LAND USE BEHAVIOR OF PRIVATE LANDOWNERS AT THE URBAN/RURAL FRINGE

DISSERTATION

Presented in Partial Fulfillment of the Requirements for

The Degree of Doctor of Philosophy in the

Graduate School of The Ohio State University

By

Jill R. Robinson, B.A., J.D.

****

The Ohio State University
2004

Dissertation Committee
Professor Tomas Koontz, Adviser
Professor Joseph Arvai
Professor Jeff Sharp
Professor Robert Gates

Approved by

______________________________
Adviser
The School of Natural Resources
ABSTRACT

Rapid changes in population growth at the rural/urban fringe are changing community dynamics and challenging the conclusions of prior research regarding landowner behavior. One important aspect of this behavior is land use behavior. Several studies have identified attitudinal, demographic, and situational variables that are correlated with land use behavior in the literature in the disciplines of rural sociology, political science, and anthropology. Despite the quantity of the literature, few studies have successfully captured the relationship between these variables in a comprehensive model.

In this study, I test the hypothesis that attitude is correlated with length of residence, and the hypotheses that attitude plus several demographic variables can successfully predict preservation as a land use behavior and participation in government programs.

Using multiple regression, I found that length of residence was not a significant predictor of attitude. Using logistic regression analysis, I found a significant relationship between preservation and the following variables: occupation as a farmer (negative) years living in the county (negative) and residence in Geauga County (positive). Parcel size, years living in the county, and an increasingly anti-development attitude were all significantly positively related to participation in government programs.

Previous land use and soil type/topography were rated most important as factors in land use decisions.

The results of the study support the theory of deHaven-Smith (1988), that land use decisions are based primarily on local, situational factors, rather than broader concepts such as concern for the environment and the Extractive Resource Commodity Theory (Tremblay and Dunlap, 1978) which states that those in extractive occupations such as farming value land differently.

The results of the study are discussed in terms of farmland conservation, technical assistance, and stakeholder processes.
ACKNOWLEDGEMENTS

I thank my advisor, Dr. Tomas Koontz, for all he has done, including mentoring, teaching, and guiding me through the dissertation process. I thank my committee members Dr. Jeff Sharp, Dr. Joseph Arvai, and Dr. Robert Gates for many helpful suggestions. I also thank my dissertation proposal reviewers, Dr. John Heywood and Dr. Robert Vertrees for their comments and guidance.

I thank Dr. Mark Tucker and Dr. Ted Napier for the opportunity to conduct original research and for the opportunity to work as a Research Assistant. I am grateful to Dr. Allen Lines for his advice and support.

I wish to thank all of those who helped me with research and data analysis. I am grateful to Dr. Notz and his staff at the Statistics Department of the Ohio State University for providing guidance and feedback. I thank Susan Logan, Ohio State University Librarian for her assistance.

I thank all of my friends who have supported me throughout this effort and I am grateful for the gift of your friendship.

The support of my family was invaluable to me in completing this dissertation. I thank my mother, Dora Rice, my father, Dr. Larry Rice, my grandmother, Eleanore Loyer, and my brothers Larry and Nick Rice. I thank my mother in law, Carol Robinson, and my father in law, John Robinson, and my sister in law Anne Albers and brother in law Kirk Albers.

I thank my husband Paul and by daughters Jane and Hannah for their patience, encouragement, and love that carried my through the challenges of this work. I could not have done it without you and every day with you is a gift.

I give thanks to God for the opportunities and challenges given to me through this work.
VITA

November 29, 1968.................................Born – Cleveland, Ohio

1990..................................................Teaching Assistant, The American University
                                           Department of Economics, Washington DC

May 1991............................................B.A. cum laude, School of Public Affairs, The
                                           American University

Summer 1991.......................................Research Assistant, Foundation on Economic Trends,
                                           Washington DC

June 1994..........................................J.D., The Ohio State College of Law

1995 – 2003........................................Attorney, Judge Advocate General’s Corps, United
                                           States Army Reserve

                                           Ohio

1998 – 1999........................................Research Associate, The Ohio State University
                                           Department of Human and Community Resource
                                           Development

November 2003- present.........................Regional Land Use Planner, Rockingham Planning
                                           Commission, Exeter, New Hampshire

PUBLICATIONS


2. Robinson, J. and Napier, T.L. 2002. Adoption of nutrient management techniques to reduce
   hypoxia in the Gulf of Mexico. Agricultural Systems 72(3) 197 – 213.

FIELDS OF STUDY

Major Field: Natural Resources

Minor Field: Ecosystem Science and Management
## TABLE OF CONTENTS

ABSTRACT ........................................................................................................... ii

ACKNOWLEDGMENTS ..................................................................................... iii

VITA OF JILL R. ROBINSON ........................................................................... iv

LIST OF TABLES .............................................................................................. vi

CHAPTER 1: INTRODUCTION ......................................................................... 1

CHAPTER 2: LITERATURE REVIEW ................................................................. 10

Private Property Rights and Land Use: A Brief History ................................. 10

The Attitude Behavior Relationship ................................................................. 12

The Misuse of the Attitude Concept in Early Research ................................. 15

Attitudes are Linked to Behavior ................................................................. 16

Attitude Scale Theories .............................................................................. 19

Urban/ Rural Theories ................................................................................. 19

Theories of Newcomers vs. Oldtimers ......................................................... 22

Political/ Cultural Theories ........................................................................ 25

Situational Theories ..................................................................................... 29

Aesthetics as a Body of Knowledge ............................................................. 34

CHAPTER 3: METHODS ............................................................................... 45

CHAPTER 4: RESULTS .................................................................................. 60

CHAPTER 5: DISCUSSION ........................................................................... 80

CHAPTER 6: CONCLUSIONS ...................................................................... 88

BIBLIOGRAPHY ............................................................................................ 98

APPENDIX: CORRELATION TABLE ............................................................... 106
## LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Four major theory types</td>
<td>42</td>
</tr>
<tr>
<td>2.</td>
<td>List of variables</td>
<td>49</td>
</tr>
<tr>
<td>3.</td>
<td>Demographics</td>
<td>61</td>
</tr>
<tr>
<td>4.</td>
<td>Length of residence vs. year of parcel ownership</td>
<td>63</td>
</tr>
<tr>
<td>5.</td>
<td>Types of land use</td>
<td>65</td>
</tr>
<tr>
<td>6.</td>
<td>Influence of factors on land use decisions</td>
<td>66</td>
</tr>
<tr>
<td>7.</td>
<td>Sum of scores for factors in land use decisions</td>
<td>66</td>
</tr>
<tr>
<td>8.</td>
<td>Attitude towards development</td>
<td>67</td>
</tr>
<tr>
<td>9.</td>
<td>Attitude towards development by length of residence</td>
<td>69</td>
</tr>
<tr>
<td>10.</td>
<td>Multiple regression</td>
<td>69</td>
</tr>
<tr>
<td>11.</td>
<td>Likelihood of development of the property</td>
<td>70</td>
</tr>
<tr>
<td>12.</td>
<td>Typology of motivations for chance of development</td>
<td>73</td>
</tr>
<tr>
<td>13.</td>
<td>Predicted participation in proposed land use programs</td>
<td>74</td>
</tr>
<tr>
<td>14.</td>
<td>Correlation matrix for preservation as a land use behavior</td>
<td>75</td>
</tr>
<tr>
<td>15.</td>
<td>Logistic regression analysis with preservation as the dependent variable</td>
<td>76</td>
</tr>
<tr>
<td>16.</td>
<td>Logistic regression with participation in government programs as the dependent variable</td>
<td>78</td>
</tr>
</tbody>
</table>
CHAPTER 1

INTRODUCTION

When Richard Christy shot and killed the grizzly he saw approaching his sheep in the dark of night, he probably wasn’t thinking about the goals of the Endangered Species Act, or the broad concept of ecosystem management. We don’t know for sure, but he might have been thinking instead about the danger his sheep faced from the approaching predator. Or he might have been thinking about the impact these bears had already had on his flock, a loss of 20 sheep, and his futile attempts to get rid of the bears through non-lethal means, including cooperation with the Fish and Wildlife Service. Whatever he was thinking he had a belief that he had a right to protect his property, and so on the night of July 9, 1982, the rancher raised his rifle and shot the bear. The bear ran, then fell. Christy shot the bear a second time to make sure it was dead. For his actions, Christy was assessed a civil penalty of $3,000 for killing a grizzly. Later in the month, he removed his sheep from the leased land, having lost a total of 84 sheep to the bears (Christy v. Hodel, 857 F.2d 1324). In court he argued that he had a constitutional right to defend his sheep, but the court found that the right to protect one’s property in this manner was in fact not an enumerated Constitutional right.

What is a landowner to do, when faced with a conflict between the conservation goals of society, and his or her own property interests? Some may find a way to compromise, to meet their own goals as well as those of society. For example, in the above story, Christy was not without remedies. The Endangered Species Act does authorize the killing of nuisance bears, but only by government officials when live capture efforts have been unsuccessful. Landowners also have the option of applying for compensation for livestock lost to predation, through a fund administered by the Defenders of Wildlife. Other landowners however, will choose not to compromise. For these landowners, the damage has been
done and the battle lines have been drawn. Instead of a working partnership, the ranchers, farmers, and other private property owners who are so important to the success or failure of conservation on private lands and so passionate about protecting individual freedom will choose to fight, and resist any efforts to curtail their property rights.

As this story shows, the notion of property rights occupies a special place in the American mind and in American history. Many have characterized private property not as a parcel of land, but rather as a bundle of rights. The most explicit characterization of property rights is found in the Fifth Amendment to the United States Constitution. The Fifth Amendment states: “No person shall be… deprived of life, liberty, or property without due process of law; nor shall private property be taken for public use, without just compensation” (Plater, Abrams, and Goldfarb, 1992). From the very beginning, the Founders knew that the notion of property was important enough to the American people to be on par with life and liberty as a protected right.

Although property rights issues such as the implementation of the Endangered Species Act on private land, zoning to control sprawl, and the loss of farmland are often presented as current and novel, conflicts over land use have defined the American experience for several decades. Just as disputes over settlement rights, resource extraction, and conflicts between local residents and newcomers shaped American society in years past, the outcomes of land use battles today will shape the nature of society in the years to come. At the heart of these conflicts are the land use behaviors of private landowners (Platt, 1991), who are forced to weigh their individual property interests against society’s goal of protecting natural resources, and forced to weigh their own losses and gains against the needs of society.

Although many studies have scrutinized the decision-making process related to common resources (Arvai, Gregory and McDaniels, 2001; Gregory and Keeney, 1994; Ostrom, Gardner and Walker, 1994; Ostrom, 1990), fewer studies have focused on private land use, despite the fact that most land in the United States is privately held. Private lands make up at much as 66 percent of all land in the United States and as much as 80 percent of all wildlife habitats (Benson, 2001). A recurring theme in natural resources literature is the need to enfranchise private landowners to encourage their cooperation in managing natural resources (Benson, 2001). Even though many laws constrain private land use, the private landowner
retains a great deal of autonomy to use his or her land in a variety of ways, with a corresponding variety of environmental consequences. Thus the private landowner is an important actor in any policy aimed at managing natural resources.

Land use controversies occur in a variety of settings, but few are as contentious as the conflicts at the urban/rural fringe, which have sparked heated debate about urban sprawl, farmland preservation, species protection, and the loss of character of rural places (Beesley, 1999; Calthorpe and Fulton, 2001; Lehman, 1995; Platt, 1996; Salamon, 2003). Private land use at the urban/rural fringe is an important topic due to the ramifications of individual behaviors on land use patterns, social change, and the environment (Benson, 2001; Wolf, 1981).

The study of the urban/rural fringe landowner is today however at a crossroads due to a larger social trend that is an historical anomaly. This larger trend is the recent outmigration from cities to rural and urban/rural fringe areas, which has been called by some the “Rural Rebound” (Johnson and Beale, 1998; Fulton, Fuguitt, and Gibson, 1997). This trend is unique because it is a departure from the migration pattern that prevailed for most of the 20th century: migration from rural to urban areas.

The Rural Rebound

The rural rebound is the third phase of a significant change in migration patterns that began with the rural turnaround of the 1970s, continued with the reversal period of the early 1980s, and culminated in the population rebound of the 1990s (Fulton, Fuguitt, and Gibson, 1997). In the current period, migration from city to country continues, with potentially drastic consequences on the environmental, economic, and social systems of rural areas. Specifically, in the first five years of the 1990s, there was a 5.9 percent growth, not decline, in the population of U.S. rural counties.

The rebound is happening not only in population, but in other demographic categories as well. The reported rate of job growth in the early 1990s was faster in rural areas than in metropolitan areas (Johnson and Beale, 1998). The rural rebound has attracted not only new residents, but also new businesses. Rural areas with certain scenic amenities have become attractive locations for business owners.
One study found that scenic beauty was the most important location factor for business owners who chose to live in the study area (Johnson and Rasker, 1995).

The new wave of migrants to rural areas is a mixture of many economic and social classes, coming to rural areas for a variety of reasons (Johnson and Beale, 1998). While some migrants come based on economic considerations, others come based on quality-of-life or amenity factors, such as pursuit of leisure, fear of urban disamenities, a concern for environmental quality and recreation, or a combination of both economic and quality of life considerations (Williams and Jobes, 1990). Salamon (2003) posits that preferences for rural places are based on safety, closeness to nature, an expectation of a peaceful life, and negative factors associated with small cities, including high housing costs and rising crime. Others come to rural areas for aesthetic qualities associated with farms and farming. As one research team notes, “there is an abundance of evidence that current landowners as well as residents of rural communities increasingly value the cultural and scenic attributes provided by a productive agricultural landscape” (Johnson and Maxwell, 2001, p. 324).

Although migration to rural areas is welcomed by some as a means to economic growth, it is also feared and resented by others. Some researchers have pointed out the negative effects of migration on community. Salamon argues that newcomers to rural areas have different conceptions of community, and that these differences eventually erode the social networks, place identity, and other important aspects of community that are valued and reinforced by rural communities (Salamon, 2003). Johnson and Maxwell warn that the increase in rural sprawl “may eventually destroy the very qualities that attract in-migrants and the jobs that follow” (p. 324, 2001). Other researchers however, have found less dire impacts. England and Albrecht (1984) found that while social ties in the community are not disrupted by rapid growth, community services do decline as communities struggle to keep pace with the growth in population. Smith, Krannich, and Hunter found that although social disruption does occur, it is typically followed by a rebound in well-being, rather than a lasting disruption (2001). The predictions of community demise or community survival also vary substantially depending on how the research separates the sample population by socioeconomic type, as well as by length of residence (Krannich and Greider, 1984).
Further distinctions in the effect of rural population growth can also be made based on regional differences. For example, the “boomtowns” of the West have suffered from the impacts of rapid growth, but these areas are more heavily dependent on resource extraction occupations such as logging and mining than are other areas such as the Midwest, where the predominant rural occupation has been agriculture. Far fewer studies have examined the effects of migration and growth in the urban/rural fringe areas of the Midwest, particularly in terms of the impacts of migration on land use. It is arguable that the effects of migration to rural areas in the Midwest might be very different than what has been seen in the West.

How will the rural rebound affect the land use decisions of landowners at the urban/rural fringe? What factors are important in predicting land use behavior at the urban/rural fringe? Does the rural rebound represent widespread social change, or does the literature merely reflect a backlash against a perceived threat of suburbanization, anonymity, and a loss of what had been defined as “rural”? What can planners and policy makers do to combat the effects of rural sprawl and maintain the unique character of rural places? These are the key questions that I strive to answer in this study.

Untangling the motives and political dynamics of this new rural population will be a challenge for rural sociologists and demographers. It is one that must be met if we are to understand and react to the tremendous social, environmental, and political impact these new rural and urban/rural fringe residents may have through their land use behavior. As Salamon argues in discussing the effect of this trend on the discipline of rural sociology, “Because we are in the midst of a widespread social transformation, it is critical that rural sociologists shed light on the process. The change is battering what is the special province of our discipline, a unique, small community context that shapes distinctive educational, developmental, economic, environmental, agricultural, and political processes” (Salamon, 2003).

Understanding why private landowners behave as they do is thus important in this context for three reasons. First, as more people migrate to urban/rural fringe areas, more interactions will occur between newcomers and long-time residents, resulting in a greater number of possible conflicts. Understanding landowner behavior may help to diffuse social conflict by enabling policy-makers and land-users to better respond to the needs of newcomers and longer-term residents.
Second, understanding the behaviors of landowners helps to formulate land use policies that will be more relevant to their concerns and thus may be more likely to be successfully adopted (Laubhan and Gammonley, 2001). Further, understanding the interaction between rapid population growth, community well-being, and land use decisions such as preservation can help policy-makers anticipate the changes that may come from rapid growth and development at the urban/rural fringe. Leaders might seek to find ways to strengthen community ties, or build trust between newcomers and longer-term residents, so that programs requiring cooperation between neighbors will have a better chance of success.

Finally, understanding landowner behavior will help environmental educators and technicians to formulate outreach programs that effectively target private landowners, allowing citizens and governments to more efficiently utilize their time, talent, and financial resources. We can use these lessons learned to determine whether existing programs are successfully limiting rural sprawl, protecting endangered and threatened species, and preserving the quality of rural communities, or whether more must be done.

For these reasons, the study of land use behaviors on private land is important to citizens, policy makers, and managers who want to reduce conflicts between land users, make more informed land use policies, strengthen community well-being, and improve outreach programs and policies designed to foster societal land use goals.

**Theoretical Approach: A Focus on Private Land Use at the Level of the Individual**

Land use is a local process shaped by local actors and institutions: “Land use controls emerge out of interactions between developers, nearby land-users, and land-use authorities” (Rudel, 1989, p.9). To understand land use we must study actors and institutions at the local level at the scale of the individual. Additionally, to understand land use behavior we must not only scrutinize the regulations devised by land use authorities, but also the behaviors of private landowners who will be affected by those regulations, and who in turn will shape the policy process through their political and economic interactions. As Platt (1991) noted, “The property owner is the primary planner of land use in the United States. . . . It is the owner who determines how to utilize his or her land in light of geographic, economic, and personal circumstances. It is also the owner who determines when a change in existing land should occur. It is the owner’s decision to
change the use of land that triggers the public reactive role.” (Platt, 1991, p. 113). This suggests an analysis of land use from a two-fold perspective.

