dominated by forest cover, while 36% indicated a mixture of land covers. The vast majority (90%) of respondents enrolled land in the ICFWP themselves, and 58% knew someone else who participated in the ICFWP. The average landowner knew 3.8 others with land enrolled in the program. Almost a third of respondents reported that participation in the ICFWP by other landowners moderately or significantly affected their own participation in the program. See Table 2 for full demographic, land use, and behavioral descriptive results.

*RQ1: What are the differences between ICFWP participants who show interest in conservation easements and those who do not?*

Over half (51.2%) of our respondents had heard of conservation easements prior to the survey. One group of landowners included 34 who had granted conservation easements on their property and 77 who expressed interest in granting an easement (n = 111). The other group included 131 landowners who expressed no interest. Table 3 compares these two groups on demographics, land entitlement, land use, and other independent variables.

Significant differences ( $p < 0.05$ ) were detected for the variables of educational attainment, household income, visitation frequency to national forests, and outdoor recreation activity level as an adult between those with and without an interest in conservation easements. As educational attainment increased, so did the likelihood an individual would have an interest in a conservation easement. And those with income levels between \$25,000 to \$50,000 and \$75,000 to \$150,000 were more likely to have an interest in conservation easements than those with other income levels. Those who showed an interest in conservation easements reported visiting national forests more often, having a higher perception of landscape change, and having a higher outdoor recreation activity level than those with no interest.

**Table 2.** Results of descriptive analyses and comparison tests between individuals with no interest and some interest in placing a conservation easement.

Variable	Variable	No Interest N = 131	Some Interest N = 111
Age		63.33	61.02
Gender	Female/Male	55% / 50%	45% / 50%
Employment Status	Employed > 30 hrs./week	53%	47%
	Employed < 30 hrs./week	33%	67%
	Retired	59%	41%
	Other	67%	33%
Educational Attainment***	No college	23.66%	26%
	Some college / technical	34.35%	42%
	Bachelor's degree	22.90%	42%
	Prof. or graduate degree	19.08%	63%
Household Income**	\$0 - \$25,000	9.92%	24%
	\$25,000 - \$50,000	10.69%	59%
	\$50,000 - \$75,000	26.72%	31%
	\$75,000 - \$100,000	16.79%	55%
	\$100,000 - \$150,000	9.16%	57%
	\$150,000+	16.03%	38%
Land Entitlement	No response	10.69%	52%
	Hectares owned	83.2 (Mdn 32.8)	96.3 (Mdn 44.5)
Land Use	ICFWP hectares	28.5 (Mdn 16.6)	32.3 (Mdn 30.4)
	Permanent residence for you and/or your family	57.25% Yes	63.96% Yes
	Recreation (e.g., hiking, ATV use, etc.)	77.86% Yes	85.59% Yes
	Hunting or fishing (by you or someone else)	77.10% Yes	75.68% Yes
	Harvesting wild foods for personal consumption	32.82% Yes	45.05% Yes
	Harvesting wild foods for market sale	1.53% Yes	3.60% Yes
	Firewood harvesting (outside of top removal)	47.33% Yes	54.05% Yes
	Timber harvesting (by you or someone else)	47.33% Yes	38.74% Yes
Visitation to Protected Area (visits per annum)	State Forest	1.21	3.12
	State Park	2.61	3.03
	National Forest***	0.67	1.68
Perception of county landscape change** (1 = Strongly Disagree - 5 = Strongly Agree)		3.48	3.88
Outdoor recreation activity level (1 = very inactive - 4 = very active)	as a teenager	3.50	3.52
	as an adult***	3.19	3.51
Member of Env. Org.***		19.08% Yes	44.14% Yes

\*  $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ ; \*\*\*\* $p < 0.001$

**Table 3.** Results of forward stepwise logistic regression on interest in conservation easement (0 = no interest; 1 = some interest or already have easement).

