Examining private forest policy preferences

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Abstract

Policy tools are employed to effect changes in the behaviors of citizens. Policy tools, such as incentives and regulation, act as the medium through which the target population may comply with policy objectives; however, policymakers must choose carefully which policy tools to adopt. Given the predominance of privately-owned forestland in Indiana and the United States, this research explores forest policy tool preferences of family forest owners in southern Indiana. The research is based on data from 309 respondents to a mail survey of landowners in 32 southern Indiana counties. The research objectives were 1) to determine what factors influence policy preferences among family forest owners and 2) to make recommendations to policymakers regarding what policy approaches are best suited to differing landowner types. Regression analyses identify landowner attitudes as significant predictors of policy preferences and also identified both absentee and riparian forest owners as more supportive of private forest policies. Based upon the results, recommendations to private forest policymakers are made.
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1. Introduction

Our nation's forests serve many functions and provide a wide array of benefits. Forests not only serve an economic role by producing timber and other forest products, but these lands also offer shelter to many wildlife species, are a source of aesthetic beauty and recreational opportunities, and play an important role in maintaining ecological balance. In the United States, over 40% of the nation's forestlands are owned by family forest owners (Butler and Leatherberry, 2004). In Indiana, family-owned forests account for 74% of all woodlands (U.S. Department of Agriculture Forest Service, 2005). While the sustained management of family forests in the United States is an important issue, public policy for privately-owned forest lands continues to face many challenges. Enrollments for most landowner assistance programs, which aim to foster sustainable management, are lower than desired.

Public policy for private lands promotes the sustainable management of forestland and there are currently many government and private sector landowner assistance programs available to family forest owners. A variety of policy tools are utilized to attract enrollees. Policy tools utilized most prevalently in private forest policy include regulatory, incentive, and educational (or capacity-building) tools. Through these tools, policymakers are able to demand, encourage, or support desired behaviors from target populations; however, the choice of which tool(s) to implement as part of the objectives for various policies must be made strategically. The present study investigates the drivers of family forest owners' policy preferences in an attempt to better understand their decision environment. The aim of this study is to make meaningful policy recommendations that allow for better policies, thus leading to more successful management of private family-owned forestlands. Specifically, the objective of the current study is to determine how attitudinal, individual, and land characteristics influence policy tool preferences among family forest owners. Utilizing that information, we make recommendations to policymakers regarding what policy approaches are best suited to target populations.

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1.1. Policy tools

Policymakers use various tools in order to implement programs, achieve policy objectives, and shape the way in which target populations behave. Policy tools offer those targeted a means by which to comply with the purposes of policy (Schneider and Ingram, 1990). Previous policy research has noted the utility of policy classifications or taxonomies (Smith, 2002). Classical economic theorist Jan Tinbergen (1956) described policies as quantitative (monetary policies) and qualitative (changes to existing policies and drastic reforms of policies). Bemelmans-Videc, Rist, and Vedung (1998) identified three basic types of policy tools: sticks, carrots, and sermons. Alternatively, Gormley (1987) termed them — coercive, catalytic, and hortatory tools. Sticks, or coercive tools, refer to regulations or mandates that restrict the behaviors of target populations. Carrots, or catalytic tools, are those tools which are incentive-based, providing an economic motivation for engaging in desired behaviors; and sermons, or hortatory tools, are policies that are informational or persuasive in attempting to effect changes in behavior (Bemelmans-Videc et al., 1998).

Schneider and Ingram (1990) drew finer distinctions among these types of policy tools. They developed a framework based on behavioral assumptions associated with policy tools: authority, incentive, capacity-building, symbolic/hortatory, and learning (Schneider and Ingram, 1990). Authority tools aim to guide the behaviors of target populations by granting permission or prohibiting certain activities. Incentive tools rely on tangible payoffs and assume individuals are utility maximizers. That is, incentive tools assume that people will take advantage of opportunities in order to maximize their gains. Capacity tools provide education and training and assume that, given the proper means or knowledge, people will have motivation to behave in the manner desired. Symbolic and hortatory tools assume that people are motivated from within and behave in ways that are consistent with their beliefs. Therefore, symbolic and hortatory tools rely on persuasive communication and appeal to intangible values, such as justice or equality. Lastly, learning tools assume that target populations can learn the appropriate behavior. Learning tools are flexible and adaptive regarding purpose or objective and assume people can select appropriate policy tools through learning and cooperating. Such tools are used in a conjunctive learning process for both those implementing and those affected by the policy in order to discover which approaches are best suited to achieving the policy goal. Among the types of tools described above, some may be better suited to a particular policy or behavior than others, thereby affecting the success of any policy in influencing behavior. For example, authority tools would be most appropriate when the risk associated with certain behaviors is high (i.e. timber harvesting in endangered species habitat) or when the behavior is of high importance (i.e. reforestation policies). Symbolic policy tools could be employed when target populations express strong attitudes or values about an issue.