**Forward and Backward Mapping**

Elmore (1983) has described this approach as forward and backward mapping. Elmore’s approach is to study the effectiveness of a particular policy not only from the perspective of legislators who will develop and implement the policy but also from the perspective of stakeholders who will be impacted by the policy. The approach uses the terms forward and backward mapping. Forward mapping looks at policy makers’ alternatives and assessment of their expected effects. Backward mapping examines the choices made by stakeholders in order for it to be effectively implemented (Elmore, 1983).

Much work in the area of land use study and the land use planning profession has focused on a forward map analysis of land use (See, for example, Rudel, 1989). This work has examined the variables important to land use authorities as they formulate land use policy and regulations. Other research traditions have examined land use from an economic perspective. These studies have examined economic growth of and migration to rural areas including techniques for measuring the value of natural resource based amenities (Deller et al., 2001; Knapp and Graves, 1989).

Fewer studies have examined land use from the perspective of private landowners in a backward map analysis that considers how individual landowners’ behaviors are relevant to land use policy (Koontz, 2001). Although there is a large body of literature in the diffusion and adoption research tradition that studies the land use behaviors of farmers (Rogers, 1995; Pampel and van Es, 1977; Napier, 2000) this work typically does not address behavior among nonfarmers and other land users more generally.

**“Responsible” Environmental Behavior**

A related body of literature examines environmental, but not exclusively land use, behaviors by testing models that assert a correlation between environmental attitudes and environmental behavior (Scott and Willits, 1994; Hines et al. 1986; Stern, 2000; Vaske and Donnelly, 1999; Fortman and Kusel, 1990).
Unfortunately these studies have not resulted in theoretical models that fully explain the relationship between behavior and its determinants, despite the tremendous volume of this literature.

Another problem with this body of literature is that it often uses the phrase “responsible environmental behavior,” a normative phrase implying that one type of behavior is superior to another because it is judged to be responsible. For example, it is more environmentally responsible to recycle than to not recycle. More current literature substitutes the phrase “environmentally significant behavior” stating that the development of theory concerning such behavior can “inform efforts to promote proenvironmental behavior” (Stern 2000).

Though encouraging proenvironmental behavior is arguably a laudable goal, I will not use the terms “responsible environmental behavior” or “proenvironmental behavior” in my research. I will instead examine land use behaviors in a non-normative context, reasoning that a variety of intervening factors may influence land use behavior. These factors may enable or constrain individual land users from behaving consistently with their attitudes, demographic profile, political affiliations, or intention to act in a particular way. I do not think the researcher should approach the work of research through normative judgements, or approach his or her research with the goal of building support for particular social movements. I acknowledge that the research will likely be used by a variety of groups for a variety of purposes; however, I think that the researcher’s role should be limited in order to avoid bias in the research process, even though a human researcher is probably never completely free of bias. Citizens and policy makers can debate the degree of “responsible environmental behavior” to be attributed to any particular land use behavior and the level of proenvironmental behavior that is desirable for individuals or society as a whole.

In an effort to contribute to the body of knowledge that has addressed land use behavior, my work will focus on the second aspect of Elmore’s analysis, backward mapping, by trying to understand individual land owner behavior at the urban/rural fringe. I anticipate that my results will complement the work of others who have studied land use policies from the forward mapping perspective and expand on the work of those who have developed models of land use behavior as an attitude-behavior relationship.

The goal of this study is to examine landowner behavior by examining the land use choices of individual landowners and the variables that correlate with those choices. The two major land use
behaviors I examine are preservation as a land use behavior and participation in voluntary government programs.
CHAPTER 2

LITERATURE REVIEW

In this chapter, I begin with a brief history of private property and land use. In order to understand the motivations of private property owners, we must first understand the underlying political and legal structures within which private property owners operate. I then begin a discussion of the relationship between attitudes and behavior generally. This is followed by a discussion of the literature that has considered the relationship between environmental attitudes and environmental behavior. I then discuss landowner behavior specifically, and examine the various models that have been proposed in the literature to determine the variables that are related to landowner conservation behavior.

Private Property and Land Use: A Brief History

As shown by the Christy case in the introduction, for particular types of natural resources the notion of property rights is highly problematic. Natural resources such as wildlife, air, coastlines, and water, are not part of the bundle of rights known as private property, because such resources belong to all people and are often referred to as public goods. In order to protect such resources it is often necessary to require landowners to sacrifice some or all of their property use. The government has historically protected public goods through the police power.

The police power is the power of a government entity to protect the health, safety, or general welfare of its citizens by requiring individuals to act or refrain from acting in relation to public goods. As a justification for using the police power to protect environmental resources, governments rely on the public trust doctrine. The public trust doctrine is a legal theory from the Roman Empire that has a long history in American jurisprudence as well, dating back to at least the 1800s. Simply stated, the public trust doctrine holds that actions concerning public resources such as wildlife will be carefully scrutinized to prevent the
reallocation of resources to the interest of private parties (Sax, 1970). Whether a government’s actions concerning the protection of a resource on private land is within the bounds of the police power or reaches too far and thus constitutes a “taking” is the key issue in this area of environmental law.

The two main types of takings challenges that typically occur involve eminent domain and inverse condemnation actions. Eminent domain is a physical appropriation by the government of a parcel of land. The government entity files a complaint in court seeking a court order transferring title of the property. If challenged, the government must show that it has met certain procedural requirements and that the condemnation was not arbitrary and capricious. An example of eminent domain would be the granting of an easement for the construction of a road or a power line (Plater, Abrams and Goldfarb, 1992).

The other main type of a takings challenge is referred to as an inverse condemnation. This occurs when the government simply “takes” the property rights of the private landowner, without going through the procedures of suing to get those rights. In such a case the property owner can sue for compensation. In this situation, the court must determine what level of interference by the government with the landowner’s use of land constitutes a taking. Although the standards for an inverse condemnation have evolved over the years, the court in essence seeks to determine whether the owner has been deprived of the use of his or her land (Plater, Abrams and Goldfarb, 1992).

A special class of takings, the class that is most relevant to this study, is the class of takings called regulatory takings. These occur when environmental regulations or local ordinances such as prohibitions on construction or other behavior on private land is restricted to protect an environmental resource. In many of the early cases on regulatory takings the courts performed a rough analysis of the economic impact on the property owner of the government’s action versus the character of the government’s action (Penn Central Transportation Co. v. New York City, 1978; Agins v. City of Tiburon, 1980). More recently the court has evolved from a focus on the importance of individual projects to broader concepts of conservation biology, biodiversity, and ecosystem management (U.S. v. McKittrick, 1998; Christy v. Hodel, 1988).

Suffice it to say, concepts such as ecosystem management, which may at times be at odds with the interests of the private property owner, have not gone down easy with many landowners, as illustrated by the Christy case. Significant historical land use struggles such as the Sagebrush Rebellion and the takings
cases largely revolve around the conflict between private property rights and the need to protect society’s resources. Unfortunately, efforts at top-down restriction of property rights have often resulted in significant conflict.

A newer generation of legal structures has taken a different approach. Instead of “command and control” policies that forced landowners to restrict their property uses in government-determined ways, this new generation instead sought to develop partnerships with landowners, with a menu of choices of conservation programs. These types of programs are most visible in the last few versions of the Farm Bill, state farmland preservation legislation, the Endangered Species Act’s habitat conservation planning regulations, and in the area of private forest stand conservation. Recognizing that property owners often have multiple motivations, the programs appeal to an owner’s economic considerations, technical limitations, and other perceived barriers to conservation.

In order to develop effective policies and programs, however, it is necessary to understand the motivations of private landowners, and, in the context of this paper, those who reside at the urban/rural fringe. In addition to asking landowners which programs they participate in, policy-makers must also find out why. What are the key factors that motivate landowners to conserve land, or to use it otherwise? In order to answer this question, the study of landowner motivations and landowner behavior becomes important. A starting point for this understanding is the body of knowledge that examines attitude and behavior, and seeks to determine both the correlates of particular attitudes and the relationship of attitude to behavior. In addition, the research has also tried to determine which other factors, such as economic considerations, aesthetics, and land use type, are important in determining behavior.

The Attitude-Behavior Relationship

How do individual landowners make choices about land use behavior? There is not a clear consensus on the answer to this question. The literature on behavior towards the environment generally has evolved in a variety of disciplines. The dominant approach has been to identify the attitudes held by the individual, and to then argue that those attitudes will predict future behavior. This approach has been problematic for several reasons.
To begin with, the use of the term “attitude” in the environmental studies field is often imprecise. In the literature of social psychology, attitude is treated as a three-component concept, made up of affective (feeling), cognitive (believing), and behavioral (intentions and decisions to act) dimensions (Hovland 1960). Much of the literature in environmental studies however treats the concept of attitude loosely, failing to define the term and failing often to acknowledge its multi-dimensional nature. This is so even though theories from social psychology are typically cited as the basis for theoretical approaches to attitude. In many studies, there is little distinction made among these three components, as questions like “How do you feel about this? (affective)” really are asking “What do you think about this?” because the possible responses do not deal with solely with emotional elements, but instead involve cognitive processes of weighing one alternative versus another or evaluating perceived levels of risk, or using a mixture of cognitive and affective processes, depending on the level of passion an individual may have for a given issue they are being asked to evaluate.

**Seeing a Snake vs. Thinking about a Snake**

A second issue is the fact that there is a problem with measuring attitude by self-reported measures versus an observation of attitude when the object of the attitude is present. An example of this is the research done by Breckler (1984), in which studies were conducted to determine subjects’ attitudes towards snakes. In the first experiment, subjects were presented with a live snake, and verbal response measures of all three components of attitude (affective, cognitive, behavioral) were taken, with an additional measure of the affective component taken by noting the subject’s heart rate. In the second experiment, the subjects were asked to imagine if a snake were present. The results suggested that the actual experience with an object influenced the measurable components of one’s attitude (Brecklet, S.J. 1984; Eiser and van der Pligt, 1988). As one study team notes, “someone who believed, for instance, that a snake was perfectly harmless might say that they wouldn’t be afraid of it, and that they would be prepared to pick it up, but if actually confronted with a snake, harmless or not, they might react quite differently (Eiser and van der Pligt, p. 25). The implications of this experiment are fairly obvious: that someone’s attitude about a particular subject
might differ when faced with an actual experience with that object versus merely thinking about the object (as is typically the case in a survey response).

Further, the components of attitude might not be intercorrelated, in other words, feeling and behavior might be inconsistent with cognition in the face of actual experience. Yet most studies do not raise this issue, surveying subjects on a whole range of environmental issues, many of which the subject may have no personal experience with whatsoever.

**Feedback Loops and Other Problems in the Attitude-Behavior Relationship**

The third main problem with the attitude – behavior link is that, in fact, attitude and behavior may not be related at all. The relationship also may contain feedback loops, such that prior behavior will in many cases be a better determinant than attitude of subsequent behavior. Some scientists have taken the view that there may be no relationship at all, whereas others strive to find factors that will tighten up the link. A key factor often identified is the need to distinguish between attitudes generally and attitudes towards some specific action to be performed. This distinction is part of the conceptual foundation for Ajzen and Fishbein’s widely cited “Theory of Reasoned Action” (1975). In this approach, the concept attitude flows from one’s “evaluative beliefs about the consequences of the behavior.” Attitudes are then weighed against a person’s subjective norm, which flows from “beliefs about how others would view one’s performance of the behavior and the motivation to comply with their views.” The relative weight of attitudes versus norms then determines a person’s intention to act, which is seen as a predictor of behavior (Eiser and van der Pligt, 1988; Ajzen and Fishbein, 1975). This of course is also problematic, as each person will probably weigh attitudes versus norms differently, depending on how much they care about how others “view their performance” as well as other factors unique to that individual.

Given this backdrop of the complexity of the attitude concept, it is easier to see why the environmental literature has generally focused on the behavioral intention aspects of the attitude concept, and more or less ignores the other dimensions. To say “what do you think about this?” is a far different and more complicated statement than “what are you going to do about it?” because the former is further away in the causal chain from action, whereas the latter is much closer to action. For this reason, it makes sense
that much of the environmental literature spends less time dealing with the affective and cognitive dimensions of attitude, and more time dealing with the behavioral dimension.

In an effort to address some of this conceptual muddiness, I have tried to pursue several strategies in my research design. First, I use the term attitude in the same way as it is predominantly used in the environmental literature, which is typically related to the second and third components, cognitive and behavioral intentions. Although some studies do examine the affective component, it is very challenging in a survey context to accurately measure feelings and emotional responses, because the survey is of course only a piece of paper, rather than the actual object or experience to which the survey refers.

Second, my research design limits the concept of attitude to objects that the respondent can foreseeably experience. This is a departure from much of the literature which deals with multi-item scales on topics which may or not realistically be expected to be directly experienced by the survey respondent. It is highly foreseeable that the survey respondents I am dealing with will actually be impacted in some way by the development that is happening around them now and in the near future.

Third, I have tried to identify factors that would be common to all respondents, thus lessening the challenge of determining how each individual respondent will weigh their own evaluations of attitude versus norms. Further, I have tried to control for other demographic factors that might impact this weighing process, such as education, age, gender, and income.

Fourth, I have tried to avoid using attitude as a concept in a way that assumes anything about the behavior itself, as I believe this approach produces bias in the research, as I discuss now below.

The Misuse of the Attitude Concept in Early Research

Despite the difficulties noted above, the attitude concept has been central in the study of behavior generally and environmental behavior specifically. Much of the early research on links between attitude and environmental behavior was concerned with measuring public support for various protective environmental laws as well as behaviors such as recycling that were identified as pro-environmental or “environmentally responsible” (Gray, et al. 1985). It was reasoned that public support for laws and for
proactive environmental behaviors would translate into a higher level of pro-environmental behavior, a normative goal consistent with “the development of environmentally responsible and active citizens” as the “ultimate goal of environmental education” (Hines, et al. 1986/1987).

The preoccupation with the attitude-behavior relationship particularly in the field of environmental education seems to have heavily influenced the major approach to research on environmental behavior. The narrow focus of many studies has resulted in the failure to consider the possibility of interactions between variables in the attitude-behavior relationship, as well as the possibility of intervening variables that may enable or constrain an individual from acting consistently with his or her attitude. As one researcher has noted,

Generally the research strategy used outside political science has been, first, to develop a measure of concern for some aspect of the environment, and then to identify the measure’s demographic and ideological correlates. . . . the underlying assumption is that environmental attitudes reflect an ideology or philosophy that is more or less widely distributed among the mass public. . . . Implicitly, the aim is to identify the grassroots of the so-called environmental movement.

(deHaven-Smith, 1988, p. 177).

In short, much of the research exalted the goal of support for the environmental movement at the expense of a more comprehensive scholarship towards environmental behavior. Despite this shortcoming however, we can still use the results of this body of work to inform the building of more complex models of behavior towards the environment, and indeed, much of the previous research on private landowner behavior has built upon this line of research.

**Attitudes Are Linked to Behavior**

We know from the research that there is a link, albeit weak, between the concept of attitude and behavior towards the environment. “An attitude represents a person’s general feeling of favorableness or unfavorableness toward some stimulus object” (Fishbein and Ajzen, 1975). Attitude as a concept exists as a multidimensional construct, as discussed above, in relation to the concepts of belief, intention and
behavior. Beliefs, which link a particular object to an attribute, influence attitudes. According to the Theory of Reasoned Action, a person’s five to nine most salient beliefs about an object determine his attitude towards that object (Fishbein and Ajzen, 1975).

Some scholars have found fault with this aspect of the theory. They have wondered whether a person actually searches her memory for a set of salient beliefs about the consequences of a certain act, weighs the relative impact of each of these consequences, and then arrives at an attitude, which in turn will influence behavior. These scholars argue that although this theory may be useful for predicting behavior, it may not describe the actual decision-making process very well (Eiser and van der Pligt, 1988). Assuming for the moment, however, that attitudes are formed in this way, they then in turn predict the probability that a person will perform some act with respect to some object, also known as a person’s intention. Fishbein and Ajzen (1975) argue in the Theory of Reasoned Action that “most socially relevant human behaviors are under the volitional control of the individual, and a result, the most direct predictor of a behavior is the intention to engage in that behavior (Vaske and Donnelly, 1999; Fishbein and Manfredo, 1992; Fishbein and Ajzen, 1975).

Other theorists generally concur, but explain the relationships between the above concepts as a hierarchy in which values, value orientations, attitudes and norms, and behavioral intentions precede behavior (Ball-Rokeach et al., 1984; Fulton et al. 1996; Homer and Kahle, 1988; Rokeach, 1973, 1979; Vaske and Donnelly, 1999). A third prominent theory, Schwartz’s Norm-Activation Theory, holds that personal norms are the key to understanding individual’s disposition to act. Such norms are activated when a person believes that there is the possibility of an adverse consequence and that their own actions could prevent that consequence (Schwartz, 1973, 1977).

Following the Theory of Reasoned Action and Schwartz’s Norm-Activation Theory, much of the research on environmental attitudes and behavior has evolved as follows: First, attitudes are measured and scales are developed that classify individuals according to their responses to a number of questions concerning their beliefs and attitudes. Second, scores on the attitude scales are then correlated with demographic variables such as income, age, gender, race, and so on, to determine whether different social
groups hold different attitudes towards the environment and whether different social pressures or norms might affect attitudes.

The third step is to attempt to determine whether relationships exist between attitudes and environmental behaviors. Although some studies have discovered a correlation, it has often been low, suggesting that other variables might play a role in the attitude-behavior relationship (Scott and Willits, 1994).

The discussion that follows describes the relevant literature concerning environmental attitudes and behaviors at the urban/rural fringe. In the course of the discussion, I will examine four main types of theories relevant to the landowners at the urban/rural fringe.