Variables	B (Odds Ratio)
Constant	-3.127 (NA)
Perception that landscape in county has changed (1 = Strongly Disagree - 5 = Strongly Agree)	0.21 (1.23)*
Outdoor recreation activity level as an adult (1 = very inactive - 4 = very active)	0.57 (1.76)**
Member of an environmental organization (Yes vs No)	1.04 (2.83)**

B = Beta parameter estimate from model; \* $p < 0.05$ ; \*\* $p < 0.01$

*RQ2: Within this group of temporary PLC participants, which variables best predict interest in permanent PLC through conservation easements?*

To better understand which variables best predicted interest in a conservation easement we used a forward stepwise logistic

regression procedure including independent variables in Tables 1 and 2 regressed on the dependent variable “interest in a conservation easement.” This variable was coded as no interest in a conservation easement = 0 and interest or placement of a conservation easement = 1 (questionnaire Part E, Questions 4b and 4c). The model returned three significant ( $p < 0.05$ ) predictors (perceptions that landscape changed; outdoor recreation as an adult; membership in an environmental organization), presented in Table 4. As scores increased in these three variables, the likelihood of expressing interest in a conservation easement increased significantly, as represented by odds ratios ( $\exp[B]$ ).

Odds ratios in this study can be interpreted as follows: for each unit increase in any independent variable, the odds of also expressing interest in a conservation easement increases by a multiplicative factor of that independent variable’s odds ratio. For example, someone who “strongly agrees” with having perceived landscape change in the county has 1.23 times the odds of being interested in a conservation easement compared with someone who only “somewhat agrees” (Wald Chi-square[1] = 4.19,  $p = 0.041$ ). Similarly, someone who reports one unit higher in outdoor

activity has 1.76 times the odds of showing interest in a conservation easement compared with someone who reporting one unit lower (Wald Chi-square[1] = 8.332,  $p = 0.004$ ). The most powerful predictor of interest in a conservation easement is being a member, donor, or participant in an organization that focuses on environmental issues. Those who reply “Yes” to supporting environmental organizations have 2.83 times the odds of showing interest in a conservation easement (Wald Chi-square[1] = 11.65,  $p = 0.044$ ). Because these predictor variables are entered into the logistic regression model simultaneously, each odds ratio reported here is adjusted to account for the other two variables in the model.

**Table 4.** Results of correlation analysis between conservation management strategies to adult outdoor recreation activity level (ordinal rank scale of 1 = not planned; 2 = planned; 3 = underway; 4 = completed).

Conservation Mgmt. Strategy	Mean	<i>p</i> value	Correlation Coefficient
Removal/control of invasive species	2.73	0.176	0.090
Planting of native species	2.36	0.061*	0.127
Prescribed burning	1.44	0.089*	0.116
Removal of unhealthy trees	2.39	0.049*	0.132
Removal of unsafe trees	2.14	0.071*	0.123
Habitat improvement	2.61	0.000****	0.245
Groundwater protection	1.92	0.166	0.094
Erosion control	2.13	0.001***	0.223
Monitoring environmental conditions	1.92	0.231	0.081
Allowing natural succession	2.57	0.061*	0.126

\*  $p < 0.1$ ; \*\*\* $p < 0.01$ ; \*\*\*\* $p < 0.001$

Those interested in conservation easements reported they were more active as adults in outdoor recreation than those with no interest in conservation easements. Specifically, 59% of respondents interested in conservation easements indicated that they are very active in outdoor recreation, compared to 38% of respondents not interested in conservation easements.

We hypothesized that individuals engaged in land uses that account for no monetary gain would be more apt to declare interest in or grant conservation easements. Our regression results did not find this to be the case, rather, none of the land uses tested was a significant predictor of interest in a conservation easement. We also hypothesized that individuals who are members of an environmental organization are more apt to have an interest in conservation easements. Our results did support this hypothesis. Among landowners interested in a conservation easement, 44% belonged to an environmental organization, compared with 19% of those not interested in a conservation easement. Based on the regression results, belonging to an environmental organization increases the probability of conservation easement interest by 12%.

*RQ3: How might outdoor recreation as an adult help explain private landowner interest in conservation easements?*

Finally, we hypothesized that individuals who more often visit natural areas for recreation would be more apt to show interest in conservation easements. The results of our survey showed a significant relationship of interest in conservation easements with

visitation to national forests ( $p < 0.001$ ), as well as activity level of outdoor recreation as an adult ( $p = 0.001$ ) but not with visitation to state parks or state forests. Multiple regression results in Table 3 highlight that adult outdoor recreation activity was a significant indicator of interest in a conservation easement ( $p < 0.01$ ), whereas visitation to national forests was no longer significant after accounting for significance of outdoor recreation and membership in an environmental group.