1.2. Policy tools for private forestlands

Whereas public lands policy is generally regulatory in nature, private lands policy in the United States has historically been non-regulatory, mostly relying on voluntary actions of private forestland owners (Cubbage, 1991; Cubbage, 1995; Zhang and Flick, 2001). For example, incentive-based programs have evolved from a diverse history of private forestland management in the United States and have become popular tools used in the management of private forestland in the United States.

In North America, a recent study shows that 61% of the state and provincial timber harvesting practices policies are voluntary and the remaining 39% are regulatory in nature (Kilgore and Blinn, 2004). Of the voluntary and regulatory policy tools utilized across North America, technical assistance, educational and cost-share programs accounted for 88% of all state and provincial programs directed at encouraging private forestland owners to practice sustainable timber harvesting. The remaining 12% is composed of grants, premium prices for products, and preferential access to contracts and loans (Kilgore and Blinn, 2004). In fact, a study of family forest landowners in the United States indicates that these owners' reforestation investments are positively influenced by financial assistance programs while they are negatively influenced by environmental regulations (Zhang and Flick, 2001). Further, Schaaf and Broussard (2006) found that, in terms of private forest policy tools, the American public is much more likely to support empowerment tools (learning, capacity, incentive, and symbolic tools) over authority tools.

Many private forestland policy tools used in the United States are incentive-based and/or offer technical support. For example, cost-share programs like the Conservation Reserve Program (CRP) and combination cost-share/technical programs like the Environmental Quality Incentives Program (EQIP) and Stewardship Incentives Program (SIP) are all incentive-based assistance programs. Many of these programs and others [Forestry Incentives Program (FIP) and Forest Legacy Program (FLP)] originated in the 1990 Farm Bill which is when rural forestry assistance programs were included in this omnibus legislation.

Another tool that has been increasing in popularity is the use of conservation easements. Easements provide a new tool for forest conservation in which a third party purchases the development rights from private landowners to prevent the loss of land and thus promote conservation (Sullivan et al., 2005). Conservation easements are legally binding agreements between a property owner and a governmental body or a land trust that restricts the type and amount of development and use that may take place on the property. The particular arrangements of such contracts vary widely, including the length of the agreement, the restricted uses, and owner compensation. While programs implementing this approach to forest conservation are in early stages, forest banking similarly may be a viable way to accomplish environmental conservation, water quality protection, economic productivity, and rural lands preservation on privately-owned forestlands in the United States (Dedrick et al.,

2000). The Forest Bank program, a program developed by the Nature Conservancy, entails landowners depositing their right to grow and manage timber on some or all of their land in exchange for guaranteed annual dividend payments based on the appraised value of their timber (Dedrick et al., 2000). In Finland, a program titled METSO has been instituted to protect biodiversity on private lands. This program similarly relies on a graduated compensation system for landowners based on forest revenue and conservation value (Horne, 2006).

Another approach to ensuring responsible and sustainable management of natural resources is the use of Best Management Practices (BMPs). Many states in the U.S., particularly in the East and Mid-West, have implemented these voluntary approaches to forest management over direct regulation (Cubbage, 1995). Non-regulatory forestry BMPs have been used to ensure that forest practices and harvesting do not cause undue harm to the environment. BMPs prevent unreasonable regulation through their implementation, especially in concurrence with voluntary educational programs that provide knowledge and resources to foresters, loggers, and landowners (Cubbage, 1995). Taken in conjunction, the previous studies suggest that voluntary incentive-based and educational policy tools will continue to factor significantly into private forest policies.

However, a trend toward increasing regulation of private forestlands in the United States has been mounting in recent years (Cubbage and Siegel, 1988; Cubbage, 1991; Ellefson et al., 1997a). Family forest owners are subject to federal environmental laws, such as the Endangered Species Act (ESA) which demands the protection of listed threatened and endangered species as well as their critical habitats (Zhang and Flick, 2001). Most regulation of family forestlands in the United States, though, occurs at the state and local levels. Many current forest practice laws are the result of early 20th century regulation of private forests across the United States.

