

**Exploring how institutional structure, capital assets, and motivations influence landowner participation in conservation incentive programs: A mixed methods approach**

by

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## Abstract

Conservation incentive programs have become a common means of promoting preservation and best use practices for private landowners. Both non-government organizations and government agencies offer these programs to encourage conservation practices by rewarding landowners with benefits such as tax deductions, sign-up bonuses, and cost-share agreements. Given the increasing use of this technique for private land conservation, it is important to examine both the organizations that administer these programs and the landowners that participate. This study uses a top-down, bottom-up approach to explore the missions, capabilities, and external factors influencing the way organizations are able to implement conservation incentive programs through semi-structured, qualitative interviews with program administrators. Interviews were also conducted with program participants to identify motivations and capabilities for enrollment. A theoretical framework was then designed based on the qualitative data and used to construct a landowner questionnaire to expand the population sample. It was found that both organizations and landowners are enabled/constrained by the amount and distribution of capital assets in their possession.

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## List of Abbreviations

CRP	Conservation Reserve Program
WRP	Wetland Reserve Program
NGO	Non-government organization
NRCS	Natural Resource Conservation Service
FSA	Farm Service Agency
SECAS	Social-Ecological Complex Adaptive Systems
HEM	Human Ecosystem Model
IAD	Institutional Analysis and Development
SL	Sustainable Livelihoods
TPB	Theory of Planned Behavior

## **Chapter 1: Introduction**

Conservation incentive programs are promoted as a means to encourage desired land management practices on private properties. Such programs provide private landowners with benefits, often in the form of financial compensation, tax deductions, and technical assistance, in return for maintaining suitable land cover. These programs, which are administered by government agencies and non-governmental organizations called land trusts, have been proficient in preserving and protecting a variety of landscapes across the country. Despite the rising utilization of this conservation technique, little research has been conducted on this approach to land conservation.

This study proposes to identify the factors that influence a landowner's decision to participate in a conservation incentive program by examining the institutional rules, regulations, norms, and other factors that dictate the way in which the programs are administered and personal motivations held by the individual. The objectives of this study are: 1). Identify the specific aims of administering organizations and determine how their objectives shape the rules, norms, and strategies used to implement the program. 2). Understand the motivations that guide landowners' management decisions. and 3). Explore the factors that enable or constrain a landowner from participating in a conservation incentive program. The following hypotheses were developed from the above objectives: 1). Implementation of conservation incentive programs will differ by the organization's size, scope, mission, and location. 2). Landowners' decisions to

participate in conservation incentive programs will differ based on environmental values, attachment to the land, goals for the property, demographic factors, normative influences, and perceptions of conservation organizations. 3). The amounts of financial, social, human, physical, and natural capital assets will be enabling and constraining factors affecting landowner participation in programs.

The objectives are explored using a variety of frameworks that serve to predict and explain behaviors. The Social Ecological Complex Adaptive Systems (SECAS) framework provided the foundation for the study. SECAS incorporates the way in which a social system influences an actor's capacity and how individual decisions impact the environment. Elements that overlap with the concepts included in SECAS were identified in other frameworks, models, and theories. The Institutional Analysis and Development (IAD) framework recognizes rules, biophysical conditions, material conditions, and attributes of the community as major elements influencing decision-making. The Theory of Planned Behavior (TPB) uses behavioral beliefs, subjective beliefs, control beliefs, and normative beliefs to predict individual behavior. The Human Ecosystem Model (HEM) portrays how humans and nature interact. The Sustainable Livelihoods (SL) framework describes individual capital assets.

The research design of this study revolves around integrating these frameworks to explore the research objectives. The integrated framework was developed using a "top-down, bottom-up" approach which will be used to determine the degree to which the frameworks' elements contribute to a landowner's decision to participate in conservation incentive programs. This includes identifying factors that enable and constrain both the organizations that administer conservation incentive programs and participating

landowners. The framework is then tested on a larger population of landowners using a survey.

The broader impacts of this study can be used to guide the future of conservation incentive programs by providing valuable information to the organizations about their targeted landowners, as well as exploring the social and ecological outcomes of the programs.

The intellectual merit of this study will contribute to the exploration of the theoretical frameworks, which can be applied to other environmental actions guided by institutional policies, including other conservation incentive programs operating nationally and globally. In addition, applying these frameworks will provide empirical evidence to test and refine into a universal decision-making model.

#### *Problem Statement*

Private landowner cooperation is essential for the success of conservation efforts as the majority of critical habitat, including biodiversity, water, and soil conservation, is held in private property. Conservation incentive programs, instituted by policies such as the Conservation Easement Enhancement Act and the Farm Bill, have become a prevalent method for encouraging private landowners to engage in conservation efforts. These initiatives can be efficient and effective mechanisms that promote sustainable land use practices by motivating private landowners with financial and non-financial incentives. Incentives may include instruments such as compensation payments, tax credits, cost sharing agreements, tax advantages, public recognition, stewardship certification, and technical assistance. Conservation incentive programs vary in qualification criteria, length of contract, and number of restrictions, dependent on the

stipulations dictated by the federal government and private land trusts. Furthermore, the goals of government programs and land trusts that administer the programs are widely diverse, including objectives such as wildlife conservation, habitat restoration, soil conservation, cave preservation, recreation, and protection of open space. This diversity in goals and contract types leads to a wide-ranging group of participants, who hold a variety of values, attitudes, and motivations which influence their decision to enroll.

Despite their rising popularity as a technique for conservation efforts, little research has been conducted to understand the institutional structure of conservation incentive programs, what motivates landowners to participate in them, and the enabling and constraining factors affecting both organizations as well as landowners. Some are beginning to question the legitimacy of the programs and their outcomes (King and Fairfax, 2006). Specifically, land trusts that administer conservation easements have undergone a great deal of scrutiny by the media, Congress, and the Internal Revenue Service. Furthermore, funding for government conservation programs has been reduced, potentially hindering the ability to preserve land that is significant to conservation efforts.

Given the rising popularity of conservation incentive programs, more information is needed on their outcomes. This can be explored by examining how the programs are administered. Looking from the top down, one can see that the structure dictated by national policies and guidelines creates the opportunity for conservation organizations' formation and their abilities to implement the programs. In addition, due to the diversity of the organizations' objectives, each agency maintains its own set of rules, norms, supply of resources, and strategic methods, which influences how the organization operates. Exploring the institutional structure of conservation incentive programs will

provide information on the social and ecological outcomes related to the organizations' aims. Additionally, identifying the factors that enable or constrain landowners' capacities to participate can shed light on who is able to enroll.

In addition to an empirical analysis, this study also provides the opportunity to refine the SECAS framework to further explain how organizations and individuals are influenced by external and internal factors.

#### *Long-term goals*

The long-term goals of this study were to understand the factors that enable or constrain landowners to participate in conservation incentive programs and identify the characteristics of programs managed by land trusts and government agencies that influence participation. In addition, this study contributes to decision-making frameworks so that a universal framework may evolve, allowing for a greater ability to predict and explain conservation behaviors in a variety of contexts.

#### *Overall hypothesis*

The overall hypothesis was that a landowner's decision to participate is dependent on the institutional structure of the program, individual motivations held by the landowner, and the individual capacities of the landowner.

#### *Supporting objectives*

The design of this study used a "top-down, bottom-up" approach designed to explore the following objectives:

1. Identify the specific aims of administering organizations and determine how their objectives shape the rules, norms, and strategies used to implement the program.

2. Understand the motivations and other factors that guide landowners' decisions to participate in conservation incentive programs.
3. Explore the factors that enable or constrain a landowner from participating in a conservation incentive program.

### *Hypotheses*

The following hypotheses were developed from the above objectives:

1. Implementation of conservation incentive programs will differ by the organization's size, scope, mission, and location.
2. Landowners' decisions to participate in conservation incentive programs will differ based on environmental values, attachment to the land, goals for the property, demographic factors, normative influences, and perceptions of conservation organizations.
3. The amounts of financial, social, human, physical, and natural capital assets will be enabling and constraining factors affecting landowner participation in programs.

### **Review of literature**

#### *Policies and guidelines*

The Uniform Conservation Easement Act of 1981 outlines the general guidelines that all administering organizations must abide by in order to place a conservation easement on a parcel of land. In addition, all conservation easements must fulfill the requirements of the Internal Revenue Code 170(h), Treasury Regulations section 1.70A-14, and in some cases a state Conservation Easement Act. The IRS tax code also defines the types of properties that can qualify for tax benefits. According to this document, tax



deductions can only be received by landowners holding property that possesses a conservation purpose, defined as providing public recreation or education, protection of an environmental system, preserving of open space, or securing properties of historical significance. In addition, landowners must agree to the stipulations of the conservation easement in perpetuity. The contract becomes attached to the land title and must be maintained by all subsequent landowners. The amount of tax benefits is determined by a property appraisal conducted by an external appraiser before and after the conservation easement is placed on the property. The difference between the two values is the worth of the conservation easement.

The Farm Bill of 2008 describes 15 conservation programs that provide landowners with land management assistance. The programs were designed by the United States Department of Agriculture (USDA) and build upon the programs outlined in the 1985, 1996, and 2002 Farm Bills. Under these contracts, landowners must agree to certain land management practices. In return, they receive benefits such as cost-share payments, property rental payments, sign-up bonuses, tax benefits, and/or technical assistance, depending on the program. Qualifications and contract length also vary between programs. The main goal of these programs is to provide aid to American farmers while improving the environment (USDA, 2011).

#### *Institution structure and organization diversity*

As defined by Scott (1995), “Institutions consist of cognitive, normative, and regulative structures and activities that provide stability and meaning to social behavior. Institutions are transported by various carriers- cultures, structures, and routines- and they operate at multiple levels of jurisdiction.” Thus, the structure of organizations and the

social systems they belong to influence individuals' motivations and their ability to act in particular situations (Vatn, 2005). Institutional analysis is often applied to studying environmental valuation, in which monetary worth is assigned to various natural entities in order to guide political action (Spash, 2007); however, it provides a powerful lens to examine the relationships and controls determined by national policies, conservation organizations, and individuals as it encompasses all aspects of this hierarchy.

Conservation organizations administering conservation incentive programs maintain a set of rules within each individual organization, which dictates the specific objectives and strategies of how conservation programs are enacted. Each organization differs greatly in size, scope, and mission. This diversity is shaped by the level of operation (national, state, local), the type and conditions of the natural geography, the threats a region faces, and cultural norms (Brewer, 2003).

#### *Landowner motivations*

It is believed that humans act to maximize satisfaction and minimize displeasure (Irwin, 1971; Beck, 2004). Unraveling the reasons behind certain behaviors is complex, as multiple motivations often operate at varying degrees dependent on an individual's values, beliefs, attitudes, and norms. In addition, it must be recognized that individuals never have complete knowledge of a given situation and must act using the best information available (Hayek, 1945).

Prior research indicates that landowners are generally receptive to conservation incentive programs, as long as their social and economic welfare and long-term goals for the land are not disrupted (Kabii and Horwitz, 2006). This is understandable, as those who spend more time in nature or have personally invested themselves in their property

are believed to feel more attached to it (Rogan *et al.*, 2005; Vining *et al.*, 2008), which predicts increased pro-environmental behavior (Clayton and Myers, 2009). Nature is recognized to have intrinsic worth (Lockwood, 1999), but other values may take precedence over specific conservation actions. A combination of external and internal factors is involved in choosing to participate in a conservation incentive program (Bliss and Martin, 1990). For example, past studies have noted demographics, including age, gender, education level, ethnicity, property size, years of property ownership, location, primary land use, occupation, marital status, and presence/absence of residence on property (Bliss and Martin, 1989; Langpap, 2004; Ernst and Wallace, 2008).

A theme of conservation-mindedness is also evident in previous research and includes items such as protection from development, preservation of habitat and open space, general improvement of the land, and the satisfaction of contributing to conservation efforts (Ernst and Wallace, 2008). Additional motivations were driven by the benefits provided to the community, family heritage values, financial incentives, increased production generated by the land, knowledge of the programs, and personal values (Bliss and Martin, 1989; Bliss and Martin, 1990; Guerin, 1999; Langpap, 2004; Ernst and Wallace, 2008).

### **Rationale and significance**

As the majority of land vital to conservation efforts is held in private property, it is important to examine how conservation incentive programs operate and the outcomes they achieve. This topic is particularly relevant to Alabama, the site of this research, as 60% of the state is forested and the majority is private land (Silvano *et al.*, 2010). In addition, the Nature Conservancy (2011) cites Alabama as the fifth most biologically

diverse state in the country. The state contains 18 river systems and provides habitat for the most species of freshwater fish, mussels, turtles, snails and crayfish in the United States. However, there are 119 species listed as threatened or endangered within the state (FWS, 2011). The perilous condition of Alabama's environment, coupled with high percentage of privately owned land, makes the cooperation of landowners essential in conservation efforts.

The future of funding for conservation incentive programs is uncertain. As of February 2014, budget cuts were approved to decrease the financial base of government conservation programs. In addition, the Conservation Easement Enhancement Act has not been approved for renewal meaning that incentives are lower than they were from 2006-2010. Research demonstrating the structure and outcomes of conservation incentive programs could prove useful in supporting monetary allocation. Furthermore, by identifying landowner motivations for participating in conservation incentive programs, the results of this study will benefit conservation organizations aiming to target particular values held by voluntary landowners.

The research design in this study, with the incorporation of an integrated decision-making model, has never been used to explore this context. Studies that have examined motivations for participation in these programs do not thoroughly address the administering organizations. The results of this study will also provide knowledge that will be applicable to other situations. A variety of conservation incentive programs exist nationally and globally. As interest in conservation incentive programs expands organizations necessitate the ability to target landowners, which is possible by characterizing participants and examining decision-making models. The frameworks

utilized in this study can also be applied to a variety of other fields of research, including marketing, politics, and health behavior (Ajzen, 1991). The contribution of a variety of case studies from different fields of study is necessary to support the validity of any model. Adding to the growing database of decision-making research can aid in further advancing the ability to explain and predict behavior.

## **Research plan**

### *Research design*

The basis of this proposal is guided by several frameworks focused on decision-making, natural resource management, and/or human impacts on the environment. Advancement in decision-making research by testing such frameworks has been deemed of the utmost importance in order to understand how certain outcomes are achieved (Ostrom, 2005). Each framework utilized in this study focuses on a different scale. The Institutional Analysis and Development (IAD) framework aims to determine how organizations function (Ostrom, 2005). The Theory of Planned Behavior (TPB) concentrates on individual decision-making in specific contexts (Ajzen, 1991). The Social Ecological Complex Adaptive Systems (SECAS) framework seeks to explain land use behaviors (Morse *et al.*, 2011). The Sustainable Livelihoods (SL) framework describes enabling and constraining factors for individuals and households. The Human Ecosystem Model (HEM) considers how people and nature interact. The proposed research integrates these frameworks to test data on landowner motivations and abilities to participate in conservation incentive programs. Qualitative interviews with organizations responsible for administration of conservation incentive programs will provide insight into the factors that enable and constrain how the institution operates.

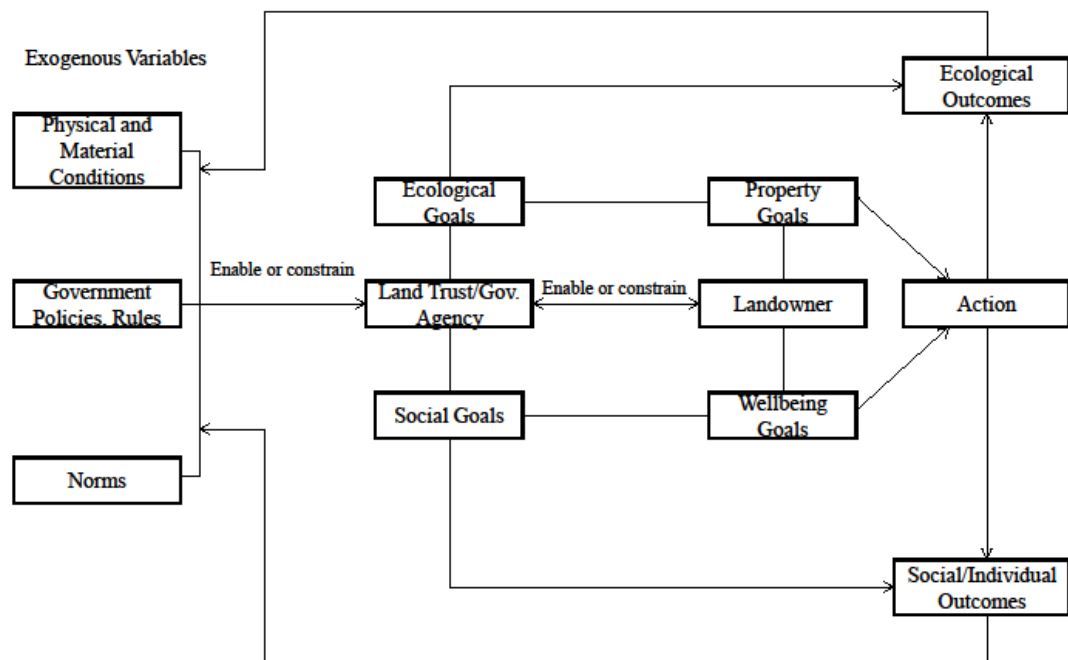
Interview questions will focus on the elements used in each of the frameworks.

Interviews will also contribute in identifying the qualities of the institution that influence individual landowner decision-making, as each organization maintains a specific mission and utilizes various strategies to reach their goals.

Exploring each of these frameworks contributes to decision-making research on a variety of levels. This methodology can be used to examine the same conservation incentive programs at other research sites. In addition, it can be used to investigate other conservation incentive programs that are administrated nationally and globally. Specifically, the SECAS model can be used to explore any land use decision-making and behavior. Furthermore, this research will supply knowledge on decision-making in general, on both institutional and individual scales. In this way, this study provides one case furthering decision-making research.

The proposed research aims for a “top-down, bottom-up” approach. Thus, the first step is to gain an understanding of the stipulations of the national laws and policies that specify the process and land qualifications necessary to enroll in a conservation incentive program. The diverse set of organizations administering conservation incentive programs was studied, followed by an evaluation of landowners who participate in the programs. Figure 1 depicts the hierarchy that dictates the way in which programs are administered.

A case study with multiple embedded units is the most appropriate approach for this study. Several sources of data were used to explore the proposed research topic. First, in-depth document analyses on national policies and organizations’ mission statements, program brochures, and handbooks were used to gain a sense of agencies’ guidelines, objectives, and program processes.



**Figure 1.** This illustration represents a simplified view of how exogenous factors enable or constrain the means by which an organization can implement a conservation incentive program. The organization is also enabled or constrained by the qualities and capabilities of the landowner’s ability to participate. Landowners are influenced by the structure of the individual organization. The ecological and social goals of the organization must be compatible with the landowner’s goals for his/her property and wellbeing. The resulting ecological and social outcomes create a feedback loop to potentially have an impact on the exogenous variables.

A significant portion of the proposed research will be explored through semi-structured, qualitative interviews. Previous studies on the actions of private landowners have focused on descriptive statistics, especially through the use of survey research. There has been a demand for qualitative methods to fill the gaps that limit quantitative research (Bliss and Martin, 1989). Therefore, it was determined that interviews are necessary to identify potential emergent factors within the decision-making process.

Qualitative, semi-structured interviews were conducted with a variety of program administrators and participating landowners. Scripted interview questions were designed based on literature review and the above-mentioned decision-making frameworks. Interview questions posed to organization administrators will focus on the objectives of the organization, factors that enable or constrain the organization, the strategies of the organization, and perceptions of landowners participating in conservation incentive programs. This focuses on taking note of the exogenous factors influencing behavior, desired outcomes, and the actions taken to achieve the sought result (Ostrom, 2005; Morse et al., 2011).

Landowners were identified by asking program administrators to contact landowners, describing the study and its purpose and providing the researcher's contact information so those interested could set up an interview time. Landowners were asked about their motivations for participating in their respective program, the factors that enabled or constrained their ability to enroll, their goals for their property, and the perceived view on conservation incentive programs within their community. Interview questions will be framed to reflect the constructs in Figure 1.

A landowner survey was developed based on the knowledge gained from the interviews and an in-depth literature review on environmental decision-making and landowner motivations. Survey questions sought to explore both *a priori* factors identified in previous studies and emergent themes discovered throughout the qualitative phase of the research. After IRB approval, this survey was mailed to a sample of 2,000 landowners across the state of Alabama.



### *Case selection*

The state of Alabama was chosen as the research boundary for this project. This is an appropriate area due to the high percentage of private land within the state and the perilous condition of the environment. Sixty percent of Alabama is forested, a land cover of the utmost importance to the state, and the majority of this land is held in private property (Silvano *et al.*, 2010). In addition, the Nature Conservancy (2011) cites Alabama as the fifth most biologically diverse state in the country. The state contains 18 river systems and provides habitat for the most species of freshwater fish, mussels, turtles, snails, and crayfish in the United States; however, there are 119 species listed as threatened or endangered within the state (FWS, 2011). The condition of Alabama's environment, coupled with the high percentage of privately owned land, makes the cooperation of landowners essential in conservation efforts, justifying research on the decision-making processes of landowners involved in conservation efforts.

Conservation easements have been cited as the most effective tactic to encourage private landowner participation in conservation efforts within the Southeastern region of the United States (Brewer, 2003) and are becoming increasingly popular in Alabama (LTA, 2011). Although, conservation programs implemented by the federal government have provided Alabama with \$493 million dollars from 1995 to 2010 (EWG, 2011), yet there is little information on how the programs operate within the state. As funding for such programs is currently under review, explanation of their function and outcomes can be beneficial in policy decisions.

*Research site/Data sources*

Table 1 summarizes the methods and data sources utilized in this study. A variety of land trusts and government organizations within the state of Alabama, operating at different levels and holding diverse missions were selected for interviews. Land trusts were identified through the Land Trust Alliance website. Contact information for government agencies operating at state and local levels was found using the USDA’s website.

Landowners participating in interviews were recruited by asking the organizations’ administrators to present the researcher’s contact information to their participating landowners. Questionnaires were sent out to 2,000 private landowners holding at least 20 acres of land, identified by a database maintained by Auburn University. Twenty acres was selected based on past research indicating that the general average private landowner holds this amount of property (Ma *et al.*, 2012).

**Table 1.** Qualitative interviews were with both program administrators and participating landowners were used to provide a foundation for items important to include in the state-wide survey.

Objective	Data source	Research method
Gain an understanding of program objectives, missions, strategies, perceptions of landowners	Conservation incentive program administrators	Qualitative, semi-structured interviews
Explore motivations for participation, enabling/constraining factors influencing participation, values	Participating landowners	Qualitative, semi-structured interviews
Compare land management objectives, values, and capabilities of participants and non-participants	Alabama landowners	Questionnaire

## **Key concepts**

The key concepts of this study will be assessed by comparing the themes emerging from administrative executives and those surfacing from participating landowners. In doing so, the structure and functioning of conservation incentive programs will become clear. The following constructs have been identified in the frameworks guiding this study as important factors influencing decision-making on both institutional and individual scales.

**Biophysical/material conditions** refer to the goods and services available. This may include natural resources, access to technology, information available to the participants, and monetary funds. In short, this aspect determines which outcomes are physically possible (Ostrom, 2005). This construct exists at different scales, including the individual, community, and organization levels.