The first type of theory is **Attitude Scale theory**. These theories attempt to measure attitudes towards the environment and then correlate those attitudes with different environmental variables to produce a “profile” of someone to target for support of environmental causes or issues.

The second type of theory is the **Urban/Rural theory**. This research compares urban and rural residents to try to determine differences in their attitudes towards the environment, and develops theories to explain such differences.

The third type of theories dealt with are the **Newcomers/Oldtimers** theories. These are akin to the rural/urban theories, except that now the people previously classified as Urban have moved to the country, and are called Newcomers. This body of literature considers not only prior theory borrowed from the rural/urban literature, but also develops political explanations to try to explain the differences in population groups. This subtype I call **Political/Cultural** theories.

The last type of theories I examine conclude that attitude and behavior are not directly related, and introduce moderator variables such as social context and other situational factors to try to predict how people will behave towards the environment. I call this group of theories **Situational Theories**.
**Attitude Scale Theories**

A multi-item scale is one of the most common ways of measuring environmental attitudes. An individual’s score on this scale is then used to classify survey respondents into separate groups. Frequently cited environmental attitude scales include the Environmental Concern Scale (Weigel, 1978), the Conservation Scale (Moffett, 1974) and the New Environmental Paradigm Scale (NEP) developed by Dunlap and Van Liere (1978). The NEP scale, or a similar anthropocentric/ecocentric continuum (see Vaske, 1999) is frequently used in studies on environmental attitudes at the urban/rural fringe (e.g., Scott and Willits, 1994).

The NEP separates survey respondents based on two worldviews. The first view, labeled the dominant social paradigm (DSP) is pro-growth, anthropocentrically oriented, and posits that nature is primarily for human consumption. The second view, labeled the New Environmental Paradigm (NEP), rejects the tenets of the first view, instead holding that sustainability is more important than growth, that humans are only one part of a complex ecosystem, and that nature is not primarily for human consumption. Instead, nature must also be valued for its existence, aesthetics, and other attributes. Many researchers have used these scales or slight variations in their surveys and then have tried to correlate the scale scores with specific demographic groups. The differences between groups are then discussed in terms of theories that attempt to more fully explain the underlying attitudes of different groups.

**Urban/Rural Theories**

Does the rural rebound change the dynamics of measuring environmental attitudes and behavior? What is the best way to analyze the attitudes of and behaviors of those who live in rural areas or fringe areas, so that we can better understand the impact their choices will have? Early literature did not address this trend. Literature on environmental behavior gradually evolved from a focus on environmental behavior generally to examination of specific topics. In the area of attitudes toward land use and development, a starting point is the body of knowledge that examines attitudes by contrasting the residents of urban areas and the residents of rural areas.
Many researchers have examined the differences in environmental attitudes between urban and rural residents (McBeth, 1995; Gray, Borden and Weigel, 1985; Tremblay and Dunlap, 1978; Buttel and Flinn, 1977; Lowe and Pinhey, 1982; Van Liere and Dunlap, 1980). These examinations have typically relied on two competing theories to explain the differences in opinion found in different residential groups: the Extractive Resource Commodity Theory and the Conservative Non-Elite Theory.

**Extractive Resource Commodity Theory**

The Extractive Resource Commodity Theory posits that rural people value natural resources for their economic potential rather than for their inherent aesthetics or other values because rural people rely heavily on those resources for their livelihood. Thus, rural people will express attitudes that reflect a lower level of environmental concern than urban residents or newcomers to rural areas (Tremblay and Dunlap, 1978; Cockerham and Blevins, 1977).

**Conservative Non-Elite Theory**

The Conservative Non-Elite Theory posits that rural people typically do not represent the elite, because rural people are lower in income, less educated, older, and more politically conservative than their urban counterparts who report higher levels of environmental concern (McBeth, 1995). Thus, differences in environmental attitudes are not attributable to place of residence per se, but rather to other demographic factors that tend to be found as characteristics of rural communities. Reliance on the Conservative Non-Elite Theory would also explain differences in environmental concern between the urban elite and the urban non-elite residents (McBeth, 1995).

**Empirical Studies on Urban/Rural Differences**

Tremblay and Dunlap (1978) focused their study on the differences between rural and urban residents. They found that rural/urban differences are stronger when concern is measured for environmental problems at the community, as compared to the state level, and that rural farmers are less environmentally concerned than rural non-farmers, and both are less concerned than urban residents. They
found partial support for their hypothesis that rural residents are less concerned with environmental problems than urban residents.

Tremblay and Dunlap relied on two explanations for their results. First, the level of exposure to pollution is higher for urban than for rural residents, thus urban residents report greater environmental concern. Second, in support of the Extractive Resource Commodity Theory, rural residents are more likely to hold utilitarian as opposed to appreciative views of nature, due primarily to the resource-extraction occupations of rural people.

In contrast, Lowe and Pinhey (1982) found that although association with farming lowered a respondent’s score for environmental concern, employment in other resource extractive industries had negligible impact on the environmental concern score. Thus, they did not find support for the Extractive Resource Commodity Theory.

Other researchers have focused more closely on the different groups within the rural population. Freudenburg (1991) found that both farmers and ranchers showed significantly higher than average levels of concern for the environment on three of four scales he used. He found that the lowest levels of concern were found among persons in coal-mining and in growth-related business and professional occupations. He explained this result by reference to the Growth-machine theory (Murdock and Schriner, 1977), which holds that the economically risky nature of many rural occupations may lead them to be more likely to favor growth over environmental protection, because they feel that environmental regulations will lead to additional costs to their businesses and thus narrow their profit margin.

Freudenburg also made a distinction in his study between nature extractive occupations (mining) and nature manipulative occupations such as farming and ranching. He reasoned that farmers and ranchers may differ from miners in how they perceive their impacts on the environment, and may also differ based on the environment in which they work. Farmers, he argued, would generally work in more pristine and less industrialized conditions than miners would.

The only environmental scale on which farmers scored the lowest was in their level of support for planning and zoning. Freudenburg reasoned that farmers might want to have the ability to sell their land for higher residential prices, and thus might not be in favor of zoning and other controls that might interfere
with their ability to sell their land at the highest price. Despite his results, he urged caution at full acceptance of the findings, citing a plausible and probable attitude-behavior gap:

Indeed, given the very high levels of support for environmental protection that continue to be found among the public at large (citations omitted)… it would appear that even those who are creating significant levels of pollution – or perhaps especially such actors – would find it in their interest to project a public image of concern for the environment (Freudenburg, 1991).

More recently, studies have found that although support for environmentalism was highest among younger people, those with higher education, and political liberals, those demographics were no longer distinctly urban. This finding seems to refute the Conservative-Non Elite Theory, in that rural areas can no longer be characterized by a distinct set of demographic variables. The authors of one study conclude that “overall, it appears that environmentalism has broadened its appeal, especially in communities located near national and state parks, wildlife refuges, and other outdoor recreation sites” (Jones, Fly, and Cordell, 1999). Another possible explanation is that massive outmigration from cities to the countryside has resulted in a mix of demographics, such that rural areas are no longer distinctively populated by the non-elite. In other words, the elites who have migrated to rural and urban/rural fringe areas have brought their environmentalism with them.

**Theories of Newcomers vs. Longer-term Residents**

Reflecting the increasing migration from urban to rural areas, an alternative line of research has focused not on the urban/rural dichotomy, but on differences between newcomers and longer-term residents. This line of research has questioned the utility of the two theories above and instead looked at particular socio-demographic factors to explain differences in attitudes between newcomers and longer-term residents. As in the urban versus rural studies, there is considerable debate about whether newcomers and longer-term residents are truly different in terms of attitude.

Cockerham and Blevins (1977) found that amount of land owned was the key variable that correlated with differences between newcomers and longer-term residents of rural areas regarding attitudes
towards planning and development. Longer-term residents, who owned larger tracts of land, did not support additional planning because they saw this as restricting their ability to use land as they wished. Newcomers, who owned smaller tracts of land, wished to preserve rural and scenic values of the community and thus favored additional planning as a means to restrict future development.

In contrast, Sofranko (1980) found no differences between newcomers and longer-term residents in terms of attitudes towards population growth. Similarly, Smith and Krannich (2000) found that there were no statistically significant differences between newcomers and longer-term residents. They did not support media accounts suggesting that newcomers to rural areas in the Rocky Mountain West have different values than longer-term residents regarding the environment and development.

**Boomtown Studies**

An important subtopic of much of this research on newcomers versus oldtimers is the boomtown literature. This body of knowledge is largely focused on rural areas with high amenity values, such as parks and wilderness, or areas that have experienced rapid growth as a result of energy production. It includes studies such as Smith and Krannich’s, above, as well as England and Albrecht’s studies of boombtowns in Colorado and Utah (1984) and many others. Boombtowns are defined as having two main characteristics prior to the boom: a decline in population, and a homogenous population. After the boom, often due to new facilities for energy production, these areas experience rapid population growth that taxes the community’s social resources. A key aspect of this literature is the focus on the social disruption hypothesis, which states “boombtown communities enter a period of generalized crisis and loss of traditional routines and attitudes” (England and Albrecht, 1984).

An example of the social disruption hypothesis is found in research that examines specific attributes of the community. These studies suggest that even when newcomers and oldtimers get along, the community still suffers in other ways. In a meta-analysis of 23 before and after studies, Freudenburg (1991) found that all but two of the communities studied reported greater increases in criminal activity than in population at ratios as high as 3.6 to 1. Freudenburg suggests the results may be explained in terms of
the changes in the community that occur as a result of rapid growth, such as impairment of informal social controls and the decline in a community’s density of acquaintanceship.

The tremendous volume of this literature throughout the 1970s and early 80s attracted media attention and a characterization of the social conditions of boomtowns. As Smith et al. (2001) noted, “By the early 1980s the accumulated literature on social consequences of boom growth apparently had established that boomtowns were characterized by the emergence of numerous, and often quite serious, social problems” (p. 429). In response to some of the early literature, later studies began to question the social disruption hypothesis, and findings showed that rapid growth was not “uniformly associated” with social disruption (Smith et al., 2001, p. 431). In a 13-year longitudinal study of four communities, Smith et al. found that although social disruption occurs in several dimensions of well-being, it does not occur in all dimensions. When disruption does occur it is typically followed by a rebound in well-being rather than a lasting disruption (Smith et al., 2001).

Why include a discussion of community in a study about land use, development, and other “environmental” matters? The boomtown studies that discuss the social disruption hypothesis are important because they demonstrate how migration affects a community, in addition to migration’s environmental and economic effects. Community has become an increasingly important dimension of natural resources issues as it is recognized that almost all management strategies require coordination and cooperation within a community, particularly those strategies that deal with public goods. In addition, community and land uses are related because land users are also neighbors. In the context of large-scale management approaches like ecosystem management, the degree to which a community is disrupted or connected could be a large factor in the success of cooperative management strategies requiring landowners to cooperate with their neighbors.

Although boomtowns differ from the Midwestern communities I study here, they are also similar to my study areas in their key defining characteristic: rapid population growth. Will towns in regions other than the West, such as those in this study, suffer the same fate of social disruption as the boomtowns of the West? Or are there characteristics of these Midwestern places that would isolate them against the possible problems of community breakdown associated with rapid community growth, and produce more of a blend
of old and new citizens? Several factors seem to suggest that development in the Midwest might follow a different course. First, the development in the Midwest is not being fueled by the construction of large energy producing plants. Second, the growth in population, while still impressive, is not as rapid as that in the West. Third, the areas experiencing growth in the Midwest are more heavily agricultural, suggesting that farming, rather than mining and ranching, would be an important dimension of the study. Finally, the histories of the counties in my study suggest a pre-existing mix of industry that may not be present in the rural West. For these reasons, although the key phenomena studied in boomtown literature, rapid growth and its effects on the community, are important, I argue that the results may be very different in the Midwest. Although community is not the central focus of my study, I do include analysis of newcomers versus longer-term residents, which could be a useful building block in future research comparing community disruption in Western versus Midwestern communities.

I now turn to some of the theories that deal with attitudes towards the environment by examining the political dynamics at work behind the scenes of rural communities.

**Political/Cultural Theories**

**New Voice Thesis**

Political science and anthropology have put forth their own explanations for hypothesized differences in environmental attitudes towards land use between newcomers and longer-term residents. Fortmann and Kusel (1990) tested whether longer-term residents and newcomers hold different environmental attitudes that lead to conflict over natural resource use. They argued that the urban/rural dichotomy was too simplistic, and without widespread empirical support. They further argued that rural conflict over natural resources arises not out of differences between longer term and newer residents, but instead from the new residents giving voice to already held attitudes. Because commodity interests historically predominated in rural areas, the viewpoint of those who viewed the environment as a commodity prevailed, even though many rural residents may not have shared that view. When newcomers to a rural area were willing to express their views, they not only expressed them on their own behalf, but also “gave voice” to those previously silent longer-term residents who did not share the view that nature is

Affirming this thesis, they found that residential status did not have a significant effect on the environmental attitudes of the general public. In examining specific demographic variables however, they found that gender had a significant positive effect of environmental attitudes among the residents in one of their study areas, in that women were more likely than men to be pro-environmental.

**Polarizing Groups Thesis**

In a related political analysis, McBeth (1995) offered an explanation for urban/rural differences based not on the voice of rural residents, but on the voice of the polarizing groups that seek to enlist support among rural residents. McBeth found that contrary to public perception, rural populations held moderate environmental and economic views. McBeth suggested that this result may be explained because the policy process of rural development is shaped by polarizing forces “outside the mainstream of rural culture” such as business lobbyists and environmentalists, the elites who represent the polar extremes and may not be the true voice of rural communities.

Both of the above theories, the New Voice Thesis and the Polarizing Groups Thesis, share a conceptual basis with the Norm-Activation theory (Schwartz, 1973, 1977) and Stern’s Value-Belief-Norm-Theory. Stern observes that “environmental personal norms and the predisposition to proenvironmental action can be influenced by information that shapes these beliefs. . . It also suggests an interpretation of environmentalist and antienvironmentalist rhetoric as efforts to activate or deactivate people’s environmental norms by highlighting certain kinds of values or consequences.” (Stern, 2000, p. 414; Stern, Dietz, Kalof & Guagnano, 1995).

**Mass Belief Systems Thesis**

A third type of analysis is the “mass belief systems approach” which is based on the premise that different people may conceptualize the same issue differently. Rather than trying to identify groups based on attitude differences, this line of research tries to “determine the conceptual foundations of opinion
among different groups.” (deHaven-Smith, 1988). The mass belief systems concept was initially
developed by Philip Converse (1964), who argued that mass belief systems are based mostly on people’s
immediate circumstances and experiences, and that the little information most people had on political
issues was controlled by elites, as McBeth argues.

Although Converse’s theory has been both supported and criticized (deHaven-Smith, 1988), it is
clear that some elements have survived in recent work on behavior towards the environment, as shown by
McBeth’s Polarizing Groups explanation. In deHaven-Smith’s study, land use behavior was examined to
determine whether support for land use regulations was “based in a sophisticated philosophy that is
distributed more or less diffusely in the mass public, or instead in a variety of distinct belief systems that
are relatively crude and very narrowly focused” (deHaven-Smith, 1988, p. 184). He found support for the
mass belief systems theory, in that most respondents conceptualized land use regulation narrowly. Their
attitudes towards land use regulations depended more on local conditions than on more abstract concerns.
He also found that priorities differed based on the conceptual foundations of attitudes towards the
environment:

Some people are concerned primarily about the quality of the built environment; some
focus on the natural environment; others emphasize the politics of planning and zoning,
and still others have little substantive content at all in their views” (deHaven-Smith,
1988, p. 194).

He concludes that leaders should try to address local, everyday environmental issues, rather than
trying to make abstract arguments about man and nature, and that in turn, scholars should abandon studies
of “concern for the environment” and instead be more issue-specific as to particular environmental
problems and public attitudes.

**Cultural Theory**

Ellis and Thompson argue that differences in attitudes towards the environment are not so much
differences on the specific environmental issues per se, but rather differences in broader cultural
conceptions of how we should live with one another. Testing four diverse theories, they found the most
support for Douglas and Wildavsky’s theory that there is a correlation between egalitarianism and environmentalism, suggesting that those most concerned with equal distribution in society are most likely to show concern about environmental degradation. They also found a strong inverse relationship between individualism and support for environmentalism, noting that “egalitarianism and market individualism consistently emerge as the variables that explain the greatest amount of variance in environmental attitudes” (Ellis and Thompson, 1997, p. 889). They state that their conclusions suggest that beneath shared environmental concerns lie different conceptions of how environmental problems should be dealt with (Ellis and Thompson, 1997).

Interpretation of Attitudinal Studies: Key Variables, but not a Model

From the studies above, it seems clear that the urban/rural theories and the newcomer/oldtimer theories have not been successful in explaining differences between urban and rural people, or between longstanding and newer residents of rural communities. In fact little difference may exist between urban versus rural groups and newcomers versus longer-term residents. Even though studies of newcomers versus longer-term residents have identified some variables that are correlated with differing attitudes, such as parcel size, occupation, and gender, these individual variables by themselves do not seem to constitute a holistic model. Most importantly, the studies do not consider the possibility that the attitude-behavior relationship may in fact be complex. Although theories that explain the political and cultural dimensions of attitude shed light on the dynamics that shape perceptions of rural attitudes, they do not fully illuminate the relationship between the attitudes and behaviors of land users.

Is it more plausible to find support for a less grand theory, such as deHaven-Smith’s work, which argues that environmental attitudes and behavior are not in fact very sophisticated or well-thought out, but are instead mostly the products of local conditions and individual circumstances? Could it also be true that the shifting demographics and recent in-migration to rural and urban/rural fringe areas will render useless our earlier understandings of those who are “rural” versus those who are not?
Another important feature of the studies that must be recognized is the context of the studies, which varies widely. It is possible that the type of rural environment (near forests, near mines, in the West versus East, in a Boomtown or not, and so on) may also be a significant variable such that findings are inconsistent and not generalizable. This view is supported by deHaven-Smith’s findings that the everyday environmental conditions of people may vary from one location to another, and thus their level of concern may similarly vary.