In the East, state regulation came in the form of seed tree laws which govern harvests on pine lands (Cubbage, 1991). However, most of these early laws have been revised (Salazar and Cubbage, 1990; Ellefson and Cheng, 1994). In the 1970s and 80s, the development of state Forest Practice Acts dramatically increased in both the Eastern and Western United States. During the same time period, regulation at the local level also began increasing with over 400 ordinances regulating forestry practices being passed (Ellefson et al., 1997b). Many of these local ordinances were developed to protect water quality, aesthetic beauty, and road quality (Martus et al., 1995). The trend of fragmented regulation has been most prominent in the Northeastern United States (Martus et al., 1995). States in the South, historically non-regulatory in regards to privately-owned lands, have also been shifting toward increased local regulation and environmental protection (Martus et al., 1995).

1.3. Target populations of policies

Schneider and Ingram (1993) and Tinbergen (1956) note the importance of identifying and understanding target populations of particular policies. An understanding of who a policy will directly affect can offer meaningful insight when choosing the most effective policy tools. Political scientists and policymakers can employ a policy tool framework which captures the behavioral attributes of target populations in order to bring laws, regulations, and programs more fully into the realm of analysis. Therefore, it is not only important to know the underlying assumptions inherent in each type of policy tool, but it is also important to know as much about the affected population as possible, as different policy tools may have varied appeal (Schneider and Ingram, 1990). Further, focusing on the behavioral assumptions of policy tools allows us to determine whether different policy types actually promote the desired behaviors of the policy, particularly for different subgroups of the target population. A problem that private forest policy has faced is a lack of voluntary program participation by private landowners. One means of addressing this problem for forest practices policies on privately-owned lands is to identify subgroups of the population. This approach provides a way of segmenting landowners for purposes of crafting better policy tools. Thus, classifying subgroups of the target populations of private forestland policies can lead to policies being designed for the proper targets, avoiding a "one size fits all" policy approach.

2. Research methodology

2.1. Data collection and survey

Data for the analyses were obtained from a mail survey of forestland owners conducted by Purdue University researchers in the spring of 2005 (Broussard and Lamprecht, 2006). The survey, entitled "Understanding Your Perspectives: A Survey of Indiana Forestland Owners," covered several regions of Indiana, including all 32 counties making up southern Indiana. The survey was mailed to a random sample of 916 landowners, weighted by the number of landowners in each county, and was conducted between April 2005 and July 2005 using the Tailored Design Method (Dillman, 2000). The Tailored Design Method is a 5-wave survey method consisting first of a cover letter to potential respondents notifying them of the coming survey, the survey and cover letter, a reminder postcard, and two subsequent mailings of the survey with a cover letter. The topics the survey covered were: 1) land characteristics; 2) landowners' attitudes, values, and knowledge of their forested land; 3) land uses; 4) private land conservation program familiarity and participation; 5) attitudes towards issues associated with private lands; 6) awareness of and attitudes toward The Nature Conservancy; and 7) demographics. The total number of respondents to the survey was 309, with an overall response rate of 33.7%.

2.2. Dependent variable: policy preferences

A set of items in the survey was developed to measure the full range of current and potential landowner assistance policies and programs for private lands management. The a priori constructs based on theoretically-based policy tools were 1) financial assistance tools ($\alpha = 0.714$), 2) connections and

Table 1
Rotated component matrix with factor loadings for Ownership Motivation Attitude Scale [a]

	Factor 1	Factor 2	Factor 3	Factor 4
	Privacy and aesthetics	Active use and learning	Legacy	Investment
To enjoy scenery	**.614**	.266	.300	.081
For privacy	**.755**	.171	.057	−.033
To have trees surrounding my home or vacation home	**.784**	.132	.014	.080
To conserve forestland	**.410**	.229	**.643**	.129
To protect watershed/ provide clean water	**.443**	.341	**.507**	.161
To learn about nature	**.438**	**.583**	.252	−.005
To collect firewood	.089	**.435**	.053	**.541**
To pick nuts, berries, mushrooms, etc.	.091	**.672**	.231	.234
To supply food and habitat for wildlife	.308	**.597**	.342	−.089
For hunting and fishing	.072	**.684**	.018	.243
For recreation other than hunting and fishing	.244	**.750**	.027	−.048
To pass on to my children or heirs	.039	.077	.874	.106
As part of my family heritage	.026	.103	.878	.119
As a long-term financial investment	.258	−.061	.099	**.792**
For timber production	−.196	.151	.186	**.757**