**Attributes of the community** involve a variety of factors, including the values accepted by the community, the level of comprehension held by participants regarding the outcomes linked to the behavior, the degree of agreement of preferences between participants, the size and demographics of the community, and the existing degree of inequality. These qualities are important because they dictate what is culturally significant and accepted by the community and define power structures (Ostrom, 2005).

**Rules** can be defined as regulations, instructions, precepts, and laws. They are the norms of society. On a smaller scale, they are the guidelines followed by an institution. Rules determine the situation in the action arena and the choices available to participants. The origin of the rules is also a significant factor, as it is necessary to know how decisions are made and who makes them (Ostrom, 2005).

**Behavioral beliefs** describe the expected outcome produced by a particular behavior (Ajzen, 1991).

**Normative beliefs** refer to an individual's perceived behavioral expectations of a reference group (Ajzen, 1991).

**Subjective norms** indicate the social pressure felt by an individual to engage in (or abstain from) a certain behavior (Ajzen, 1991). This is driven by the individual's construction of normative beliefs.

**Control beliefs** are the factors that an individual perceives to enable or constrain the ability to perform a certain behavior. The way in which an individual perceives their power to control these aspects dictates the behavior that is performed (Ajzen, 1991).

**Intention** reflects an individual's readiness to perform a particular behavior (Ajzen, 1991). It implies the motivational factors involved, the degree to which they are present, and how much effort the individual is willing to put forth to reach the goal in mind.

**Motivations** are the reason behind the action. In this study, a purposive definition is used rather than a regulatory approach, meaning the focus is the "goal-directed nature of a behavior" instead of a biological response to stimuli (Beck, 2004). Studying motivation attempts to reveal why one action or goal is selected over the alternatives.

**Attitudes** provide a positive or negative evaluation, based on beliefs, of particular objects or behaviors (Dietz *et al.*, 2005; Clayton and Myers, 2009). They generate positions on specific issues and are thought to be more accurate in predicting behavior than values. Attitudes are learned (Manning *et al.*, 1999) and can be changed (Guerin, 1999).

**Social systems** describe the conditions under which individuals must act (Morse *et al.*, 2011). They are the external, social and political constructs influencing an individual's ability to act.

**Actor's capacity** refers to an individual's social location within a community. This includes factors such as class, status, gender, cultural or religious marginality, access to resources (financial, human, or technological), power, opportunity, and knowledge (Kondrat, 2002; Morse *et al.*, 2011). It also reflects the actor's perception of his/her ability to perform a behavior (Ajzen, 1991).

**Outcomes** are the responses observed from the action committed (Ajzen, 1991; Ostrom, 2005). It should be noted that outcomes can be represented in a variety of ways, depending on the realm of focus. For example, an outcome of using pesticides on crops could be evaluated by assessing plant vigor, profitability, or soil condition. In this study, the *a priori* considerations of outcomes will be measured in terms of social consequences, ecological results, economic outcomes, and personal satisfaction (Morse *et al.*, 2011).

**Evaluative criteria** refer to the process in which the outcomes are assessed and analyzed. This results in a new or renewed knowledge of the actor's capacity (Morse *et al.*, 2011). Positive feedback will likely result in repeating the behavior, whereas negative feedback may dissuade the actor from duplicating the same decision. This factor may reflect an actor's satisfaction with the decision made.

Each of these constructs was considered in a "start list" to reflect the aspects included in Figure 1. A more developed *a priori* coding scheme was set up based on these broad terms. It is essential to define each term on a code list to assure certainty in the analysis process. There may be some overlap in the constructs used in each

framework. In such cases, one term was decided on and the definition will incorporate the descriptions used by both.

This study was not limited to an *a priori* code list. Emergent themes were identified and described as they arose. These new factors can offer additional information regarding the frameworks and may provide missing links that could strengthen the power of the models.

The constructs can be measured and assessed based on the analysis of participants' responses to interview questions, as questions were designed to reflect these elements. They identify the specific features of each construct in the context of conservation incentive programs. Compiling the factors that participants felt influenced their behavior and the degree to which each factor played a role is useful in unraveling the complexities within the decision-making process. For example, participants may express that social pressure influenced the decision to enroll in a conservation incentive program, whereas financial reserves were not as significant.

### *Survey methods*

Survey questions were developed based on an in-depth literature review and the responses from interviewed participants. The information gained from the survey was then used to measure the constructs and scales of the framework. Questions were framed using a Likert scale. A modified version of the standard implementation methods (Dillman *et al.*, 2009) was utilized. First, a pre-notice postcard was sent out to the sample of 2,000 landowners. A few days later they were sent a letter inviting them to participate in the study, along with instructions on how to access the questionnaire online. A couple weeks later, a letter was sent asking the landowners who have not yet responded whether

they would 1) like to receive a hard copy of the questionnaire or 2) rather not participate in the study. A pre-stamped return postcard let them mark their option. Hard copies of the questionnaire were sent to those who request them on their postcards. Reminder postcards were sent out seven to 10 days after the questionnaire is sent. As responses began to dwindle, a random sample of 200 of the original sample that had not responded was sent a hard copy questionnaire.

### **Data analysis**

Qualitative data was collected until the point of saturation of thematic range (Creswell, 2007). All interviews were completely transcribed and entered into QSR NVivo software. NVivo was used to organize and analyze the data by creating a hierarchical coding scheme. Themes were identified as they emerge through notable codes identified throughout the interviews. The code list used a combination of *a priori* and emergent themes. *A priori* themes were based on previous research conducted on institutional analysis and landowner motivations. Interpretation of the results underwent peer validation to determine if the transcripts were appropriately coded (Kvale and Brinkmann, 2009).

Survey data were analyzed using basic descriptive statistics, t-tests, ANOVAs, and logistic regression.

### *Data Management*

This study produced raw data in the forms of audio recordings, demographic information, and survey responses. Recordings were processed by transferring the audio files from the digital recorder onto a computer. The recordings were then completely transcribed in Microsoft Word, and then saved as a PDF. The text was be copied into

NVivo for qualitative analysis. Survey data returned by mail will be entered into SPSS for statistical analysis.

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## **Chapter 2: Exploring organizational objective diversity within conservation incentive programs**

### **Abstract**

Conservation incentive programs have become a primary technique in encouraging private landowners to engage in conservation efforts. These programs are administered by government agencies and land trusts which offer financial and non-financial benefits in return for enrollment. The goals of program administering organizations are widely diverse, including objectives such as wildlife conservation, habitat restoration, soil conservation, cave preservation, recreation, and protection of open space. Diversity in missions, amount and distribution of capital assets, and types of strategies influence the outcomes achieved by the organizations. Qualitative, semi-structured interviews were conducted with 18 land trust administrators and government agency officials in Alabama to investigate which capital assets influenced the operation and strategies utilized. It was found that human, social, financial, natural, and physical capitals were all significant factors. In addition, strategies were formed in response to access to resources.

## **Introduction**

The rate and degree of human impact on Earth's natural resources has increased dramatically over the last century, creating a perilous state for many ecosystem services necessary for human existence (Millennium Ecosystem Assessment, 2005). In the United States, the situation is further complicated as the majority of land characterized with high biodiversity is privately owned (Langpap, 2004). Subdivision of private properties and urban growth has been shown to decrease the amount of available agricultural land, impact natural resources, damage wildlife habitat, and reduce local biodiversity (Theobald *et al.*, 1996; McKinney, 2002). The decrease in the amount and quality of land providing ecosystem services, coupled with the high percentage of privately owned land, makes private landowners central actors in conservation efforts.

Numerous programs have been developed to encourage conservation land management among private landowners, with varied success rates. Direct payments to promote sustainable land use have been found to be more effective than indirect approaches (Ferraro and Kiss, 2002). The development of programs with payments for the provision of ecosystem services arose as a way to mitigate the problem of landowners providing beneficial services such as water quality, biodiversity, habitat, and erosion control to the surrounding community going uncompensated (Claassen *et al.*, 2008; Pagiola, 2008). Additionally, these incentive programs can be used to discourage landowners from contributing environmental disservices such as sedimentation and pollution (Forshay *et al.*, 2006).

Research has concentrated on landowner characteristics (Langpap, 2004; Ma *et al.*, 2012) and landowner motivations for participating in conservation incentive

programs, such as conservation easements and conservation Farm Bill programs (Kabii and Horwitz, 2006; Ernst and Wallace, 2008). However, little research has explored the organizations that administer these programs. It has been suggested that research should also focus on the assessment, planning, management, and resulting outcomes of the organizations working to preserve ecosystem services (Cowling *et al.*, 2008).

Institutions are the constructs that people use to organize structured and iterative interactions (Ostrom, 2005). This means that institutions create both opportunities and constraints that enable or prevent the occurrence of certain actions. It also highlights the importance of the internal capabilities of both organizations and individuals. Institutions shape interactions between humans as they both share and exploit the same reserve of natural resources (Vatn, 2005). This generates relationships which define how these common pool resources are distributed and utilized. Common pool resources include natural resource stocks, access to goods and services, and amenities (Hagedorn, 2008). Therefore, understanding institutions and their goals and capabilities is fundamental in determining how social-ecological decisions are structured.

Although operating within the context of institutions which have their own rules, values, and norms, it must be noted that an organization holds its own culture (Smircich, 1983). They are characterized by the roles and duties of the employees, relationships of power, and the internal rules and regulations that dictate action. They also share common objectives to achieve a shared mission (North, 1990). As noted by Black and Groombridge (2010), “Conservation professionals need to understand both the organizational system and the biological system in which they work.” The capabilities of

conservation organizations include both organizational processes and land management processes (Born and Genskow, 2001).

As the popularity of voluntary, incentive-driven conservation techniques rises, it is appropriate to ask how organizations cultivate themselves to successfully administer conservation incentive programs. In addition, it is important to identify the factors that enable and constrain these organizations to understand how they operate in different contexts.

In all decision-making situations, the action and resulting outcome is dependent on the amount and distribution of the capabilities surrounding the situation. As explained by Dosi *et al.* (2000), “Capabilities fill the gap between intention and outcome, and they fill it in such a way that the outcome bears a definite resemblance to what was intended.” Organizations seek to maximize all forms of capital. The evolution of natural resources objectives into practices that meet the desired outcome is reliant on the organization’s ability to learn and enhance its capabilities.

The objectives of this study are to 1) understand the factors that enable and/or constrain conservation organizations in administering incentive programs, and 2) explore how the strategies utilized by different conservation organizations compare to one another.

### *Land trusts*

According to the Land Trust Alliance (LTA), land trusts are non-governmental, nonprofit organizations that “actively work to conserve land by undertaking or assisting in land or conservation easement acquisition, or by stewardship of such land or easements” (LTA, 2011). The missions of these organizations are widely diverse,

including objectives such as wildlife conservation, habitat restoration, soil conservation, cave preservation, recreation, and protection of open space. In addition, various land trusts operate on different scales. Some focus on local regions, others confront state issues, and several operate on a national (or international) level. In the United States land trusts have conserved over 5 million acres of land through conservation easements and land acquisition strategies (LTA, 2011).

Conservation easements are voluntary contracts in which the landowner donates certain property rights (such as development rights) to the land trust while still maintaining ownership of the land. In return, the landowner receives tax benefits and potentially a sign-up bonus. The Uniform Conservation Easement Act of 1981 outlines the general guidelines that all administering organizations must follow in order to place a conservation easement on a piece of property. In addition, all conservation easements must fulfill the requirements of the Internal Revenue Code 170(h) and Treasury Regulations section 1.70A-14. The IRS tax code also defines the types of properties that can qualify for an easement. According to this document, tax deductions can only be received by landowners holding property that possesses a conservation purpose. The four conservation purposes include: 1) providing public recreation or education, 2) protection of an environmental system, 3) preserving open space, and/or 4) securing properties of historical significance. The conservation easement is held in perpetuity. Therefore, the contract becomes attached to the land title and must be maintained by all subsequent landowners (Merenlender *et al.*, 2004).

Land acquisition is another tactic utilized by land trusts to acquire property for conservation and preservation purposes. Under this technique, the landowner voluntarily

donates or sells their property to the land trust, often at a discounted rate (Main *et al.*, 1998). The land trust is then responsible for the maintenance of the property. Oftentimes, a land trust will transfer the property to another organization (usually government) for management purposes (Parker, 2004).

### *Government agencies*

Programs included in the 2008 Farm Bill, such as the Conservation Reserve Program (CRP) and Wetlands Reserve Program (WRP) are examples of government administered conservation incentive programs. Other conservation programs are included in the Farm Bill; however the CRP and WRP will be the focus of this study. Within these programs, participating landowners receive financial benefits, such as a sign-up bonus, annual rental payments and cost-share support for land management practices (FSA, 2012). The CRP was established by the Food Security Act of 1985. It is the longest running and largest conservation program in the United States, with 738,000 active contracts and over 29.5 million acres enrolled (FSA, 2012). The CRP was originally created to reduce soil erosion and excess crop production; however it has now evolved to focus on the restoration of native ecosystems, enhancement of water quality, and the improvement of wildlife habitat (Classen *et al.*, 2008). The CRP is administered by the Farm Service Agency (FSA), while the National Resources Conservation Service (NRCS), state forestry agencies, and local soil and water districts direct the technical and management services for the program. Under a CRP contract, a landowner agrees to temporarily retire a parcel of marginal cropland for 10 or 15 years. During this term, the plot is transformed to a more suitable land cover that aligns with the USDA's environmental goals for the region.



The WRP was established in the 1990 Farm Bill in response to the degradation and loss of wetland habitat. The overall goals of the initiative were to ensure no net loss of the nation's remaining wetlands and improve the quality and quantity of all wetlands (thus, engaging in restoration efforts). In general, WRP contracts are geared towards landowners holding marginal farmland that was previously part of a wetland ecosystem. There are currently 1,039 contracts covering over 200,000 acres (NRCS, 2011). The WRP is administered by the NRCS and aims to restore, protect, and improve wetlands by converting former wetlands to their natural state. Landowners interested in the WRP must agree to enhance and protect wetlands on their property and have the option of a 10-year agreement, 30-year contract, or a permanent easement (NRCS, 2011).

#### *Research framework*

The capital assets identified in the Sustainable Livelihoods framework (Scoones, 1998) are used to describe the capabilities of conservation organizations in this study. These capital assets include human, natural, financial, physical, and social capitals (described in Table 1). Several past studies have explored the capital assets of conservation organizations, although some do not use this terminology. Natural capital is often cited as a factor that influences the mission and tactics of conservation organizations. Physiology, habitat types, biodiversity, presences of threatened and endangered species, important ecosystems, and aesthetic values within a region have been noted as factors affecting where and what conservation organizations preserve (Brewer, 2003; Merenlender *et al.*, 2004).

Social capital is primarily evident in the way that conservation organizations interact with each other as well as with landowners. Networking with landowners is a

primary avenue in gaining participants in conservation programs in order to educate them on program details and land management techniques (Nagubadi *et al.*, 1996; Langpap, 2004). Pretty and Smith (2004) explain that interactions between organizations and landowners are an important means of developing a trusting relationship where the landowner becomes more educated and open to new land use practices. This establishment of trust has particularly been noted in landowner enrollment in conservation incentive programs (Kabii and Horwitz, 2006; Cross *et al.*, 2011).

In addition to social capital, there has also been an appeal for the inclusion of human capital in conservation efforts (Pretty and Smith, 2004; Knight *et al.*, 2010). Increased social capital can lead to enhanced knowledge and assistance, which is essential in setting conservation priorities (Rodriguez *et al.*, 2006). Staff size, knowledge, and specific job roles have been noted to play a role in the strategies and effectiveness of conservation organizations (Black and Groombridge, 2010). Each type of program has been recognized to have employees of different roles and responsibilities (York *et al.*, 2006).

The financial capital accessible to a conservation organization has been found to have a great influence on what it can accomplish. Government agencies are allotted a designated amount of money to work with to fund their programs. Land trusts have access to both public and private funding, and often additionally rely on membership fees to fund their organizations (Merenlender *et al.*, 2004). The amount of the financial incentive as well as the regularity of being paid has been shown to play a role in the attractiveness of the program and oftentimes the benefits of the program must be greater than the financial return of current practices (Mayer and Tikka, 2006).

Zoning, land use restrictions, and infrastructure (a form of physical capital) are also factors influencing the capabilities of conservation organizations. Gerber and Rissman (2012) note that some land trusts are interested in having more control over land use planning, but political tensions are often a deterrent. In addition, conservation organizations are often at odds with the “physical capital” approach to land management, which entails the creation of infrastructure to control nature. Costanza *et al.* (2006) note the trade-offs that are often made when considering investing in natural capital versus physical capital. For example, a tug-of-war often exists between the preservation of land in its current state or transferring it to residential or commercial use.

### *Strategies*

Foremost, conservation organizations are enabled and constrained by the policies that outline the acceptable criteria of incentive programs. The organizations and the policies they must follow create the opportunity for conservation incentive programs to exist, however each organization holds its own standards and implements the national rules in a variety of ways. York *et al.* (2006) found that governmental programs are less adaptive to potential changes due to their bureaucratic nature as compared to programs administered by NGOs. They note that political officials often have different interests and agendas than those held by the government agencies administering conservation programs.

The diversity in strategies, missions, and contract types among conservation organizations leads to a wide-ranging group of program participants and distinct goals. Wells (1998) asserts that the multi-level, multi-dimensional structure of conservation programs is necessary to correspond with the diversity of biological systems. However,

additional research is necessary to understand these programs. In order to better comprehend the operation of conservation incentive programs, it is essential to understand the capabilities of the administering organizations. In addition, there is a need to better understand the strategies used by different types of land trusts (Merenlender *et al.*, 2004). To address these issues, this study focuses on how the organizational capabilities of groups administering conservation incentive programs affect their development of conservation strategies, missions, and scale of operation.

### *Study site*

The state of Alabama was the chosen physical boundary for the study because the majority of its land is held as private property. For example, 68% (22.7 million acres) of Alabama land is forested, and 82% of this land is privately owned (Silvano *et al.*, 2010). Furthermore, according to the Nature Conservancy (2011), Alabama is the fifth most biologically diverse state in the United States. In addition, the state contains 18 river systems and is home to the most species of freshwater fish, mussels, turtles, snails and crayfish in the United States. There are 119 species listed as threatened or endangered in the state of Alabama (US Fish and Wildlife Service, 2011). The vulnerable condition of the state's environment along with the high percentage of privately owned land makes the cooperation of landowners essential in conservation efforts.

The land trust movement is relatively new to Alabama. It ranks in the bottom third of the United States in the number of land trusts operating within the state. Alabama land trusts own 8,571 acres within the state, ranking it 27<sup>th</sup> in the United States (including Washington DC) (LTA, 2011). Conservation easements are becoming more popular

within the state, and as of the end of 2010, Alabama was 16<sup>th</sup> in the nation of total number of acres held in a conservation easement by a land trust (LTA, 2011).

Alabama landowners have received \$393,672,852 from 1995 to 2012 in direct payments for the CRP, ranking 21<sup>st</sup> nationally (EWG, 2012). \$1,545,512 has been allotted for the WRP from 1995-2012, ranking 35<sup>th</sup> nationally (EWG, 2012).

## **Methods**

### *Research design*

A case study focused on Alabama with multiple embedded units (land trust and government agency administrators) was the approach utilized for this study (Creswell, 2007). The research questions of this study were explored through semi-structured, qualitative interviews. Semi-structured interviewing allows the researcher to ask follow up questions to gain clarification and expansion of specific ideas presented (Kvale and Brinkmann, 2009). This is beneficial in discovering emergent themes. This exploratory approach was selected because the majority of previous studies on the actions of private landowners focus on descriptive statistics of the participants, especially through the use of survey research (Drost *et al.*, 1996; Maynard *et al.*, 1998; Guerin, 1999; Langpap, 2004; Rissman *et al.*, 2007).

Interview questions focused on the objectives of the organization, how conservation incentive programs are administered, the strategies of the organization, access to resources, and perceptions of landowners participating in conservation incentive programs (see Appendix for list of interview questions). The questions were developed based on *a priori* literature review and aspects of decision-making and environmental behavior theories (Ajzen, 1991; Ostrom, 2005; Morse *et al.*, 2011). The aspects utilized

from these concepts included social norms, resources, rules, motivations, capacities, outcomes, biophysical conditions, intentions, and evaluative criteria. Participants were asked to describe how their program is administered, the objectives of their organization, the approaches and tactics used in implementing programs, and the resulting outcomes, among other questions. Interviews ranged from 30 minutes to two hours in length.

### *Study sample*

Interviews were conducted with representatives from eight land trusts and eight government-affiliated agencies throughout Alabama. Land trusts operating in Alabama were found using the Land Trust Alliance website. At the time of the study, 12 land trusts operating at the local or state level and eight working on a national scale were identified and all were contacted for an interview. Of the local and state land trusts, three were discarded because they do not hold any easements and focus on other means of conservation. Two of the local/state land trusts declined to participate in the study. Of the national land trusts, three were eliminated because they either did not use easements as a conservation technique or they held no easements in Alabama. Four of the national land trusts declined to participate in the study.

Government agencies were found on the USDA's website. Since the sample was selected to represent land conservation throughout Alabama, CRP and WRP agencies were chosen from various regions of the state. Participants were contacted by telephone to request an interview. Four state level offices were contacted; one declined to participate. Eleven local agencies were contacted; six declined to participate in the study.

Four of the participating land trusts are local organizations working in one to several counties in Alabama, two operate at a regional level working in the Southeast,

one functions at the state level, and one is a state office of a national organization. Of the government agencies, five work at the local level and three are state offices. All participants had direct experience implementing conservation incentive programs and interacting with participant landowners.

### *Data analysis*

All interviews were transcribed and entered into QSR NVivo software (2008). NVivo was used to organize and analyze the data through the development of a hierarchical coding scheme. The constructs from the theories used to frame the study were used as a start list for coding. Themes also emerged as the interviews were analyzed using descriptive codes. The code list was developed based on *a priori* (established from a literature review based on relevant theoretical constructs) and emergent themes. The *a priori* code list included the capitals (human, social, natural, physical, and financial) described by Scoones (1998) in the Sustainable Livelihoods framework (Table 1). Data collection continued until all land trusts willing to participate had been interviewed and a variety of WRP and CRP administrators were interviewed from around the state. It was determined saturation of the thematic range was reached as the last several interviews yielded little to no new information (Creswell, 2007). The coding list underwent peer validation to check that the transcripts were coded correctly (Kvale and Brinkmann, 2009).

**Table 1.** Definitions of the livelihood assets included in the Sustainable Livelihoods framework (Scoones 1998).

Human Capital	Skill levels, knowledge, ability to work, good health, education
Natural Capital	Natural resource stocks, resource flows, ecosystem services
Financial Capital	Monetary resources used to meet objectives
Physical Capital	Basic infrastructure and producer goods, technology, access to information
Social Capital	Networks, connectedness, trust, membership in groups, reciprocity exchanges

## Results

Several themes emerged from the interviews indicating several factors that enable and constrain organizations in administering conservation incentive programs and thus, how they develop their strategies. Mission statements, landowner diversity, and five areas of organization capital were noted as significant elements contributing to the success of the organizations in attempting to reach their desired outcomes.

### *Mission*

Each organization's mission acts as a guiding force in the development of conservation strategies. There is great diversity in the missions among conservation organizations. Some are very specific in the mission and focus on very targeted conservation initiatives. As one land trust director explained, "There are groups that want to protect open space and that's their mission. Ours is much more specific on what our goals are for conservation easements... We look for very pristine properties within our region."