**Situational Theories**

The third step in the evolution of research in this body of knowledge has focused less on correlating attitudes with place of residence (urban/rural) or length of residence (newcomer/longer-term) or political forces and instead has attempted to model a more complex relationship between environmental attitudes and behaviors. The important research question is: What missing variables might better describe the relationship between attitudes and behavior?

**The Disparity between Words and Deeds**

Scott and Willits (1994) attempted to determine what some of these other variables might be. Their study tested two models. One correlated five social characteristics (gender, age, education, income, and political ideology) with pro-environmental political and consumer behavior. The second model added scores from the New Environmental Paradigm Scale to these five social characteristics. They found that although social characteristics were better predictors than NEP scores of environmental behavior, adding NEP scores to social characteristics increased the explained variance of the model from .26 to .33 for consumer behavior and .23 to .30 for political behavior. Still, they noted that the overall multiple r was not high and speculated about possible causes, including the following:

... the observed low attitude-behavior linkage may be less a result of question wording or measurement error than a real disparity between words and deeds. Given the amount of media coverage devoted to environmental problems, it could be that many people have learned the language of environmentalism without developing a simultaneous behavioral commitment.

*(Scott and Willits, 1994, p. 255).*
Another possible explanation for these results is that the attitude-behavior model used was too simplistic. It may be that attitudes do not in fact have a direct relationship with behavior, and that other variables may intercede or interact with attitude. As Abelson (1986) noted, “We are very good at finding reasons for what we do, but not so good at doing what we have reasons for (p. 228).” In order to build such models, scholars have begun to examine in greater detail variables other than attitude that may be correlated with behavior. These scholars argue that in some situations other variables may be more important than attitude in predicting behavior (Stern, 2000) or that attitudes and their underlying constituents, beliefs, may be more complex than previously acknowledged.

**Diffusion and Adoption**

A discussion of land use decision-making would not be complete without reference to the literature on the land use behavior of farmers. These studies comprise the research tradition known as diffusion and adoption. The studies largely emanate from the work of Rogers (1995) and others who defined a theory to predict whether a particular innovation on the farm would be adopted or rejected, based on characteristics of the farm and the farmer, as well as characteristics of the innovation itself. Many of these innovations can also be seen as land use practices. In this research, there is general agreement that for most innovations, the innovation must be profitable to the farmer in order for it to be adopted (Napier et al., 2000). Still, some land use practices have been found to not fit well with the Rogers model. Many of these uses are characterized as conservation practices and essentially involve land uses that further conservation goals. A growing body of literature on environmental land use practices calls into question the applicability of the adoption model for uses that may not be profitable, but may be attractive to land owners for other reasons, such as aesthetics or recreation. Examples of uses have included preservation of forested land, use of riparian buffers to prevent contamination of rivers, and participation in government programs that encourage restrictions on land use for various environmental quality goals (Pampel and van Es, 1977; Taylor and Miller, 1978; Koontz, 2001; Napier, 2000, Ryan, Erickson and De Young, 2003). For example a study of 268 farmers in a Midwestern watershed in Michigan found that farmers are intrinsically
motivated to adopt conservation practices by such factors as attachment to the land (Ryan, Erickson and DeYoung, 2003).

Other farm studies have tried to distinguish different categories of adopters. One study found that early adopters have greater financial resources or larger farms, and that education encourages adoption. Further, adopters of multiple conservation practices are a distinct group, called innovators, who can influence neighbors to also adopt. These innovators are argued to have special information about costs, yields, and technical aspects of conservation practices that enables them to make the decision to adopt earlier. The authors of this study suggest that such innovators should be included in leadership roles in conservation education programs (Upadhyay, et al., 2003).

Another topic of the literature is organic or sustainable farming. This literature attempts to discover variables other than economic ones that may help to explain land use decisions. One study found that although both organic and conventional farmers are concerned about the economic risks of farming, organic farmers are more concerned with long-term sustainability and are more willing to incur present risk to incur benefits in the future. Organic farmers also scored higher on attitude scales measuring awareness of and concern about environmental problems associated with agriculture (McCann, et al., 1997).

An important subset of the adoption and diffusion literature is the set of studies dealing with landowners’ decisions to participate in government programs. Although much of the research is concerned with adoption of farm programs that encourage the use of conservation practices, as discussed above, other studies deal with participation in government programs by other landowners. A large category of this literature is the group of studies on private non-industrial forest owners. Studies in this literature have found a statistically significant positive correlation between acreage of ownership and the use of assistance (Lorenzo and Beard, 1996). Other factors positively correlated with participation in government programs include income, age, education level, and use of government sources of information (Mills, et al. 1996).
Other Landowner Behavior Studies

Other studies have dealt with landowners generally, and draw upon a variety of bodies of knowledge including adoption and diffusion as well as other work in agricultural economics and wildlife management to examine specific land use practices.

One study examined the demographic variables associated with land use activities and found that education, age, and holdings were significantly correlated with land use activities. Specifically, younger age and higher education were positively associated with active protection activities, whereas farming and haying were negatively associated with better-educated owners. Timbering was positively associated with larger landholdings, whereas mowing was negatively associated with larger land holdings (Koontz, 1999).

Many studies have examined land use decisions concerning non-industrial private forests, also known as woodlots. In a study of landowners in Michigan, researchers found that aesthetic appreciation was the strongest factor motivating landowners to retain woodlots, especially by non-farmers, and that protection of the environment was also important. Economic motivations were found to be significantly less important (Erickson, Ryan and DeYoung 2003).

Jacobson (2002) studied landowner motivation to participate in ecosystem management by preserving part of their property as a wildlife corridor. Examining both spatial attributes of the property as well as other variables, Jacobson found that there was no significant linkage between spatial attributes of a landowner’s property (such as type of land and location) and interest in ecosystem management. Attitudes towards environmental issues and incentives for participating in a corridor system were more likely to influence decisions about whether to participate in ecosystem management, rather than spatial characteristics or demographic variables. This suggests that although economic considerations play a role in motivation, other factors are important as well. Another finding of the study was that many of the respondents identified recreational uses as important motivators for land use. One half of all respondents reported using their land for hunting, and one third of the respondents said that “hunting and fishing” is one of the top reasons they own their land (Jacobson, 2002).

Kline et al. (2000) found that land use decisions are influenced by forest ownership objectives. This study examined the willingness of nonindustrial private forest owners to forego harvesting. Higher
incentive payments were necessary to induce owners to forego harvesting for owners who had primarily timbering objectives as opposed to those who had both timbering and nontimber objectives, or primarily recreation objectives.

A blend of the literature on farmer behavior and forest management is found in a study on farmers’ use of woodlots and windbreaks. This study found that farmers who had a higher level of maintenance of woodlots and windbreaks were characterized by an approach to farming based upon aesthetic and intrinsic forces whereas farmers who demonstrated a reduced maintenance of woodlots and use of windbreaks had a more conventional, externally motivated approach to farming (Erickson and DeYoung, 1993).

A common theme is that enfranchisement of owners, through direct involvement in planning or participation, encourages conservation. A study of landowner participation in ecosystem management found that ecosystem management would be more successful if greater efforts were made to educate owners about ecosystem impacts and to develop greater public ownership in the early stages of ecosystem management programs (Raedeke, Nilon, and Rikoon, 2001).

From a policy perspective, it is important to identify the motivations of landowners to adopt conservation practices on private land. It is here that the literature that examines the perspectives of managers and policy makers can make a contribution to our understanding of private landowner behavior. In one study that surveyed state wildlife agency administrators, respondents reported a range of techniques necessary to encourage good wildlife management on private lands. These techniques included fostering cooperation, empowering landowners, technical support, educational assistance, and funding (Benson, 2001). Other work stresses the importance of planning and management on private lands, noting that only a small percentage of nonindustrial private forest owners have management plans (Elwood, Hansen, and Oester, 2003).

In addition to landowners however, it must be noted that other groups of land users also affect conservation practices. Hunters are an example of a significant population that is being studied in this context. Although many hunting organizations support wildlife conservation, one recent literature review found that hunters often have attitudes and behave in ways that do not support “broad-based, ecological
objectives.” It is argued that hunters are a crucial target group for achieving conservation goals and progress towards this goal can be made through increased hunter education that fosters moral norms and ecological understanding (Holsman, 2000).

Aesthetics as a Body of Knowledge

Throughout this literature, there is some confusion over the term aesthetics. Despite the fact that aesthetics is in itself an entire field of study, few scholars dealing with the issue in environmental behavior research attempt to define aesthetics. Although articles in the disciplines of philosophy, religion, and as mentioned, aesthetics, very carefully define aesthetics, it is often assumed in the environmental management literature that aesthetics as a concept is clear enough. This approach is fraught with difficulties however, when policy makers must compare aesthetic motivations to other motivations. It is frequently found that it is difficult to convert aesthetic value to a common currency for the purposes of comparing aesthetics to economic motivations. Economists have developed a number of measures to try to create such a currency when market valuation techniques do not really work to measure ecosystem values such as aesthetics. These techniques include avoided cost, replacement cost, factor income, travel cost, hedonic pricing, and contingent valuation (Farber, Costanza, and Wilson, 2002). Although these techniques arguably do a good job in capturing “what” is being valued, they cannot answer as well the question of motivation, or why aesthetics are valued, particularly when the motivation isn’t related to an economic gain, but instead is a value such as beauty, peacefulness, or “character.”

Another way to define and measure aesthetics comes from the field of philosophy. One author in this field has attempted to define aesthetics character as a descriptive process, in which one identifies the particular qualities that give a landscape “a distinctive look or feel” (Brady, 2002). Included in Brady’s description of aesthetic character are the perceptual qualities of visual qualities, sounds, tactile qualities, olfactory and gustatory qualities, as well as the interaction with one’s thoughts, emotions, imagination, and memory. Being a rather complex quality then, aesthetic character contains not only the objective elements like color, topography, climate, and the like, but also highly individualized elements such as those mentioned above.
In addition, aesthetic character is not static; just as environmental systems experience disturbance and change, so also do landscapes or other aesthetic objects experience change and thus have “aesthetic narratives” that describe the history of an object or place. An example of an aesthetic narrative that can be useful to natural resource conservation is the practice of “reading the landscape” as expressed in the book of the same title by Dr. Tom Wessels of Antioch New England Graduate School (1997). Dr. Wessels considers the types of trees, the shape of the land, the quality of the groundcover, the description of old stone fences and other artifacts at a site to determine the area’s aesthetic narrative. This narrative might tell us that an area was used formerly as an old field, pasture, quarry, or the site of a fire or other historical events, such as a battlefield or meeting place. This historical reading adds not only an environmental history dimension to the description of a place’s aesthetic character, but also a cultural history: the way that early landowners cleared, managed, and used their land had long-term environmental consequences on such things as species composition and the pathways of succession.

These early practices also influenced the legal and social dimensions of the landscape, including how particular parcels were divided, whether land is in public or private hands, and whether land is preserved based on its historical uses and aesthetic features or has simply evolved in its uses over time.

Why does it matter how one defines aesthetics? It is my contention that it is important in understanding the data generated from survey responses. Although the economic definition of aesthetics may be more useful from a manager’s standpoint, it may not truly reflect the way individuals actually weigh aesthetic considerations against other considerations. Few people probably value their scenic views, landscapes, or the peacefulness of their surroundings in terms of willingness to pay, for example, unless expressly asked to do so by a researcher. For this reason, in examining the data in my study, I have chosen to adopt the complex, multi-layered second definition of aesthetics, as it seems to more accurately match the kinds of answers written by survey respondents, even though it fails to meet the goal of parsimony. In this definition, aesthetic considerations contain both objective elements, such as open green spaces like pastures and old fields, but also more subjective elements, such as beauty. In addition, the definition also contains the aesthetic narrative of a place that may be highly individualized to each landowner, but can also be understood by others who have some skill in reading the landscape.
As a measure for aesthetics, I have included both a direct question from the survey that asks landowners their primary reason for owning the property, as well as an analysis of the narrative responses from the survey that discuss aesthetic considerations in landowners’ development decisions.

**Social Forces in the Aesthetics Literature**

An interesting dimension of the economics versus aesthetics literature on land use is a growing category of literature that deals with the darker side of aesthetics. This body of literature argues that some landowners use landscapes and landscape preservation as mechanisms for social exclusion. This exclusion is achieved through restrictive land use policies, protection of large numbers of acres as preserves, and the enhancement of particular communities. As one author notes, “The seemingly innocent pleasure in the aesthetic appreciation of landscapes and the desire to protect nature can act as a subtle but highly effective mechanism of social exclusion in the reaffirmation of elite class identities” (Duncan and Duncan, 2001).

A related theme is examined in the broad literature on the New Urbanism. This is a body of literature from architecture, planning, and community development that seeks to correct some of the social ills of suburbia. It does so by managing the form of development both at the level of the architecture of the individual house as well as larger spatial scales of neighborhood, village, and region. The goal of the New Urbanism is to increase local opportunities for networking and building social capital through management of the physical form of development. Planners develop communities that have features characteristic of old towns, such as small lots, narrow streets, houses close to the street, and other physical features that encourage more walking and human interaction in neighborhoods. There is typically a mix of residential and retail space, and the inclusion of green spaces and other focal points in neighborhoods intended to be gathering places (Axhausen, K.W. 2000; Kunstler, J.H., 1993).

Although this literature has thus far mostly been applied to urban and suburban areas, it is inevitable that this approach will be applied to rural areas, which must increasingly deal with a similar set of issues in trying to predict the social and environmental impacts of rural population growth. Social capital, and the means to achieve it, become important components of the literature addressing the problems of rural sprawl. For example, the literature in rural sociology has shown that the development of
social capital through relationships between farmers and non-farmers can be an important strategy in dealing with conflicts between non-farmers and farmers as well as non-farmer support of agricultural activities (Sharp and Smith, 2003; Kelsey and Vaserstein, 2000).

The problem of dispersed development is even more pronounced in rural areas due to the greater availability of land and the current low density of housing in many rural areas. Because the rural community is different than urban communities, the New Urbanism literature might be applied in a different way, as “rural planners” try to encourage physical development forms that encourage community. Or, new urbanists might simply take their current approaches to developments further into the countryside, developing “new towns” and “villages” as entire development projects emulating a rural village or town, in the attempt to enhance social networks, in the space that was once a single farm or an open field (e.g., Arendt et al., 1994).

**Instrumental and Symbolic Beliefs**

Some researchers have rejected the arguments that suggest that a multitude of factors play a role in land use behavior, and instead focus on more intuitive sources for behavioral intentions.

Cary (1993) found that beliefs of landowners, both instrumental and symbolic, were related to land use behavior. Whereas an instrumental belief concerns the evaluation of an object as itself, a symbolic belief concerns what the object represents. Although Cary found that instrumental beliefs had a higher correlation to environmental behavior than did symbolic beliefs, some symbolic beliefs and behaviors, such as planting a small or token amount of trees to combat desalinization, may allow individuals to avoid cognitive dissonance between their beliefs and actions. This work may also provide yet another explanation for why the correlation between beliefs and actions remains low.

By examining new and more complex models of behavior, we can begin to find the missing links in the attitude-behavior model, in order to better explain and predict environmental behaviors.
Methodological Explanations

In a meta-analysis of 128 studies of determinants of behavior, Kraus (1995) found two general approaches to explaining the low correlation between reported attitudes and reported or observed behaviors: methodological and moderator variable explanations.

Methodological explanations include measurement problems, artificial as opposed to real-world behavior settings, and surveys of homogenous groups such as students (Kraus, 1995). Measurement problems arise when the level of specificity for measuring an attitude and an action are not the same. An example of this would be to measure attitudes towards environmental protection generally and then to correlate this to a specific environmental behavior, such as recycling. The correction of this problem would require a measure of attitudes toward recycling specifically and a measurement recycling actions.

Others have argued that artificial or lab settings produce lower attitude-behavior correlation, though studies testing this assertion are mixed (Kraus, 1995, Hines, et al, 1986). Finally, some argue that using students as opposed to other groups in a sample may cause lower correlations because students’ attitudes may still be developing and may not be based on direct experience. All of these problems are relatively easy to address in the land use context if the sample of individuals is heterogeneous, the setting is real-world, and the questions are designed to measure specific attitudes and actions. A more challenging problem seems to be the design of the model to include moderator variables.

Moderator Variables

“A variable can be said to moderate the attitude-behavior relationship if the correlation between attitudes and behavior varies at different levels of the variable” (Kraus, 1995, p. 60-61). Examples of moderator variables include stability, certainty, affective-cognitive consistency, direct experience, and accessibility. Other key moderators are personal variables, such as the degree of self-monitoring and situational factors, such as norms, roles and reference groups (Kraus, 1995). Kraus found in his meta-analysis that these moderator variables had “substantial and relatively consistent moderating effects” (Kraus, 1995, p. 70). Based on his findings, he developed a model of the attitude-behavior relationship that incorporates these moderators.
Although the Krause study examined research in a variety of disciplines, those in the field of environmental attitudes and behavior have also begun to examine the effect of intervening moderator variables, including situational factors and social context.

**Situational Factors**

In a meta-analysis of environmental studies, Hines et al. (1986) examined situational factors: economics, social pressure, and social opportunities as possible moderator variables, in addition to a number of skill and knowledge variables that may moderate the relationship between attitudes and behavior. For example, in examining the role of social opportunities, Hines and colleagues found that the type of population sampled (general vs. those who are members of an environmental organization) affected the size of the correlation between knowledge of an environmental problem and pro-environmental behavior.

Relying on the Hines model, Hwang et al. (2000) selected knowledge about an issue, locus of control, attitude, and personal responsibility as antecedent variables to intention to act, which was chosen as an indicator of responsible environmental behavior. They hypothesized relationships both among the antecedent variables as well as direct paths from antecedent variables to intention to act. They found that locus of control had the largest effect on intention to act, and that locus of control also had direct effects on attitude. They also found that general knowledge about an issue had only a small effect on locus of control. They suggested that other types of knowledge in the Hines model, such as knowledge of action strategies, might be more effective in raising the level of internal locus of control of individuals (Hwang et al. 2000).