To further explore this result, we compared adult outdoor recreation activity level with data on engagement in 10 conservation management activities given land management and eco-restoration activities are equated to a recreation activity and leisure experience according to Chen et al.’s (2013) supposition on horticultural activities. Results from the correlation analysis indicated that adult outdoor recreation activity level was significantly correlated with actions leading to habitat improvement and erosion control activities. The effects of each were marginal, which was expected given the indirect linkage. Several other conservation management activities were marginally correlated with the adult outdoor recreation activity level.

**DISCUSSION**

Perception of landscape change, outdoor recreation as an adult, and membership in an environmental organization were all found to be the most powerful predictors of whether or not landowners enrolled in temporary PLC programs (in this case the ICFWP) would show interest in pursuing a permanent conservation easement. Although these results are somewhat consistent with other literature on PLC participants (e.g., Brenner et al. 2013), the specificity of the results pertaining to outdoor recreation and landscape change perception make important contributions to the literature and the field of land conservation by better describing those landowners interested in conservation easements.

As in other studies (e.g., Brenner et al. 2013, Farmer et al. 2016a), membership in an environmental organization was found to be the strongest determinant of interest in conservation easements. Previous studies have also linked conservation behavior to environmental awareness (Zorondo-Rodríguez et al. 2014) and environmental values (Elconin and Luzadis 1998, Jacobson 2002, Ryan et al. 2003, Farmer et al. 2015). Perhaps, in our case, environmental awareness and environmental values are manifested through membership in environmental organizations.

Still more revealing are the roles of adult outdoor recreation activity and perception of landscape change. Interestingly, the variable “recreational use,” explicitly characterized as an on-site land use, was not found to be significantly related to conservation easement interest (in contrast with Brenner et al. 2013). However, adult outdoor recreation activities writ large were significant. Although the literature on recreation’s relationship to conservation behavior has yielded mixed results, our study suggests that engagement in outdoor recreation experiences anywhere is positively related to interest in granting a conservation easement on one’s own property. Our results support the early work on outdoor recreation and proenvironmental behavior of Dunlap and Heffernan (1975), who found outdoor recreationists to report more engagement in proenvironmental behaviors than the general public. The work of Theodori and

others (1998) further specified the relationships between specific outdoor recreation and proenvironmental behavior. For example, hunting and off-road vehicle use were not aligned with proenvironmental behavior, while lower-impact, nonextractive activities like picnicking, camping, hiking/backpacking, and mountain biking were aligned with proenvironmental behavior. Conversely, our results linking outdoor recreation to environmental behavior interest/intention contradict subsequent findings of Nisbet et al. (2009) and Teisl and O'Brien (2003).

Landowners most interested in conservation easements were active outdoor recreationists who visited national forests significantly more often than others. One possible explanation for this outcome is that when compared to state parks and state forests, the Hoosier National Forest is less developed, with fewer amenities, and likely draws a different type of recreationist. Our finding also raises a question: To what extent do these landowners who report engagement in outdoor recreation do so on their own property? Bliss (1989) reported that recreation was a prime objective of private forest landowners. This study also reported that recreating on their own land was a meaningful family activity. Further, managing the land itself was a form of recreation for many landowners. In Butler and Leatherby's (2004) survey of family forest owners, nearly half of respondents reported that an important reason for owning forestland was hunting or other recreation.