[a] Bold indicates factor loadings over 0.4, contributing most to latent theme of the sub-scale.

technical assistance tools ($\alpha=0.809$), and 3) private sector policy tools ($\alpha=0.836$). Summated scales were constructed for each of the three policy tool preferences and retain the interpretation of the original scale (Spector 1992). The financial assistance policy tools scale consisted of the following survey questions: knowing what my timber is worth, reducing my taxes, receiving annual payments based on the value of my forestland rather than having to wait for timber harvest, and receiving financial assistance to conduct management activities such as timber stand improvement or invasive species removal. The connections and technical assistance scale contained the following survey questions: having a professional help manage my forest, being connected with other landowners of similar interests, and personal contact with natural resource professionals. Lastly, the private sector policy tools scale was comprised of knowing my forest is certified, temporary (5–15 years) agreements to protect forestland, and permanent (permanently attached to the land) agreements to protect forestland.

2.3. Scale development for ownership motivations

Scale development for ownership motivations was achieved by using the principle components analysis extraction method on the correlation matrix with Varimax rotation, after determining that the KMO test for sampling adequacy was acceptable. The KMO for ownership motivations was 0.827. Cronbach's alpha

was equal to 0.85. The common factors identified in the analyses are estimated as linear combinations of the original variables, and the resulting factor scores are used in the regression analysis. The factor analysis for ownership motivation attitudes resulted in four general constructs for owning forestland: privacy and aesthetics, active use and learning, legacy, and investment/production (Table 1). These factors explained 62.5% of the total variance. Regression factor scores for the four scales were computed and used in the analysis.

2.4. Scale development for conservation responsibility

Scale development for ownership motivations was achieved by using the principle components analysis extraction method on the correlation matrix with Varimax rotation, after determining that the KMO test for sampling adequacy was acceptable (KMO=0.814). Factor analysis of the landowner responsibility and importance of conservation survey items revealed two factors: landowner responsibility/development pressure and shared responsibility/development pressure (Table 2). In this scale, items pertaining to the impending threat of development and pressure to sell land are conceptually-related to both factors; however, examination of the factor loadings for these items reveals that issues of development are more closely associated with the second factor. Two items ("I feel pressure to sell my land" and "No more private forestland in the United States should

Table 2
Rotated component matrix with factor loadings for Responsibility and Conservation Attitude Scale [a]

Items	Factor 1	Factor 2
	Landowner conservation responsibility/ development pressure	Government and landowner responsibility/ development pressure
Private forestland is important for endangered species	**.707**	.154
Forestland threatened by development pressures	**.601**	.351
Forestland owners must take care of the future	**.723**	.159
Landowners should work together to improve Indiana	**.696**	.138
Private forestland conserves native plants and animals	**.831**	−.005
No more private land should be converted to other uses	.219	**.633**
It is up to the government to conserve private land	.032	**.749**
Private landowners should help stop global warming	.327	**.678**
I feel pressure to sell my land	.031	**.480**

[a] Bold indicates factor loadings over 0.4, contributing most to latent theme of the sub-scale.

be converted to other uses") loaded high only with the second factor, while another item ("Forestland is threatened by development pressures") affects both factors in the scale. Therefore, while both factors incorporate development pressures, this concept is largely reflected by the second factor, shared responsibility and development pressures. Three additional items were omitted from the factor analysis because their removal increased the scale reliability ("private forest landowners have the right to do on their land whatever they see fit," "what neighbors do on their land doesn't affect me," and "what I do on my forestland doesn't matter in the long-term"). The conservation responsibility scale has a Cronbach's alpha of 0.76 and the factors explained 52.1% of the total variance. Regression factor scores for the two scales were computed and used in the analysis. The omitted items were included in the regression model as independent items.

2.5. Regression analysis

Multiple linear regression was used to examine the effects of attitudinal, individual, and land characteristics in shaping private forest policy tool preferences. A model-building approach was used in order to elicit a predictive model that accounts for the most variance for the three policy tool types, while attempting to isolate the greatest change in variation due to one or more sets of variables. For all policy types, three models were constructed: 1) attitude variables only, 2) attitude variables and land characteristics, and 3) attitudes, land characteristics, and demographics.