Other organizations have broader missions and are generalized in the landscapes they target. As one participant explained,



Very simply put, we want to help the people help the land. And so what our mission of our agency is, is to promote the wise use of natural resources on private lands in the United States through technical assistance and financial assistance through our agency... so therefore it protects our water resources, soil resources, forest and all those and that is the justification for the tax dollars in this country going to fund our agency.

### *Landowner diversity*

The different values and motivations of landowners were noted by many participants as a factor influencing the enrollment of properties. “One thing you’ve got to consider is, every landowner is different,” one organization director explained.

Finding the correct program and specifying contract details requires organization employees who can identify the goals and motivations of the individual landowner. This requires strategic planning.

“We try to find out what the landowner’s objective is, and as much as possible, include that in the conservation plan. Because we don’t want to go out there and tell them what they have to do, because it’s their land and we want to match what the program offers to what their objectives are.”

Participants explained that there is not one “type” of landowner interested in enrolling in conservation incentive programs. There are many different factors that influence the decision to enroll.

For every landowner and every piece of land there are so many variables and there are so many different motivations in my opinion that I don’t know that I can narrow it down. If I had to lump it into two broad categories it would be people

that are motivated by monetary gains and people that are motivated by a passion or a love of the land within those two categories there is tons of variables.

Oftentimes, the participant would give hypothetical scenarios to describe some of the motivations of the landowner.

I am renting this land, my mother is getting old, she owns this property, I am worried about the people renting the land, they are not taking care of the land, so we have decided this is the kind of cash and income that she needs every year to live off of. We have been depending on the rent for her to live, now we don't have to depend on that rent. We will get this cash, it could be growing trees. And it just depends on what their goals are.

### *Strategies*

Participants expressed a range of techniques used internally within their organizations as their strategies. While some organizations do not specifically try to target and recruit program participants, others are active in their landowner outreach activities.

We do have project areas where we have someone on the ground that goes to people... We'll look at very specific tracts and rank them. We prioritize those and say these are the tracts we want to get first... We kind of cold call and introduce ourselves and explain what we're trying to do and develop a relationship.

Smaller land trusts were in the study more likely to pursue land acquisitions instead of conservation easements. As one administrator explained, "We prefer fee simple, because fee simple you can manage it directly, and it's in our hands permanently."

Although not all programs have a designated number of acres necessary for enrollment, others have set a standard: “But obviously the bigger a property is, the more attributes it can support. So there is an inherent advantage in some instances with size.”

Education is also a central component of these programs. Participants from both land trusts and government agencies expressed the way in which conservation incentive programs can act as a teaching mechanism. In the process of completing a contract, organization representatives are able to show landowners the unique qualities of their property and how it benefits the greater community. They also have the opportunity to explain the importance of proper land management. Therefore, those who were uneducated or unclear on these topics are able to learn through their interactions with organization representatives. As one government agency administrator described, “[The landowners] get a lot of knowledge about the benefits I think that they are giving the overall ecosystem and maybe some side benefits of things that they had not thought about.”

One organization noted that they give out annual awards to encourage continual conservation successes on enrolled properties: “We have special awards for properties that are managed above and beyond what an average landowner will do.”

Two organization administrators explained that they actively review and revise their strategic mission and analysis techniques to be sure they are acquiring high quality properties.

It is a constant issue, whether we need to tweak this question... We are constantly talking with all of our partners... we meet on a regular basis. We invite all of these people in to get their comments on what the program, how it is working out,

if it is not working, what is your suggestion on this ranking? What would you change about the ranking? Do you think these questions are fair? Do you think we need to add anymore questions? And it is just a dynamic thing that will always change as long as we have it.

### *Human capital*

Knowledge and expertise also factor into the operation of conservation organizations. Administrators who are familiar with the process of the programs are able to implement them more efficiently. Both land trust and government agency participants expressed that it takes time to become accustomed to the process of drafting and implementing programs. As interest in the programs grew, administrators became more familiar with the rules and processes. As one WRP administrator stated, “Our comprehension has started getting a little bit larger for this program. We have actually, as an agency in Alabama, have got a better understanding of it now.”

This study also indicated that an organization is also enabled or constrained by the number of employees that work for the agency. Several administrators from both land trusts and government agencies expressed that their organization is understaffed, which hinders its ability to effectively achieve its goals. According to this study’s participants, lack of employees results in delays in drafting and finalizing contracts. One land trust administrator described the difficulty in documenting conservation values quantitatively due to limited manpower. “But now we have a small staff so... you know a lot of land trusts have these fancy sheets and they score it and all. We could be there if we wanted to, but I don’t have the time.”

Perhaps a more serious concern relates to the organization's difficulty to monitor properties already enrolled in a program. It was noted by several government agency administrators that an official site visit does not occur for monitoring purposes, but rather a "drive by," when employees are en route to another destination.

We do spot checks like I said... It's not an official site visit, I guess... it's just hard to police everything with a limited staff. Basically, once a plan goes into CRP we'll only go back if we're called to do so by the landowner.

Land trust administrators differed from government agencies in describing their ability to monitor easement properties: "Both conservation easements and fee properties we monitor on an annual basis at least. We actually monitor them more often than that."

One participant working for a newly formed, volunteer-based land trust expressed the difficulty of taking on easements because of the inability to monitor. Therefore, the organization focused on fee-acquisition strategies.

"If you are talking about the small trust like we are, we don't really; we are all a volunteer organization. We don't have the man power to go and monitor the easements and all that kind of stuff."

In addition, different roles and personality traits of administrators of the organization lend a variety of skill sets for the group's utilization. Some may offer a strong ability to communicate with landowners, while others may be proficient in implementing the technical aspects of the program. As one administrator stated, "Every transaction is different, every landowner is different, and every circumstance is different so it just depends on the chemistry that you are able to put together."

*Financial capital*

Organizations that hold conservation easements are required to retain a certain amount of financial reserves for the maintenance and defense of the deed. Land trusts often request a stewardship contribution from landowners to add to the endowment, but can be difficult to acquire. As one participant explained,

[The stewardship endowment] either comes from the landowner directly or we have to privately fundraise for that. It is very difficult to raise that easement endowment. If you are a landowner and you want to give up your development rights and other rights for an easement, you don't want to write a check to go with that. We usually have to fundraise privately for that.

As non-profit organizations, land trusts must find sources for financial support to sustain the continuation of their programs. As one land trust participant explained, "All of our events are fundraisers... We raise money through events and then we also have a limited number of grants and corporate support. One of the areas that we have to increase our capacity is in grants."

Unlike land trusts which are obligated to fundraise for their financial reserves, government programs are allocated a certain amount of funding which is determined at the national level. This allocation varies by region and differs over time. Oftentimes offices within the study boundary receive more applications than can be funded. "We take 3,000 applications in a year, we fund 1,000. Two thousand people are mad, they want to know why in the heck they didn't get funded and we have to explain it to them."

Both land trusts and government agencies are enabled or constrained based on the financial value of the incentive they are able to offer a potential participant. If the value does not match the landowner's requirements the program will not be adopted. As one

land trust official explains, “Many of our projects fail because we can’t get an appraisal that meets their expectations in value.”

### *Physical capital*

The constraints evident in the physical capital of the organization are highlighted by the scale each organization chooses to target. Those that have a larger scale face challenges of abiding by different laws depending on location. “We work in three different states, seven different counties, which within itself is a challenge because every county has different rules, regulations, ordinances, zoning and so forth. Some don’t have any. And then some are very rigid.”

In addition, participants of large organizations noted that community outreach became more difficult when operating at greater scale. “We don’t really have the resources to do educational or outreach activities, especially since we’re so far flung.”

Scale is also apparent in the size of the property accepted into the programs. While some organizations are flexible in the amount of acreage they are willing to permit, others are more stringent. “We would not hold an easement on two acres of wooded tract in the city. That just didn’t meet our goals.”

### *Natural capital*

Each organization’s existence was triggered by the state of the natural capital surrounding it. Land trusts take varied approaches to achieving their ecological goals, given the diversity of missions. One land trust administrator explained that they accept a broad range of land:

As far as what meets our qualifications, we are not a very specifics based organization in terms of like, we are not going to take an easement unless it is in

this watershed or if you have this certain animal existing on the property. I guess there are some organizations that do have a stricter code like that. But we mainly work to, if the landowner wants to protect his land, we are here to try and provide that if we can if it meets the IRS regulations.

The ecological objectives and outcomes were dependent on the mission of the organization. For instance, an organization wishing to preserve biodiversity will likely target important habitat regions for threatened and endangered species. However, despite their specific individual goals, participants stressed the wide variety of benefits generated from their goals.

Our conservation values that we want to protect, not only focusing on water quality, but we are also wanting to protect endangered or threatened species and important recreation areas for the public. We also want to make sure we are maximizing connectivity between existing protective lands.

Themes of wildlife conservation, water conservation, forest preservation, and biodiversity were the most prevalent mentioned among participants. Promoting habitat connectivity, soil conservation, open space, air quality, historic site preservation, and scenic views were discussed to a lesser degree. Providing connectivity between other protected lands was also frequently noted.

The CRP focuses on preventing soil erosion and restoring a particular ecosystem to a region. The restoration of the longleaf pine has been the main objective in Alabama, since it is a threatened ecosystem that is relatively easy to re-establish. The ranking system in the CRP is the main strategy used to assure that the highest priority lands are enrolled. The ranking system favors properties that are marginal farmland and are



considered more environmentally beneficial as another land cover. This allows for benefits to both the landowner and the land.

Landowners are looking at CRP as an opportunity to still get some type of income off of the farm each year to help them pay their taxes on it, since it's not great farmland. They are looking at having that land out there in some type of practice where it is not growing up; they are not having to worry so much about maintaining it, or having it maintained because a lot of CRP participants are absentee landowners.

The WRP strives to increase the quantity of wetlands through restoration and preserve and improve the quality of remaining wetlands. Restoring wetlands involves recreating the physical structure of the ecosystem, and in some cases installing mechanical features that imitate natural topography. Common techniques include plugging ditches, breaking drainage tiles, installing water control structures, excavating meander swales, and planting trees (Rewa, 2005). As the structure of the wetland is restored, it is able to begin functioning as intended. Providing connectivity between WRP lands is also a goal, so as to restore the entire ecosystem (Rewa, 2005). "Whether it is bottomland hardwood tree planting, putting in shallow water areas for wildlife, plugging ditches. Things of that nature to revert it back to a wetland habitat. And that is the intent of the program."

A secondary goal of both the WRP and the CRP is to provide wildlife habitat. Participants noted observing the beneficial outcomes for wildlife. "We have got some WRPs up here that are completed and it is something to see, it really is. There is wildlife everywhere; it's really worked."

### *Social capital*

The networks, connections, and relationships formed between the conservation organization and the community, landowners, and other organizations were highly noted among participants. Trust within the community was noted by all participants. One land trust director explained, “As far as just getting the word out, we have established this network of people who know us in the community. We are not a member organization, kind of a friends’ organization. We foster that relationship with them...”

In addition, many land trust administrators expressed how their organizations coordinate education, outreach, and stewardship opportunities within their region to strengthen their relationship with the greater community. According to participants, this is a way to build trust within the community. As one land trust administrator stated, “Typically, a landowner will do a little bit of background work before they call a land trust up. That is why our reputation is so important.”

Land trust participants also expressed the importance of including the community’s input in carrying out their mission. One land trust administrator described how community members are involved in the process of drafting the organization’s new strategic plan: “We have conducted about 20 stakeholder meetings throughout eight counties to get the communities input on what kind of lands they feel is important for us to protect and so we are incorporating that into our plan as well.”

### *Collaboration*

Collaboration between organizations was a prominent theme that arose from the interviews. This element seems to be a norm across the conservation organization community, as all participants mentioned it during interviews. Land trusts partner with

other land trusts or with a government agency. Government agencies cooperate in running programs by delegating certain tasks to different branches. For instance, the FSA is responsible for the initial administration of the CRP; however the NRCS controls the technical aspects of the program.

Collaboration is also a way to increase access to resources and overcome obstacles that would have constrained the organization from reaching its goals. Reliance on different expertise and resources from other groups has been a positive influence, allowing for the preservation and proper management of more properties than would be possible without additional assistance. A goal that was unreachable due to the constraint of lack of funding can be achieved when two organizations combine their financial reserves. Furthermore, they are able to share human resources. As one land trust administrator explained:

For us, being such a small new organization, we can work with more established, older organizations that have money. For example, if we came across a parcel of land that we thought would be a really good candidate for conservation, but was something that we couldn't afford to do ourselves we would contact one of the state agencies or another land trust that maybe would have the resources to move on that and get them in touch with the landowners and kind of help facilitate.

Competition between organizations was noted as low. In fact, most participants commented on referring landowners to another organization if the landowner's goals were more cohesive with that group. Collaborative efforts make sense among conservation organizations. Their specific missions lessen the likelihood of competition

for restricted resources. Instead, they are able to build off of each other's success by focusing on particular landscapes. As one participant explains,

Especially in Alabama, environmental groups really tend to work together and share information. A lot of cooperation and cohesion. I think that is important because we can make sure that we are supporting each other on goals and that we don't have two groups wasting time on the same issue. We can have a better allocation of resources and efforts into all areas are covered.

## **Discussion**

One of the most significant finding in this study is the way in which lack of financial and human capitals affects management and monitoring of properties. Deficiency in these two critical areas can have severe effects on an organization's ability to carry out its mission effectively. Batie (2001) also recognizes this challenge: "The use of measurable objectives, assumes that *measurement and monitoring* will occur—not only to judge progress toward the objective, but also to allow agencies to reassess and to make changes where necessary...The budget constraints for measuring and monitoring are real; yet insufficient funding of monitoring and measuring shortchanges critical program functions."

Monitoring also seems to be particularly challenging for government agencies in Alabama that are understaffed and lack the financial ability to collect data beyond compliance as is recommended in some studies (Kiesecker *et al.*, 2007; Rissman, 2011). Kauneckis and Imperial (2005) suggest that collaborative monitoring is an appropriate and effective means to hold organizations accountable for the management of common pool resources.

Although participants did not mention collaboration as a technique to aid in monitoring activities, it was noted that collaboration between groups is used to compensate for lack of one or more capitals in other ways. The sharing of financial resources, knowledge, and social connections were frequently cited. Similarly, Leach and Pelkey (2001) found that watershed partnerships were most frequently formed to meet adequate funding requirements. In addition, Wolf and Primmer's (2006) study on Finnish forestry incentive programs noted that interacting with other organizations was an important means of gaining knowledge in order to enhance organizational capabilities. Kauneckis and Imperial (2005) assert that collaboration is the only way to properly manage common pool resources. Similarly, Wells (1998) notes that failure to communicate between organizations in conservation incentive programs can ultimately lead to biodiversity loss.

Trust within the community has been shown to be a significant factor in implementing natural resource planning endeavors. A lack of trust has been noted to be a major constraint in successfully executing several conservation initiatives (Lachapelle *et al.*, 2003; Cross *et al.*, 2011). Participants in this study echoed this sentiment, recognizing the importance of establishing their organization as a reputable source in the community.

Part of creating a sustainable organization is to revisit strategic plans to ensure the mission is being carried out effectively (Doppelt, 2010). Two organizations in this study mentioned that this strategy is a regular component of their organization's operation. Brechin *et al.* (2002) suggests that all conservation organization's strategic actions should revolve around six key points: determining who benefits, deciding on the appropriate

process, abiding by a set governance structure, establishing accountability, reflecting on past projects, and considering the “big picture” of conservation.

A successful conservation organization is not so different than a lucrative business. Black and Groombridge (2010) echo this sentiment, suggesting a business excellence model as a means to improve conservation programs. In the “Conservation Excellence Model,” they focus on clarity in goal setting, clearly detailed job descriptions and responsibilities, more effective usage of resources, and well-measured data to document progress. This framework seems beneficial for conservation organizations as a framework to assess their capabilities and mission.

## **Conclusion**

This study provides greater insight into the capital assets and strategies that influence the operation of conservation organizations administering incentive programs. As indicated by the results, it is important to examine all capital assets to gain a holistic view of the enabling and constraining factors affecting organization operation. In addition, this study was able to provide additional data on the strategies utilized by conservation organizations to reach their objectives. It would be beneficial for future research to study these aspects on a larger scale to see how conservation organizations compare across the United States.

## **Appendix 1**

1. Could you describe the objectives of your organization?
2. Who do you target in these programs? (Where, what is being conserved?)
3. What do you think enables your organization to reach its mission? What hinders it?
4. What strategies does your organization employ to achieve its mission?

5. What do you think the landowners' motivations for participating in these programs?
6. What level of understanding do you think participating landowners have of the ecological benefits their land provides?

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### **Chapter 3: Integrating decision-making theories and frameworks to explain and predict environmental behavior**

#### **Abstract**

Given the environmental challenges currently facing the world, it is critical to gain understanding of human-environment interactions in order to make the most advantageous decisions. Frameworks provide an excellent means to understand the structures influencing decision-making processes. Identifying enabling or constraining factors allows for the recognition of leverage points to promote change. This paper presents a framework based on the components included in the Social Ecological Complex Adaptive Systems framework. The goal of this integrated framework is to better understand human-environment interactions in order to explain and predict behaviors that result in social and ecological outcomes. This framework focuses on the interactions between organizations and individuals and the goals and capabilities that enable and constrain each from taking particular actions. In addition, the framework specifically defines the social and ecological elements that influence (and are impacted by) these decisions. A case study of the structure of conservation incentive programs is used as an example to explain the framework.

## **Introduction**

There is an indisputable link between human and ecological systems. The rising growth of the human population has generated a greater demand for resources causing more extensive human impacts to the environment, occurring at a faster rate (Millennium Ecosystem Assessment, 2005). Continual manipulation of the environment is threatening the ecological benefits necessary for survival. Evidence of great losses in biodiversity and diminished land use functioning has resulted from human modifications (Moran, 2005). Finding a balance between the preservation of nature and providing for humans has become a global predicament, as societies struggle with the tug-of-war between ecosystem preservation and providing everyday needs to the population (Briechle, 2006). In the face of this challenge there has been a focus on researching human-environment interactions (Moran, 2005). Studying coupled human and natural systems, where people interact with natural entities, has revealed new complexities that were undetectable when examining each of the two components in isolation (Liu *et al.*, 2007). For example, as depicted in one study, residents were forced to expand their range of collecting fuelwood for cooking and heating as the forests near their homes diminished. The great depletion of the forests for fuelwood then reduced the amount and quality of habitat for important species (Liu *et al.*, 1999).

As the world faces growing environmental challenges, it becomes increasingly important to examine the way in which environmental decisions are made. In recent years, there has been rising interest in promoting sustainable choices in a variety of realms, including school systems, businesses, architecture, agriculture, forestry, non-

governmental organizations (NGOs), and government agencies (Henderson and Tilbury, 2004; Ostrom, 2007; Doppelt, 2010). With this influx of information pertaining to a wide range of entities, it is appropriate to consider the decision making process that leads individuals and organizations to engage in certain behaviors that impact social and environmental systems.

Conceptual frameworks provide a variety of benefits when examining behavior. They can help explain and predict behavior. In addition, such frameworks have been used to identify governance structures, which determines who has the power to make rules (Bushouse, 2011). Such analyses have been beneficial in identifying challenges when implementing new plans (Imperial, 1999a). Knowing and understanding the key constructs that influence behavior in an institution can be beneficial in pinpointing leverage points in order to promote change (Fielding *et al.*, 2008). It is beneficial for those studying particular phenomena to use a common framework because it allows for the recognition and understanding of enabling and constraining factors influencing actions as well as the ability to compare research findings to identify overlapping trends (Ostrom, 2009). For example, Plummer and Fitzgibbon (2004) developed a conceptual framework for the co-management of natural resources in which they identify the contexts in which co-management should be used, the components involved, the proposed outcomes, and the linking mechanisms needed for collaboration. Through identifying these aspects, they suggest managers can use the framework systematically in practice.

This paper combines and tests the constructs of several theories and frameworks to create an integrated framework that can be used to analyze the factors that enable or

constrain individuals and organizations in making social-ecological decisions. The goal of this framework is to provide further understanding of how social and ecological systems interact so as to make better environmental decisions. A case study examining conservation incentive programs is used as an example to support the integrated framework. It concludes by describing the implications and potential applications of the framework.

## **A Review of Key Approaches and Concepts**

### *Institutions*

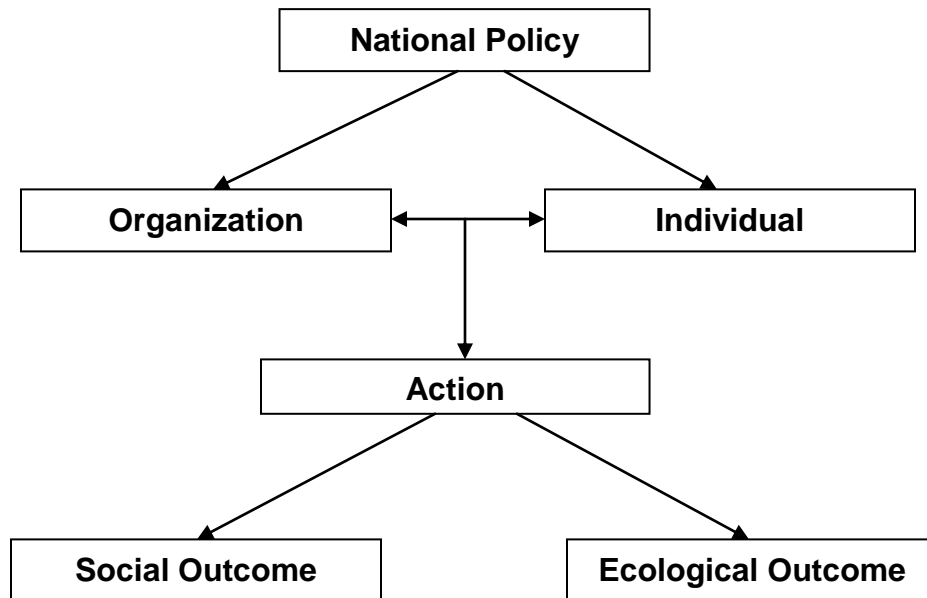
Institutions are the constructs that people use to organize structured and recurring interactions (Ostrom, 2005). This means that institutions create both opportunities and constraints that enable or prevent the occurrence of certain actions. It also highlights the importance of the internal capabilities of both organizations and individuals.

As defined by Scott (1995), “Institutions consist of cognitive, normative, and regulative structures and activities that provide stability and meaning to social behavior. Institutions are transported by various carriers- cultures, structures, and routines- and they operate at multiple levels of jurisdiction.” Thus, the structure of organizations and the social systems they belong to influence the possible outcomes of particular situations (Vatn, 2005).

Institutions shape interactions between humans as they both share and exploit the same reserve of natural resources (Vatn, 2005). This generates relationships which define how these common pool resources are distributed and utilized. Common pool resources include natural resource stocks, access to goods and services, and amenities (Hagedorn,

2008). Therefore, understanding institutions is fundamental in determining how social-ecological decisions are made.

Institutional analysis is often used to study natural systems in an economics context (Vatn, 2005; Spash and Vatn, 2006; Hagedorn, 2008); however it also provides a powerful lens to examine the hierarchy that exists between national policies, organizations, and individuals (Figure 1). With the rising interest in environmental policies, this structure is valuable in understanding the interactions that determine social and ecological outcomes.