**Conflict vs. Consistency**

Using a different model that emphasized conflict versus consistency between attitudes and situational variables, Corraliza and Berenguer (2000) examined the relationship between personal and situational variables in predicting environmental behavior. They considered a personal variable to be a person’s attitudinal disposition. A situational variable was defined as “not only variables of a social origin, such as social norms, but also the characteristics of the physical setting in which people carry out specific
environmental actions, which act as facilitatory and inhibitory factors of responsible ecological behavior” (Corraliza and Berenguer, 2000, p. 836).

The Corraliza-Bereguer model was based on the hypothesis that the personal and situational variables would interact with conflict or consistency:

Conflict is high when there is low attitudinal disposition and facilitation, or when there is inhibition, but high attitudinal disposition . . . Consistency occurs when personal disposition to the behavior is low and the situation makes it difficult, or when the personal disposition to the action is high and the situation facilitates it.

(Corraliza and Berenguer, 2000, p. 837).

Consistent with their hypothesis, they found that the predictive power of attitudes was highest in low conflict situations, and lowest in high conflict situations, and concluded that situational characteristics played a role in the attitude-behavior relationship.

Other researchers, however, have found that the association between attitude and behavior was highest when contextual factors were neutral. When contextual factors were strongly positive OR negative, the attitude-behavior relationship approached zero (Guagnano et al., 1995).

Social Context

Olli et al. (2001) examined social context as a variable in the attitude-behavior relationship also, measuring social context as “the intensity of social networks within environmental organizations” (Olli et al., 2001). They operationalized this variable by examining participation in environmental organizations, frequency of volunteering, and face-to-face contact with friends in the organization. They found that social context as a variable was more determinative than any of the other correlates of environmental behavior. They argued that the effect of social context was as great as environmental attitudes or all of the sociodemographic variables put together (Olli et al., 2001). Unfortunately, in this model social context was treated as just one more independent variable, and thus the study confirms its importance but does not examine the possibility of interactions between social context and attitude or intervention of social context between attitude and behavior.
It may be that few authors have been able to adequately address the attitude-behavior inconsistency due to the difficulty of building a model that can be tested by common statistical procedures. Discussing the difficulty of building a model of responsible environmental behavior, Hines et al. note that:

It appears to involve a number of variables, none of which are likely to operate without interacting with others. The development of a model becomes a difficult task when it is considered that the majority of studies reported in the literature failed to measure interactions among the variables studied.

(Hines et al., p. 6).

**Multivariate Statistical Alternatives**

In an attempt to more accurately portray the relationships between antecedent variables, Vaske and Donnelly (1999) have suggested a path analysis method to test a model wherein environmental attitudes would mediate the relationship between value orientations and voting intentions. Though a step in the right direction, the model fails to consider any of the moderating variables proposed by Kraus and others, instead treating attitude as an intervening variable.

Similarly, other researchers have used Analysis of Moment Structures (AMOS) software to test a hierarchical model of general values, environmental values, problem awareness, and personal norms on general pro-environmental behavior. Despite the originality of the model and the statistical tool used, the authors found that there was still a large amount of unexplained variance (R squared = 0.21) (Nordlund and Garvill, 2002).

These studies provide a basis for synthesizing theoretical and statistical approaches to develop a model to predict land use behavior. The reader may find helpful at this juncture the following table, which summarizes the four main types of theories discussed in this section.
## Theory Major Argument Key Variables

<table>
<thead>
<tr>
<th>Theory</th>
<th>Major Argument</th>
<th>Key Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I. ATTITUDE SCALES</strong>&lt;br&gt;New Environmental Paradigm (Dunlap and Van Liere, 1978)</td>
<td>Separates survey respondents based on two worldviews. Scores on the scale are correlated with demographic variables.</td>
<td>Multidimensional measures of attitude, demographic variables like age, education, political party affiliation, income, gender.</td>
</tr>
<tr>
<td><strong>II. URBAN/RURAL</strong>&lt;br&gt;Extractive Resource/ Commodity Theory (Tremblay and Dunlap, 1978)</td>
<td>Rural people value natural resources for their economic potential, rather than aesthetics or other values because rural people rely on these resources for their livelihood. Thus rural people will express lower levels of environmental concern.</td>
<td>Rural/urban residence, occupation, attitudes about the environment, demographic variables.</td>
</tr>
<tr>
<td>URBAN/RURAL&lt;br&gt;Nature Extractive vs. Nature Manipulative (Freudenburg, 1991; Mohai and Twight, 1986))</td>
<td>Persons in agriculture live in natural settings; those in other extractive occupations live in more heavily industrialized areas. Need to separate residence and occupation because it is difficult to determine whether differences in attitudes are due to occupation alone or occupation and exposure to pollution.</td>
<td>Occupation, exposure to pollution, multidimensional measure of attitude, extensive list of demographic variables.</td>
</tr>
<tr>
<td>URBAN/RURAL&lt;br&gt;Conservative Non-Elite Theory (McBeth, 1995)</td>
<td>Rural people are the non-elite. They are lower in income, less educated, older, and more politically conservative than urban counterparts. They express lower levels of environmental concern.</td>
<td>Demographic variables, urban/rural residence, attitude.</td>
</tr>
<tr>
<td><strong>III. NEWCOMERS/OLDTIMERS</strong>&lt;br&gt;Land Ownership (Cockerham and Blevins, 1977; Sofranko, 1980)</td>
<td>Newcomers differ from longer-term residents based on amount of land owned. Longer-term residents own larger tracts, don’t support planning/zoning because it restricts ability to use land as they wish. Newcomers own smaller tracts, wish to preserve rural/ scenic values, favor planning and zoning.</td>
<td>Length of residence, amount of land owned, attitude towards planning and zoning, demographic variables.</td>
</tr>
<tr>
<td>NEWCOMERS/OLDTIMERS&lt;br&gt;Social Disruption Hypothesis (Smith, Kramlich and Hunter, 2001 and others)</td>
<td>Boomtowns, due to rapid growth, face disruption of community ties, social services, and community well-being. Disruption is typically followed by a rebound in well-being, not a lasting disruption.</td>
<td>Length of residence, formal/ informal ties, crime rate, age, gender, income, fear of crime, satisfaction with community services.</td>
</tr>
</tbody>
</table>

Table 1: Four major theory types (Continued)
<table>
<thead>
<tr>
<th>THEORIES</th>
<th>Description</th>
<th>Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>POLITICAL/CULTURAL</strong></td>
<td><strong>New Voice Thesis</strong> <em>(Fortman and Kusel, 1990)</em> Conflict over natural resources arises not out of real differences between longer-term and newer residents, but from new residents giving voice to already-held attitudes. Commodity interests historically predominated in rural areas, and thus prevailed. Newcomers willing to express their views give voice to silent interests.</td>
<td>Length of residence, occupation, demographic variables, attitudes towards the environment.</td>
</tr>
<tr>
<td><strong>Mass Belief Systems Thesis</strong></td>
<td><em>(Converse, 1964; deHaven-Smith, 1988)</em> Beliefs are based mostly on immediate circumstances and experiences. The little information most people have on political issues is controlled by elites.</td>
<td>Conceptual foundations of attitude, location specific factors: land type and topography, demographic variables.</td>
</tr>
<tr>
<td><strong>Skills and Social Factors</strong></td>
<td><em>(Hines et al., 1986; Hwang et al., 2000)</em> Personal skill factors and social relationships are important moderators in the relationship between attitude and behavior.</td>
<td>Type of population, knowledge about an issue, locus of control, attitude, membership in environmental or other organization.</td>
</tr>
<tr>
<td><strong>The New Urbanism</strong></td>
<td>Social factors can be manipulated through physical form of homes, villages, and regions.</td>
<td>Social networks, density of homes, physical elements such as lot size, and frontage.</td>
</tr>
<tr>
<td><strong>Conflict vs. Consistency</strong></td>
<td><em>(Corraliza and Berenguer, 2000)</em> Personal (attitude) and situational (social norms, physical setting) variables interact with conflict or consistency. Predictive power of attitudes is highest in low-conflict situations.</td>
<td>Attitude, social norms, elements of the physical setting.</td>
</tr>
</tbody>
</table>
Integration of Theory from Diverse Bodies of Knowledge

My research seeks to integrate the findings of the studies discussed above by building and testing a model of environmental behavior that will include demographic, attitudinal, physical and situational variables. The variables chosen for the statistical analysis will be based on the research above. Results of the analysis will be considered in light of the several theories that have been described.

I expect that environmental attitudes will be correlated with land use behavior, but that introducing new variables will improve the predictive utility of the model and more accurately reflect the relationship between attitudes and behavior. Results will be discussed in terms of the literature reviewed above. Policy-makers, environmental educators and others who require an understanding of land use behavior can use the results of this study. These actors can use the findings of this study to diffuse social conflict and to effectively match policies and outreach programs to landowner behavior to encourage socially desirable land use behavior.
CHAPTER 3

METHODS

Variables Chosen for the Study

The preceding literature review demonstrates that attitude and behavior have been measured and studied in a variety of ways. The volume of literature addressing the attitude behavior relationship is large, the findings somewhat inconsistent, and the approaches to the question come from many different disciplines. Despite these challenges, three factors jump out from the literature that are useful in approaching the issue of which variables to include in an attitude and land use behavior model: control variables, the attitude variable, and moderator variables.

Control Variables

First, it has been consistently demonstrated that there exist a number of demographic variables that either act as control variables in the multiple regression approach to the attitude behavior question or are correlates to land use behavior. Length of residence has been found to be a complex variable that may reflect not only how long a person has been in an area, but also what types of attitudes towards development a person may be likely to support or give voice to (Fortman and Kusel, 1990). Further, length of residence may also be a predictor of the size of land a resident is likely to own, which in turn may affect their attitude towards development (Cockerham and Blevins, 1977). Other researchers have found no differences or no statistically significant differences between newcomers and longer-term residents (Sofranko, 1980; Smith and Krannich, 2000). Even though the results from these studies are inconsistent, length of residence will be included given its potential effect on attitude as a control variable.

Other commonly included sociological variables such as age, education, gender, and race are worthy of inclusion. This is so due to their demonstrated effects on attitude as well as the body of literature that
includes these variables in the theoretical construct (McBeth, 1995; Scott and Willits, 1994; Fortman and Kusel, 1990; Stern, 2000).

For example, the Conservative Non-elite theory posits that differences in environmental attitudes are not attributable to place of residence per se, but rather to demographic factors that tend to be found as characteristics of rural communities, such as income, education, and age (McBeth, 1995). Koontz (1999) found that education, age, and total land holdings were significantly correlated with land use activities. Gender has been found to have a significant positive effect on environmental attitudes in some studies (Fortman and Kusel, 1990) and disputed in others. A recent meta-study of research from 1988 to 1998 found that gender does have a positive effect on both environmental attitudes and behavior in that women report stronger environmental attitudes and behaviors than men (Zelezny, Chua, and Aldrich, 2000). Although race is often included in this set of demographic variables, because of the very small non-white populations in the three counties, race will not be included as a variable in this study.

For the reasons above, length of residence, amount of land owned, age, education, and gender have been included as control variables in my model of the attitude-behavior relationship.

**Occupation**

Occupation will be included as a variable to test the theory that employment in an extractive industry such as farming, logging, or mining will affect attitudes towards land use (Tremblay and Dunlap, 1978; Cockerham and Blevins 1977; Freudenburg, 1991). Although initial review of the data revealed no respondents reporting employment in mining, significant percentages of the sample reported employment in farming, and a small percentage reported employment in logging. Although some researchers have reported a difference in attitude of farmers versus other types of extractive occupations (Freudenburg, 1991), the very low number of non-farm extractive occupations listed in the survey responses do not justify a separate category. The analysis will separate occupation by farming/non-farming, but include the few responses that listed logging as an occupation within the farming category.
The Attitude Variable

The attitude variable has been measured in a variety of ways, from multi-item scales, to single issue questionnaires, to political and cultural theories that connect attitudes to larger social forces. A common thread in much of the research is an apparent low correlation between the attitude measured and the resulting behavior (see, for example Nordlund and Garvill, 2002). Is attitude worthy of inclusion at all, especially in a study that purports to be unconcerned with finding support for the environmental movement or “environmental concern?” I include attitude as a variable in this study due primarily to the centrality of the attitude concept in the social psychology literature on behavior (Fishbein and Ajzen, 1975; Fishbein and Manfredo, 1992; Rokeach, 1973; Fulton et al. 1996) and the literature on environmental behavior and land use (Jacobson, 2002). As has been argued by many other researchers, (Kraus 1995; Hines, et al., 1996; Stern, 2000) I also argue that the low correlation in past studies between attitude and behavior may be due to measurement problems and the absence of moderator variables.

In order to deal with the measurement problems suspected in some studies, I have followed the findings of Kraus (1995) in the design of this study. Kraus found in his meta-analysis of 128 studies of determinants of behavior that measurement problems arise when the level of specificity for measuring an attitude and an action are not the same. Stern (2000) has demonstrated that different types of environmental behavior have somewhat different determinants, and that the attitude concept may play a greater or lesser role depending on the type of behavior studied. For this reason, I have deliberately chosen narrowly focused questions that deal specifically with land use issues, instead of more broadly based scales or sets of questions that address a variety of environmental attitudes. I also rely on free-response variables that give respondents the opportunity to explain their answers to further elucidate the attitude variable as captured in this study. In this way I hope to address the measurement/ specificity issue.
**Moderator Variables**

The common thread in the latest research on the attitude-behavior relationship is to incorporate the use of moderator variables in the model. In my study, I include moderator variables, based on the literature: physical factors, participation in government programs, social context, and economic factors.

**Physical Factors**

A direct question from the survey concerning the influence of physical factors in land use decisions is included based on the work of Corraliza and Berenguer (2000) and deHaven-Smith (1988). Corraliza and Berenguer found that the characteristics of the physical setting can facilitate or inhibit action consistent with a person’s attitude. deHaven-Smith found that the everyday local conditions and personal situations of people may have a greater influence on their actions, and that many may lack a sophisticated or comprehensive understanding of environmental problems (deHaven-Smith, 1988).

**Participation in Government Programs**

I have chosen participation in government programs because these programs are key policy tools aimed at influencing land-user behavior. I am testing this variable both as an independent variable to see if it is correlated with preservation behavior, and also as a dependent variable that demonstrates landowner behavior in separate models. I am using this variable based on the literature discussed in the adoption and diffusion section of my literature review, which discusses the research that has shown that those who participate in voluntary government programs are older, better educated, and own more land.

**Social Context**

I include dummy variables for county to determine whether county level social context influences individual decisions. Social factors at the county level include the makeup of industry, percent of farms,
and population density. I chose these particular factors because these were the main differences I identified between the three counties based on county-level data from the U.S. Census and other sources.

**Economic Factors**

Economic factors are the final moderator variable based on the body of literature in the adoption and diffusion research tradition. Many studies in this body of literature have pointed to economic factors as key variables in predicting behavior (Pampel and van Es, 1977; Taylor and Miller, 1978; Napier, 2000). I chose the variable representing income to operationalize economic factors.

**Aesthetics**

Aesthetic appreciation as a variable is included in the regression model, given the literature pointing to the importance of aesthetics (Brady, 2002; Erickson, et al., 2002), particularly in the forest-management context. As a variable, it does not squarely fit within either the category of a control variable or the category of a moderator, but rather exhibits traits of both types of variables. The coding for a question about the landowner’s main reason for owning the parcel was changed to a dichotomous variable of aesthetic/non aesthetic. A second test of the importance of aesthetics was conducted by examining the free-response answers to questions regarding landowner attitudes towards development. The list below shows the variables chosen for the study.

| **Demographic variables** (Length of residence, age, education, gender, parcel size, occupation) |
| **Physical/structural influences** (physical characteristics of the land and legal constraints) |
| **Attitude** |
| **Social Context** (county of residence) |
| **Economic factors** (income) |
| **Participation in government programs** |
| **Aesthetics** |

Table 2: List of variables
Analysis of Policy Choices

Part Four of the survey, “proposed land use policies” deals with several policies currently under consideration that could affect landowner behavior. These policies include purchase of development rights, township zoning regulation, regulation of sewage systems, technical assistance, and two agricultural programs, the Current Agricultural Use Value tax program and the Agricultural Security Area program.

Purchase of development rights is a program in which a permanent easement is written into the property deed, prohibiting development on a portion of the property. In return for this restriction, the property owner is paid a lump sum payment and receives a lower property tax bill, because the value of the property is diminished by the easement.

Township zoning regulation would permit township officials to control and plan rural development through a variety of land use controls.

Regulation of sewage systems would permit county officials to prohibit installation of new household sewage systems in areas designated as “unincorporated,” effectively limiting residential development at greater densities than could be handled by individual septic systems.

Technical assistance would provide landowners advice and training from extension specialists and others on programs and techniques to retain farmland and open space on their property.

The Current Agricultural Use Value tax would provide tax savings to landowners who enrolled a minimum of 30 acres of land devoted exclusively to agricultural use. If any CAUV land were taken out of agricultural use, tax savings for the past eight years would be owed.

The Agricultural Security Area Program would allow “one or more owners of at least 1,000 acres of productive farmland among them to enroll for a 10-year term. Only agricultural activities would be allowed there. In return, owners would get lower estate tax, priority in selling their development rights, and property tax reduction on new and improved farm buildings. An owner could opt out of the ASA before 10 years by paying back tax savings for the previous five years.” (Survey).

Feelings about participation in the programs are analyzed by county and discussed in the context of the findings on individual landowner behavior.
Design of the Study

Although some studies of land use have relied on a historical or ethnographic approach using case studies and interviews, the body of literature that shapes the theoretical approach of this study is largely reliant on quantitative data gathered from surveys and interviews of individual landowners. I will utilize survey data from a three-county survey of Ohio landowners to test the hypotheses below:

1. **Attitude towards development**: Parcel size, occupation as a farmer, and status as a longer-term resident will be positively correlated with a pro-development attitude. Years of education, aesthetic purpose in land ownership and status as a newcomer will be negatively correlated with a pro-development attitude.