Hunting was not a strong predictor of interest in permanent land conservation in our study. Instead, our study suggests an alternative explanation involving land management activities as a form of recreation and leisure. Correlation results (Table 4) show a relationship between conservation management activities and adult outdoor recreation. One possible explanation is that landowners are engaging in a sort of "functional leisure." Based on Stebbin's definition that leisure is an "uncoerced activity engaged in during free time, which people want to do and, in either a satisfying or a fulfilling way (or both), use their abilities and resources to succeed at" (Stebbins 2008:4), functional leisure would comprise those uncoerced activities that people engage in that result in an end product or accomplishment. Land management and conservation activities might fit this definition. Indeed, most of the conservation management activities from our survey would not be considered mandatory requisites for owning the land; rather, landowners might be internally, if at all, compelled to engage in these activities. As found by (Farmer et al. 2016b) analysis of land use activities (environmental, residential, or financial) in relation to conservation management activities, those using land for more environmental protection or residential purposes were more apt to engage in and complete conservation management activities. In essence, we propose these landowners are engaging in productive, or functional leisure. This functional leisure hypothesis is consistent with research carried out by Brenner et al. (2013), which suggested that landowners who actively use, or work, their land (albeit not for income) are significantly more likely to support permanent land conservation through conservation easements.

Residency on ICFWP land, surprisingly, was not a significant predictor of conservation easement interest in our study. The importance of residential status was particularly intriguing given that it has only recently been acknowledged in the literature.

Petrzalka et al. (2013), for example, found that individuals living on their land were more likely to participate in voluntary conservation programs than those with single use parcels not containing a residence. Meanwhile, absentee forestland owners have been found to be less motivated, interested, or engaged in the management and protection of their property (Kendra and Hull 2005, Finely and Kittredge 2006, Rickenbach and Kittredge 2009, Knoot et al. 2009). The relationships between permanent and seasonal residency, absenteeism, and voluntary land conservation warrant more research in the future.

#### **PROFESSIONAL IMPLICATIONS, LIMITATIONS, AND FUTURE DIRECTIONS**

Our results have a number of potentially important implications for policy, practice, and future research. Our demonstration that interest in permanent private land conservation depends significantly on other widespread activities such as support for environmental organizations and outdoor recreation suggests great potential to "mainstream" this conservation mechanism.

Land conservation organizations, which typically broker and hold conservation easements, could partner with state agencies responsible for managing public lands by using state land conservation program rosters to identify landowners with high potential for granting conservation easements. For example, a statewide or local land trust could work with the state's department/division of natural resources to identify and communicate with landowners already involved in voluntary PLC programs such as the ICFWP. Another promising approach would be for land conservation organizations to work with local environmental organizations and identify their landowning members who might also be potential conservation easement grantors. A precedent for such a collaboration is the Virginia Outdoors Foundation, which has protected land at large spatial scales (over 303,514 ha throughout the commonwealth) via strong working relationships with nongovernmental organizations like local land trusts (Virginia Outdoors Foundation 2016).

Permanent private-land conservation easement programs could also help achieve conservation goals over long temporal scales via combination with nonpermanent voluntary conservation programs, such as the ICFWP. Landowners who initially enrolled land in a nonpermanent mechanism like the ICFWP could later be approached to consider permanent protection mechanisms such as conservation easements. Thus, conservation easement programs, if developed as mainstream opportunities for environmentally minded private landowners could play a pivotal role in an integrated effort to achieve large-landscape conservation goals over the short, medium, and long terms (Trombulak and Baldwin 2010).

Our study has a number of limitations that should be considered with the interpretation of the data and for future use of the survey methodology. The present study was limited to only one program in Indiana in which respondents were overwhelming older, white males. Future studies should continue to strive for samples that represent landowning populations. In this regard, studies on more demographically and geographically diverse landowners should be undertaken to determine if they may yield similar or different results. Generalizations about landowner decision making and behavior vis-à-vis permanent voluntary land conservation will depend on broader representation of the landowning population nationwide.

The instrument used in our study, developed by Brenner et al. (2013), lacks the breadth and depth necessary for fine-grained and nuanced data collection on landowner motivations. Multiple-item factors from a more detailed instrument would enhance our capacity for measuring multidimensional items embedded within land use. Response and nonresponse bias are always concerns in survey research such as this. We were unable to account for nonresponse bias; therefore we contend that the results are representative of respondents to this survey and others like them. Finally, our choice to lump those that had placed a conservation easement with those that indicated an interest in doing so runs the risk of conflating stated and revealed preferences. More research should more specifically tease out differences between those who show interest in conservation easements, those who actually grant them, and those who show no interest. Future studies should specifically solicit data from individuals who had considered a conservation easement but declined to grant one. Unfortunately, landowners such as these are not identifiable in public records, so they must be approached through survey research, which is subject to the biases discussed above. One way to control for the confounding factor of easement awareness and knowledge is to provide more in-depth educational material about conservation easements prior to administering a survey.