**Figure 1.** National policies create the opportunity for the existence of particular organizations, while constraining the actions they are able to perform. Organizations interpret these policies and interact with individuals resulting in both social and ecological outcomes.

### *Organizations*

It is important to make the distinction between organizations and institutions. As Hagedorn (2008) explains, “[Organizations] are not themselves institutions; rather they



reveal how institutions define concrete governance structures for shaping human (inter)actions at an individual or collective level.” Therefore, organizations are a component of an institution. The factors that define institutions operate as exogenous factors that act upon organizations to define the realm of possibilities available to the organization.

Although operating within the context of institutions which have their own rules, values, and norms, it must be noted that an organization holds its own culture (Smircich, 1983). They are characterized by the roles and duties of the employees, relationships of power, and the internal rules and regulations that dictate action. They also share common objectives to achieve a shared mission (North, 1990).

### *Individual*

It is believed that humans act to maximize satisfaction and minimize displeasure (Irwin, 1971; Beck, 2004). Unraveling the reasons behind certain behaviors is complex, as multiple motivations often operate at varying degrees dependent on an individual’s values, beliefs, attitudes, and norms. In addition, it must be recognized that individuals never have complete knowledge of a given situation and must act using the best information available (Hayek, 1945).

Each individual is guided by a purposive approach when making decisions (Beck, 2004). This type of motivation is defined by goal-directed, future-oriented thought processes. When comparing a variety of alternatives, individuals strive for outcomes they deem to be of the greatest value to them. Ostrom (2005) refers to the choice of one behavior after examining all available alternatives as “strategy.”

## **Theoretical Background**

### *Social-Ecological Complex Adaptive Systems Framework*

Morse *et al.*'s (2011) Social-Ecological Complex Adaptive Systems (SECAS) framework provides the foundation for the development of the improved framework presented in this paper. SECAS was developed by studying land use change and is based on structuration theory (Giddens, 1984; Stones, 2005), theories on complex adaptive systems (Levin, 1998; Gunderson and Holling, 2002), and hierarchical patch dynamics (Wu and Loucks, 1995). The framework illustrates the way in which social systems enable or constrain an actor's capacity to perform an action. The actor maintains specific motivations, knowledge, and capabilities which determine the actions available to perform. The larger landscape influences the features of individual parcels of land. The action results in new or renewed actor's capabilities and landscape characteristics. The action will reinforce or change the social system. Similarly, the changes to structure, processes, and functions of an individual parcel may eventually alter the larger landscape's properties.

SECAS highlights several important features that had been overlooked in other frameworks. First, external and internal social structures are recognized as different entities and broken down into more specific components. This more detailed approach clarifies the particular factors that influence the actors. In doing so, it emphasizes how social systems, such as top-down policies influence an individual's ability to perform an action.

Second, the knowledge, capabilities, and motivations of the actor are recognized. Outcomes describe the social and environmental impacts experienced by the community

as well as the returns received by the actors. This differs from other frameworks which do not specify the different outcomes experienced by each stakeholder.

Thirdly, the functions and processes characterizing both the biophysical realm and social domain are incorporated. Past frameworks have overlooked the intricacies comprised in the functioning of the natural world. Ecosystems are inextricably interconnected. There are countless examples of the ways in which one change in the structure of an ecosystem can completely alter its functioning. To account for this essential consideration, SECAS specifically highlights the social and ecological processes that result from decision-making. In addition, the framework recognizes the actor as maintaining control of a patch of land that is part of the larger patch mosaic.

SECAS has not been applied to studies other than the one used in its development, however it provides relevant constructs that incorporate the processes of both social and ecological systems. The addition of constructs borrowed from other relevant frameworks (presented below) elaborates on the social-ecological interactions presented by SECAS to provide a more complete depiction of the system.

#### *Human Ecosystem Model*

SECAS borrows elements from the Human Ecosystem Model (HEM) which was designed as a concept to guide ecosystem management and emphasizes human social systems, socioeconomic resources, and cultural resources as important elements affecting the environment (Machlis *et al.*, 1997). Machlis *et al.* (1997) explain: “the *human ecosystem* is defined as a coherent system of biophysical and social factors capable of adaptation and sustainability over time... Human ecosystems can be described at several spatial scales, and these scales are hierarchically linked.”

The model recognizes three sets of critical resources (natural, socioeconomic, and cultural) that influences the human social system. The social system controls the flow and use of these resources and consists of three subsystems: social institutions, social cycles, and social order. Social institutions are entities that are created in response to collective challenges. For example, schools are built as a means to fulfill the challenge of education. The second subsystem, social cycles, highlight the importance of temporal patterns in human activity. The quality and availability of certain resources vary over time. In addition, the conditions under which humans are acting will dictate their behavior. Social order, the third subsystem, determines how people interact and provides a high level of predictability in human behavior (Machlis *et al.*, 1997). Social order can be described using three elements: identities, norms, and hierarchies. Identities describe the demographics or attributes of a community, such as age, gender, race, etc. Norms can be classified as either formal or informal. The former refers to the more institutional rules of a community, which the latter is defined as adherence to social conventions. Hierarchy recognizes that not all individuals have equal access to the same amount and quality of resources. The definitions of the constructs used in the HEM are described in Table 1.

The HEM is often referenced when studying urban ecosystems, where human manipulation of the environment can cause habitat fragmentation, increase pollution, and affect local climate due to an intense demand for resources in a small region (Cadenasso *et al.*, 2006; Grove *et al.*, 2006). Pickett *et al.* (1997) build upon Machlis *et al.*'s (1997) Human Ecosystem Model, and further define the processes and components of the natural ecosystem resources. This has allowed for a more complete portrayal when studying an urban area through the HEM framework. Several long term research studies on urban

areas have been conducted under the HEM framework to track both social and ecological systems over time. For example, Pickett *et al.* (2010) describe the identification of potential “urban syndromes” related to soil, streams, wildlife, and plants as a result of their long term study framed through HEM.

**Table 1. Definitions of elements used in the HEM (Machlis *et al.*, 1997)**

Socioeconomic Resources	Information flow, population dynamics and interactions, capacity to work (labor), and the economic instruments for production (capital)
Cultural Resources	Formation of organizations, beliefs, traditions
Social System	The set of general social structures that guide much of human behavior
Social Institutions	Collective solutions to universal social challenges or needs
Social Order	A set of cultural patterns for organizing interaction among people and groups
Identity	Ascriptive labels given to individuals based on action, achievement, or characteristics
Social Norms	Formal and informal rules that guide behavior
Hierarchy	Social differentiation within a boundary

*Institutional Analysis and Development Framework*

In general, Ostrom’s Institutional Analysis and Development framework (IAD) is used to “identify the major types of structural variables that are present to some extent in all institutional arrangements, but whose values differ from one type of institutional arrangement to another” (Ostrom, 2011). It identifies rules, community attributes, and biophysical/material conditions as the exogenous factors influencing the situation experienced in the “action arena.” Actors experience an action situation within the action arena and generate outcomes that return to affect the participants and the action situation.

An action situation occurs “whenever two or more individuals are faced with a set of potential actions that jointly produce outcomes...” (Ostrom, 2005).

IAD has been used in a variety of contexts to identify governance structures (Bushouse, 2011), analyze policy (Imperial and Yandle, 2005), and determine leverage points for making organizational change (Imperial, 1999b). In some cases, it has been used as a foundation to further develop testable hypotheses as Andersson (2006) did with decentralized forest governance in Bolivia.

Due to its focus on common pool resources, it is has been increasingly used to examine social-ecological systems (SESS) (Ostrom, 2009). Analyses directed at the governance structures and management plans involving fisheries (Imperial and Yandle, 2005), forestry initiatives (Andersson, 2006; Coleman and Steed, 2009; Mehring, 2011), watersheds (Imperial, 1999a), and agricultural economics (Hagedorn, 2008; Thiele *et al.*, 2011) emphasize its use in studying the administration of programs focused on natural resources. It has also been used to examine community member stakeholder participation in environmental efforts (Koontz, 2005).

### *Theory of Planned Behavior*

Ajzen’s (1991) Theory of Planned Behavior (TPB) focuses on the factors that dictate individual decision-making. It is used to explain and predict behaviors based on attitudes, subjective norms, and perceived behavioral control. Attitudes describe the positive or negative reaction of performing a behavior. Subjective norms refer to the social pressure the individual feels to perform or refuse to execute the behavior based on the perception of their reference group’s reaction. Perceived behavioral control represents

an individual's perception of the factors involving the behavior that are within power to control.

TPB has been used in a variety of contexts, especially those related to environmental behaviors. Studies have included the effects of green marketing (Kalafatis *et al.*, 1999), sustainable food consumption (Vermeir and Verbeke, 2007), use of public transportation (Heath and Gifford, 2002), recycling (Tonglet *et al.*, 2004), and adopting sustainable agricultural practices (Fielding *et al.*, 2008). Although there has been broad support for TPB, meta-analyses have suggested that revisions to the theory, particularly in including additional normative variables, would add to its predictive ability (Rivis and Sheeran, 2003; Armitage and Connor, 2001).

#### *Sustainable Livelihoods framework*

The Sustainable Livelihoods (SL) framework has been used to guide policy decisions and implement development programs (Scoones, 1998). It is particularly used to better understand and improve the livelihoods of poor and rural communities (Allison and Horemans, 2006). The SL framework considers a social and economic unit (usually a household) defined by five capital assets (see Table 2). Access to goods and activities is enabled or constrained by policies, institutions, and processes which encompass social relations, markets, and organizations (Allison and Horemans, 2006). External factors, termed as the vulnerability context, refer to the shocks, trends, and seasonal elements that are outside of the household's control.

Determining the factors that cause success or failure of sustaining livelihoods in the face of vulnerability factors can be beneficial in developing policies and programs to assist people in similar occurrences in the future. Outcomes in this framework allows for

the evaluation of livelihood sustainability. Livelihoods are considered sustainable if standard of living (such as income or other wellbeing goals) is maintained or increased, vulnerability is reduced, and the natural resource base is retained.

The SL framework incorporates the social-economic elements held by an actor which is a critical component in decision-making. Although it is not the sole determinant of outcomes, financial drivers often provide motivation for certain actions (Lumley, 1999). Monetary reserves can also dictate power relationships, education opportunities, and access to other goods and services (Machlis *et al.*, 1997) which are often critical factors in explaining and predicting behavior.

**Table 2.** Definitions of the livelihood assets included in the Sustainable Livelihoods framework (Scoones, 1998).

Human Capital	Skill levels, knowledge, ability to work, good health, education
Natural Capital	Natural resource stocks, resource flows, ecosystem services
Financial Capital	Monetary resources used to meet objectives
Physical Capital	Basic infrastructure and producer goods, technology, access to information
Social Capital	Networks, connectedness, trust, membership in groups, reciprocity exchanges

### *Integration*

Each of the above mentioned frameworks provide useful constructs, but are not enough individually to predict and explain social-ecological behavior occurring between two collaborating actors. The IAD framework focuses on the factors affecting decision-making on a broad scale. In addition, it is very vague in specifying ecological components, grouping both market conditions and environmental conditions as one element. Similarly, HEM is ambiguous when describing natural resources. The TPB only



considers individual behavior without incorporating the effects on a greater system. It also lacks a feedback loop important in determining how the behavior was evaluated and if the action will occur again. It could also benefit from including additional normative factors. The SECAS framework recognizes the capabilities of individual actors but the concept is not applied to organizations. In addition, the goal/motive described in SECAS is generic and does not include norms within the exogenous factors, a vital component highlighted by IAD, TPB, and HEM. The SL framework focuses on the social factors affecting individual capabilities and does not emphasize environmental conditions.

### **Developing an Integrated Framework**

A key feature of the integrated framework is that it recognizes the nested hierarchy that exists between institutions, organizations, and individuals. Organizations are enabled or constrained by the top-down policies they must follow. In turn, organizations hold their own specific rules, goals, and strategies that reflect their missions. These factors enable or constrain the way an individual acts. However, the individual's interactions with the organization determine the resulting outcomes. According to Ostrom (2009), "A core challenge in diagnosing why some [social-ecological systems] are sustainable whereas others collapse is the identification and analysis of relationships among multiple levels of these complex systems." Thus, zooming in on the interactions between organizations and individuals is relevant as it focuses on a specific relationship allowing for the dissection of a portion of highly complex systems.

The integrated framework presented in this article (Figure 2) highlights several important distinctions absent from those exhibited in other works. First, it incorporates

the interaction that occurs between an organization and an individual. Second, the framework recognizes the specific capabilities, and goals held by an organization. Thirdly, strategies are depicted as the product of the interaction between individual and organization. Finally, outcomes of an action are viewed in terms of wellbeing and recognize economic, social, and ecological consequences.

### **Presentation of an integrated framework**

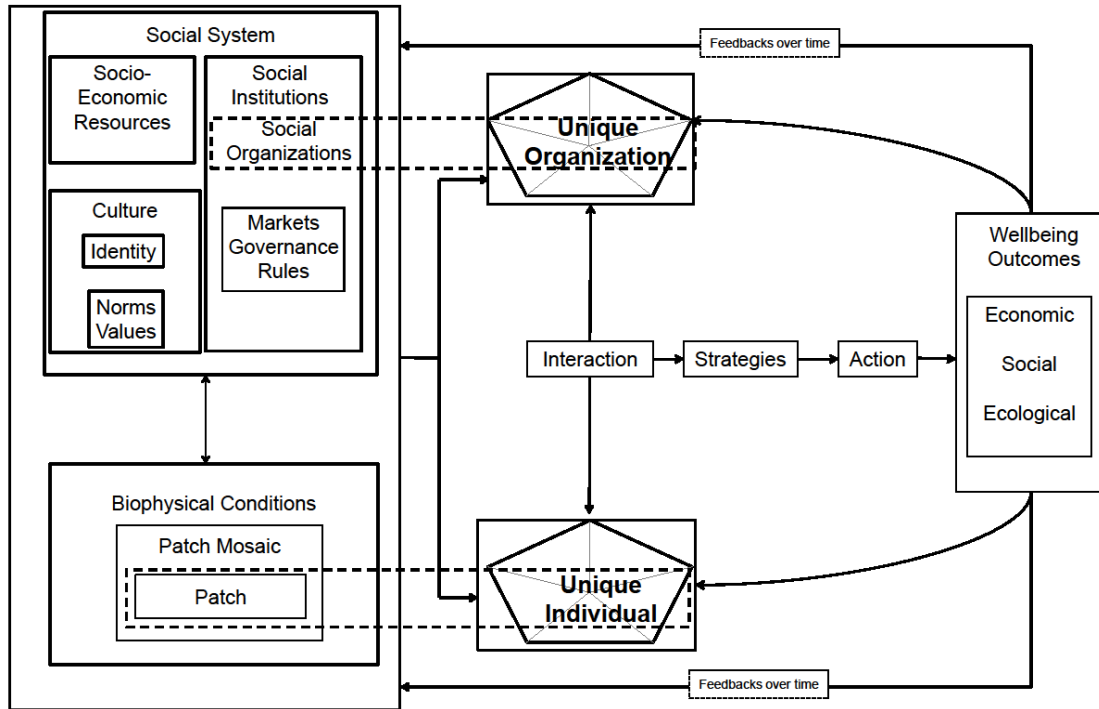
The link between human-environment interactions is expressly illustrated within the framework. This connection represents the ways in which social and environmental systems influence each other. Humans rely on the environment for the provision of food, water, and other services critical for survival. The ways in which humans utilize and manipulate the natural environment can change its structure and function. Likewise, biophysical conditions can provide the setting for the success or collapse of civilizations (Diamond, 2005).

#### *Social system*

External social structures and systems have been defined to encompass entities including markets, governments, power relationships, beliefs, behaviors, networks, relationships, resources, and rules (Kondrat, 2002; Stones, 2005). The wide ranging factors categorized as social structures and systems makes it difficult to pinpoint specific elements involved in the system. Parsing out these entities provides a better visualization of each factor.

#### *Social institutions*

Social institutions, such as faith, health, sustenance, justice, commerce, governance, and defense provide some context for a region's social conditions (Machlis



**Figure 2.** The social system is composed of several elements. Socio-economic resources represent information flow and labor. A governance structure allows for the formation of laws and the creation of organizations. Rules determine the legal boundaries of organizations and individuals. The culture of an area is characteristic of a community influence the actions of both the individual and organization. In addition, the individual and the organization are part of the culture and can influence its qualities. The biophysical conditions are broadly defined as the general environmental conditions of an area. Spatially, it is composed of individual patches (controlled by individuals) which form a patch mosaic. The individual and organization are both enabled and constrained by livelihood factors and specific goals and objectives. The action agreed upon by both the individual and organization results in social, economic, and ecological outcomes. The action has immediate effects on the organization, which seeks to accomplish its mission and changes its capabilities. The individual also seeks to meet his/her goals and experiences new or renewed capabilities. The social outcome may impact the social conditions of a region. The ecological outcome specifically affects a patch which in turn influences the patch mosaic and biophysical conditions. The economy is also impacted through the financial transactions.

*et al.*, 1997). These constructs are designed to meet the social needs of the community and organize human activities (Dietz *et al.*, 2003). In regards to human-environment interactions, Acheson (2006) asserts that the establishment of effective natural resources management institutions could solve many of the world's environmental problems. However, there is a lack of agreement on how such institutions should operate as both private and government control mechanisms have advantages and disadvantages (Moran, 2010). Cleaver (2002) suggests that several multi-purpose institutions are a more appropriate solution.

#### *Socio-economic resources*

Three of the components Machlis *et al.* (1997) describe as components of socio-economic resources are information, labor, and capital. Information is necessary in both social and biophysical systems. Information is coded and received in a variety of ways. Genes, newspapers, radio, word-of-mouth, and nonverbal cues are all defined as a means of transmitting information (Machlis *et al.*, 1997). Information flow is also important as it is critical to understand who has access to information and how it is received (Agrawal *et al.*, 2013). The way in which information is coded and transmitted affects decision-making. As noted in consumer research, humans will pick up on information that is most relevant to their own interests (Ariely, 2000). In addition, the amount of information available also affects decision making (Ostrom, 2005).

Labor is defined as an individual's capacity to work, however there are several facets to this construct (Machlis *et al.*, 1997). Raw materials for working, time needed to create goods and services, output rates, and unemployment rates are all concepts to consider. A change in labor can greatly affect a social system. For example, the depletion

of raw materials to create good can increase unemployment which disrupts the functioning of the system.

Capital is defined as financial resources, technological tools, and the value of resources (Machlis *et al.*, 1997). This concept drives production, consumption, and the value placed on natural resources. Capital can be influenced in a variety of ways. For instance, the development of a new business can create new jobs. Likewise, the closing of an industrial plant can increase unemployment. Tracing the flow of capital and its hierarchy are also significant.

Markets and the exchange of capital also exist within socio-economic resources. Access to markets is an important factor to examine. Some are excluded from market transactions due to physical constraints (lack of transportation), hierarchical structure (business partners), and/or incompatibility (non-existent markets for some goods).

### *Community*

Agrawal and Gibson (1999) define community “as a small spatial unit, as a homogeneous social structure, and as shared norms.” Identity, social norms, and values are also components of this realm (Machlis *et al.*, 1997; Ostrom, 2005). These attributes dictate the willingness of the group to accept new ideas by describing the diversity, general perceptions, attitudes and values of the residents, and how these traits may affect action. Trust and power relationships live within this construct. These qualities are important because they dictate what is culturally significant and accepted by the community and define power structures (Ostrom, 2005).

Organizations and individuals are both influenced by this construct. Organizations must gain trust within the community in order to gain credibility and access to

community members. Individuals are affected by informal norms sometimes resulting in social pressure to engage in a particular action (Ajzen, 1991). Likewise, as members of the community, organizations and individuals can influence the attributes of the community. For instance, an organization could transform a social norm after gaining significant power, or the demographic makeup may change over time creating new values within the region.

### *Identity, norms, and values*

Identity indicates who is living within the community. This includes the demographic makeup (such as age, race, gender, education levels, etc.) of the region and the existing power structures. It is also characterized by the creative actions of the individuals within the community (Machlis *et al.*, 1997).

The norms within a community dictate what is socially acceptable within the culture. Violating an informal norm does not result in a formal, institutionalized punishment but may still have social consequences (Machlis *et al.*, 1997).

In an economics context, values often represent the utilitarian view which signifies the greatest good for the greatest number. In this case, values are viewed through a social psychology lens. Values are general preferences for ways of acting (Dietz *et al.*, 2005). There is a high level agreement across cultures and countries that nature has value (Clayton and Myers, 2009). The type of value assigned to nature differs globally. According to Kellert's (1996) study, Americans tend to fall in the humanistic value type, portraying an emotional attachment to nature, especially companion animals. A variety of studies have sought to describe values, community, and views on nature (i.e. Mayer *et al.*, 2004; Light, 2009). Communication between individuals tends to shape

values. In this way, communities cultivate communality in values, although it is never a perfect consensus (Dietz *et al.*, 2005). The values of the community thus form the attitudes of the individuals (Clayton and Myers, 2009).

#### *Governance and rules*

Ostrom (2005) identifies rules (formal norms) as a significant exogenous factor within social conditions affecting actor's behaviors. Rules can be defined as regulations, instructions, precepts, and laws. They are the guidelines that have been institutionalized, prescribe consequences for their violation, and determine the choices that are legally available to the actors (Machlis *et al.* 1997; Ostrom 2005). Rules often create the opportunity for the existence of many organizations. In addition, these guidelines determine allowable and prohibited actions. Individuals are also enabled or constrained by formal norms when developing strategies.

According to Folke *et al.* (2005), governance “connects individuals, organizations, agencies, and institutions at multiple organizational levels.” It requires leadership and vision. Governance is based on who forms the rules and how they are enforced. For example, it determines the definition of property rights within a region. Some governance structures involve stakeholders while others do not.

#### *Biophysical conditions*

Alberti *et al.* (2003) asserts that the integration of ecological, social, and economic studies are necessary to fully explain human-environment interactions. This link is emphasized by the double-arrow between social systems and biophysical conditions. The construct of biophysical conditions refers to natural resources on a broad level. The biophysical conditions provide the context for the actors' decisions.

Topography, landscape type, and flora and fauna compositions differ among regions allowing humans to utilize the ecosystem in various ways. As explained by Van Wey *et al.* (2005), “Different ecosystems offer different products and services to human communities, and human impacts therefore vary among ecosystems” (p. 36).

Furthermore, the infrastructure of a region will also affect the ways people interact with the environment and the areas within the region that face the greatest ecological threats. For example, the construction of roads can result in habitat fragmentation which can cause population declines in certain species (Andrews, 1990).

Within biophysical conditions are the patch and the patch mosaic. These constructs are borrowed from hierarchical patch dynamics, a theory commonly applied in landscape ecology and conservation biology (Wu and Loucks, 1995). A patch is a spatial unit within an ecological system characterized by size, shape, content, structure, function or spatial configuration (Pickett and White, 1985). Patches exist at different scales and are nested within vertical nested hierarchy to comprise a patch mosaic (Wu and Loucks, 1995). It is vital to understand the composition and configuration of patches in order to comprehend ecosystem functions and flows (Turner and Chapin III, 2005). Disturbances within a patch mosaic can cause changes in patches’ shapes, sizes, structures, and functions (Turner *et al.*, 2001), thus the alteration of one patch affects the others within the mosaic. Disturbances may be natural occurrences (ex. lightning causing a forest fire) or human-driven events (deforestation).