2. **Preservation as a land use behavior**: Parcel size, occupation as a farmer, pro-development attitude and status as a longer-term resident will be negatively correlated with preservation as a land use behavior. Years of education, aesthetic purpose in land ownership, and status as a newcomer will be positively correlated with preservation as a land use behavior.

3. **Participation in government programs**: Parcel size, occupation as a farmer, education and longer-term residence will be positively correlated with participation in voluntary programs. Non-farm occupation, newcomer status, and fewer years of education will be negatively correlated with participation in government programs.

Case Selection

The study was based on data collected in a study administered by Dr. Tomas Koontz from a sample of 521 parcel owners in three Ohio counties. The survey was conducted between July 2000 and September 2001.

The counties in the study were chosen based on two criteria: (1) substantial rural land with growing population (a characteristic of urban/rural fringe areas) and (2) availability of an electronic database to randomly select parcel owners for contact and to map the location of identified parcels. Within each county, surveys were sent to owners of parcels at least 5 acres in size. The survey instructions asked “the primary decision-maker about land use” to complete the survey.

The three counties in the survey are Delaware County, Geauga County, and Medina County. There were 188 cases from Delaware County, 157 from Geauga County, and 176 from Medina County.
Delaware County

Delaware County is located in central Ohio, north of Columbus. The most recent census figures indicate a population estimate of 119,752 in 2001, with a density of 248.6 persons per square mile in 2000. The county has recently experienced massive population growth, with an increase in population percent change in the ten years from 1990 to 2000 of 64 percent. More recently, the population grew by 8.9 percent between April 2000 and July 2001 (Census Bureau, 2003).

The county is a mix of business enterprises, farms, and bedroom communities that house workers who commute to nearby Columbus. The largest employment sector in Delaware County is education, health, and social services, which accounts for 18.3 percent of employment. The county has a much smaller base of manufacturing and trade industries, although manufacturing accounts for 13.2 percent of the total industry and trade 15.6 percent. Agriculture, forestry and fishing account for only 0.9 percent of all industry. Recently, tax abatements given to new construction have encouraged job growth within Delaware County. The unemployment rate in Delaware County is a low 2.8 percent (Census Bureau 2003).

Although some areas remain distinctively rural in character, with large tracts of farmland dotting the countryside, other parts of Delaware County such as Dublin are distinctively suburban. The county contains many cultural amenities, including the Columbus Zoo, Ohio Wesleyan University, and many sports and recreational facilities (Delaware Organization, 2002). Delaware County is not racially diverse, with a white population of 94.2 percent. It is well educated, with 41 percent of residents having earned a bachelor’s degree or higher (Census Bureau, 2003).

As the county has changed over the years, farming and other extractive occupations have dwindled to be replaced by management and professional occupations of those who commute to work in Columbus or who work locally at one of several new corporate office parks. Still, the wide-open spaces, small villages, and remnants of farming and rural life including a small but visible Mennonite population continue to attract residential development for those seeking rural amenities.
**Geauga County**

Geauga County is located in the Northeast corner of the state, adjacent to Cuyahoga County and Cleveland, Ohio. The Grand River, the Chagrin River, and the Cuyahoga River all flow through Geauga County.

The estimated population for 2001 was 92,180. Over the past decade, the population grew by 12.1 percent from 1990 to 2000, with a 1.4 percent change from April 2000 to July 2001. The county has grown more slowly than Delaware county, and remains slightly less dense, with 225.2 persons per square mile compared to Delaware’s 248.6. Like Delaware County, Geauga County is mostly white, at 97.4 percent, but slightly less educated, with 31.7 percent having earned a bachelor’s degree or higher (U.S. Census Bureau, 2003).

The county has a mixture of industries, with manufacturing and services predominating, but also a significant sector of employment in agriculture, forestry and fishing. 64,000 acres are in farmland composed of 710 farms, with an average farm size of 90 acres. The unemployment rate is 3.0 percent (Census Bureau 2003), slightly higher than Delaware’s rate. Middlefield Township, within Geauga County, is well known for its Amish community and the cheese and other farm products it produces.

Like Delaware County, a trip through Geauga County would pass through many smaller cities, towns, and villages, but also many sparsely populated rural agricultural areas. The county is known for its maple products and other locally produced foods, but also for several amusement and water parks, including Sea World, Six Flags, and the fishing and boating industry (ODD, 2003). A large number of acres in Geauga County are in state parks (891.18 acres), adding to the scenic amenities of Geauga County.

**Medina County**

Medina County is also located in northeast Ohio, adjacent and directly south of Cuyahoga County. The Rocky River and the Black River cross through Medina County.

The population estimate for 2001 was 155,000, the largest population in the surveyed counties. Medina, like the others, has grown over the years with a population increase of 23.5 percent from 1990 to
2000 and a 3 percent population change from April 2000 to July 2001. The county is mostly white, at 97.3 percent, and slightly less educated as a whole than the other two counties, with only 24.8 percent of the population having earned a bachelor’s degree or higher. Although on the whole the county is more densely populated than the others, at 358.4 persons per square mile, the county has 113,000 acres in farms, with a total of 1,060 farms with an average size of 107 acres (ODD, 2003). This is almost twice the amount of farmland in Geauga County (64,000 acres), a greater total number of farms than Geauga’s 710 farms, and a larger average farm size than in Geauga County’s average of 90 acres. It is far smaller than the land in farms of Delaware County (175,000 acres). There are more, but smaller farms in Medina than in Delaware County: Delaware County has 750 farms, with an average size of 233 acres, compared to Medina’s average size of 108 acres.

Medina County contains several townships and a few small cities. The largest employers in Medina County are the local boards of education, city and county government, and some light manufacturing.

I include the descriptions of the counties not only to familiarize the reader with the study area, but also to illustrate that although the three counties are quite similar in many ways, there are a few significant differences. These differences can be understood as social context, in other words, the factors that do not describe the individual landowner, but rather the larger context within which the landowner makes decisions about land use behavior.

Although it is difficult to sort out the factors that may be significant in determining the social and physical context of one area versus another, we can begin by comparing the county-level statistics to see what differences exist between the counties. Of the social factors, we can tell that the three counties do differ in the types of industries that predominate. While Medina’s largest industry is trade, Geauga’s largest is manufacturing, and Delaware’s is social services. The three counties also differ in the amount of extractive industries such as farming and forestry, and fishing. Although more densely populated than both
Delaware and Geauga Counties, Medina has more farms than Geauga County and Delaware County, but far less land in farms than Delaware County.

For these reasons, I included a dummy variable in the analysis representing “county” to determine whether these county-level characteristics have any impact on individual land use choices.

**Survey Distribution Method**

Owners were contacted via mail survey, using the guidelines for reliability and validity in Dillman’s Total Design Method (Dillman, 1978). The mail survey was supplemented with spatial data supplied by information gleaned from GIS software, which provided such information about parcels as distance from roads and proximity to urban areas.

**Data Analysis**

Both quantitative and quantitative analysis were used in this study. Quantitative analysis of the data was performed using SPSS software to analyze general trends in the data and to perform multiple regression to test the stated hypotheses and determine whether relationships exist among the variables chosen for the study. The sample size for this study was 521 cases composed of cases from the three counties described in the previous section. 188 cases came from Delaware County, 156 from Geauga County, and 177 cases came from Medina County.

I first examined the data to gather demographic information about the survey sample using descriptive statistics. Next, I examined the variables chosen for the study using the correlations function to examine relationships between pairs of variables. Third, I performed three regression equations. In the first equation, I used the multiple regression feature of SPSS to test an equation with attitude towards development as the dependent variable.

In the second and third equations, I used the logistic regression feature of SPSS to test equations with preservation as a land use as the dependent variable and participation in government programs as the dependent variable, respectively. Logistic regression was chosen as the appropriate statistical method
because in each equation the dependent variable was coded as a dichotomous variable. Multiple linear regression is not an appropriate method to use in this situation because one of the assumptions in linear regression is that the relationship between variables is linear. When a variable is dichotomous, this assumption is typically violated. Specifically, a dichotomous variable violates the assumptions of normality and homoscedasticity, or equal variances. While the problem of non-normal distribution of error is not as serious a problem with large sample sizes, the problem of heteroscedasticity will bias standard errors and cause tests of significance to be invalid. While this problem can be dealt with technically by weighing least squares estimates, conceptually linear regression is still not appropriate for a dichotomous variable because of the underlying nonlinearity and nonadditivity (Field, 2000; Pampel, 2000).

The technique used in logistic regression to transform the data so that it can be used in logistic regression is the logarithmic transformation. The resulting transformation expresses the equation in terms of the probability of Y, the dependent variable occurring. The probability value varies between zero and one. A value close to zero means that Y is unlikely to occur, whereas a value close to one means that Y is very likely to occur.

In contrast to multiple linear regression’s least squares method, logistic regression uses the method of maximum likelihood to estimate parameters. This method provides model fit measures that are analogous to those used in linear regression, typically the least squares method (Field, 2000; Pampel, 2000). The output from a logistic regression analysis using SPSS includes a comparison of two models, one in which none of the predictors are known and are treated as having a value of zero, and the other in which the independent variables/ predictors are known. This statistic is referred to as the log likelihood. The second statistic typically reported is the Wald statistic. The Wald statistic is the square of the ratio of the coefficient divided by its standard error and is a chi-square distribution. The probability associate with the Wald statistic is given in the column headed significance. Just as in multiple linear regression, where the significance level exceeds .001, or .05, as chosen by the researcher as a cutoff level of significance, the meaning and direction of the coefficients can be interpreted. Instead of interpreting the coefficients in terms of a one-unit increase in X results in a one-unit increase in Y however, the coefficients are interpreted
in terms of logged odds. The exponent of the coefficients is interpreted in terms of odds. An exponent value of 15 would indicate that for every one-unit change in x, the odds of Y occurring are 15 times greater.

SPSS reports two pseudo-R-squared measures, the Cox and Snell r-squared and the Nagelkerke r-squared, however, most published works do not report a measure of goodness of fit given that there is no general consensus on the best measure (Pampel, 2000; Schuster, 1983). Further, researchers who frequently use logistic regression do not report the pseudo r-squared statistic (Lemeshow, 2004).

My goals in using multiple linear regression and logistic regression were to determine which factors are most important in predicting attitude towards development, participation in government programs, and preservation as a land use behavior.

Qualitative Analysis

In the qualitative analysis section of the study, I examined the narrative responses to a question dealing with the likelihood of a person developing his or her property. The question asked respondents to explain, in narrative form, their reason for reporting the level of percent chance of development of their property.

Qualitative analysis requires the researcher to be particularly aware of potential sources of bias and error, since there are no built-in tests, such as significance tests or quantitative methods to ensure a random sample. The researcher must be aware of potential sources of bias and error in the gathering of data, the analysis of data, and subsequent interpretation of the analysis, and must use methods to address potential bias and error. In their text Qualitative Data Analysis (1984), Miles and Huberman suggest several methods that can be used by a researcher to check for bias and error. The goal is to complete a study in which the methods of data collection and analysis can be understood, accepted, and replicated by others. Although bias in qualitative research is most frequently discussed and studied in the context of anthropological studies in which the researcher spends several weeks to several years studying a particular population, any study in which the researcher is dealing with non-numeric data has the potential for bias and error.
There are three sources of bias commonly identified in qualitative research: 1) the holistic fallacy, which involves interpreting single events as congruent and patterned, when in fact they are not; 2) elite bias, which involves giving too much weight to respondents who are articulate and well-informed, and under-representing data from less articulate and less informed people; and 3) “going native,” which involves losing perspective by becoming overly sympathetic to local informants’ perceptions and explanations (Miles and Huberman, 1984).

Given that the nature of my study does not involve field-based immersion, but instead relies on data from a study conducted by mail survey, the first two concerns are the most relevant. There are a number of methods for checking for bias and error of the types described above. I have chosen the following methods based on the nature of my study and the limited use of qualitative data in my analysis.

Random sampling is the first method I have chosen to address potential sources of bias. While it is true that some respondents may be more inclined to give written responses than others, all respondents had the opportunity to respond, and no responses were deleted based on the level of coherence or sophistication of the response. The analysis included 268 cases. The preceding question, which asked for quantitative data concerning the likelihood of development, included 270 responses. At the very least, the qualitative data set is about the same as the quantitative data set for this particular issue.

The second method I used is the documentation method, which requires the researcher to describe the data sets, the procedural steps used to organize data, the decision rules used to classify data, and the steps taken to draw and confirm conclusions. I discuss the documentation method I followed below.

The data sets for the qualitative data were the same as for all other data as the question involved is found within the same survey. The first step in my data analysis was to list the responses. I then read through all of the responses to determine whether the responses could be grouped into topical categories. I used the theory from my literature review as a basis, but found that additional categories of responses became apparent as I reviewed the responses, consistent with Miles and Huberman’s observation that “the categories used by the analyst may be preexisting or they may emerge from the data” (1984, p. 218-219). Miles and Huberman refer to this technique of categorizing data as clustering. After coming up with
categories of for the responses, I then counted the number of responses in each category. If a single respondent listed more than one reason, in other words, a response that fell into more than one category, the response was counted in each category it fit into. This process is referred to as the procedural steps used by the researcher. Next, the categories themselves represent the decision rules of my methodology. I included eight categories of responses based on the wording of the answers given. These categories are discussed in greater detail in the results section.

The last two steps of my methodology, again following the guidance of Miles and Huberman (1984), were the steps of drawing conclusions and confirming conclusions. I drew my conclusions from the data by the method referred to as counting, in which the researcher simply counts the number of responses in each category and then computes the percentages for each category. The simplicity of this method allows the researcher to minimize the chance of drawing conclusions that go beyond what is represented by the data, because I report that these percentages represent only what has been reported by respondents. To check my own work, I asked two colleagues to count responses in each category. I then tallied the results and report these numbers, as well as the differences between the three counts. These results are discussed more fully in the results section.

In confirming my conclusions, I utilized the method of checking the results against the theory I discuss in the literature, to see if it is consistent or not. For obvious reasons, this aspect of the analysis is discussed more fully in the discussion section. I also utilized the method of comparison, in that I compare these motivations to the answers given for another question that deals with the “biggest land use” of each respondent. What I report in this comparison is the differences in percentages for similar categories and the new categories that emerged from the analysis of the qualitative data.

By utilizing the above methods, I have tried to present my qualitative data in such a way that it can be readily understood, accepted as valid, and replicated by other researchers who wish to study similar issues using similar types of questions.
CHAPTER 4

RESULTS

I will discuss the results of the analysis in the following order: first, I will discuss demographic information from the data. Second, I will discuss length of residence variables. Third, I will discuss factors in land use. Fourth, I will discuss the relationship of two attitude variables to the other variables in the study. Last, I will discuss two logistic regression equations. The two equations test models with preservation and participation in government programs as the dependent variables, respectively.

Demographic Information and Trends

The following table provides information on the demographics of the survey sample. Demographic information is important in this study given that most of the literature that I have relied upon to build the models that will be tested incorporates demographic variables. In some theories, such as the Extractive Resource Commodity Theory (Tremblay and Dunlap, 1978) and the Conservative Non-Elite Theory (McBeth, 1995) demographic variables such as occupation and income play a central role. In the Extractive Resource Commodity Theory, occupation is the key variable used to explain differences in attitude and behavior between groups. In the Conservative Non-Elite Theory, the variables of income and education are used to separate the elite from the non-elite.

Demographic variables are also important as control variables when building a model to test the relationship between a set of independent variables and a dependent variable. Finally, demographic variables are useful in showing the differences and similarities between the three counties in the study. For these reasons, I have included an extensive table of demographic information.
<table>
<thead>
<tr>
<th></th>
<th>Geauga County</th>
<th>Medina County</th>
<th>Delaware County</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (mean)</strong></td>
<td>55 years</td>
<td>54 years</td>
<td>53 years</td>
</tr>
<tr>
<td><strong>Education Level (mean)</strong></td>
<td>Some college or associate’s degree</td>
<td>Some college or associate’s degree</td>
<td>Some college or associate’s degree</td>
</tr>
<tr>
<td>Did not complete high school or G.E.D.</td>
<td>9.4 %</td>
<td>1.9%</td>
<td>0.6%</td>
</tr>
<tr>
<td>Completed high School or G.E.D.</td>
<td>25.9%</td>
<td>31.8%</td>
<td>28.5%</td>
</tr>
<tr>
<td>Some college or Completed Associate's degree</td>
<td>23.7%</td>
<td>33.1%</td>
<td>26.7%</td>
</tr>
<tr>
<td>Completed Bachelor's degree</td>
<td>17.3%</td>
<td>7.1%</td>
<td>19.4%</td>
</tr>
<tr>
<td>Some graduate work</td>
<td>7.2%</td>
<td>9.7%</td>
<td>6.1%</td>
</tr>
<tr>
<td>Completed graduate Work</td>
<td>16.5%</td>
<td>16.2%</td>
<td>18.8%</td>
</tr>
<tr>
<td><strong>Income (mean)</strong></td>
<td>$60,000 - $79,999</td>
<td>$60,000 – 79,999</td>
<td>$80,000 - $99,999</td>
</tr>
<tr>
<td>Less than 20,000</td>
<td>6.4%</td>
<td>4.5%</td>
<td>1.6%</td>
</tr>
<tr>
<td>20,000 to 39,000</td>
<td>15.3%</td>
<td>10.2%</td>
<td>8.0%</td>
</tr>
<tr>
<td>40,000 to 59,999</td>
<td>7.6%</td>
<td>14.2%</td>
<td>17.0%</td>
</tr>
<tr>
<td>60,000 to 79,000</td>
<td>8.9%</td>
<td>13.6%</td>
<td>11.2%</td>
</tr>
<tr>
<td>80,000 to 99,999</td>
<td>8.9%</td>
<td>9.7%</td>
<td>9.6%</td>
</tr>
<tr>
<td>100,000 to 119,999</td>
<td>11.5%</td>
<td>6.8%</td>
<td>6.9%</td>
</tr>
<tr>
<td>120,000 to 139,999</td>
<td>3.8%</td>
<td>1.7%</td>
<td>8.0%</td>
</tr>
<tr>
<td>140,000 to 159,000</td>
<td>1.3%</td>
<td>2.8%</td>
<td>1.6%</td>
</tr>
<tr>
<td>160,000 to 179,000</td>
<td>0.6%</td>
<td>1.7%</td>
<td>2.1%</td>
</tr>
<tr>
<td>180,000 to 199,999</td>
<td>0.6%</td>
<td>1.7%</td>
<td>2.1%</td>
</tr>
<tr>
<td>200,000 and above</td>
<td>6.4%</td>
<td>4.0%</td>
<td>8.5%</td>
</tr>
<tr>
<td><strong>Missing</strong></td>
<td>28.7%</td>
<td>29%</td>
<td>23.4%</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td>67.9 % male</td>
<td>70.1 % male</td>
<td>81.2 % male</td>
</tr>
<tr>
<td><strong>Retired</strong></td>
<td>29.3%</td>
<td>27.8%</td>
<td>27.1%</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td>95.0% white</td>
<td>97.4% white</td>
<td>99.4% white</td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td>14.7 % farmer</td>
<td>8.7 % farmer</td>
<td>18% farmer</td>
</tr>
<tr>
<td></td>
<td>85.3% non-farmer</td>
<td>91.3% non-farmer</td>
<td>82% non-farmer</td>
</tr>
<tr>
<td><strong>Length of Residence</strong></td>
<td>26.91 years</td>
<td>15.27 years</td>
<td>No data available</td>
</tr>
<tr>
<td>(mean)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Acres Owned (mean)</strong></td>
<td>48.75 acres</td>
<td>46.02 acres</td>
<td>97.66 acres</td>
</tr>
</tbody>
</table>

Table 3: Demographics

Overall Geauga and Medina counties were very similar in terms of age, education level, income, and acreage owned, whereas Delaware County residents were similar to the other two counties in age and education but on average had higher incomes and owned more land. The data from Geauga County
revealed a longer average length of residence. The sample as a whole is not racially diverse, with all counties consisting of 95 percent or more “white” as the race category.