Future research should seek to expand and refine the Brenner et al. (2013) instrument in a manner that does not compromise its efficiency while allowing for more robust analysis and more nuanced interpretation. One notable gap is questions that would illustrate how recreational experiences on one's own land influence proenvironment values and land-conservation behaviors. Especially promising is work that could provide a more fine-grained understanding of on-site recreational activities, especially land management-as-leisure, or what we call productive leisure or functional leisure. Such work could shed important, much-needed light on the issues for researchers in their endeavor to understand conservation decision making on private lands.

Responses to this article can be read online at:  
<http://www.ecologyandsociety.org/issues/responses.php/8515>

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**Appendix 1. Survey instrument.**

**Part A: Participation in the Indiana Classified Forest and Wildlands Program (ICFWP)**

1. What year was your land first enrolled in the ICFWP? \_\_\_\_\_
- A. Did you enroll the land in the ICFWP or was it enrolled when you obtained ownership of it?
- I enrolled the land in the ICFWP.
- It was already enrolled when I obtained ownership of it.
- B. Is your land still enrolled in the ICFWP?
- Yes
- No

If not, what year did you remove the land from the ICFWP? \_\_\_\_\_

2. Which of the following best describes your involvement in the ICFWP?
- Participant in the ICFWP
- Formerly a participant in ICFWP
- Never a participant in ICFWP **(Please skip ahead to Section E on page 5)**
3. In terms of eligibility for the ICFWP, which of the following best describes your property?
- Minimum of 10 acres of forest  Minimum of 10 acres of grassland
- Minimum of 10 acres of wetland  Mixture of land cover types; minimum of 10 acres
- Minimum of 10 acres of shrubland
4. How did you first learn about the ICFWP programs? \_\_\_\_\_
5. Do you know other landowners who participate in the ICFWP?
- No
- Yes → Approximately how many? \_\_\_\_\_

[IF Yes} 5a. To what extent would you say the participation of other landowners influenced your decision to participate?

Not at all	Minimally	Moderately	Significantly

6. Which of the following best describes your property?
- Commercial farm, operated by you  Non-farm, rural business
- Commercial farm, leased or rented to another operator  Residential lot with surrounding lands
- Hobby farm
7. How many totals acres of land do you own? \_\_\_\_\_ (acres)
8. How many acres of land do you own that is enrolled in the ICFWP? \_\_\_\_\_ (acres)
- 8a. How many separate parcels of land do you own that are enrolled in the ICFWP? \_\_\_\_\_
9. Please check all of the following features that your ICFWP enrolled property includes:
- Woodlands  Natural lakes / ponds
- Natural grasslands  Man-made / dug lakes / ponds
- Wetlands  Other features: \_\_\_\_\_
- Streams / creeks \_\_\_\_\_

**Part B: Land Stewardship**

1. In your opinion, what term best describes the biodiversity found on your property enrolled in the ICFWP?
  - Outstanding
  - Good
  - Fair
  - Poor
  
2. Which of the following statements do you feel best describe the current status of the biodiversity on your ICFWP enrolled property?
  - Overall the biodiversity of this property is improving
  - On balance the biodiversity of this property is remaining about the same
  - The general state of biodiversity on this property is declining
  
3. In terms of reasons for owning the land enrolled in the ICFWP, how important are the following reasons?

Land Features	Very important	Important	Moderately important	Of little importance	Not important	Not applicable
To enjoy beauty or scenery						
To protect nature or biological diversity						
To protect water resources						
To protect or improve wildlife habitat						
For land investment						
It is part of my primary residence land						
Is part of my cabin or vacation home site						
Is part of my working farm or ranch						
For privacy						
To raise my family						
To pass land on to my heirs						
For firewood						
For timber products, such as logs/pulpwood						
For nontimber products, such as nuts/syrup						
For hunting						
For recreation, other than hunting						
Other:						