#### *Individual capabilities and motives*

The individual is represented by a pentagon to represent the livelihood assets associated with the SL framework. Although the SL framework is usually applied on a



household level, the livelihood assets it describes provides an appropriate means to identify the elements that may enable or constrain an individual in engaging in a particular behavior. Physical capital such as development of infrastructure or access to technology provides a foundation for how the individual can act. Natural capital recognizes the stock of natural resources available to the individual. Specific skills and knowledge defined by human capital influences the strategy employed by the individual. Social capital in the form of networks and relationships can influence how the individual gains information and the role played in the community. Financial capital represents monetary inflows which may influence actors seeking to maintain or maximize economic reserves.

An individual's perception of their own capabilities is also an important factor in decision-making. Ajzen (1991) explains that the perception of control (or lack thereof) over one's capabilities can dictate actions. Therefore, an actor must be mindful of individual capabilities in order to make good decisions. In addition, to maintain or improve the current state of wellbeing the individual must strive to preserve or increase each livelihood asset (Scoones, 1998).

In addition to capabilities, individuals also have personal beliefs, values, attitudes, and motivations that direct decision-making. Beliefs reference individual worldviews while values (in this context) are an abstract set of principles that reveal general preferences for outcomes or behavior (Clayton and Myers, 2009). Values are believed to influence attitudes and guide behavior (Dietz *et al.*, 2005). In the decision-making process, the importance of each value and the consequences of the potential change are considered. In the case of multiple, conflicting values, each is ranked against the other

and the action taken is aimed to satisfy the most highly esteemed item. As discussed earlier, Ajzen (1991) identifies attitude toward an outcome as a significant factor in predicting behavior.

The framework specifically illustrates the control an individual has over a specific patch of land. This could refer to actors such as a landowner's property or the chief decision maker's management of a state park. Recognition of this control is an important aspect of this framework. Ownership implies that the individual has the power to decide how to manage his/her property. Management practices could result in environmental services that would benefit the surrounding environment and community, or disservices which would cause harm.

*Organizations: capabilities and motives*

Organizations and their structure influence individuals' motivations and actions in a variety of ways (Ostrom, 2005; Vatn, 2005). As Doppelt (2010) explains, "they [organizations] are systems of community" (p. 89) Thus, it is fitting that the attributes of the given community dictate the way in which organizations make decisions. In addition, given that organizations are components of social institutions, they can affect what is accomplished in the region.

Ostrom (2005) recognizes that an actor can represent either an individual or an organization. Therefore, it is appropriate that the same livelihood assets influencing an individual are also relevant to an organization. Physical, natural, human, social, and financial capital are all characteristics held by an organization, however the magnitude is larger than that of individual capabilities. Organizations operate on a wider scale than individuals; therefore the reaches of their physical, natural, and financial capital are also

greater. Given that an organization is made up of a group of individuals, they hold a diversity of human capital and have more opportunities to expand social capital.

Organizations are guided by mission statements and internal rules and norms. These internal structures unite individuals in striving for the common objectives that define the organization's purpose for existence. Just as individuals maintain beliefs, values, attitudes, and motivations, organizations hold similar notions on a broader level. These characteristic traits of the organization influences the likelihood of certain individuals (guided by values, attitudes, and motivations) to interact with it.

#### *Interactions and intention*

Decisions may occur quickly or may take a great deal of time to accomplish. In an organization-individual context, this is often reflected by a matching of goals, objectives, and strategies. Although their aims do not have to be identical, a certain level of agreement must be present for the action to take place. During this discussion period, information, viewpoints, and perspectives are shared.

Intentions are formed through interactions and reflect the actors' readiness to perform a particular behavior (Ajzen, 1991). It implies the motivational factors involved, the degree to which they are present, and how much effort the actors are willing to put forth to reach the goal in mind. Intentions are likely to signify behavior unless an unpredicted factor prevents its execution (Ajzen, 1991).

#### *Strategies*

In any decision-making situation an individual has a variety of options available to attempt to reach a desired goal. Identifying and weighing the available choices is called a strategy (Ostrom, 2005). Strategies are dependent on the situation and must be

adaptive due to the inevitable changes that occur in social-ecological systems (Walker *et al.*, 2004).

#### *Action*

The action represents the behavior that occurs as a result of the interactions between the organization and the individual. In addition, the action is expanded from simply an observable response as has previously been described (Ajzen, 1991; Ostrom, 2005) to also encompass changes that occur at imperceptible levels (Morse *et al.*, 2011). This includes the expansion of knowledge within the individual and organization and the changes in natural processes at undetectable levels such as soil formation. Theoretically, actions result in the accomplishment of the actors' personal objectives (Ajzen, 1991).

#### *Wellbeing outcomes*

There is a strong link between ecosystem condition and human wellbeing (MEA, 2005). A change in the landscape not only affects the physical properties of the region, but can also have significant impacts on economic and social conditions. As noted by Díaz *et al.*, (2006), "Biodiversity in the broad sense affects the properties of ecosystems and, therefore, the benefits that humans obtain from them." Scarcity of a vital resource can increase its economic value and the social wellbeing (ex. health, security) of the community may suffer.

#### *Social outcomes*

Social outcomes feed back to influence social conditions. Effects may be immediate or develop over time. An evaluation of the outcomes may result in changes in the composition of the social conditions. Social outcomes often seek to fulfill goals of policies, therefore laws might change as a consequence. The makeup of the community

may also evolve as a result if more people are convinced to partake in the action or if the demographics of the area shift.

#### *Ecological outcomes*

Ecological outcomes denote the changes to the environment as a result of the action. This may refer to something visible, such as a prescribed fire, or something imperceptible such as a change in soil formation. Often both visible and invisible changes can be noted. Ecological outcomes may take time to recognize. For instance, the protection of habitat for an endangered species may eventually result in population increases but effects will not be instantaneous.

#### *Economic outcomes*

Economic outcomes include the financial gains or losses experienced by the individual and organization as a result of the action. In addition, the economy is affected on a large scale since a transaction took place. As noted, the condition of the environment affects market prices of necessary goods.

#### *Time*

This framework focuses on one action; however it is important to note that the outcomes that result from one action may provide the context for additional decisions (Ostrom, 2005). In addition, the action causes the actors to evaluate their decision. Initial feedback is immediate; however delayed reactions may occur as well. It is also important to note that unpredicted consequences may arise due to the action.

Time is incorporated into both the biophysical and social conditions. As explained earlier, patch mosaics are dynamic and can change over time. Likewise, social conditions fluctuate as humans undergo social cycles, which dictate the temporal patterns for human

activities (Machlis *et al.*, 1997). These periods may be physiological, institutional, individual, or environmental.

#### *New, renewed conditions*

During the interaction phase, both actors come away with new or renewed knowledge. This includes the accomplishment of the intended objective as well as the evaluation of the effects of the action. Positive evaluation will likely result in the repetition of the action, whereas negative responses may result in an abandonment of the behavior. New knowledge can also become the basis of a new action situation (Ostrom 2005; Morse *et al.* 2011).

### **Case Study**

#### *Background*

Conservation incentive programs are schemes designed to encourage private landowner engagement in land preservation and restoration efforts. Participating landowners receive financial and non-financial incentives in return for enrolling their property. Conservation easements and Farm Bill programs are examples of conservation incentive programs. Under a conservation easement, landowners agree to permanently retire their land in return for tax benefits. Farm Bill programs, such as the Conservation Reserve Program (CRP) and Wetlands Reserve Program (WRP) offer monetary rental payments, cost-share agreements, and technical assistance for habitat preservation and restoration.

Qualitative, semi-structured interviews were conducted with representatives from eight land trusts and eight government agencies operating in Alabama. Interview

questions focused on the organizations' objectives, mission, interactions with landowners, process of enrollment, and factors that enable or constrain the organization.

Qualitative, semi-structured interviews were also conducted with eight landowners currently participating in a conservation incentive program. Interview questions focused on landowners' goals for their property, motivations for participation, interactions with the administering organization, process of enrollment, and factors that enabled or constrained the decision of participation. A further review of the methods and results can be found elsewhere (see Chapter 1).

#### *Biophysical system conditions*

The broad biophysical conditions in this context are exemplified by the state of the environment. It dictates the regions where administering organizations choose to target for protection. It provides the areas where ecosystem services are threatened on private lands. Administering organization representatives identified the threat of development, important ecosystem types, habitat for endangered species, culturally important landscapes, and historical sites as prominent biophysical conditions that prompted action for protection of areas given their provision of valuable ecosystem services.

The patch in this case is the property held in ownership and control by the landowner. It is characterized by the qualities that make it eligible for its particular conservation incentive program. The patch mosaic is represented by the surrounding ecological community which is affected by the enrollment of the property. For instance, conservation of a particular region of a river may improve water conditions downstream.

Participants tended to realize the benefits their properties provide to the surrounding community. One participant explains:

It is the finest old growth hardwood forest remaining in the state of Alabama. So it is really extraordinary. There are at least 60 acres that have never been touched and mature forest that surrounds it, so it is very well buffered. It is unusual, not only because it is superlative old growth forest of which there are very few left in the state of Alabama, but because of its sight. It is just for the luck of the draw it is naturally incredibly diverse and rich in species. There are over 30 rare species on just the 60 acres.

#### *Socio-economic resources*

Program administrators noted the difference in enrollment based on the health of the economy. Poor national economic conditions have lessened the amount of funding for Farm Bill programs. In addition, a low economy caused more people to sign up for conservation easements in order to enjoy the tax benefits. As one participant enrolled since the program began explains:

The government programs are the only thing that kept us in business. We survived on account of it; they would give us a guaranteed price on the cotton and got a payment for growing cotton or whatever out of it. I mean we weren't getting rich out of it but it was keeping us in business.

#### *Community*

Both the organization and the individual landowner have relationships with the community. Administering organization representatives expressed the importance of gaining trust within the community in order to be successful in promoting their programs.



Both land trusts and government agencies often hold meetings for landowners interested in participation. They also present themselves being receptive to ecological questions and technical advice. In addition, land trusts frequently organize stewardship events and educational opportunities as a means to advertise and integrate into the community.

Individuals both create and respond to the social norms held within their community. The perception of participating in a conservation incentive program varied between participants. Landowners enrolled in the CRP or WRP viewed enrollment as a socially acceptable behavior. In fact, participation was encouraged within the community. Landowners all noted that they found out about the programs from neighbors. One program administrator explains:

What we have had appear is one person got it and he told the neighbor and the neighbor come in and asked about it and it has just kind of went from there. And I think that is exactly what happens in a lot of other places too, it is just word of mouth.

Landowners enrolled in conservation easements through land trusts expressed mixed views of the perceptions of the community on their participation. Some are proud of their decision and encourage neighbors to enroll. Others fear the reaction of their neighbors will be negative and do not publicize the protection of their property. This trend seems to be related to the demographics of the community. In regions where people are dependent on their land as part of their livelihood, conservation easements are viewed as negative.

### *Rules and governance*

National policies and guidelines allow for the creation of conservation incentive programs, while also putting restrictions on what they do and how they do it. The Conservation Easement Act of 1981 allows landowners to receive tax deductions for enrolling properties in a conservation easement. Section 170(h) of Internal Revenue Service Tax Code defines the criteria necessary to create a conservation easement. In particular, it states that a property must exhibit “conservation value” in the form of 1) important ecosystem, 2) recreation or education for the general public, 3) open space, or 4) historical importance. These rules also describe how the tax deductions should be calculated and the qualities of an organization that can hold an easement.

The USDA Farm Bill of 2008 describes several conservation programs designed to help American landowners. It defines the types of lands targeted for the program throughout the nation, how to calculate annual rental payments, and how many contracts can be awarded each year.

The rules and regulations can seem vague to administrating representatives. As one explains, “Well the property has to meet the IRS regulations but there are sometimes there are gray areas.”

### *Individual*

Landowners identified a variety of factors that enabled or constrained their ability to enroll their property in a conservation incentive program. The qualities of their property made them eligible for the program (natural capital). Monetary incentives such as tax breaks, rental payments, and cost-share agreements provided additional motivation to enroll, increasing financial capital. Human capital showed to be a prominent factor in

the decision-making process. Knowledge of the program and recognition of the unique qualities of his/her property influenced the landowner in being receptive to administering organization. In many cases, negotiations with relatives took place in order to convince all familial stakeholders of the benefits (social capital). Relationships with the organization administrators also showed to be a significant factor. The fear of development (physical capital) was also a frequently mentioned motivating factor for participation. As one program participant notes, “My worst case scenario, without the easement, is fear that it would get subdivided into a subdivision.”

### *Organization*

In addition to complying with the national, top-down policies, organizations also maintain their own set of rules and norms. Administering organizations vary greatly in size and scope. This diversity is shaped by the level of operation (national, state, local), the type and conditions of the natural geography, the threats a region faces, and cultural norms (Brewer, 2003). It is also defined by the variety of missions held by the organizations. The objectives of conservation organizations may include wildlife conservation, habitat restoration, soil conservation, cave preservation, recreation, and protection of open space. Some focus on one particular conservation purpose, while others are broader in their interests. One program administrator explains the mission of his organization as follows:

Our mission of our agency is to promote the wise use of natural resources on private lands in the United States through technical assistance and financial assistance through our agency. Which therefore helps landowners do things they were going to do and they just didn't understand how to do it. They didn't know

how to get things done and a way to do it in an environmentally safe manner. And so therefore it protects our water resources, soil resources, and forests.

The geographical range and physical conditions of a region (physical capital) as well as the conservation mission (reflected by natural capital) dictated the purposes of the organizations. Organization administrators often noted being constrained by lack of monetary reserves (financial capital) and insufficient staffing (human capital). Collaboration with other organizations was frequently mentioned as a means to overcome these constraints (social capital). Knowledge and skills of employees (human capital) enabled proper evaluation and negotiations with landowners.

### *Interactions*

Negotiations take place between landowners and representatives from the administering organization until a decision is reached. Discussions on a proper management plan for the property and specific restrictions and allowances are necessary to determine if the landowner and organization can reach an agreement. The administering organization assumes a great responsibility when accepting a property into a conservation incentive program (Bick and Haney, 2001). In addition, the landowner is also making a substantial commitment when enrolling, thus it is critical that the goals of both the organization and the landowner are met. One program administrator describes a typical interaction with a potential participant:

We encourage them just by talking to them and tell them what their options are. If they think they can only do something one way, then we can tell them. Many times we can help them by offering alternatives that are cheaper or easier or going to reach their goals better than what they are thinking.

### *Strategy*

Strategies are formed based on the agreed upon stipulations during the interaction of landowners and representatives. It is the best course of action recognized by both parties to reach both of their objectives.

### *Action*

The action occurs when an organization accepts a property and the landowner signs the contract to enroll in the conservation incentive program. This behavior has consequences for the individual, organization, community, society, and environment. The landowner receives the financial rewards and achieves any other goals that motivated the decision (see Table 2). In addition, after the landowner enrolls in the conservation incentive program his/her capacities change. Many landowner participants expressed that the process of enrolling in a program enhanced their knowledge of the ecological functioning of their property, increasing human capital. Capabilities also change as the landowner has transferred certain property rights to the organization. This influences what can be done with the natural capital. Social capital increases with new membership in the organization. Financial capital is enhanced with the reception of the financial incentives. Physical capital is maintained as the property will remain intact, and access to technical assistance is gained.

The organization accomplishes its mission in protecting the region. As with the landowner, the organization's capabilities also change. Land trusts assume many financial responsibilities when accepting a conservation easement (Bick and Haney 2001). In addition, with each contract signed, government agencies reduce the amount of funding available to accept other properties, thus financial capital is affected. Human

capital is expanded, as each contract is unique increasing the skills and knowledge of the employees. Natural capital is increased with each property enrolled. Social capital is increased with the formation of new relationships with the landowners. Physical capital is maintained as development is prevented on enrolled properties.

### *Ecological outcomes*

The ecological outcomes are related to the types of landscapes the administering organization protects or restores through a landowner's enrollment of a property in a conservation incentive program. Therefore, ecological outcomes are reflective of the missions of the administering organizations. If an organization's objective is to protect a particular mountain and its resources, the outcome is evident with each property enrolled in the region. The ecological outcomes feed back to the biophysical conditions as natural resource stocks are preserved and ecosystem services are protected.

Program administrators often mentioned the ecological benefits to the individual and the community through program enrollment. As one states:

More and more we are encouraged from a federal government level to manage property with the landscape view in mind. What is best for the masses. And I suppose that is what is best for the individual landowner and for his particular property is going to be best for society as a whole. If everybody manages their property to its potential then that is going to be good for the society as a whole.

### *Social outcomes*

The social outcomes in this case study justify the creation of the programs. The goal of the Conservation Easement Act is to provide society with regions that exhibit conservation value so as to improve or maintain environmental integrity and protect

ecosystem services that benefit humans. The Farm Bill programs seek to help American farmers owning marginal farmland in order to improve productivity and ecological functioning. The social outcomes feed back to social conditions, altering the demographics (ex. annual income) of the community. Rules may be affected and determine the funding for the programs. Many participants expressed that enrolling in a conservation incentive program was a way to help their community. One conservation easement participant explains “I don’t have children so as far as leaving something that I can be pleased to have brought into the world... I can’t think of anything else I’d rather leave.”

#### *Economic outcomes*

Depending on their income level, program participants differed in how much they depended on the economic benefits gained upon enrollment. One participant explains his advice to a neighbor who was resistant to applying for enrollment:

I am smart enough to know that you either take what the government is offering on this do it, or you are going bankrupt. You are not going to stay in business; you can't grow cotton because it isn't affordable. If you ain't got the government help you can't afford to fool with it at all. And he was growing corn and soybeans and he was likely to go belly up. So he went to growing cotton and built an allotment and he's got a big farm... he changed his mind, finally woke up.

#### *Uncertainty*

As with any framework attempting to predict and explain behaviors, it must be noted that there is a level of uncertainty that must be considered. Ajzen (1999) accounts for uncertainty with the construct “actual behavioral control,” which denotes the potential

for an actor's misjudgment of the ability to perform a certain behavior. Uncertainty can also account for an actor's unawareness of certain relevant information.

Just as an actor will never have access to all information of the social system in which he/she is performing, it is impossible to have complete knowledge of how a system functions or responds to management actions. Structured decision making (Martin *et al.*, 2009) and adaptive management (Lee, 1999), which are often used in making land management decisions, try to account for uncertainty factors, but challenges of which uncertainty to address first still presents a problem (Runge *et al.*, 2011). Folke *et al.* (2005) indicate that developing well thought out, adaptive strategies will aid in the uncertainty of decision-making. Given the problem of incomplete knowledge in both social and ecological realms, it is important to recognize that decision-making frameworks are not silver bullet solutions.

## **Discussion and Conclusion**

The proposed framework provides a means to identify the factors that enable or constrain organizations and individuals when making environmental decisions. It differs from other frameworks in that it focuses on the interactions between individuals and organizations and illustrates both the social and ecological processes that are affected by these decisions.

The case study presented in this article focuses on describing the structures of a nature-based institution; however the framework is not limited to this realm. As organizations are comprised of individuals, it could be used to assess individual employee relationships with their workplace. Through this lens, the framework could be used to identify leverage points for promoting change within organizations. Knowing all



factors affecting the participants (exogenous institutional factors, internal organization elements, and personal individual facets) provides a solid foundation for examining a complex system involving intricate relationships.

In addition, the framework could apply to other organizations working with stakeholders on social-environmental issues. As mentioned at the beginning of the article, the development of sustainability initiatives are flourishing in a variety of fields including school systems, businesses, architecture, agriculture, forestry, NGOs, and government agencies. Utilizing this framework as more people are consciously making social-environmental decisions will allow for the accumulation and analysis of data, which will enhance knowledge and allow for modifications to the framework.

The goal of developing this framework was to advance knowledge on identifying factors that affect human-environment interactions. Incorporating top-down and bottom-up relationships in addition to the inclusion of both social and environmental systems allows for a close examination of decisions, actions, and outcomes. Furthermore, this research contributes to the overall knowledge on decision-making processes in order to enhance further research in universal decision-making frameworks.

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## **Chapter 4: Motivations for enrollment in conservation incentive programs in Alabama: Comparing participants and non-participants**

### **Abstract**

Given that the majority of land vital to preserving biodiversity is held in private property, it is important to understand conservation behavior among private landowners. Conservation incentive programs are an increasing means of encouraging private landowners to engage in conservation efforts. This study focused on the research questions 1) what are the objectives of landowners in Alabama? 2) what are the motivations for achieving these objectives? 3) what are the motivations for participation in conservation incentive programs? and 4) why do non-participating landowners decline to participate? To explore these questions, a survey on private landowners was conducted across the state of Alabama. Landowners' objectives for their properties included environmental management, providing a peaceful residence, maximizing investment, and recreational use. Motivations for achieving these objectives included conservation beliefs, personal use, providing community benefits, social norms, and a personal connection to the property. Participants were motivated to enroll in conservation incentive programs by the program's compatibility with their property objectives, satisfaction with interaction with administering organizations, the accessibility of their property, and financial state. Market conditions were not a motivating factor. Non-participants indicated a concern for the legal implications of the programs and an

unwillingness to work with conservation organizations. Perceptions of government capabilities in administering conservation programs, elements of conservation beliefs, objectives, and conservation ethic were all significant predictors of program participation.

## **Introduction and background**

As the majority of land vital to biodiversity is held in private property (Langpap, 2004), it is important to examine how conservation incentive programs operate and landowners' willingness to participate. Voluntary, incentive-based conservation programs have become a prevalent means in encouraging environmentally beneficial practices among private landowners (Rissman *et al.*, 2007). As regulatory approaches based on land-use restrictions have resulted in negative reactions from landowners (Langpap, 2006; Giampaoli and Bliss, 2011), conservation incentive programs offer a more attractive approach by rewarding landowners for desired management practices (Langpap, 2004). In these programs, landowners receive financial and non-financial benefits in return for protecting their property and/or restoring it to a more suitable landscape (Kabii and Horwitz, 2006). The objectives of these programs are diverse and include missions such as preservation of important ecosystems, conservation of biodiversity, protection of open space, and enhancement of ecosystem services (Ribaudo *et al.*, 2001; Brewer, 2003).

As the prevalence of conservation incentive programs increases, it is important to understand the characteristics, objectives, and motivations of the landowners that participate in these programs. Moreover, it is of interest to explore the characteristics, values, and reasons for resistance of those that are not enrolled in conservation incentive



programs. This study explores the following research questions: 1) what are the objectives of landowners in Alabama? 2) what are the motivations for achieving these objectives? 3) what are the motivations for participation in conservation incentive programs? and 4) why do non-participating landowners decline to participate?

Many studies have focused on landowners' objectives for their properties (Kuuluvainen *et al.*, 1996; Creighton *et al.*, 2002; Arano and Munn, 2006) and disregard the incorporation of the motivations that influence those goals. This research makes the important differentiation between objectives and motivations. Whereas objectives reflect what a landowner hopes to achieve, motivations emphasize *why* the landowner wants to achieve these goals.

Given the culture of the Southeastern United States where landowners have a strong sense of property rights and a "propensity for independent decision-making" (Jacobson, 2002), we predicted that the legal implications of conservation incentive programs were a deterrent for non-participants. In addition, given the independent nature of landowners, we predicted that lack of knowledge would also show as a significant factor.