The sample is skewed somewhat on the statistic of gender. 23.4 percent of the sample is female and 64.7 percent is male, reflecting that a greater number of males completed surveys. 11.9 percent of the sample did not respond to the gender question. An average of 11 percent of cases is missing from each county in the gender statistic.

The sample education statistic reflects a well-educated sample population. 12.2 percent of the sample did not respond to the education question.

All of the counties were remarkably similar in the breakdown of vocational pursuits. The occupation variable was included given the number of theories that suggest that differences in attitudes towards the environment are based on whether an individual is engaged in an extractive occupation such as farming, mining, or logging (Freudenburg, 1991; Mohai and Twight, 1986; Tremblay and Dunlap, 1978). For this reason, the occupation variable was broken down into a dichotomous variable of farmer or non-farmer. Very few respondents reported logging as an occupation, and none reported mining.

The data from the sample on farming as an occupation is somewhat inconsistent with county-level census data, which would suggest that Medina County would have the largest number of farmers, since it has the largest number of farms of the three counties. A possible explanation is that Medina County farmers list occupations other than farmer as their primary occupation. This explanation is logical given that even though Medina has more farms than the other two counties, the average farm size is smaller than farms in Delaware County. Farmers in Medina County may thus be a mix of farmers who work only as farmers, plus others who may “hobby farm” in addition to their primary vocational pursuit.

The income measure may be skewed higher than that of the general population given the fact that only landowners with 5 or more acres were included in the survey. This restriction would eliminate from the sample a great number of people who are renters, rather than property owners. Based on county-level census statistics, this number is approximately 15 percent of all housing units, on average.
Length of Residence at Time of Survey

In order to separate the sample into those termed newcomers and those termed longer-term residents, the sample was split based on the response to a question asking “How long have you lived in (this) County?” The sample was split into three categories: newcomers, midterm residents, and long-term residents. Newcomers were identified as those who have lived in the county five or fewer years. Midterm residents were identified as those who have lived in the county six to ten years. Longer-term residents were identified as those who had lived in the county 11 years or more. The survey was taken in the time frame of July 2000 to September 2001. Because the length of residence question was not included in the Delaware surveys, analysis using this length of residence variable was limited to cases from Geauga and Medina Counties.

The sample was also split based on another question, year of parcel ownership, to see if there were major differences between these two indicators of residence. Those who became parcel owners in 1995 or later were designated as newcomers; those who became parcel owners between 1989 and 1994 were designated as midterm residents, and those who became parcel owners in 1988 or earlier were designated as longer-term residents.

Analysis of the length of residence and year of parcel ownership variables revealed that these two variables were not interchangeable. Table 4 shows the percentages of respondents in each of the variable categories.

<table>
<thead>
<tr>
<th>Year of Parcel Ownership</th>
<th>Length of Residence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newcomer (0 to 5 years)</td>
<td>17.9 %</td>
</tr>
<tr>
<td>Midterm (6 to 10 years)</td>
<td>21.5%</td>
</tr>
<tr>
<td>Longer-term (11 years +)</td>
<td>60.6%</td>
</tr>
</tbody>
</table>

Table 4: Length of residence vs. year of parcel ownership
The differences could be the result of landowners owning, but not residing on, a particular parcel of property, or the result of differences between times when the respondent lived in the county but did not own property. These times could include the respondent’s childhood, during which time they lived in the county, but did not own property, or during times when the respondent may have rented property, or during a time when the respondent lived on a property less than five acres.

The breakdown of these variables was somewhat problematic in the study design. Originally, I had planned to use the year of parcel ownership as a proxy for length of residence, because one of the three surveys (Delaware) did not include the length of residence question. Because the two variables differ markedly, it is clear that they are not interchangeable in this way.

Given that there could be many reasons for owning property, including purchase of the land as an investment, or for future use, I decided that year of parcel ownership was a less accurate reflection of actual time spent as a resident in the county. I chose to focus instead on length of residence, even though it necessarily excludes the data from the Delaware survey in the subsequent regression equations and some of the other analyses in this section.

Types of Land Use

One question asks the following: “Parcel owners use their land for many different things, including the Land Use Types listed under questions 11-13. Note that a land use could be leaving the area alone. Please think about the three biggest (in terms of acres) land uses on this parcel within the last three years. They may be either ongoing or completed in the past. For the biggest land use (in terms of acres): Which type of land use is it?” The choices available were: F: Farming or haying; H: House (primary land use is for a residence*); G: Grazing, M: Mowing or brush cutting; T: Timber preparation or cutting; D: Development (building roads, houses, other buildings); P: Planned preservation (purposely leaving land in its current state for particular benefits) U: Unplanned preservation (leaving land in current state due to lack of activity, rather than planned decisions) O: Other. Largest percentages in each category appear in boldface type.
<table>
<thead>
<tr>
<th></th>
<th>Delaware County</th>
<th>Geauga County</th>
<th>Medina County</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development</td>
<td>2.7 percent</td>
<td>2.5 percent</td>
<td><strong>2.8 percent</strong></td>
</tr>
<tr>
<td>Farming or haying</td>
<td><strong>38.3 percent</strong></td>
<td>22.3 percent</td>
<td>35.2 percent</td>
</tr>
<tr>
<td>Grazing</td>
<td>5.9 percent</td>
<td>3.8 percent</td>
<td><strong>7.4 percent</strong></td>
</tr>
<tr>
<td>House</td>
<td>12.2 percent</td>
<td><strong>13.4 percent</strong></td>
<td>10.8 percent</td>
</tr>
<tr>
<td>Mowing or brush cutting</td>
<td>9.6 percent</td>
<td>2.5 percent</td>
<td>6.3 percent</td>
</tr>
<tr>
<td>Planned preservation</td>
<td>9.6 percent</td>
<td><strong>22.3 percent</strong></td>
<td>14.2 percent</td>
</tr>
<tr>
<td>Timber preparation or cutting</td>
<td>1.1 percent</td>
<td><strong>3.2 percent</strong></td>
<td>2.3 percent</td>
</tr>
<tr>
<td>Unplanned preservation</td>
<td>6.4 percent</td>
<td><strong>20.4 percent</strong></td>
<td>12.2 percent</td>
</tr>
<tr>
<td>Other</td>
<td><strong>4.8 percent</strong></td>
<td>3.2 percent</td>
<td>.6 percent</td>
</tr>
<tr>
<td>Missing</td>
<td>9.6 percent</td>
<td>6.4 percent</td>
<td>8.0 percent</td>
</tr>
</tbody>
</table>

Table 5. Types of land use

* House was added after analysis of the data revealed significant percentages had written in this use.

Types of land use varied by county. Delaware had the highest percentage of farming and the lowest percentage of planned and unplanned preservation. Geauga County had the lowest percentage of farming as a land use and the highest levels of planned and unplanned preservation. These results suggest that the variable of residence in Geauga County may be important in predicting preservation as a land use in the logistic regression equation that appears later in this chapter.

Reasons for Land Use

One question addressed the influence of various factors on land use decisions. The question states: “Please estimate, on a scale of 0 to 4, the influence of the factors below in the decision to do this land use at this location.” Responses of 0 were labeled as “No influence,” responses of 1 or 2 were labeled as “Medium influence” and responses of 3 or 4 were labeled as “high influence.” The factors were: 1) Soil or topography (wet, steep, etc); 2) Previous land use; 3) Municipal water/sewer availability; 4) Highway
access; 5) Technical assistance availability; 6) Government cost-sharing available; 7) Tax laws; 8) Other laws/regulations (zoning, etc.) and 9) Other (describe).

In order to determine which land use factor had the greatest influence on land use decisions, a summary calculation was performed using SPSS by requesting summaries of scores for each factor for all cases. All of the scores for each factor from all cases are added together to determine which factor had the highest overall score. Overall, category 2) previous land use, had the highest cumulative score influence on land use decision. The breakdown of the influence of factors on land use decisions is given in the tables below. To determine what factors landowners considered in the “other” category, I looked to the free-form responses. Respondents listed a variety of reasons that corresponded with the categories above. The three most common reasons were aesthetic considerations, family farm concerns, and conservation.

<table>
<thead>
<tr>
<th>Factor</th>
<th>No influence</th>
<th>Medium (1)</th>
<th>Medium (2)</th>
<th>High (3)</th>
<th>High (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil/ Topography</td>
<td>45.3 percent</td>
<td>4.8 percent</td>
<td>13.7 percent</td>
<td>16.9 percent</td>
<td>19.3 percent</td>
</tr>
<tr>
<td>Previous Use</td>
<td>43.4 percent</td>
<td>5.6 percent</td>
<td><strong>14.3 percent</strong></td>
<td>7.5 percent</td>
<td><strong>29.1 percent</strong></td>
</tr>
<tr>
<td>Water/sewer</td>
<td>87.0 percent</td>
<td>3.6 percent</td>
<td>3.9 percent</td>
<td>1.9 percent</td>
<td>3.6 percent</td>
</tr>
<tr>
<td>Highway Access</td>
<td>71.5 percent</td>
<td>5.8 percent</td>
<td>10.8 percent</td>
<td>5.8 percent</td>
<td>6.2 percent</td>
</tr>
<tr>
<td>Technical Assistance</td>
<td>84.2 percent</td>
<td>5.3 percent</td>
<td>6.1 percent</td>
<td>2.9 percent</td>
<td>1.5 percent</td>
</tr>
<tr>
<td>Gov. Cost Sharing</td>
<td><strong>89.4 percent</strong></td>
<td>3.4 percent</td>
<td>3.6 percent</td>
<td>1.9 percent</td>
<td>1.7 percent</td>
</tr>
<tr>
<td>Tax Laws</td>
<td>72.0 percent</td>
<td>4.1 percent</td>
<td>10.3 percent</td>
<td>6.5 percent</td>
<td>7.2 percent</td>
</tr>
<tr>
<td>Other Laws</td>
<td>71.4 percent</td>
<td><strong>6.1 percent</strong></td>
<td>9.5 percent</td>
<td>6.6 percent</td>
<td>6.4 percent</td>
</tr>
<tr>
<td>Other</td>
<td>55.3 percent</td>
<td>2.7 percent</td>
<td>3.3 percent</td>
<td>4.0 percent</td>
<td>34.7 percent</td>
</tr>
</tbody>
</table>

Table 6: Influence of factors on land use decisions

<table>
<thead>
<tr>
<th>Factor</th>
<th>Sum of Scores</th>
<th>Stan. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil</td>
<td>664 *</td>
<td>1.63</td>
</tr>
<tr>
<td>Previous Land Use</td>
<td>738 *</td>
<td>1.72</td>
</tr>
<tr>
<td>Municipal Water/sewer avail.</td>
<td>131</td>
<td>.920</td>
</tr>
<tr>
<td>Highway Access</td>
<td>290</td>
<td>1.23</td>
</tr>
<tr>
<td>Technical Assistance avail.</td>
<td>132</td>
<td>.831</td>
</tr>
<tr>
<td>Government Cost Sharing</td>
<td>96</td>
<td>.756</td>
</tr>
<tr>
<td>Tax Laws</td>
<td><strong>304</strong>*</td>
<td>1.29</td>
</tr>
<tr>
<td>Other Laws</td>
<td>288</td>
<td>1.25</td>
</tr>
<tr>
<td>Other</td>
<td>240</td>
<td>1.88</td>
</tr>
</tbody>
</table>

* highest scores

Table 7: Sum of scores for factors in land use decisions
**Attitude**

One question from the survey asked: “How do you feel about the amount of developed land (for example, residential housing, commercial businesses) that currently exist within approximately 1 mile of this parcel?” The available responses were: 1) I feel strongly that there is too much developed land; 2) I feel that there is probably too much developed land; 3) I feel that there is the right amount of developed land; 4) I feel that there is probably too little developed land; 5) I feel strongly that there is too little developed land; and 6) I don’t know.

There were a total of 287 valid responses to this question, rather than 521, because the question was not included in the Delaware County survey. Table 8 shows the responses of the sample.

<table>
<thead>
<tr>
<th>Attitude Towards Development</th>
<th>Total Percent</th>
<th>Geauga County</th>
<th>Medina County</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel strongly that there is too much developed land.</td>
<td>40.0 percent</td>
<td>35.3 percent</td>
<td>44.8 percent</td>
</tr>
<tr>
<td>I feel that there is probably too much developed land.</td>
<td>19.9 percent</td>
<td>23.3 percent</td>
<td>16.9 percent</td>
</tr>
<tr>
<td>I feel that there is the right amount of developed land.</td>
<td>28.6 percent</td>
<td>29.3 percent</td>
<td>27.9 percent</td>
</tr>
<tr>
<td>I feel that there is probably too little developed land.</td>
<td>3.1 percent</td>
<td>4.5 percent</td>
<td>1.9 percent</td>
</tr>
<tr>
<td>I feel strongly that there is too little developed land.</td>
<td>2.1 percent</td>
<td>1.5 percent</td>
<td>2.6 percent</td>
</tr>
<tr>
<td>I don’t know.</td>
<td>5.9 percent</td>
<td>6 percent</td>
<td>5.8 percent</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 8: Attitude towards development

**Attitude Towards Development**

To determine whether significant differences existed between groups based on length of residence, responses to the attitude question above were classified based on the resident’s status as a newcomer, midterm resident, or longer-term resident.

Table 9 below shows the results of this analysis.
Table 9: Attitude towards development by length of residence

<table>
<thead>
<tr>
<th></th>
<th>Newcomer</th>
<th>Midterm Resident</th>
<th>Longer-term Resident</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel strongly that there is too much development.</td>
<td>23.5</td>
<td>38.1</td>
<td>40.1</td>
</tr>
<tr>
<td>I feel that there is probably too much developed land.</td>
<td>23.5</td>
<td>9.5</td>
<td>21.4</td>
</tr>
<tr>
<td>I feel that there is the right amount of developed land.</td>
<td>38.2</td>
<td>38.1</td>
<td>23.5</td>
</tr>
<tr>
<td>I feel that there is probably too little developed land.</td>
<td>5.9</td>
<td>4.8</td>
<td>2.1</td>
</tr>
<tr>
<td>I feel strongly that there is too little developed land.</td>
<td>2.9</td>
<td>0</td>
<td>1.1</td>
</tr>
<tr>
<td>I don’t know.</td>
<td>2.9</td>
<td>9.5</td>
<td>5.3</td>
</tr>
</tbody>
</table>

*Correlation between Demographic Variables and Attitude*

To determine whether there were significant correlations between attitude and other variables, a correlation analysis was performed. For the purposes of this analysis, attitude was recoded into a scale
variable of 1 to 5, with choice 6 deleted. 5 represents the response “I feel strongly that there is too much developed land” while 1 represents the response “I feel strongly that there is too little developed land.”

The results of this analysis can be found in the correlation table in the appendix, which is too large to fit within the margin requirements of the text here. Of all the variables, only participation in government programs was significantly correlated with attitude. Participation in government programs included both current and past participation. The correlation was positive and significant at the .05 level; an increasingly anti-development attitude was positively correlated with participation in government programs.

Multiple regression analysis with attitude as the dependent variable

A multiple regression analysis was performed with attitude towards development as the dependent variable and total acres, occupation as a farmer, gender, county of residence, aesthetic purpose in land use, income, years living in the county, age, and education as the independent variables. The r-squared value for the model was .071, relatively low, indicating that the model is not very useful for predicting the dependent variable attitude. The only variable that was significant at the .05 level was aesthetic purpose in land ownership. The results of the analysis are shown below.