The dependent variables in this analysis were the three policy preference scales: financial assistance tools, connections and technical assistance tools, and private sector policy tools. A separate regression was conducted for each dependent variable. The dependent variables were on a scale of 1–5, where 1 = Not Important, 2 = Of Little Importance, 3 = Somewhat Important, 4 = Important, and 5 = Very Important. While these Likert scale variables are ordinal, ordinal data of five or more classes are generally treated as continuous and analyzed using statistical analyses such as regression, analysis of variance, and correlation (Borgatta and Bohrnstedt, 1980). Although there has been some debate regarding the use of Likert scales as continuous (Wilson, 1971), many argue that such procedures are reliable and robust (Binder, 1984; Davison and Sharma, 1988; Davison and Sharma, 1990; Gregoire and Driver, 1987; Rasmussen, 1989; Zumbo and Zimmerman, 1993). In a recent review of the literature on this topic, Jaccard and Wan (1996) concluded that the use of ordinal scales in statistical procedures assuming interval data did not compromise Type I and Type II error.

The independent variables are the individual characteristics of both the landowners and their forests. Such characteristics consist of landowner attitudes, land characteristics, and sociodemographic variables. Attitudes examined in this research include ownership motivations and responsibility related to owning, managing, and conserving private forestland in the United States:

- privacy and aesthetics (continuous regression factor score)
- active use and learning (continuous regression factor score)

- legacy (continuous regression factor score)
- investment (continuous regression factor score)
- landowner conservation responsibility (continuous regression factor score)
- government and landowner conservation responsibility (continuous regression factor score)
- three independent attitude items (on a scale of 1–5, where 1 = Strongly Disagree, 2 = Disagree, 3 = Unsure, 4 = Agree, and 5 = Strongly Agree)
  ○ private forestland owners should have the right to do on their land whatever they see fit
  ○ what neighbors do on their land doesn't affect me
  ○ what I do on my forestland will not matter in the long-term.

Land characteristics refer to:

- total acreage (continuous)
- forested acreage (continuous)
- riparian forest (dichotomous).

Individual characteristics include various sociodemographic characteristics:

- age (continuous)
- education (measured with categories of less than 12th grade, high school or GED, vocational/technical school, some college credit, and college degree)
- income (measured with categories of less than $10,000, $10,000 to $29,999, $30,000 to $49,999, $50,000 to $74,999, $75,000 to $99,999, and $100,000 or more)
- political ideology (How would you characterize yourself politically? Conservative, Liberal, or Moderate)
- residency (absentee or resident forest owner, dichotomous)
- land tenure (length of ownership) in years (continuous).

Before running the analysis, we consulted collinearity statistics, such as tolerance and variance inflation factors (VIFs), which ensure that no high correlations exist when one independent variable is regressed on the others. Tolerance should be close to one and VIFs should be small (not greater than 10); the results for these diagnostics in the present study were satisfactory. Also, a series of diagnostics (standardized residual analysis, histograms, and scatterplots to detect any outliers) were run after analysis to identify any unusual observations. The outcomes of the diagnostics were acceptable. All statistical tests were conducted using SPSS Version 13.0.

3. Results

3.1. Financial assistance model

The initial model, which used only the attitude variables to explain policy preferences regarding financial assistance tools, accounted for 26.2% of the variance (Table 3). The attitude variables of legacy and investment/production were significant. For these variables, as attitude importance increases, the support

Table 3
Multiple linear regressions: three models including selected predictor variables for support for financial assistance policies

Standardized beta coefficients

Variables		Model 1	Model 2	Model 3
Attitudes	Privacy and aesthetics	−0.008	−0.020	0.072
	Legacy	0.248*	0.202*	0.228*
	Active use and learning	0.078	0.067	0.000
	Investment	0.401**	0.423**	0.430**
	Private forestland owners should have the right to do on their land whatever they see fit	−0.064	−0.054	−0.022
	What neighbors do on their land doesn't affect me	−0.150*	−0.178*	−0.175*
	What I do on my forestland will not matter in the long-term	0.038	−0.030	−0.053
	Landowner conservation Responsibility/dev. pressures	0.117	0.138	0.037
	Shared responsibility/dev. pressures	0.098	0.106	0.094
Land characteristics	Total acreage	–	0.131	0.144
	Forested acreage	–	−0.111	−0.129
	Riparian forest	–	0.165**	0.2941**
Demographics	Age	–	–	−0.091
	Education	–	–	−0.005
	Political Ideology	–	–	
	Conservative	–	–	0.019
	Moderate	–	–	0.087
	Liberal	–	–	–
	Income	–	–	0.085
	Tenure	–	–	−0.073
	Residency status	–	–	−0.241*
Statistics	F statistic	8.152	6.837	4642
	p-value	<.001	<.001	<.001
	df	216	208	145
	R^2 (adjusted R^2)	.262 (230)	.295 (.252)	.412 (.323)