## **Literature review**

### *Farm Bill programs*

Government agencies within the United States offer several conservation programs to aid landowners. The Conservation Reserve Program (CRP) is the nation's largest government conservation program (Jacobs *et al.*, 2014). The CRP is administered by the Farm Service Agency (FSA), while technical assistance is provided by the Natural Resources Conservation Service (NRCS). Landowners with marginal farmland are targeted to sign up and convert their property to a more suitable land cover. For example,

qualifying landowners in the Southeast are offered the opportunity to convert their marginal farmland to longleaf pines (Lavoie *et al.*, 2011). Contracts are offered at either 10 or 15 year increments, often with the possibility to renew the contract. Landowners are provided with an annual rental payment, 90% cost-share, and the technical assistance for converting the landscape. While under contract, the landowner must abide by the management plan drafted at the time the land enters into the contract (Hellerstein, 2012).

### *Conservation easements*

Conservation easements are permanent agreements where certain property rights (such as development rights) are transferred from the landowner to a conservation organization, such as a government agency or a land trust. Private land trusts are non-profit, non-governmental organizations that “actively work to conserve land by undertaking or assisting in land or conservation easement acquisition, or by stewardship of such land or easements” (LTA, 2011). Land trusts differ greatly in the size and scope of their operation. Some focus on local or regional environmental concerns, while others work on a national (or international) level. In addition, land trusts often maintain a diversity of missions including wildlife conservation, habitat restoration, soil conservation, cave preservation, recreation, and the protection of open space (Brewer, 2003).

Conservation easement contracts are voluntary and legally binding. Landowners who enroll their property in a conservation easement receive tax deductions and occasionally sign-up bonuses. According to the Internal Revenue Code 170(h) a property can qualify for a conservation easement if it serves a conservation purpose. Conservation purposes are defined as 1) preserving land for outdoor recreation and/or education for the

general public, 2) protecting an important ecosystem, 3) preserving of open space (including farmland and forestland) for the scenic enjoyment of the general public, or falls in line with federal, state, or local policy that yields public benefits, and/or 4) preserving a historical site or structure (Lindstrom, 2008).

#### *Motivations for management practices*

Past studies have often focused on the demographic measures (i.e. age, income, profession, residence) to explain management decisions among private landowners (Joshi and Arano, 2009; Fischer, 2011). However, other studies have indicated that management decisions are much more complex and require additional consideration in the motivations that guide property objectives.

Bengston *et al.* (2011) analyzed the open-ended response question on the National Woodland Owner Survey that asked private forest owners to indicate the main reason they own their woodlot. They were able to distill eight broad categories and 37 sub-categories from the diverse, multidimensional motivations identified by the survey respondents. The categories included environment, recreation, investment, home, non-instrumental, family, farm/ranch, and incidental ownership. The majority of these reasons are non-consumptive, which has also been found in other studies that have explored landowner motivations. Concepts such as privacy, a legacy for future generations, personal experiences on the property, and appreciation of natural intrinsic value are often cited as primary motivations for property ownership (Ross-Davis *et al.*, 2005; Paloniemi and Tikka, 2008).

Several studies have found that non-industrial private forest owners are primarily motivated by environmental protection and aesthetic reasons rather than economic ones

(Erickson *et al.*, 2002; Ryan *et al.*, 2003). Furthermore, landowners have been found to be more likely to engage in conservation behaviors if they have a strong personal attachment to their property (Ryan *et al.*, 2003).

#### *Motivations for enrollment*

Several past studies have explored landowner motivations for enrolling in conservation incentive programs. Researchers using an economic lens report financial motivations, such as cost-share agreements as the main driver for landowner participation (i.e. Mehmood and Zhang, 2002). In comparing various conservation incentive scenarios, Goldman *et al.* (2007) focus only on the financial drivers, such as sign-up bonuses, rental payments, and cost-shares that may influence participation. Bliss and Martin (1990) note several financial “external” motivations influencing landowners’ management decisions as: income generating opportunities, forest property tax programs, cost-share programs, and the benefit of technical assistance. In addition, Parker (2004) asserts that those who enroll in conservation easements are primarily seeking the financial benefits.

However, research also demonstrates that there are often multiple motivations that influence the ways in which landowners manage their properties. Sorice *et al.* (2012) identified one cluster of landowners in a Texas-based study that were motivated by a combination of maintaining a rural lifestyle, investment, agricultural production, and providing wildlife habitat when considering enrollment in conservation incentive programs.

Ernst and Wallace (2008) also specifically examined the motivations that influence private landowners to enroll in conservation programs. Their study indicated five divisions of motivations that affect participation: natural resource protection,

community-mindedness, family commitments, financial incentives, and agricultural production. Natural resource protection was defined as the satisfaction of contributing to conservation, the desire to safeguard wildlife habitat, open space, and unique ecosystems as well as preventing poorly planned development. Community-mindedness was described as the desire to protect natural resources for the benefit of future generations and the overall quality of the community as well as the normative component of the influence of fellow residents. Family commitments indicated the desire to keep the land under family ownership, preserving family legacy, and aid in estate planning. Financial incentives were defined as the tax and monetary benefits of enrollment. Production signified the desire to preserve the traditional use of properties, protect working farms and ranches, and protect regionally important prime farmland.

Similarly, Farmer *et al.* (2011) found that landowners in Indiana were most motivated by a combination of personal environmental values, desire to benefit the community, and the ability to prevent unwanted development. Financial considerations ranked lowest in both easement holders and non-participants.

Kabii and Horwitz's (2006) review of landowner motivations for participation in conservation incentive programs identifies several additional determinants common in numerous studies on the subject. These factors include landowner demographics, length of program contract, knowledge and awareness of programs, economic benefits, and risks/benefits associated with the program. Maintaining a high conservation ethic was also identified as a motivation for enrollment. In addition, the review indicated that fear of inequitable compensation and infringement of property rights were factors contributing to non-participation.

Cross *et al.* (2011) build on Kabii and Horwitz's article to explore place attachment and trust in land trusts as components influencing enrollment. They further analyze the influence of landowners' economic dependence and conservation ethic on enrollment. Their results indicated that economic dependence were positively related to conservation ethic, but negatively related to enrolling in a conservation easement. This suggests that non-participants may hold a high conservation ethic but may be unwilling to enroll due to financial considerations. In addition, being approached by a land trust was positively associated with trusting the organization and increased the likelihood of enrollment in a conservation easement. Results also indicated that strong place attachment is often associated with a high conservation ethic (Cross *et al.*, 2011).

The majority of the research on conservation incentive programs has been conducted in western (i.e. Ernst and Wallace, 2008; Cross *et al.*, 2011) and northeastern states (i.e. Kilgore *et al.*, 2008; Butler and Ma, 2011). Only a few studies have examined these factors for participation in conservation programs in the Southeastern United States. Jacobson (2002) noted landowners' concern over maintaining control of land rights and the desire to limit outside intervention when asking about joint management among South Carolina landowners. Gentle *et al.* (1999) also noted that landowners in the Southern United States put a strong emphasis on the individual having responsibility and control over his/her land. Results from their study suggest that Southern landowners were least open to the general public using their property for outdoor recreation. In addition, some have asserted that lack of participation in the Southeast is a result of lack of knowledge of conservation programs (Raedeke *et al.*, 2001; Measells *et al.*, 2005).

The current study attempts to build upon these past research findings to understand the characteristics and motivations of participants and non-participants in conservation incentive programs in the Southeast. In addition, we examine the factors that deter non-participating landowners who are aware of the programs from enrolling.

## **Methods**

### *Study site*

Alabama is the fifth most biologically diverse state in the country (The Nature Conservancy, 2011). The state contains 18 river systems and provides habitat for the most species of freshwater fish, mussels, turtles, snails and crayfish in the United States. However, there are 119 species listed as threatened or endangered within the state (FWS, 2011). In addition, 60% of the state is forested and the majority is private land (Silvano *et al.*, 2010). The perilous condition of Alabama's environment coupled with high percentage of privately owned land, makes the cooperation of landowners essential in conservation efforts.

The state of Alabama was chosen as the physical boundary of this study. Alabama provides an interesting context for studying private landowners. The majority of past research on private landowner management decisions regarding conservation incentive programs has been focused on western states (i.e. Ernst and Wallace, 2008; Cross *et al.*, 2011) or the northeast (i.e. Kilgore *et al.*, 2008; Butler and Ma, 2011).

Currently, there are 320 conservation easements (144 federally held, 175 held by a NGO, one with an unknown holder) within the state (National Conservation Easement Database, 2013). Between 2005 and 2010, Alabama experienced a 101% increase in the number of acres enrolled in conservation easements (LTA, 2011). In the 2010 Land Trust

Alliance Census, Alabama ranked in the bottom third of the number of land trusts operating in the state (tied with AK, KS, NM, UT, and WV at eight). However, the state is 17<sup>th</sup> in the nation for the number of acres enrolled in easements. In addition, it ranks 24<sup>th</sup> in the nation and sixth in the Southeast for total number of acres conserved by land trusts at 161,015 acres (LTA, 2011).

Furthermore, there have been a total of 17,315 participants in Alabama enrolled in the CRP from 1995-2012 (EWG, 2012). Currently, there are over 230,825 acres actively enrolled in the program in Alabama (USDA, 2012).

#### *Data collection*

A survey was designed based on a literature review and the results of a scoping process that included 20 qualitative interviews with both conservation incentive program administrators and participating landowners. The scoping process focused on property objectives, current land use, motivations for owning property, and reasons for participation (or non-participation) in a conservation incentive program.

The survey was administered to a sample of 2000 landowners throughout Alabama in the spring of 2013. Names and addresses were acquired through local town halls or purchased by a private service (Survey Sampling International). Landowners were randomly chosen from this database, given that they owned at least 20 acres of property. This criterion was chosen because the average privately held property is approximately this amount (Ma *et al.*, 2012).

The survey was administered using a modified version of the Dillman *et al.* (2009) method. First, landowners were sent a pre-notice postcard as a notification that they would be requested to complete a questionnaire on land management decisions and



conservation behavior. Next, the sample was sent an information letter with a web address and unique password to access the questionnaire online. Three weeks later, a postcard was sent to those who had not completed the questionnaire online giving them the option to 1) receive a paper copy of the questionnaire or 2) not participate in the study. Paper copies were sent to those who requested them. Reminder letters were sent to those who did not complete the questionnaire. In addition, a paper copy was sent to a random sample of those who had not responded in any way.

### *Measurement*

The questionnaire measured dimensions of participation in conservation programs with a Likert type scale ranging from 1 = “strongly disagree” to 5 = “strongly agree”. The items included questions focusing on landowner objectives, motivations for achieving objectives, perceptions on conservation programs and the organizations that run them, and conservation values. Participants were presented with a section of questions relating directly to motivations for enrollment and non-participants were asked to complete a specific section on reasons for not enrolling. The wording for the scale items was developed from the scoping process.

### *Landowner objectives*

The questionnaire measured dimensions of landowner objectives with 18 Likert items on the individuals’ importance of achieving certain goals on his/her property. Response categories ranged from 1 = “Not important at all” to 5 = “Very important”. Both consumptive and non-consumptive objectives were included. A factor analysis identified 12 items (see Table 1) clustering into four distinct dimensions: environment, peaceful residence, maximizing investment, and recreation (see Table 2).

### *Landowner types*

The questionnaire measured values and motivations that influence the way landowners manage their properties with 26 Likert items. Response categories ranged from 1 = “Strongly disagree” to 5 = “Strongly agree”. The items included various topics social perceptions of conservation practices, perceptions on the services properties provide the community, and family importance. A factor analysis identified 20 items (see Table 3) clustering into five distinct dimensions: conservation behavior, community benefits, social norms, personal use, and personal connection (see Table 4).

### *Conservation Beliefs*

A factor analysis was conducted on nine Likert scale items to distinguish types of conservation beliefs held by landowners. The items used were based on the New Environmental Paradigm (Albrecht *et al.*, 1982). Three distinct factors were identified: anti-regulation, conservation as a means to benefit the community, and fear of environmental destruction (see Table 5 and 6).

## **Results**

Out of the 2000 randomly sampled landowners asked to participate in this study, 123 did not have a viable address and 276 declined to participate after initial contact. Approximately 18% (362 landowners) completed the questionnaire. Of these, 155 filled out the online version and 187 returned the hard copy.

### *Demographics*

The majority of landowners (42%) characterized their land as forested. Farmland (16%), residential (15%), recreation (13%), ranching (7%) and investment (7%) were cited to lesser degrees. The majority of landowners (71.8%) indicated that there is a

designated successor to take over the management of the property upon their passing. The typical respondent was male (76.4%), well educated (50.9% with a bachelor's, graduate, or professional degree), relatively wealthy (70.9% earning \$50,000 or greater), retired (55.5%), married (79.8%), white/Caucasian (92.4%), and politically conservative (77.4% somewhat or very conservative). The majority of landowners obtain 10% or less of their income from their property (78.2%), with 45.2% receiving no household income from their property.

Thirty-one (8.4%) respondents perceived themselves as knowing “a lot” about conservation programs whereas 126 (34.2%) know “some”, 97 (26.4%) know “a little”, and 108 (29.3%) know “nothing”.

#### *Factors influencing participation in conservation programs*

A forward binary logistic regression was used to answer the question, “What predicts participation in conservation incentive programs?” ( $p < 0.001$ ) and explains 64.8% of the results. Property objectives, motivations for management, and conservation beliefs were the factors included in the regression. Four variables were statistically significant predictors. Individuals with higher scores on conservation beliefs (fear of environmental destruction), motivated by conservation behaviors, holding the objective to have a peaceful home, and holding the objective of maximizing investment were more likely to participate in conservation incentive programs (see Table 7).

#### *Participant motivations*

Of the respondents who participate in conservation incentive programs 94 (25.6%) are enrolled in a cost-share program, 13 (3.5%) have a conservation easement, and four were unsure of their program type. Six (1.6%) indicated that the program was

administered by a land trust, 43 (11.7%) administered by a state program, 96 (26.1%) were run by a federal program, and 11 were unsure of the administering organization.

A factor analysis was conducted on items only answered by program participants to determine their reasons for enrollment (see Table 8). Twenty items were included in the factor analysis and resulted in five distinct participant motivation groups: program compatibility, program satisfaction, market accessibility, market conditions, and financial state (see Table 9).

#### *Non-participant motivations*

When asked if they had ever considered enrolling in a conservation incentive program, 86 respondents indicated that they had thought about a cost-share program (CRP, WHIP, EQIP) and 21 had looked into permanent contracts.

A factor analysis on 12 items was used to identify potential factors preventing landowners from participating in incentive programs (see Table 10). The items factored into three scales of negative perceptions of programs, incompatibility, and legal concerns (see Table 11).

Non-participants were asked the question “Assuming the benefits were sufficient, how likely would you be willing to participate in a program for conservation that required the following contract length” for four different contract terms on a Likert scale with 1 as “definitely not” and 5 as “definitely”. Negative responses were given for each contract length: 10-year ( $M = 2.81$ ,  $SD = 1.058$ ), 20-year ( $M = 2.19$ ,  $SD = 0.986$ ), 30-year ( $M = 1.91$ ,  $SD = 0.965$ ), and permanent contract ( $M = 1.69$ ,  $SD = 0.989$ ).

#### *Legal implications of conservation programs*

To further examine landowners' concerns on program implications several items were presented on perceptions of the longevity and legal uncertainties of conservation incentive programs. The scale for this dimension comprised five items, including the stability of the organizations that run the program, the effectiveness of contracts on property, and the legal hurdles that the programs face (see Table 12). All items reflect concern over the legal underpinnings of conservation incentive programs. The items were combined into a single scale, using the mean of all items (Cronbach's  $\alpha = 0.60$ ). Participants ( $M = 2.96$ ,  $SD = 0.51$ ) and non-participants ( $M = 3.11$ ,  $SD = 0.46$ ) significantly differ on their views of legal uncertainties;  $t(240) = -2.35$ ,  $p = 0.02$ .

## **Discussion**

Findings of this study have implications for research on conservation incentive programs. Past research has indicated that there has been difficulty in obtaining the cooperation among private forest landowners (which includes the majority of participants in this study) in conservation incentive programs. Less than 10% of family forest landowners have enrolled in a conservation incentive program, nationwide (Butler, 2008). For example, Kilgore *et al.*'s (2008) study found that 40% of their sample of family forest owners was unsure about enrolling in any conservation incentive program. The current study attempts to offer insight on this trend.

Several past studies found non-use ownership objectives as primary motivations for owning land particularly among forest landowners. Such objectives included lifestyle enhancement (Haymond, 1988), aesthetic appreciation (Erickson *et al.*, 2002), simple living (Kendra and Hull, 2005), privacy (Ross-Davis *et al.*, 2005), family legacy (Richter, 2005), spiritual importance (Rickenbach *et al.*, 2006), and rural living (Sorice *et al.*,

2012). Similarly, the results of the current study indicate non-consumptive objectives such as recreation and peaceful residence.

Environmental objectives, conservation behavior motivation, and dimensions of conservation beliefs were all significantly different between participants and non-participants. This is similar to Farmer *et al.*'s (2011) study comparing easement holders to non-participants. However, unlike Farmer *et al.* (2011) and other past studies, the current study found a significant difference between participants' and non-participants' financial objectives with participants indicating a higher desire to maximize investment.

Landowner motivation types found in this study matched up relatively well in identifying motivation types found by Ernst and Wallace's (2008) Colorado-based study on conservation incentive program participants. Both recognized groups focused on natural resource protection, community-mindedness, family values, and financial considerations. While Ernst and Wallace's (2008) study only focused on participant motivations for enrollment, this study considered both motivations for land management practices as well as motivations for enrollment. This study identified additional components to landowner types and motivations for program enrollment including personal use, social norms, satisfaction, compatibility, and market conditions. The rankings of each construct differed between the two studies. Participants in this study cited personal use over conservation, whereas the latter was the top noted measure in Ernst and Wallace's (2008) study. In addition, while participants in the current study generally agreed that community benefits, production, and (to a lesser degree) financial state are motivating factors, Ernst and Wallace's (2008) participants generally disagreed.

These differences may be related to cultural difference, however this assertion requires additional research.

Other studies also indicate that participating landowners are satisfied with programs and compatibility with goals as factors influencing program enrollment (Forshay *et al.*, 2005; Kilgore *et al.*, 2007; Dombrovski *et al.*, 2011; Rissman and Sayre, 2012). Although previous studies have noted that incentive programs can enhance production abilities on enrolled properties (Feather *et al.*, 1999; Kilgore *et al.*, 2007), studies on programs in the United States have not focused on market accessibility. Examples from other nations indicate that incentive programs enable landowners to tap into a new market, which is especially beneficial to rural landowners who may not have effective means to transport their products (Ferraro, 2001; Engel *et al.*, 2008).

Lack of knowledge of conservation incentive programs showed to be prevalent among participants, as almost 57% of respondents noted that they knew little to nothing about the programs. Other studies have also found that landowners are generally unaware of conservation incentive programs offered in their region (Kabii and Horwitz, 2006; Kaetzel *et al.*, 2009). This seems especially true in the Southeast as a survey conducted by Measells *et al.* (2005) in the region showed that 75% of landowners were unaware of programs that could be utilized to benefit their forest land. Raedeke *et al.* (2001) assert that lack of knowledge is a function of lack of education on programs in the Southeast.

Non-participants who are aware of the programs available to them may experience competing motivations and barriers to enrollment, as described by Kabii and Horwitz (2006). However, unlike both Kabii and Horwitz's (2006) and Cross *et al.*'s (2011) studies, the data from this survey did not reveal that the private landowners have a

high dependence on their property for income, which may also explain the top two motivations for land ownership.

The measurements conducted on conservation beliefs yielded interesting results. Both groups were opposed to the government intervening to aid in environmental issues. This is perhaps a function of fear of property rights infringement (Kabii and Horwitz, 2006). Whereas participants believe that changes in land management practices can help the environment, non-participants disagree. In addition, participants are more concerned about environmental destruction than non-participants. The results of the last two constructs are not surprising as those enrolled in conservation programs are often noted to hold stronger conservation beliefs (Ernst and Wallace, 2008; Farmer *et al.*, 2011).

Legal uncertainties and implications have been hypothesized to deter landowners from participating in conservation incentive programs (Kabii and Horwitz, 2006). For example, Nagubadi *et al.* (1996) found landowners feared a loss of property rights and Gutwein and Goldstein (2013) noted the concern of ranchers on restrictions of property use and other legal factors. In addition, Lockie and Rockloff (2005) found a fear of loss of funding and long-term existence of programs among the landowners sampled in Australia as well as a distrust of government intervention on private property. Similarly, non-participants in this study imply more uncertainty in the legal framework of the programs than participants.

Brewer (2003) posits that the Southeast is an appropriate region for expanding the conservation easement movement because of the amount of private land. The results of this study suggest this may be a difficult task as the majority of non-participating landowners noted that they were opposed to enrolling their properties in binding



contracts. Non-participants in the current study were disinclined to enroll in a contract of any length even with adequate incentives. Moreover, the majority of non-participating landowners were opposed to working with any government agency or NGO, except an extension agency. Given that the culture of the South has a “territorial conscious ancestry” (Gentle *et al.*, 1999), these results are not surprising.

It is important to recognize that conservation incentive programs are not the best fit for all landowners and other options must be explored. Kabii and Horwirz (2006) explain that although some landowners highly value conservation, they may not find programs necessary to engage in conservation efforts. In addition, they maintain that landowners are a heterogeneous group and there is no “one-size-fits-all” approach to fulfilling their objectives.

These findings have implications for further research on landowner decision-making and behavior. Future research on the factors preventing landowners from enrolling in conservation programs would be helpful to define reasons for non-participation and identify potential alternatives (especially in Alabama and states with low enrollment). Research on additional techniques that encourage conservation efforts among private landowners would be interesting to explore. If tax benefits and cost-share benefits are unappealing, what incentive could be potentially offered for cooperation among non-participating landowners? What types of programs are appealing to landowners whose main motivations for owning property are non-use non-economic, intangible concepts? Perhaps, affording educational programs to such landowners would be helpful. Peer-to-peer education has been a suggested approach by some (Sagor, 2012), and has received positive reviews by those who have participated in pilot programs (Ma

*et al.*, 2011). Exploring the willingness of adopting such programs in the Southeast United States may be a beneficial approach to conservation in the region. The recent passage of the latest Farm Bill may be reassuring to those on the fence about term contracts.

## **Conclusion**

It is important to realize that conservation incentive programs are not the only means for encouraging conservation practices among private landowners. The values of some may not align with the goals, objectives, and contract details of conservation incentive programs, and thus other options should be made available to get this demographic on board. For those that are “on the fence” about conservation incentive programs, conservation organizations need to make strides in gaining trust and educating private landowners in the region. Alabama landowners’ lack of willingness to work with conservation organizations is a testament to the deficiency in confidence that they can aid landowners in achieving their goals. Exploring alternative actions may be the best route for encouraging non-participants to engage in conservation efforts.

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**Table 1.** Factor loadings of landowners' objectives for their properties.