4. In terms of ecological management practices for this property, please indicate which of the following has been undertaken or is planned:

Action/Activity	Completed	Underway	Planned	Not Planned	N/A @ this Property
Removal/control of invasive species					
Planting of native species					
Prescribed burns					
Removal of unhealthy trees					
Removal of unsafe trees					
Improvements to wildlife habitat					
Groundwater protection					
Erosion control					
Monitoring environmental conditions					
Allowing natural succession					
Other:					

**Part C: The ICFWP**

1. Overall, how would you rate the level of influence that the ICFWP has on the conservation of private lands in Indiana? (please select one answer)

- |   |  |
|---|--|
| <input type="checkbox"/> Not at all influential | <input type="checkbox"/> Very influential      |
| <input type="checkbox"/> Slightly influential   | <input type="checkbox"/> Extremely influential |
| <input type="checkbox"/> Somewhat influential   | <input type="checkbox"/> Don't know            |

2. To what extent do you feel the following environmental issues are problems in Indiana?

Issue	Serious Problem	Moderate Problem	Slight Problem	Probably not a Problem	Definitely not a Problem
Damage to natural heritage					
Loss of biodiversity					
Threats to endangered species					
Loss of quality woodlands					
Loss of greenspace					
Spread of invasive species in forest ecosystems					
Threats to water quality					
Spread of invasive species in freshwater ecosystems					

3. To what extent do you feel government programs like the ICFWP are necessary for achieving the following environmental goals?

Environmental Goal	Very Unnecessary	Unnecessary	Necessary	Very Necessary
Protecting natural heritage and biodiversity				
Helping to preserve representative ecosystems				
Protecting endangered species				
Maintaining habitat				
Preserving woodlands				
Encouraging woodland management				
Preventing incompatible uses of greenspace				
Promoting natural heritage conservation				
Protecting water quality				

4. In relation to the same set of environmental goals, how would you rate the effectiveness of the ICFWP?

Environmental Goal	Very Ineffective	Ineffective	Effective	Very Effective	Don't Know
Protecting natural heritage and biodiversity					
Helping to preserve representative ecosystems					
Protecting endangered species					
Maintaining habitat					
Preserving woodlands					
Encouraging woodland management					
Preventing incompatible uses of greenspace					
Promoting natural heritage conservation					
Protecting water quality					

5. Based on your experience, please rate the ICFWP in relation to the following criteria:

Criteria	Excellent	Good	Fair	Poor	Don't Know
Overall program design					
Quality of information provided to landowners					
Timely response to questions you posed					
Technical advice provided to landowners from professional foresters					
Support for developing a forest/land management plan					
Other:					

6. Please indicate whether you agree or disagree with each of the following statements:

Statement	Definitely Agree	Somewhat Agree	Somewhat Disagree	Definitely Disagree
The property tax reduction provided by the ICFWP doesn't make the program worthwhile				
The ICFWP is a major reason for our decision to actively manage the land.				
The ICFWP has no influence on how we manage the environmental features of this property				
Without the ICFWP our woodlot/property would not be affordable				
We consider the ICFWP as largely compensation for property taxes which are already too high				
The amount of compensation available through the ICFWP makes it worthwhile to participate				
If there was no financial compensation (reduction in tax bill) I/we would not participate in the ICFWP				
The ICFWP is effective for promoting biodiversity				
The ICFWP is effective in helping maintain/conservate Indiana forests				

### Part E: Background Information

1. How many times during the past 12 months have you visited the following places?

A State Park: \_\_\_\_\_ times

A State Forest: \_\_\_\_\_ times

A National Forest: \_\_\_\_\_ times

2. Please check all the ways you have used or managed your ICFWP and adjacent land(s) that are not in the program:

Permanent residence for you and/or your family

Seasonal residence for you and /or your family

Crop farming or gardening for personal consumption

Crop farming for market sale

Livestock raising for personal consumption

Livestock raising for market sale

Do you consider your crops or livestock "organic"?  Yes  No

Recreation (e.g. hiking, ATV use, etc.)

Hunting or fishing (by you or someone else)

Timber harvesting (by you or someone else)

Harvesting wild foods for personal consumption

Harvesting wild foods for market sale (e.g. ginseng, walnuts, berries, etc.)