*Denotes significant variables in each model at the $p<0.05$ level.
***Denotes significant variables at the $p<0.001$ level.

for the policy tool increases. The attitude item "What my neighbors do on their land doesn't affect me" was also significant; however, as agreement with this statement increases, support for the policy tool decreases. Model 2 included the land characteristic variables, of which having riparian forest was significant, indicating that having water on one's property increases support for financial assistance policy tools. This model accounted for 30% of the variance, an additional 4% over Model 1. Legacy, investment, and "What my neighbors do on their land doesn't affect me" were all still significant. The full model added in the demographic variables, of which only residency status was significant and indicated that living on one's land decreases support for financial assistance policy tools. The R^2 was 0.412 for the full model (an additional 11% over the variance explained by Model 2). All previously significant variables were still significant in the complete model.

Of the variables which were significant in the model, owning forestland for investment/production had the strongest influence on the model. Noting the standardized beta coefficients (Table 3), the coefficient for the investment variable (0.430 in

the full model) indicates the greatest change in the mean response for support of financial assistance tools with a unit increase in the investment variable. Coefficients for legacy (0.228) and residency (0.241) were about half as strong as investment, while riparian ownership (0.294) also influenced the model but to a lesser degree than investment/production.

3.2. Connections and technical assistance model

Results of the regression analyses for connections and technical assistance policies are reported in Table 4. Model 1 had an R^2 of 0.344, and all attitude variables, except for the ownership motivation variable active use and learning, were significant. For legacy, investment, landowner conservation responsibility, and government and landowner responsibility, increasing importance attitudes corresponded to increasing support for connections and technical assistance policy tools.

Table 4
Multiple linear regressions: three models including selected predictor variables for support for connections and technical assistance policies

Standardized beta coefficients

Variables		Model 1	Model 2	Model 3
Attitudes	Privacy and aesthetics	−0.125*	−0.125*	−0.025
	Legacy	0.183*	0.152*	0.243*
	Active use and learning	0.047	−0.055	0.079
	Investment/production	0.336**	0.343**	0.350**
	Private forestland owners should have the right to do on their land what ever they see fit	−0.186*	−0.174*	−0.100
	What neighbors do on their land doesn't affect me	−0.125*	−0.146	−0.112
	What I do on my forestland will not matter in the long-term	−0.157*	−0.160*	−0.203*
	Landowner conservation Responsibility/dev. pressures	0.247*	0.273*	0.156
	Shared responsibility/dev. pressures	0.169*	0.172*	0.202*
Land characteristics	Total acreage	–	0.172	0.151
	Forested acreage	–	−0.075	−0.098
	Riparian forest	–	0.073	0.151*
Demographics	Age	–	–	0.160
	Education	–	–	0.147
	Political Ideology	–	–	
	Conservative	–	–	−0.058
	Moderate	–	–	−0.098
	Liberal	–	–	–
	Income	–	–	0.089
	Tenure	–	–	−0.062
	Residency status	–	–	−0.152**
Statistics	F statistic	12.467	10.076	5.494
	p-value	<.001	<.001	<.001
	df	223	215	149
	R^2 (adjusted R^2)	.344 (.316)	.373 (.336)	.445 (.364)

*Denotes significant variables in each model at the $p<0.05$ level.
**Denotes significant variables at the $p<0.001$ level.

Table 5
Multiple linear regressions: three models including selected predictor variables for support for private sector policies