	Environment ( $\alpha = 0.79$ )	Personal Residence ( $\alpha = 0.65$ )	Investment/Income ( $\alpha = 0.67$ )	Recreation ( $\alpha = 0.73$ )
Reducing wildfire risks	.822			
Managing forest health	.798			
Enhancing wildlife habitat	.651			
Restoring native species	.644			
Providing a home for me or my family		.788		
Peace and quiet		.767		
Personal enjoyment		.692		
Providing income			.846	
Maximizing investment value			.723	
Crop production			.603	
Timber production			.569	
Recreational purposes				.876
Hunting and/or fishing				.800

**Table 2.** Comparison of landowner objectives scales between participants and non-participants.

	Mean Score	Std. Dev.	Composite Mean	Participant Mean	Non-participant mean
<b>Environment*</b>			3.86	3.97	3.78
Reducing wildfire risks	3.90	1.09			
Managing forest health	4.16	1.04			
Enhancing wildlife habitat	4.12	1.02			
Restoring native species	3.25	1.27			
<b>Peaceful residence</b>			4.31	4.23	4.34
Providing a home for me or my family	3.89	1.61			
Peace and quiet	4.41	0.92			
Personal enjoyment	4.64	0.74			
<b>Maximizing investment**</b>			3.49	3.76	3.31
Providing income	3.56	1.36			
Maximizing investment value	4.05	1.15			
Crop production	2.48	1.50			
Timber production	3.85	1.35			
<b>Recreation</b>			3.86	3.96	3.80
Recreational purposes	3.87	1.23			
Hunting and/or fishing	3.85	1.30			

\*\* denotes significance  $\leq 0.001$

\* denotes significance  $\leq 0.05$

**Table 3.** Factor loadings for landowner motivations for land management practices.

	Community benefits ( $\alpha = 0.79$ )	Conservation behavior ( $\alpha = 0.79$ )	Social norms ( $\alpha = 0.80$ )	Personal connection ( $\alpha = 0.63$ )	Personal use ( $\alpha = 0.68$ )
My property provides the community with additional scenic beauty.	.789				
My property helps protect the overall quality of the community.	.787				
My property preserves open space in my community	.737				
Owning my property protects the area from development.	.607				
My property benefits the health of my community's water.	.567				
Practicing conservation is very beneficial to my land.		.787			
Practicing conservation on my land would NOT cause too many problems.		.749			
For me, practicing conservation is just the right thing to do.		.729			
Practicing conservation on my land is a priority.		.714			
My community is supportive of conservation efforts.			.864		
My peers are supportive of conservation efforts.			.803		
The state of Alabama is supportive of conservation efforts			.723		
My property is important to my family heritage.				.791	
This property was special to me during my childhood.				.726	
Ownership of my property is a means of leaving a legacy after my passing.				.647	
I have a spiritual connection to my property.				.475	
My property is important for recreational use.					.789
My property provides me with personal enjoyment.					.675
I enjoy learning new ways to manage my property.					.563

**Table 4.** Landowner typology reflecting how and why landowners manage their property.

	Mean score	Standard dev.	Composite mean	Participant mean	Non-participant mean
<b>Conservation behavior**</b>			4.05	4.24	3.94
Practicing conservation is beneficial to my land.	4.13	0.76			
For me, conservation is just the right thing to do.	4.37	0.69			
Practicing conservation on my land would NOT cause too many problems.	3.90	0.74			
Practicing conservation on my land is a priority.	3.78	0.99			
<b>Personal use*</b>			4.30	4.38	4.25
My property is important for recreational use.	4.06	0.90			
My property provides me with personal enjoyment.	4.59	0.63			
My property provides habitat for wildlife.	4.41	0.67			
I enjoy learning new ways to manage my property.	4.12	0.88			
<b>Community benefits</b>			3.59	3.65	3.55
My property provides the community with additional scenic beauty.	3.55	1.03			
My property helps protect the overall quality of the community.	3.68	0.94			
Owning my property protects the area from unwanted development.	3.65	1.19			
My property preserves open space in my community	3.35	1.10			
My property benefits the health of my community's water.	3.72	0.90			
<b>Social norms*</b>			3.62	3.74	3.55
My peers are supportive of conservation efforts.	3.60	0.78			
My community is supportive of conservation efforts.	3.46	0.75			
The state of Alabama is supportive of conservation efforts	3.80	0.72			
<b>Personal connection</b>			3.98	4.01	3.93
My property is important to my family heritage.	4.44	0.79			
Ownership of my property is a means of leaving a legacy after my passing.	4.12	0.92			
I have a spiritual connection to my property.	3.62	1.20			
This property was special to me during my childhood.	3.67	1.38			

\*\* denotes significance  $\leq 0.001$

\* denotes significance  $\leq 0.05$

**Table 5.** Factor loadings of conservation belief items.

	Conservation to benefit the community	Anti-regulation	Fear of environmental destruction
Good land management can improve both economic and environmental values.	.877		
I believe conservation practices have a beneficial impact on the surrounding community.	.856		
I believe conservation practices will improve the environment over time.	.836		
Good business practices provide protections for land, water, and wildlife	.573		
Regulations on land management are a loss of liberty and freedom.		.821	
Land management in this country is already overregulated.		.797	
The government's job is to protect what's good for society, including the environment (reverse code)		.658	
Humans are severely abusive of the environment.			.858
If things go on the way they are, we will soon have an ecological catastrophe.			.855

**Table 6.** Comparison of conservation belief scales between participants and non-participants.

	Mean score	Std. dev.	Composite mean	Participant mean	Non-participant mean
<b>Anti-regulation</b>			3.25	3.20	3.27
Regulations on land management are a loss of liberty and freedom.	3.45	0.99			
Land management in this country is already overregulated.	3.27	0.91			
The government's job is to protect what's good for society, including the environment (reverse code)	3.02	1.10			
<b>Conservation to benefit the community*</b>			4.02	4.11	3.97
Good land management can improve both economic and environmental values.	4.11	0.61			
I believe conservation practices have a beneficial impact on the surrounding community.	4.04	0.67			
I believe conservation practices will improve the environment over time.	4.02	0.65			
Good business practices provide protections for land, water, and wildlife	3.09	0.78			
<b>Fear of environmental destruction*</b>			3.16	3.00	3.25
Humans are severely abusive of the environment.	3.50	1.06			
If things go on the way they are, we will soon have an ecological catastrophe.	2.81	1.06			

\*\* denotes significance  $\leq 0.001$

\* denotes significance  $\leq 0.05$

**Table 7.** Binary logistic regression results for factors predicting participation in conservation incentive programs.

	B	S.E.
Fear of environmental degradation	.344*	.136
Conservation behavior motivation	-.837**	.222
Peaceful residence objective	.339*	.138
Maximizing investment objective	-.510**	.143
Constant	3.236	1.063

\*\*\* denotes significance  $\leq 0.001$

\*\* denotes significance  $\leq 0.05$

\* denotes significance  $\leq 0.1$

**Table 8.** Factor loadings of landowners' motivations for enrolling in conservation incentive programs.

	Satisfaction ( $\alpha = 0.86$ )	Compatibility ( $\alpha = 0.78$ )	Accessibility ( $\alpha = 0.85$ )	Market conditions ( $\alpha = 0.64$ )	Financial state
The people were helpful.	.851				
The sign-up process was straight forward.	.798				
My goals aligned with those of the group running the program.	.770				
Enrolling in a conservation program has helped me reach the objectives for my property.	.764				
I am satisfied with enrolling in a conservation program.	.638				
A conservation program still allows me to manage the property the way I'd like		.805			
My family was supportive of enrolling in a conservation program.		.761			
I trust the organizations that run conservation programs.		.661			
The idea of conservation programs seemed attractive as soon as I learned of them.		.525			
I think conservation programs are effective.		.485			
The products my property produces is too far away from roads to transport them. (reverse code)			.859		
My property is not useful for production. (reverse code)			.838		
My property is not big enough for production. (reverse code)			.813		
Markets for the products my property produces do not exist in my area. (reverse code)			.758		
I was unable to find someone to rent my property. (reverse code)			.592		
The agricultural market influenced my decision to enroll my property.				.766	
Timber prices influenced my decision to enroll my property.				.696	
The state of the economy was a factor in enrolling my property.				.659	
Retirement was a contributing factor.				.491	
<b>Financial state</b>					.786



**Table 9.** Scales for participant motivations for enrolling in a conservation incentive program.

	Mean score	Standard deviation	Composite mean
<b>Compatibility</b>			3.75
I trust the organizations that run conservation programs.	3.69	0.73	
The idea of conservation programs seemed attractive as soon as I learned of them.	3.81	0.64	
A conservation program still allows me to manage my property the way I'd like.	3.70	0.79	
I think conservation programs are effective.	3.87	0.62	
My family was supportive of enrolling in a conservation program.	3.69	0.65	
<b>Satisfaction</b>			3.93
I am satisfied with enrolling in a conservation program.	4.03	0.70	
Enrolling in a conservation program has helped me reach the objectives for my property.	3.92	0.68	
The sign-up process was straight forward.	3.83	0.72	
The people were helpful.	4.07	0.59	
My goals aligned with those of the group running the program.	3.84	0.68	
<b>Accessibility</b>			4.04
My property is not useful for production. (reverse code)	4.08	0.87	
The products my property produces is too far away from roads to transport them. (reverse code)	4.11	0.77	
My property is not big enough for production. (reverse code)	4.03	0.85	
Markets for the products my property produces do not exist in my area. (reverse code)	3.97	0.83	
I was unable to find someone to rent my property. (reverse code)	3.85	0.86	
<b>Market conditions</b>			2.72
Timber prices influenced my decision to enroll my property.	2.75	1.03	
The agricultural market influenced my decision to enroll my property.	2.86	1.00	
Retirement was a contributing factor.	2.54	0.99	
The state of the economy was a factor in enrolling my property.	2.70	0.97	
<b>Financial state</b>			3.44

**Table 10.** Factor loadings for non-participant motivations for declining participation in conservation incentive programs.

	Negative perception ( $\alpha = 0.89$ )	Incompatible ( $\alpha = 0.74$ )	Legal concerns
The sign up process is too confusing.	.815		
The programs aren't flexible enough to meet my needs.	.802		
The contract details usually don't work for me.	.791		
It's too much hassle to get involved.	.689		
I don't trust the organizations or agencies that run these programs.	.650	.524	
Programs like these tend to create unintended consequences.	.642		
I'm uncomfortable with the attention programs like these would bring me.		.775	
I don't want to be involved in programs.		.728	
I don't think the government should pay for programs like these.		.708	
The financial benefit isn't high enough for me.		.680	
The programs aren't compatible with my goals for my land.		.591	
I'm concerned about the legal or regulatory implications.			.816

**Table 11.** Scales describing non-participants' motivations for declining enrollment in a conservation incentive program.

	Mean score	Standard deviation	Composite mean
<b>Negative perception</b>			3.21
The programs aren't flexible enough to meet my needs.	3.23	0.73	
I don't trust the organizations or agencies that run these programs.	3.04	0.92	
The contract details usually don't work for me.	3.11	0.62	
It's too much hassle to get involved.	3.39	0.85	
Programs like these tend to create unintended consequences.	3.26	0.88	
The sign up process is too confusing.	3.21	0.73	
<b>Incompatible</b>			2.95
I don't think the government should pay for programs like these.	2.89	0.94	
The programs aren't compatible with my goals for my land.	2.96	0.75	
I don't want to be involved in programs.	3.06	0.87	
I'm uncomfortable with the attention programs like these would bring me.	2.76	0.78	
The financial benefit isn't high enough for me.	3.07	0.75	
<b>Legal concerns</b>			3.48
I'm concerned about the legal or regulatory implications.	3.48	0.81	

**Table 12.** Legal concerns on conservation incentive programs held by landowners.

	Composite mean	Std. dev.	Participant mean	Non-participant mean	Cronbach's $\alpha$
Legal concerns	3.03	0.490	2.96	3.11	0.60
Permanent contracts will not pass legal hurdles.	3.31	0.751	3.32	3.30	
The funding for conservation organizations will eventually run out, ending the programs.	3.55	0.759	3.54	3.57	
The groups that run conservation programs are not stable.	2.93	0.773	2.83	3.03	
Temporary conservation contracts are ineffective in benefiting the environment.	2.78	0.832	2.61	2.94	
Conservation programs take good land out of production, harming the community's economic state.	2.60	0.859	2.50	2.70	

## **Chapter 5: Enabling and constraining factors for enrolling in conservation incentive programs: A case study of Alabama landowners**

### **Abstract**

The majority of land critical to biodiversity, in Alabama and the United States, is held in private property. This makes cooperation with private landowners essential as conservation organizations attempt to preserve and protect these regions. Conservation incentive programs have become a central means of attracting private landowners to adopt desired land management practices. In such programs, landowners are rewarded with financial and non-financial benefits for adopting conservation-friendly techniques. To understand what influences participation in these programs a case study of private landowners was conducted in Alabama. The results of this study 1) classified the landowners' desired outcomes for their properties and the strategies they use to achieve them and, 2) identified landowners' capital assets enabling and/or constraining participation. Desired outcomes included managing for forest health, enhancing wildlife habitat, peace and quiet, personal enjoyment, and maximizing investment value. Primary strategies used to achieve these outcomes included timber production, recreational use, and hunting and/or fishing. Natural, social, financial, and human capitals were identified as significant factors influencing participation. Furthermore, using capital assets to

examine landowner decision-making processes was deemed useful in explaining behavior.

## **Introduction**

In the United States, the majority (56%) of forestland is privately owned, with 62% (264 million acres owned by 10.4 million people) held by families, individuals, and other non-industrial groups of individuals (Butler, 2008). In the state of Alabama, there are over 600,000 non-industrial private landowners, collectively holding a vast amount of property critical for biodiversity. This makes cooperation in conservation efforts especially important as biodiversity is a central component in enriching ecosystem services and contributing to human well-being (Millennium Ecosystem Assessment, 2005; Sorice *et al.*, 2012). The preservation and enhancement of these ecologically important areas becomes complicated when trying to engage private landowners in conservation efforts as they have the freedom to manage their properties as they wish.

Conservation incentive programs have become a primary method to promote conservation behaviors among private landowners (Langpap, 2004) by rewarding individuals with financial and non-financial benefits for adopting desired conservation practices. Incentives include tax deductions, cost-share agreements, technical assistance, and/or sign-up bonuses, depending on the type of contract. Incentive programs are administered by non-governmental organizations (land trusts) and government land management agencies. Land trusts primarily focus on fee simple land acquisitions (direct transfer of ownership) and conservation easements, where a landowner receives tax deductions in return for permanently preserving their property by transferring certain

rights to the administering organization. They aim to preserve a variety of environmental characteristics, including open space, pristine natural areas, localities used for outdoor recreation, and regions that provide vital ecosystem services (Brewer, 2003). Government agencies offer a range of programs focused on converting a property to a desired land cover, restoring a particular landscape, and preservation of important ecosystems (NRCS, 2013). These programs are usually term contracts (not permanent) and offer technical assistance.

Given that enrollment in conservation incentive programs is voluntary and has become a primary conservation method, it is important to understand the factors that influence participation among landowners. Although several studies have focused on describing the characteristics of private landowners, especially those owning forestland in the Southeastern United States (i.e. Measells *et al.*, 2005; Richter, 2005; Pan, 2006), few have differentiated between landowners' desired outcomes and their strategies to achieve these objectives. Furthermore, there is very little knowledge on the capabilities that enable (or constrain) landowners in enrolling in these programs.

The factors that enable and constrain landowners' participation in these programs are multi-faceted. This study applied a modified Sustainable Livelihoods approach to explore the options that are feasibly available to landowners to improve their well-being as well as the quality of their community. This framework recognizes that each individual holds different capabilities that dictate the options available in a decision-making context. In addition, each individual has multiple, competing objectives for themselves and their property. Each goal is ascribed a different rank, determining the person's decisions through motivation.

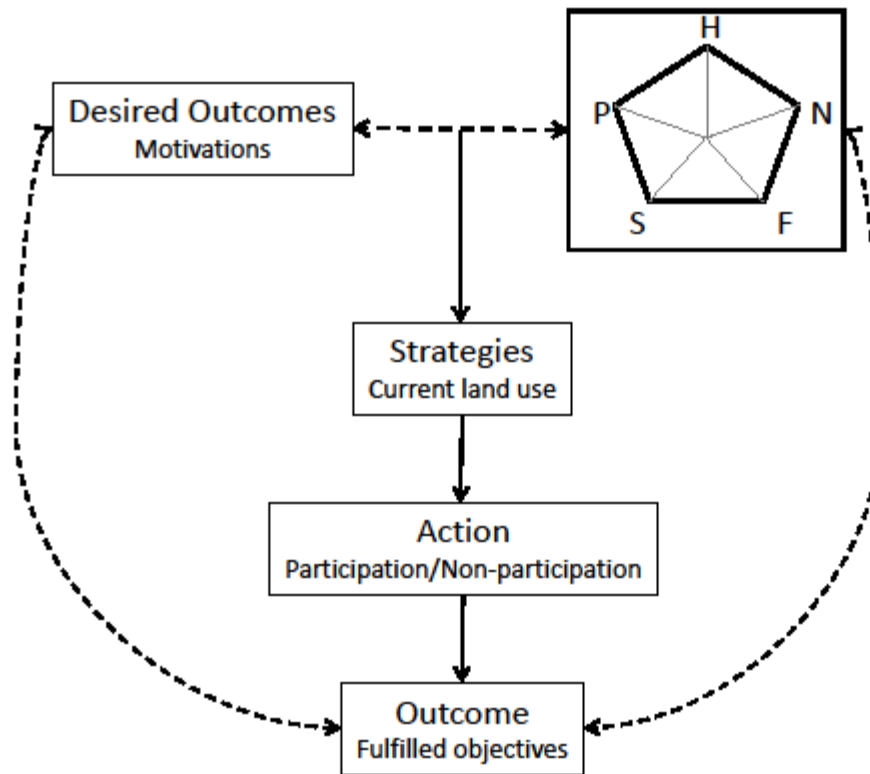
In addition, it is important to note that landowners are a diverse group and value and utilize each form of capital differently (Turner and Daily, 2008; Moran, 2010). An increase of one form of capital may be more appealing to one individual than others. These multiple motivations affect an individual's decision making process and result in outcomes that are dictated by 1) what is realistically possible in terms of potential social, economic, institutional, and technological constraints (Moran, 2010), and 2) what the landowner values most (Clayton and Myers, 2009). Current land use and management practices combined with motivations represent a landowner's strategies for reaching desired outcomes (see Figure 1). Taking action (or repeating the same action to maintain status quo) results in the outcomes caused by behavior. Ideal outcomes may not always be reached based on incomplete knowledge and unpredicted events involved in any decision (Ajzen, 1991).

In this study, the action of focus is the participation (or non-participation) in a conservation incentive program. Strategies are defined by the current land uses employed by the landowner. Desired outcomes are characterized as the motivations the landowner wants to realize. By comparing the five capital assets, current strategies, and desired outcomes between program participants and non-participants, we can pinpoint the areas that potentially allow or prevent landowners from conservation incentive program enrollment.

This study builds upon previous research by examining the characteristics of participating and non-participating landowners and investigating the objectives, strategies, and livelihood capitals to explore the foundation of landowners' decision making. The research questions explored in this study are 1) Do capabilities, strategies,



desired outcomes, or a combination of these drive conservation incentive program participation? and 2) Which capital assets affect participation? Although other studies have identified one or two capital assets influencing conservation behavior, this study takes a more holistic approach intended to provide additional insights on landowners' decision making processes.



**Figure 1.** Individuals have a set of human, natural, financial, physical, and social capitals that impact the actions reasonably available. Desired outcomes exist as a separate entity and represent the motivations the individual wants to realize. They are established based on multiple, often competing values. Strategies are developed that reflect what is feasible based on capital assets and what the individual wants to achieve. Actions are taken resulting in an outcome that potentially fulfills the individual's objectives. The consequences of the outcome (including any physical changes as well as imperceptible changes in thoughts and knowledge) feed back into the individual's reserve of capital assets and desired outcomes.

## **Background**

The Sustainable Livelihoods (SL) framework has been used to design policy decisions and employ development programs (Scoones, 1998). It is primarily used to better comprehend and enhance the livelihoods of poor and rural communities (Bebbington, 1999); however, it has also been used to study social-ecological issues. For example, Allison and Ellis (2001) use this framework to explore factors affecting the strategies used in small-scale fishing communities. In addition, Pereira (2010) uses SL to explore conservation and development by examining the utilization and outcomes for residents involved in payment for ecosystem services in the Amazon.

The SL framework considers a social and economic unit (usually a household) with access to five primary capital assets (see Table 1). These components of the SL framework provide a holistic perspective for identifying enabling and constraining factors influencing participation in conservation incentive programs. The amount and type of each form of capital plays a powerful role in decision-making as it defines the viable options available to the individual. It is also important to note that these five factors are not isolated components; rather they interact with each other. For example, an increase in financial capital may enable a landowner to invest in more land and thus enhance his/her natural capital. Alternatively, an injury resulting in the inability to work (human capital) may decrease a household's financial capital due to medical bills and stoppage of income.

**Table 1.** Definitions of the livelihood assets included in the Sustainable Livelihoods framework (Scoones, 1998) with examples examined in the current study.

Human Capital	<p>Skill levels, knowledge, ability to work, good health, education</p> <ul style="list-style-type: none"> <li>- Knowledge of programs</li> <li>- Property as residence</li> <li>- Enjoyment of learning new management skills</li> <li>- Retirement</li> <li>- Peace and quiet</li> <li>- Personal wellbeing</li> <li>- Education level</li> <li>- Successor for property</li> </ul>
Natural Capital	<p>Natural resource stocks, resource flows, ecosystem services</p> <ul style="list-style-type: none"> <li>- Wildlife habitat</li> <li>- Restoring native species</li> <li>- Quality of land cover</li> <li>- Protection of overall quality of community</li> <li>- Valuable part of ecosystem</li> <li>- Benefits community's water</li> <li>- Acreage</li> </ul>
Financial Capital	<p>Monetary resources used to meet objectives</p> <ul style="list-style-type: none"> <li>- Property as an investment</li> <li>- Providing income</li> <li>- Property value</li> <li>- State of economy</li> <li>- Household income</li> <li>- Percentage of income provided by property</li> </ul>
Physical Capital	<p>Basic infrastructure and producer goods, technology, access to information</p> <ul style="list-style-type: none"> <li>- Access to technical assistance</li> <li>- Open space in community</li> <li>- Scenic beauty</li> <li>- Threat of unwanted development in community</li> <li>- Access to markets</li> <li>- Infrastructure for transporting products produced by property</li> </ul>
Social Capital	<p>Networks, connectedness, trust, membership in groups, reciprocity exchanges</p> <ul style="list-style-type: none"> <li>- Perceptions of conservation organizations</li> <li>- Social norms of peers, community, and state</li> <li>- Willingness to work with conservation organizations</li> <li>- Sources of information</li> <li>- Helpfulness of peers, organizations</li> <li>- Influential people/organizations in land management decisions</li> </ul>

Although previous studies have not conducted analyses under the SL framework some have noted the different ways landowners' decision making can be influenced by the availability and utilization of different capital assets. The following review outlines

the contribution of previous work using the perspective and language of the SL framework.

Social capital has been found to be important in many past studies on engaging landowners in conservation efforts. For example, trust in administering organizations has been found to be a vital component of adoption of conservation programs in several studies (Sanders, 2005; Kabii and Horwitz, 2006; Cross *et al.*, 2011). Fear of property rights infringement of administering organizations has also been noted as a deterrent for program enrollment (Klapproth and Johnson, 2001; Wilcove and Lee, 2004; Sorice *et al.*, 2011). Social norms are a significant predictor of participation as well. For example, Sorice *et al.* (2011) found that program participants were likely to feel social pressure to enroll while non-participants experience the same persuasion to not enroll.