Firewood harvesting (outside of top removal)

Leased some of the land

3. Are there any other land uses not listed above (question 2) that you would like to include? \_\_\_\_\_

4. **Conservation easements** are permanent legal agreements that limit future land development while leaving land in private ownership and on the local tax toll. Conservation easements are primarily used for preservation of ecological values of land for future generations.

- Were you aware of conservation easements before today?  Yes  No  
 Is any of your land under a conservation easement?  Yes  No  
 If not, would you consider a conservation easement for your land?  Yes  No

5. Do you consider yourself an environmentalist?  Yes  No

6. Please indicate your level of agreement with the following statement:

“The landscape in the county where my land is has changed a lot since I moved (or purchased property) there.”

- strongly Agree  
 somewhat Agree  
 somewhat Disagree  
 strongly Disagree  
 Don't know or no opinion

7. To what extent would you say you were/are active or inactive in outdoor recreational activities like hiking, camping, boating, or hunting (**not** including organized team sports like soccer or hockey) as a teenager and as an adult?

	Very Active	Somewhat Active	Somewhat Inactive	Very Inactive
As a teenager				
As an adult				

8. When you were growing up (0-18 years of age), what best describes the place or places where you lived?

\_\_\_\_\_

9. Are you a member, donor, or participant in any organizations that focus on environmental issues?

- Yes  No If so, which organization(s)? \_\_\_\_\_

10. Would you have participated in the ICFWP without the accompanying reduction in your property tax bill?

- Yes  No  N/A, I have never participated in the ICFWP.

11. Are there other types of incentives or measures you would like to see or believe would be effective for promoting environmental stewardship on private lands? Please list up to three recommendations in the spaces below.

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Part F: Demographic Information**

1. What is your age? \_\_\_\_\_
  
2. What is your gender?       Female       Male       Other
  
3. Which of the following best describes your household?  

<input type="checkbox"/> Single adult living alone	<input type="checkbox"/> Adult couple living alone
<input type="checkbox"/> Single adult with child or children	<input type="checkbox"/> Adult couple with child or children
<input type="checkbox"/> Two or more unrelated adults	<input type="checkbox"/> Three or more related adults
<input type="checkbox"/> Other: _____	
  
4. Which of the following best describes your educational background?  

<input type="checkbox"/> Some grade school or high school	<input type="checkbox"/> Professional degree (i.e. MD, JD, DVM)
<input type="checkbox"/> High school diploma or GED	<input type="checkbox"/> University graduate degree (i.e. MA, MS, PhD)
<input type="checkbox"/> Some college/university/technical school	<input type="checkbox"/> Other: _____
<input type="checkbox"/> Technical school diploma	_____
<input type="checkbox"/> Bachelor's degree (i.e. BA, BS)	_____
  
5. Which of the following best describes your employment status? (Check multiple categories, if needed)  

<input type="checkbox"/> Homemaker	<input type="checkbox"/> Employed part-time (<30 hrs/wk)	<input type="checkbox"/> Retired
<input type="checkbox"/> Employed full-time (30+ hrs/wk)	<input type="checkbox"/> Unemployed	<input type="checkbox"/> Student
		<input type="checkbox"/> Other: _____
  
6. What ethnicity do you most identify with? \_\_\_\_\_
  
7. What category best describes your household income for 2013?  

<input type="checkbox"/> \$0-\$25,000	<input type="checkbox"/> \$75,000-\$100,000	<input type="checkbox"/> \$200,000-\$250,000
<input type="checkbox"/> \$25,000-\$50,000	<input type="checkbox"/> \$100,000-\$150,000	<input type="checkbox"/> \$250,000-\$300,000
<input type="checkbox"/> \$50,000-\$75,000	<input type="checkbox"/> \$150,000-\$200,000	<input type="checkbox"/> \$300,000+
  
8. Would you be willing to participate in a follow up telephone interview? If yes, please provide your phone number in the space below and best time for us to reach you:  
  
(      ) \_\_\_\_\_ - \_\_\_\_\_
  
9. Do you have any further comments or information that you would like to share about this survey and other related issues?