Standardized beta coefficients

Variables		Model 1	Model 2	Model 3
Attitudes	Privacy and aesthetics	0.062	0.040	0.022
	Legacy	0.213*	0.168*	0.144**
	Active use and learning	0.043	0.027	0.013
	Investment/production	0.284**	0.312**	0.384**
	Private forestland owners should have the right to do on their land what ever they see fit	−0.152*	−0.150*	−0.053
	What neighbors do on their land doesn't affect me	−0.149**	−0.176**	−0.233**
	What I do on my forestland will not matter in the long-term	−0.054	−0.053	−0.180*
	Landowner conservation Responsibility/dev. pressures	0.192*	0.219*	0.178*
	Shared responsibility/ dev. pressures	0.251**	0.267**	0.272**
Land characteristics	Total acreage	–	0.068	0.192
	Forested acreage	–	0.002	−0.103
	Riparian forest	–	0.161**	0.242**
Demographics	Age	–	–	0.134
	Education	–	–	0.032
	Political Ideology			
	Conservative	–	–	−0.173
	Moderate	–	–	−0.170
	Liberal	–	–	–
	Income	–	–	−0.051
	Tenure	–	–	−0.096
	Residency status	–	–	−0.103
Statistics	F statistic	12.426	10.613	6.555
	p-value	<.001	<.001	<.001
	df	218	211	149
	R^2 (adjusted R^2)	.349	.390	.489
		(.321)	(.353)	(.415)

*Denotes significant variables in each model at the $p<0.05$ level.
**Denotes significant variables at the $p<0.001$ level.

Increasing importance for privacy and aesthetics and increasing agreement with the three independent statements corresponded to decreasing support for connections and technical assistance tools. Model 2 accounted for 37.3% of the variance, an additional 3% over Model 1. All variables significant in model 1 were still significant, except for neighbor influence. The full model had an R^2 of 0.445, adding 8% of total variance explained to that of Model 2. The positive significant variables in this model were legacy, investment, government and landowner conservation responsibility, and having riparian forest. The negative significant variables were residency and the item "What I do on my forestland will not matter in the long-term."

Those variables that exerted the strongest amount of influence on policy support for connections and technical assistance given a unit increase in the independent variable were the attitude items referring to investment/production (0.350), legacy (0.243), long-term affects of landowner actions (0.203), and shared conservation responsibility (0.202), and (Table 4). In this model, investment/production was again the strongest predictor.

3.3. Private sector policy model

In the regression analyses for support for private sector policy, Model 1 had an R^2 of 0.349. The significant variables for this model were legacy, investment, landowner conservation responsibility, government and landowner conservation responsibility, and the items "Private forestland owners should have the right to do on their land whatever they see fit" and "What neighbors do on their land doesn't affect me." Increasing agreement with the two statements corresponds to decreasing support for private sector policy tools. All other variables had positive beta coefficients. Of the land characteristics added in model 2, only having riparian forest was significant, and it corresponds to increasing support for private sector policy tools. Model 2 accounted for 39% of the variance, an additional 4% over Model 1. The full model accounted for almost 50% of the variance ($R^2=0.489$), an additional 10% of explained variance over Model 2 (Table 5). In this model, the significant variables were legacy, investment, landowner conservation responsibility, government and landowner conservation responsibility, having riparian forest, and the two statements "What neighbors do on their land doesn't affect me" and "What I do on my forestland will not matter in the long-term."

Examination of the beta coefficients in the full model reveal that, as for the financial assistance tools and connections and technical assistance tools models, the coefficient for the variable investment/production (0.384) indicated the greatest change in mean response for support for private forest policy tools with a unit increase in the predictor variable (Table 5).

In predicting support for private sector policies, variables which were not significant in any of the models were privacy and aesthetics, active use and learning; total acreage, forested acreage, and all sociodemographic variables used in the model (Table 5).

3.4. Residency

Because residency was a significant variable in the policy tool models, subsequent comparisons were done to determine if absentee owners differed from resident owners in southern Indiana regarding their ownership motivations, attitudes, and demographics. While the two landowner groups do not differ demographically, results from mean comparisons did reveal that absentee owners differ from resident owners regarding particular ownership motivations, such as owning their land for privacy ($F=5.702$, $p=0.018$, $df=293,1$), for having trees around the home ($F=37.856$, $p=0.000$, $df=290,1$), and for timber production ($F=8.184$, $p=0.005$, $df=298,1$). It seems intuitive that resident landowners would value owning their forests more for privacy (mean=4.17 for resident owners, 3.83 for absentee owners) and having trees around their home (3.79 for resident, 2.79 for absentee) as they do live on their land. However, it is interesting to find that absentee owners (3.65) value owning their forests for timber production more than resident landowners (3.15). This finding is consistent with previous research regarding timber market development and privately-owned forests. One study noted that absentee

landowners are a source of historically underutilized timber, despite the fact that they are more willing to harvest timber than resident landowners (O'Hara and Reed, 1991).