Pretty and Smith (2004) recognize the strong interaction between social and human capital as the connections individuals form in network groups can increase knowledge and skill levels. This phenomenon has been found to hold true in a variety of landowner studies that indicate that awareness of conservation issues is often a result of involvement in groups, relationships with neighbors, and interactions with professional agencies (Kabii and Horwitz, 2006; Shelton *et al.*, 2009). With the education and know-how gained from these social connections, individuals are able to enhance their skills to better reach their goals (Cramb, 2005). Furthermore, Campbell and Salus (2003) describe a case where a land trust worked in tandem with a social organization aiming to provide long-term affordable housing to low income residents. This partnership resulted in an increase in natural, human, and social capital, and the preservation of financial capital for residents.

Natural capital, even when held privately, is still somewhat a common-pool resource (Ostrom, 1990) as the state of one individual's "patch" of natural capital can have a significant impact on the surrounding environment. This is where the collective action of groups (social capital) and education (human capital) are utilized to protect the natural capital of the area (Pretty and Smith, 2004). Several studies indicate that when a community is well connected and residents' knowledge is valued and integrated, conservation efforts are more likely to be sustainable into the future (Pretty, 1995; Mayer and Tikka, 2006).

Turner and Daily (2008) note that ecosystems are increasingly perceived less for their scientific and intrinsic value and more for their economic worth: a shift strengthening the link between financial and natural capital. This is certainly true in conservation incentive programs, where the monetary benefit is rewarded for desired ecological practices on property. Several studies have criticized this aspect of the programs. For example, Tegene *et al.* (1999) assert that conventional appraisal methods overprice conservation easements by exaggerating the potential urban returns and overlook the option value of waiting for a better offer, while the current method of easement appraisal underprice the financial benefits. Parker (2006) also notes the problematic outcomes of appraisal errors. It has also been reported that properties encumbered by conservation contracts often sell for low financial return that may not have been covered by the initial financial benefits (McLaughlin, 2005). In addition, incentive programs may not be financially appropriate in all regions as Geisler (1993) suggests that the cost-effectiveness of conservation program may not be suitable for regions experiencing high developmental pressure.

Physical capital comprises the infrastructure and access to technology of a household. Landowners in past research have indicated that the provision of technical assistance on their property was a central motivation in enrolling in a conservation program (Bliss and Martin, 1990; Sanders, 2005). In addition, Bliss and Martin (1989) note that preventing unwanted development (a change in infrastructure) was a main reason for owning woodlots among landowners in Wisconsin. Conversely, some landowners are discouraged from participation in conservation incentive programs because restrictions prevent the ability to change the infrastructure on their property, such as building a house (Kabii and Horwitz, 2006). Lambert *et al.* (2006) point out the connection between physical and human capitals by noting that the introduction of a new form of technology necessitates the knowledge to use it effectively. Furthermore, they suggest that farmers who are wealthier utilize highly intensive management practices, which require higher education levels, linking human capital and success. Thus, they conclude that younger landowners would be more willing to operate highly intensive farm operations, whereas elderly and retired farmers would be more likely to enroll in the conservation programs because of their decreased ability to work and comfort with out-of-date technology (Lambert *et al.*, 2006).

Knight *et al.* (2010) examined the human and social dimensions believed to influence the conservation effectiveness of land managers. The scales used to measure human capital focused on knowledge, skills, and education. The scales used to measure social capital included networks, norms, trust, and willingness to collaborate. They were then able to use cluster analyses to determine that the most successful land managers were well-regarded by peers, are knowledgeable on conservation issues, and have a broad

social networking base. Lambert *et al.* (2007) measured farmers' human capital assets with scales such as farming experience, education experience, retirement status, farm attachment, and household size. They found that farmers with small properties or those with operations not primarily focused on farming are less likely to enroll in conservation programs.

## **Materials and methods**

### *Study site*

This study focuses on the state of Alabama. The Southeastern United States has been overlooked in studies on private landowners and conservation incentive programs with past studies concentrating on the Northern (i.e. Kilgore *et al.*, 2008; Butler and Ma, 2011) and Western United States (i.e. Ernst and Wallace, 2008; Cross *et al.*, 2011).

Alabama in particular provides an interesting case study on landowners and conservation incentive programs as it is a state of great conservation concern (FWS, 2011). Sixty percent of the state is forested, the majority of which is held by private landowners (Silvano *et al.*, 2010). In addition, Alabama is the fifth most biologically diverse state in the country (The Nature Conservancy, 2011). Alabama contains 18 river systems and provides habitat for the most species of freshwater fish, mussels, turtles, snails and crayfish in the United States. It is also important to note that there are 119 species listed as threatened or endangered within the state (FWS, 2011). The importance of Alabama's fragile environmental condition in addition to the high percentage of privately owned property makes the cooperation of landowners vital in conservation efforts.

### *Data collection*

Survey items were constructed based on *a priori* items in the SL framework, a literature review of landowner conservation research, and emergent themes found in a qualitative scoping process with individual conservation program administrators and program participants. Questionnaire items explored landowner desired outcomes for the property, current land uses, perceptions of conservation programs within the community, capital assets that enable participants to enroll, and constraining factors that constrain non-participants from signing up.

The survey was administered to a sample of 2000 Alabama landowners in the Spring of 2013. Names and addresses were obtained through local town halls and purchased from a private service (Survey Sampling International, 2013). Landowners were randomly chosen from this database, given that they owned at least 20 acres of property. This standard was selected based on Ma *et al.*'s (2012) report that the average privately held properties are approximately this amount.

The survey was administered using a modified version of the Dillman *et al.* (2009) method. First, landowners were mailed a pre-notice postcard as a notification that they would be invited to complete a questionnaire on land management decisions, conservation behavior, and incentive programs. A few days later, the sample was sent an information letter with a web address and unique password to access the questionnaire online. Three weeks later, a postcard was sent to those who had not completed the questionnaire online offering the choice to 1) receive a paper copy of the questionnaire in the mail or 2) not participate in the study. Paper copies were sent to those who requested them. Those who indicated that they did not wish to participate in the study were removed from the mailing list and not contacted again. Reminder letters were sent to



those who did not respond to the postcard or agreed to complete the questionnaire and had not sent it yet. In addition, a paper copy was sent to a random sample of 200 landowners who had not responded in any way.

The questionnaire included 194 Likert items, although the number of items answered by each respondent depended on the skip patterns built into the survey instrument. Response categories ranged from 1 = “strongly disagree” to 5 = “strongly agree”. The questionnaire included items that measured the financial, social, human, physical, and natural capabilities of landowners as well as their objectives and desired outcomes for their properties. Although there were sections filled out by all landowners, a skip pattern incorporated in the questionnaire allowed for a section only filled out by landowners participating in conservation incentive programs and a separate section only filled out by non-participants.

To examine the enabling and constraining factors influencing landowner enrollment in conservation incentive programs we used factor analyses to identify the distinct capabilities that describe participation and non-participation factors. The resulting factors were then converted to scales and tested for reliability. Table 1 describes the items included for each form of capital. A binary logistic regression was conducted to predict the factors that influence program enrollment. To further explore significant forms of capital, a factor analysis was conducted on questions only pertaining to program participants to describe specific features influencing participation. A factor analysis was also conducted on items only asked to non-participants to identify reasons for not enrolling. Independent samples t-tests are used to compare other items answered by both participants and non-participants such as primary desired outcomes and strategies.

## **Results**

### *Demographics*

The typical program participant is male, married, retired, college educated, inherited their property from family, has a designated successor for their property, white, has resided in their current county for over 40 years, and is politically conservative. Most of these factors did not significantly differ from non-participants. Independent samples t-tests revealed that program participants only differed from non-participants on two measures: income and property size with participants generally earning higher incomes ( $M = 5.15$ ,  $t(302) = 3.02$ ,  $p = 0.003$ ) and holding more property ( $M = 951$ ,  $t(342) = 3.38$ ,  $p = 0.001$ ).

### *Desired outcomes*

Among all respondents, the primary use for their properties is forestry. Primary desired outcomes for properties are providing peace and quiet, personal enjoyment, managing forest health, enhancing wildlife habitat, and maximizing investment value. Although the items ranked out identically in the order of importance, participants indicated that managing for forest health ( $t(343) = 2.02$ ,  $p = 0.044$ ) and enhancing wildlife habitat ( $t(343) = 2.14$ ,  $p = 0.033$ ) were significantly more important desired outcomes than non-participants. Participants also significantly differed in rating the importance of providing income by generally specifying the item as more important than non-participants,  $t(343) = 3.83$ ,  $p < 0.001$ .

### *Strategies*

Recreation, hunting and/or fishing, and timber production were the primary strategies utilized by landowners to reach their desired outcomes. Participants

significantly differed from non-participants in employing the strategy of timber production,  $t(347) = 4.32, p < 0.001$ .

#### *Factors constraining enrollment*

A total of 35% of respondents indicated that they have no knowledge or awareness about conservation incentive programs, and the majority (57%) of respondents knew little to nothing about the programs. To further understand social capital we asked landowners about their willingness to work with conservation organizations (see Table 2). Program participants were significantly more likely to work with each of the groups; however this did not necessarily mean that they would agree to do so. Program participants were most likely willing to work with extension agencies more than any other conservation group ( $M = 4.02, SD = 0.987$ ).

Factor analyses were first conducted on each dimension of capital assets with questionnaire items answered by all respondents (see Table 1). Those were then converted into scales. Some of the factors consisted of only one item. A factor analysis was also conducted on landowners' perceptions of conservation organizations' capabilities (see Tables 3 and 4).

A binary backward stepwise logistic regression including each of the capital scales, management strategies, desired property outcomes, and property size was conducted to determine which factors predicted participation (see Table 5). The regression accurately predicted 70.1% of the results on participation and non-participation. Significant desired outcome predictors included enhancing wildlife habitat and managing forest health. Significant property strategies included timber production, hunting and/or fishing, and residential development. On the capital scales, two of the

three scales of social capital (social norms and perception of government agencies) significantly predicted participation. Property size (a measure of natural capital) was also a significant predictor.

### *Participant influences*

To explore the factors influencing landowner participation (and non-participation), the items presented exclusively to participants and those asked only to non-participants were examined to further explain the differences between the groups.

Scales were created for each form of capital based on the items asked only to participants (see Table 6). Participating landowners indicated strongly that their natural capital enabled them to participate. They also generally agreed that social capital, human capital, and individual financial capital were enabling factors. Overall, participants strongly disagreed that a lack of physical capital prevented them from enrollment. Participants reported that the state of the economy did not impact their decision to participate.

Scales were also created for each form of capital based on the items asked only to non-participating landowners (see Table 7). Non-participants generally agreed that perceptions of changes in physical capital as well as a lack of human capital prevented them for enrolling. They slightly agreed social and financial capitals were constraining factors. In addition, they generally disagreed that natural capital was preventing them from enrolling.

## **Discussion**

Although several studies have examined various forms of capital as related to conservation initiatives, this is the first known study to explore multiple livelihood

capabilities collectively. Gaining information on five primary forms of capital provides a more comprehensive perspective of the limiting and enabling factors influencing participation in conservation incentive programs. This study provides a snapshot of the capabilities of private landowners in Alabama. The degree to which each factor included in this study will resonate in other regions is unknown.

Consistent with other studies, participants were influenced by social norms. As noted by Sorice *et al.* (2011), likelihood of enrollment can be impacted by the encouragement or discouragement of a landowners' reference group. Social pressure to engage in behaviors has been identified as a significant factor in individual decision-making processes (Ajzen, 1991); therefore it is not surprising that it is evident in this study. Parkhurst and Shogren (2007) note how the social promotion of voluntary conservation programs can be beneficial in attaining spatial connectivity between important conservation areas as neighbors encourage each other to enroll.

Similarly, perceptions of organizations administering conservation programs have been found to be a significant factor in participant enrollment in past research as well as the current study. Trust in the organization's ability to aid landowners in reaching desired objectives is an aspect of this form of social capital (Sanders, 2005; Kabii and Horwitz, 2006; Cross *et al.*, 2011). In addition, landowners must perceive the organization as possessing the know-how to provide technical assistance and education (Pretty and Smith, 2004; Cramb, 2005). Non-participants in this study were averse to working with conservation organizations. Kabii and Horwitz (2006) also found that some landowners are resistant to working with conservation organizations due to fears of legal implications and forced regulations. Perceptions on the helpfulness and trust in organizations'

effectiveness of conservation organizations were positive among participants indicating that this form of social capital influenced participation. These results align with past research (Pretty and Smith, 2004; Cramb, 2005) that reveals that social capital can provide a means to enhance knowledge and skill levels.

In their review of the ecosystem services framework, Turner and Daily (2008) emphasize the human capital, such as knowledge of programs, available to landowners deciding whether to enroll in incentive programs. This lack of awareness and/or information is prevalent in several other research endeavors focusing on conservation incentive programs (Guerin, 1999; Haw *et al.*, 2000; Langholz *et al.*, 2000; Loftus and Kraft, 2003) and found to hold true in the current study as well. Without proper information on the programs, a landowner is unable to determine if conservation incentive programs are appropriate for their property objectives.

Butler *et al.* (2007) suggests using social marketing to increase outreach and education opportunities for receptive non-industrial private landowners. This means potentially increasing social and human capitals would most likely be effective in Alabama as those who do not engage in program activities but exhibit high interest would respond to the marketing message.

Financial capital was also an indicator of participation. Participants tend to earn higher incomes and agreed that their financial state was an enabling factor in enrollment. Past studies have also found household income as a significant factor influencing program participation, with those in higher income brackets exhibiting increased enrollment (Langpap, 2004; Ernst and Wallace, 2008). According to Langpap (2004), conservation easements may disproportionately benefit wealthier landowners who are

seeking to lessen their tax burdens. McLaughlin (2004) suggests that state income tax benefits should be increased for those enrolling in permanent conservation contracts as such bonuses would appeal to affluent landowners who would like to save on aggregate taxes and attract lower income landowners who gain more from state benefits than federal incentives.

Participants generally held more property than non-participants and indicated that the quality of their property was a significant enabling factor in enrollment. Conversely, non-participants generally disagreed that the quality of their land was a constraining factor preventing them from enrolling. This indicates that the private landowners in the study recognize the value of their property as non-participants generally agreed that their property would potentially qualify for a conservation program. In Quartuch and Beckley's (2013) study, private landowners showed a high level of responsibility and connection to their properties regardless of whether it was enrolled in a conservation program or not. In addition, Quartuch and Beckley's (2014) study on the same population indicated that some landowners did not believe that incentive programs are the best way to provide good stewardship to their properties. This may explain the results of this study.

Non-participants tended to agree that conservation programs often result in unintended consequences to a community's infrastructure. This differs from Irwin's (2002) study that indicated that residents highly valued preserved open space over potential development threats. Given that only a few items in the questionnaire focused on physical capital, more research is necessary to gain insight on this aspect of the study.

Perhaps the best way to interpret the majority of non-participating landowners in Alabama is that they are content with the capital assets that they have and/or do not wish

to change them with a conservation incentive program as there are other ways to reach desired outcomes. Jodha and Russell (1997) note that those that perceive they will have to make more sacrifices and experience more disruptions in their lives through participation are less likely to engage in programs. Brant (2000) further explains that those who might consider participation are disinclined by the high social and economic costs that would disrupt their short term (or long term) plans.

### *Desired outcomes*

The top two desired outcomes found in this study were non-use, non-consumptive purposes: personal enjoyment and peace and quiet. Many past studies have examined family forest owners throughout the United States and found similar results. Majumdar *et al.* (2008) found that Southeastern landowners who were not interested in timber production mainly desired non-consumptive outcomes for their property such as aesthetics, biodiversity, recreation, and privacy. Erickson *et al.* (2002) explains that non-consumptive desired outcomes among family forest owners are a result of preferring a “hands-off” approach to management. Other such results include maintaining privacy (Ross-Davis *et al.*, 2005), providing a family legacy (Richter, 2005), spiritual importance (Rickenbach *et al.*, 2006), and rural living (Sorice *et al.*, 2012).

Significant desired outcomes predicting participation were enhancing wildlife habitat and managing for forest health, indicating that these objectives were more important to participants than non-participants. Other studies have found that individuals who are interested in environmental protections are more likely to enroll in conservation incentive programs (Ernst and Wallace, 2008; Cross *et al.*, 2011; Farmer *et al.*, 2011).



These desired outcomes are also consistent with many conservation incentive programs' missions, so it makes sense to observe an overlap in objectives.

### *Strategies*

The majority of participants in this study cited forestry as the primary use of their property. This is to be expected given that the majority of Alabama is forested. Timber production, hunting and/or fishing, and residential development were significant strategies predicting participation. Timber production and residential development match up well the desired outcomes of maximizing investment and providing income. Timber production is also consistent with the desired outcome of managing for forest health. This may be explained by Cross *et al.*'s (2011) that note that landowners who rely more on their land for income purposes are more likely to place a conservation easement on their property.

Hunting and/or fishing matches up with the desired outcomes of personal enjoyment and peace and quiet. Many of the objectives of conservation incentive programs enhance the quality of the property for improved hunting, fishing, wildlife viewing, and other recreational activities (Feather *et al.*, 1999) which explains why these constructs were significant predictors of participation.

Participants generally disagreed that residential development was a primary strategy in reaching their desired outcomes; therefore it is a negative predictor for enrollment in conservation incentive programs. This is consistent with the regulations of most conservation incentive programs which prohibit development under enrollment. In addition, preventing the conversion of privately owned forests to residential or

commercial development has been noted as a primary motivation for owning and protecting property (Erickson *et al.*, 2002; Mayer and Tikka, 2006).

#### *Limitations and future research*

This study is limited by the robustness of some of the capability scales. Future research could add additional items to better describe the scales. Building upon the current structure of this study could result in a greater understanding of conservation incentive program participants and non-participants. Combining capital assets with additional factors that influence participation would be useful. In addition, a spatial analysis to identify spatial areas of program resistance and acceptance would be beneficial to the current study to further explain participation behavior.

#### **Conclusion**

Using the primary capital assets described in the Sustainable Livelihoods framework was found to be a beneficial means to examine landowner participation in conservation incentive programs. Human, social, natural, and financial capitals were each found to be significant in some degree in this study. Future studies can benefit from utilizing this approach. Analyzing land use as a strategy and desired outcomes separately also proved to be useful in determining how landowners sought to achieve their objectives.

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**Table 2.** Comparison of willingness to work with conservation organizations on conservation issues between program participants and non-participants.

	Participant mean	Std. dev	Non-participant mean	Std. dev
Local government agency**	3.65	1.08	2.98	1.19
State government agency**	3.79	0.99	3.04	1.15
Federal government agency**	3.82	1.12	2.54	1.15
A producer of community group**	3.02	1.11	2.53	1.19
A local or regional non-profit group**	2.99	1.12	2.54	1.16
A local or regional company/consultant**	2.97	1.17	2.51	1.14
A national or international non-profit group*	2.40	1.18	2.11	1.08
A national or multi-national company/consultant*	2.42	1.18	2.07	1.08
Extension agency**	4.02	0.99	3.40	1.18

\*\* denotes significance  $\leq 0.001$

\* denotes significance  $\leq 0.05$



**Table 3.** Factor loadings of conservation organization capabilities.

	Land trust capabilities ( $\alpha = 0.95$ )	Government agency capabilities ( $\alpha = 0.92$ )
Land trusts work with landowners to help conserve their land.	.931	
Land trusts have the know-how to protect environmentally important landscapes in the community.	.930	
Land trusts are effective at protecting land.	.908	
Land trusts are useful in creating the opportunity to network.	.903	
Land trusts have the financial resources to help landowners.	.892	
Government agencies work with landowners to conserve their land.		.905
Government agencies have the know-how to protect environmentally important landscapes in the community.		.850
Government agencies are effective at protecting land.		.838
Government agencies are useful in creating the opportunity to network.		.824
Government agencies have the financial resources to help landowners.		.738

**Table 4.** Comparison of participants' and non-participants' perceptions of conservation organizations' capabilities to aid landowners in preserving land.

	Mean score	Std. dev.	Composite mean	Participant mean	Non-participant mean
<b>Land trust capabilities</b>			3.34	3.30	3.35
Land trusts have the financial resources to help landowners.	3.29	0.78			
Land trusts have the know-how to protect environmentally important landscapes in the community.	3.36	0.84			
Land trusts are useful in creating the opportunity to network.	3.28	0.78			
Land trusts are effective at protecting land.	3.33	0.82			
Land trusts help landowners.	3.39	0.82			
<b>Government agency capabilities**</b>			3.58	3.81	3.43
Government agencies have the financial resources to help landowners.	3.75	0.89			
Government agencies have the know-how to protect environmentally important landscapes in the community.	3.70	0.86			
Government agencies are useful in creating the opportunity to network.	3.45	0.84			
Government agencies are effective at protecting land.	3.36	0.99			
Government agencies help landowners.	3.54	1.03			

**Table 5.** Binary logistic regression of participants and non-participants on various predictors.

	B	S.E.
Timber production	-.362**	.135
Hunting and/or fishing	.348**	.135
Residential development	.384**	.180
Acreage	-.001***	.000
Government capabilities	4.952**	1.827
Social norms	-5.088**	1.826
Managing forest health	.354*	.190
Enhancing wildlife habitat	-.624**	.208
Constant	2.172	.877
<i>n</i>	283	
Cox and Snell R <sup>2</sup>	0.205	

\*\*\* denotes significance  $\leq 0.001$

\*\* denotes significance  $\leq 0.05$

\* denotes significance  $\leq 0.1$

**Table 6.** Enabling and constraining conditions affecting program participants.

	<b>Mean</b>	<b>Standard Deviation</b>	<b>Cronbach's <math>\alpha</math></b>
<b>Human</b> - The idea of conservation programs seemed attractive as soon as I learned of them. - I think conservation programs are effective.	3.84	0.53	0.58
<b>Social</b> - I trust the organizations that run conservation programs. - The people I dealt with were helpful.	3.88	0.57	0.63
<b>Natural</b> - My land is useful for production. - My property is large enough for production.	4.05	0.78	0.77
<b>Financial: Economy</b> - Timber prices influenced my decision to enroll. - The agricultural market influenced my decision to enroll. - The option to sell my property was less than enrolling in a conservation program. - The state of the economy was a factor of enrolling my property.	2.69	0.68	0.65
<b>Financial: Individual</b> - My financial state allowed me to enroll.	3.44	0.82	n/a
<b>Physical</b> - Markets for the products my property produces do not exist in my area. - The products my property produces are too far away from roads to transport them.	1.96	0.72	0.77

**Table 7.** Enabling and constraining factors affecting program non-participants.

	<b>Mean</b>	<b>Standard Deviation</b>	<b>Cronbach's Alpha</b>
<b>Human</b> - I've never thought about these programs - I don't know anything about these programs	3.22	0.55	0.81
<b>Social</b> - I don't trust the people, organizations, or agencies that run these programs. - There is no one to help me sign up. - It's too much hassle to get involved.	3.13	0.64	0.68
<b>Natural</b> - My land would not qualify.	2.95	0.81	n/a
<b>Financial</b> - The financial benefit isn't high enough for me. - If the economy was worse, I'd consider enrolling. - The contract details usually don't work for me.	3.12	0.58	0.61
<b>Physical</b> - Programs like these tend to create unintended consequences.	3.26	0.87	n/a