3.5. Riparian forest owners

Subsequent analyses also were conducted to explore if differences exist between owners of riparian forests and their counterparts. Mean comparisons revealed that riparian forest owners did not differ from non-riparian owners on demographics, attitudes regarding ownership responsibility, or ownership motivations except for protecting the watershed ($F=5.181$, $p=0.024$, $df=293,1$). This result indicates that owners of riparian forests (mean $=3.79$) value owning the forest for protecting the watershed more than non-riparian owners (mean $=3.37$). Riparian forest owners appear to be conscious of the fact that their actions on their forestland can affect the surrounding watershed through water sources on their lands, and they appear to value that responsibility.

4. Discussion and recommendations

The regression models constructed in the study revealed interesting results regarding what variables predict support for the variety of private forest policy tools examined. Moreover, these models were quite strong, with R^2 ranging from 0.412 to 0.489. Indeed, landowner attitudes and motivations for owning land directly influence their support for the policy tools used for private forest conservation. These results offer meaningful insight to forestland owner policy preferences. For all types of policy tools examined in this study, attitude variables that figured significantly in the prediction of policy preferences were motivations for owning land (investment, legacy), shared responsibility for conserving the land, and awareness of impacts (of neighboring landowners on them and their impact on neighboring landowners). Educational and hortatory policy tools could be employed in order to evoke the message of the forest as a legacy and investment, and landowners' responsibility to conserve their land can be carried out through program enrollment and sustainable management of their forests.

The variable with the strongest influence in predicting support for these tools was the ownership motivation of investment. This finding indicates that those landowners who view their forest as a long-term financial investment are more supportive of private forest policies. Therefore, landowner assistance programs could increase enrollment by marketing the program as a means and/or opportunity to increase the value of their land and to receive financial benefits from proper management, whether that be through harvesting or incentives.

Landowners who view the effects of their actions on their land as isolated exhibited less support for all policy types. Thus, it is important to promote the understanding that landowners are part of a broader landscape. Further, for both connections and technical assistance and private sector policy, positive attitudes about the responsibility that a landowner feels regarding conservation of the forest, both in the present and for the future, and the shared responsibility of landowners and the

government for conserving the forest along with development pressures predicted support for such policies.

Aside from riparian forest ownership and residency status, sociodemographic and land characteristics factored little into the predictive model for landowners' policy preferences. Age, education level, income range, and political ideology apparently have no detectable influence on one's preferences for private forest policy. Only one land characteristic (riparian forest ownership) was identified as a significant predictor of support for all policy types. Owners of riparian forests were found to be more supportive of private forest policy tools; therefore, extra efforts should be made to target landowner assistance programs to riparian landowners and to contact these owners regarding program enrollment. A sociodemographic variable that emerged as a significant predictor for support of both financial assistance and connections and technical assistance policies was residency status. One is more supportive of policy tools if they do not reside on their land; that is, if they are absentee landowners. This finding agrees with previous studies which have found that absentee landowners are more supportive of wild river programs (Roggenbuck and Kushman, 1980) and participate to a greater extent in the Conservation Reserve Program (McLean-Meyinsse, 1994). Roggenbuck and Kushman (1980) also found that absentee owners were significantly more in favor of innovative policy approaches such as written agreements and tax incentives over traditional regulation. While, these pervious studies identified an emerging pattern among absentee landowners, they did not provide reasons why this subgroup of landowners expressed more support for various land management and conservation policies.

Findings of this research suggest that private forest policies should appeal to the ownership motivations, attitudes about conservation responsibility, and attitudes about awareness of impacts. In order to increase program enrollment, policymakers should craft policies that emphasize the forest as both a financial and symbolic investment for the future. While stronger attitudes correlate with support for the types of policy tools examined in this study, the nature of the attitudes identified as significant suggest that symbolic approaches to policy may appeal to forestland owners in southern Indiana.

5. Future research

A significant finding of this research is that owners of riparian forest and absentee landowners are found to be more supportive of various policy tools than their counterparts. Previous studies have also found absentee landowners to be more supportive of or more involved in forest conservation programs (Roggenbuck and Kushman, 1980; McLean-Meyinsse, 1994). However, research which explains why such findings are so lacking. In these studies (the present study included), findings regarding residency status emerged through analysis although they were not a direct objective of the study. While the Roggenbuck and Kushman (1980) study states as an objective to examine whether resident or absentee landowners differ in attitudes toward conservation programs, they did not attempt to define the absentee population or explain why

differences, if found, would exist. Therefore, future research should seek to answer the question of "why" subgroups of riparian and absentee forest landowners are more supportive of conservation policies.

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