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>Std. Error</th>
<th>Beta</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>9.423</td>
<td>9.464</td>
<td>.996</td>
<td>.320</td>
<td></td>
</tr>
<tr>
<td>Total acres</td>
<td>.001</td>
<td>.001</td>
<td>.100</td>
<td>1.431</td>
<td>.154</td>
</tr>
<tr>
<td>farmer</td>
<td>-.147</td>
<td>.221</td>
<td>-.048</td>
<td>-.662</td>
<td>.508</td>
</tr>
<tr>
<td>gender</td>
<td>-.179</td>
<td>.133</td>
<td>-.086</td>
<td>-1.344</td>
<td>.180</td>
</tr>
<tr>
<td>County of residence</td>
<td>-.149</td>
<td>.125</td>
<td>-.078</td>
<td>-1.190</td>
<td>.235</td>
</tr>
<tr>
<td>aesthetics</td>
<td>.418</td>
<td>.204</td>
<td>.130</td>
<td>2.046</td>
<td>.042</td>
</tr>
</tbody>
</table>

Table 10: Multiple regression (Continued)
Table 10: Continued

<table>
<thead>
<tr>
<th></th>
<th>income</th>
<th>.020</th>
<th>-.097</th>
<th>-1.431</th>
<th>.154</th>
<th>.856</th>
<th>1.169</th>
</tr>
</thead>
<tbody>
<tr>
<td>Years in</td>
<td>.004</td>
<td>.003</td>
<td>.078</td>
<td>1.095</td>
<td>.275</td>
<td>.765</td>
<td>1.307</td>
</tr>
<tr>
<td>county</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>age</td>
<td>-.003</td>
<td>.005</td>
<td>-.037</td>
<td>-1.541</td>
<td>.589</td>
<td>.837</td>
<td>1.195</td>
</tr>
<tr>
<td>education</td>
<td>-.062</td>
<td>.043</td>
<td>-.098</td>
<td>-1.432</td>
<td>.153</td>
<td>.839</td>
<td>1.191</td>
</tr>
</tbody>
</table>

Chance of Development

The second question selected from the survey that concerned attitude was a question asking “What do you think is the chance that you’ll develop this parcel or sell/give it to someone who might develop it?” I chose to include this question to provide a counterpart to the earlier question concerning attitude towards development. While the earlier question dealt with development around the property owner, in other words, the respondent’s attitude about the behavior of others, this question deals with the respondent’s attitude towards his or her own behavior, as measured by behavioral intention. Overall, the majority of respondents reported zero chance of development of their property. The question was a fill in the blank response in which respondents could enter any value from 1 to 100. I report three categories of all the possible responses: zero, fifty percent and 100 percent.

<table>
<thead>
<tr>
<th>Chance of Development</th>
<th>Delaware</th>
<th>Medina</th>
<th>Geauga</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zero chance</td>
<td>60.6 percent</td>
<td>64 percent</td>
<td>61.4 percent</td>
<td>62 percent</td>
</tr>
<tr>
<td>50 percent chance</td>
<td>8.5 percent</td>
<td>11.2 percent</td>
<td>9.0 percent</td>
<td>85.5 percent</td>
</tr>
<tr>
<td>100 percent chance</td>
<td>10.9 percent</td>
<td>4.3 percent</td>
<td>6.2 percent</td>
<td>7.2 percent</td>
</tr>
</tbody>
</table>

Table 11: Likelihood of development of the property
Chance of development and demographic variables

I used the bivariate correlation function within SPSS to determine whether any demographic variables were significantly correlated with chance of development. No variables were significantly correlated with chance of development.

Motivations

Following the “chance of development” question, respondents were given the opportunity to explain their responses. The free-form responses provided a more detailed explanation concerning their attitudes towards development. The reasons given for the attitudes towards development ranged from anti-development sentiments to more detailed explanations for either preserving the current land use or continuing current land use activities on the property. The responses generally fell into one of eight categories.

The first category, which I have called “price” in the table below, is composed of responses from those who expressed a willingness to develop if the price was right. An example of a response in this category was “Depends on how much they will pay for it.”

The second category, called “no development” is composed of responses from those that do not want development at any price, but do not give a highly specific reason. An example of a response in this category was “We will not develop.”

The third category, called “family/farming” is composed of responses expressing a desire to keep the land in the family, keep the farm in the family or at the least keep the land in farming if it is transferred to another. An example of a response in this category was “I am an active farmer, and have sons that want to keep farming.”

The fourth category, called “aesthetics,” is composed of responses from those who expressed a desire for preservation for aesthetic reasons. An example of a response in this category was “We like it as natural forest, woods.”
The fifth category, called “conservation” is composed of responses from those who expressed a desire for preservation of the land for reasons of protecting habitat or wildlife. An example of a response in this category was “We have made 8 acres into wildlife habitat and would like to keep it that way.”

The sixth category, called “age” is composed of responses from those who said their development decision was based on their age. A example of a response in this category was “Only if I become too old to maintain it.”

The seventh category, “structural/technical” is composed of responses from those who listed technical reasons for their development decision, such as deed restrictions, topography, or access to water or sewer. An example of a response in this category was “Most of the parcel is hard to get road access due to the 100 yr floodplain.”

The eighth category, called “already developed” is composed of responses from those who said their property was already developed. An example of a response in this category was “It is already developed.”

The ninth category, called “other” is composed of responses that do not logically fit into one of the above categories.

To analyze the responses for this data, I and two of my colleagues independently evaluated responses based on the categories above. Such multiple coder analysis provides a helpful check on interpretation of qualitative data (Miles and Huberman 1984). Given the variability in human interpretation of written responses by the three individuals, these results are limited in their generalizability, as is apparent given the differences shown in the table below. However, the data are still useful in that the narrative responses reveal motivations for behavior not available as choices in any of the quantitative data, such as family/farming, age, and conservation. As such, the data are perhaps most useful as a springboard for future research in which the motivations of family/farming, age, and conservation would be included in response categories in future surveys. Table 9 summarizes these categories with an illustrative response for each category.

72
From the analysis, it is apparent that while structural and technical considerations and price play a large role in respondents’ reasons for chance of development, as shown in the earlier section of this dissertation dealing with factors in land use decisions, it is clear that respondents are also motivated by a number of other considerations. Family / farming as a category accounted for a large percentage of responses. This suggests that a desire to preserve a way of life and the desire to pass that way of life down through the generations are very important factors in land use decisions not available as responses in the quantitative measures of land use behavior in this survey. This explanation also appeared in the free-form responses in the factors in land use decisions question discussed earlier in this chapter. Aesthetics was also reported by respondents, suggesting that aesthetic character may also be important, but not well-measured factor in land use behavior. The percentages coded by each person (C1, C2, and C3) are reported below.

<table>
<thead>
<tr>
<th>Reason</th>
<th>Percent</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price</td>
<td>10 26 14</td>
<td>Depends on how much they will pay for it.</td>
</tr>
<tr>
<td>No Development</td>
<td>15 16 6</td>
<td>Will not develop.</td>
</tr>
<tr>
<td>Family/ Farming</td>
<td>19 16 15</td>
<td>I am an active farmer. And have sons that want to continue farming.</td>
</tr>
<tr>
<td>Aesthetics</td>
<td>8 9 8</td>
<td>We like it as natural forest, woods.</td>
</tr>
<tr>
<td>Conservation</td>
<td>2 5 4</td>
<td>We have made 8 acres into wildlife habitat and would like to keep it that way.</td>
</tr>
<tr>
<td>Age</td>
<td>4 3 3</td>
<td>Only if I become too old to maintain it.</td>
</tr>
<tr>
<td>Structural/ Technical</td>
<td>20 11 19</td>
<td>Most of the parcel is hard to get road access due to the 100yr floodplain. Easement belongs to Army Corps of Engineers.</td>
</tr>
<tr>
<td>Already Developed</td>
<td>7 8 7</td>
<td>It is already developed.</td>
</tr>
</tbody>
</table>

Table 12: Typology of motivations for chance of development

Participation in government programs

One survey question deals with participation in government programs. The question states: “Federal, state, and local governments provide various voluntary programs related to land use for parcel owners who choose to participate. Are you currently, or have you in the past, participated in a voluntary government program related to land use on this parcel?” Overall, 20.3 percent of the responses were yes,
and 67.6 were no. 12.1 percent of respondents did not respond to the question. By county, Medina had the highest levels of voluntary participation in government programs at 22.2 percent of the valid responses, with 9.7 percent of cases missing. Geauga had 21.0 percent voluntary participation in government programs with 10.8 percent of cases missing, and Delaware County had the lowest levels, at 18.1 percent, with 15.4 percent of cases missing.

**Participation in Land Use Programs**

In part four of the survey, respondents were asked to consider proposed land use policies. Respondents were asked whether they would participate in such a program if it was available, and in some cases, whether the program would change land use activities on the parcel. The following table shows the predicted participation of respondents in each of the three counties in the six proposed land use policies.

<table>
<thead>
<tr>
<th>Program</th>
<th>Participation by County (%)</th>
<th>Change land use activities? (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Delaware/ Geauga / Medina)</td>
<td>(Delaware/ Geauga / Medina)</td>
</tr>
<tr>
<td>Purchase of development rights</td>
<td>26.1 35.7 34.7</td>
<td>6.9 3.2 8.0</td>
</tr>
<tr>
<td>Current agricultural use value</td>
<td>8.0 7.6 6.8</td>
<td>3.2 2.5 5.1</td>
</tr>
<tr>
<td>Agricultural security area</td>
<td>13.8 5.7 8.5</td>
<td>1.1 .6 2.8</td>
</tr>
<tr>
<td>Township zoning regulations</td>
<td>N/A------------------------</td>
<td>9.6 14.0 9.1</td>
</tr>
<tr>
<td>Household sewage disposal syst.</td>
<td>N/A------------------------</td>
<td>6.7 10.2 11.9</td>
</tr>
<tr>
<td>Technical assistance</td>
<td>38.3 29.9 40.3</td>
<td>7.4 9.6 7.4</td>
</tr>
</tbody>
</table>

Table 13: Predicted participation in proposed land use programs

As the table shows, Medina had the highest overall predicted participation in proposed land use programs.
Logistic regression equation with preservation as the independent variable

Initial analysis revealed some correlation between demographic variables and preservation as a land use type, including county of residence, occupation as a farmer, income, education, and size of parcel. There were no significant correlations between preservation as a land use type and aesthetics, gender, participation in government programs, years living in the county, or year born. There was no significant correlation between attitude towards development and preservation as a land use behavior. A complete correlation table can be found in the appendix. An excerpt of extracted information from that table is given below.

<table>
<thead>
<tr>
<th></th>
<th>County (G =1)</th>
<th>Farmer</th>
<th>Income</th>
<th>Education</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preservation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correlation</td>
<td>.171**</td>
<td>-.196**</td>
<td>.140*</td>
<td>.161**</td>
<td>-.123*</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.002</td>
<td>.001</td>
<td>.014</td>
<td>.005</td>
<td>.031</td>
</tr>
<tr>
<td>N</td>
<td>309</td>
<td>279</td>
<td>309</td>
<td>309</td>
<td>309</td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Table 14. Correlation matrix for preservation as a land use behavior

A logistic regression analysis was subsequently performed. Logistic regression is used when response variables are binary, or in other words, have two possible outcomes. Therefore, it is appropriate to use logistic regression for a variable such as preservation, which has two possible outcomes of preservation or not. Logistic regression is also appropriate for participation in government programs because the possible outcomes for this variable are participation or nonparticipation. The model describes how the probability of an outcome depends on the values of the explanatory variables. I used land use type as the dependent variable and attitude towards development, gender, years living in the county, age, education, parcel size, occupation (farm or non-farm), county of residence and income as independent variables. I converted land use type from a nominal variable to a dichotomous variable for the purposes of
the logistic regression equation. A value of 1 indicated the respondent listed planned or unplanned preservation as the biggest land use. A value of 0 was used to represent all other uses.

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>Df</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>-.005</td>
<td>.007</td>
<td>.602</td>
<td>1</td>
<td>.438</td>
<td>.995</td>
</tr>
<tr>
<td>Education</td>
<td>.054</td>
<td>.098</td>
<td>.305</td>
<td>1</td>
<td>.581</td>
<td>1.055</td>
</tr>
<tr>
<td>Years in County</td>
<td>-.017</td>
<td>.008</td>
<td>4.800</td>
<td>1</td>
<td>.028</td>
<td>.983</td>
</tr>
<tr>
<td>Income</td>
<td>.024</td>
<td>.045</td>
<td>.296</td>
<td>1</td>
<td>.587</td>
<td>1.025</td>
</tr>
<tr>
<td>Attitude</td>
<td>-.151</td>
<td>.141</td>
<td>1.154</td>
<td>1</td>
<td>.283</td>
<td>.860</td>
</tr>
<tr>
<td>Aesthetics</td>
<td>.666</td>
<td>.465</td>
<td>2.051</td>
<td>1</td>
<td>.152</td>
<td>1.947</td>
</tr>
<tr>
<td>Geauga Co.</td>
<td>.911</td>
<td>.291</td>
<td>9.808</td>
<td>1</td>
<td>.002</td>
<td>2.487</td>
</tr>
<tr>
<td>Farmer</td>
<td>-1.440</td>
<td>.696</td>
<td>4.285</td>
<td>1</td>
<td>.038</td>
<td>.237</td>
</tr>
<tr>
<td>Gender</td>
<td>-.300</td>
<td>.304</td>
<td>.977</td>
<td>1</td>
<td>.323</td>
<td>.741</td>
</tr>
<tr>
<td>Constant</td>
<td>.076</td>
<td>.736</td>
<td>.011</td>
<td>1</td>
<td>.917</td>
<td>1.079</td>
</tr>
</tbody>
</table>

Table 15. Logistic regression analysis with preservation as the dependent variable

Logistic regression analysis results were interpreted as follows. The coefficient, B, represents the change in the logit of the outcome variable associated with a one-unit change in the predictor variable. The logit of the outcome is the natural logarithm of the odds of variable Y occurring. In order to determine whether each coefficient is significant in terms of predicting Y, it is necessary to examine the Wald statistic. The Wald statistic is somewhat analogous to the t-test used in multiple regression analysis. The Wald statistic must be used with caution however when the regression coefficient B is large, because the standard error tends to become inflated. This results in the probability of rejecting a predictor as being significant when it may in fact be significant (a type II error) (Field, 2000). In the results above, the variables years in county, residence in Geauga County, and occupation as a farmer were significant in terms of predicting Y, preservation. Years living in the county was negatively related to preservation,
residence in Geauga County was positively related to preservation, and occupation as a farmer is negatively related to preservation.

Exp (B) represents the change in the odds of Y (preservation) occurring as a result of a unit change in the predictor. If the value of Exp (B) is greater than 1, then as the predictor increases, the odds of Y occurring increase. If the value of Exp (B) is less than 1, then as the predictor increases, the odds of Y occurring decrease. In the results above, for the variable years living in county, with each one unit increase in years, the odds of Y (preservation) occurring changed by .983 times. Another way to state this is that the odds of preservation were .983 times lower for each year lived in the county of residence.

For residence in Geauga County, Exp (B) was positive and had a value of 2.487. Thus, those who live in Geauga County were 2.487 times more likely to preserve land than those who do not live in Geauga County.

Finally, for occupation as a farmer, Exp (B) was negative and has a value of .237. Those who were farmers are .237 times less likely to preserve land, as measured by the dependent variable Y, than those who were not farmers.

In order to determine whether any outliers were influencing my results, I also performed casewise diagnostics of residuals using SPSS to examine the studentized residuals. The studentized residual has the property that 99 percent of cases should have values that lie within plus or minus 2.5. Values outside of plus or minus 3 may indicate that the case is having an undue influence (Field, 2000). In my results, only one case, number 499 had a studentized residual greater than 3. Field (2000) notes that unless the researcher can determine something unusual about that case that would warrant excluding it from the model, it cannot be excluded, but should be reported. I could determine nothing unusual about that particular case and thus chose to keep the case in the analysis, but identify it as possibly having undue influence.
Participation in Government Programs

The following variables were significantly correlated with participation in government programs:

- Parcel size (positively correlated at the .001 significance level), anti-development attitude (positively correlated at the .001 significance level), occupation as a farmer (positively correlated at the .001 significance level) and status as a midterm owner in terms of years of property ownership (negatively correlated at the .05 level.) Participation in government programs was not significantly correlated with gender, income, education, age or aesthetics. Correlations for all variables with participation in government programs can be found in the correlation table in the appendix.

A logistic regression analysis was performed to determine whether there was a relationship between the demographic variables and participation in government programs.

The independent variables in the model were parcel size, aesthetics, county of residence, occupation as farmer, gender, income, education, age, year of parcel ownership, and attitude towards development. The following table shows the results of the logistic regression equation.

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>parcel size</td>
<td>.021</td>
<td>.007</td>
<td>9.789</td>
<td>1</td>
<td>.002</td>
<td>1.021</td>
</tr>
<tr>
<td>Education</td>
<td>.113</td>
<td>.112</td>
<td>1.014</td>
<td>1</td>
<td>.314</td>
<td>1.119</td>
</tr>
<tr>
<td>years in county</td>
<td>.030</td>
<td>.009</td>
<td>11.889</td>
<td>1</td>
<td>.001</td>
<td>1.030</td>
</tr>
<tr>
<td>Income</td>
<td>.084</td>
<td>.053</td>
<td>2.477</td>
<td>1</td>
<td>.116</td>
<td>1.088</td>
</tr>
<tr>
<td>Attitude</td>
<td>.454</td>
<td>.182</td>
<td>6.193</td>
<td>1</td>
<td>.013</td>
<td>1.574</td>
</tr>
<tr>
<td>Aesthetics</td>
<td>.584</td>
<td>.517</td>
<td>1.272</td>
<td>1</td>
<td>.259</td>
<td>1.792</td>
</tr>
<tr>
<td>residence in Geauga Co.</td>
<td>-.642</td>
<td>.350</td>
<td>3.357</td>
<td>1</td>
<td>.067</td>
<td>.526</td>
</tr>
<tr>
<td>Farmer</td>
<td>-.733</td>
<td>.657</td>
<td>1.246</td>
<td>1</td>
<td>.264</td>
<td>.480</td>
</tr>
<tr>
<td>Gender</td>
<td>.630</td>
<td>.365</td>
<td>2.982</td>
<td>1</td>
<td>.084</td>
<td>1.877</td>
</tr>
<tr>
<td>Constant</td>
<td>-4.892</td>
<td>1.030</td>
<td>22.581</td>
<td>1</td>
<td>.000</td>
<td>.008</td>
</tr>
</tbody>
</table>

Table 16. Logistic regression with participation in government programs as the dependent variable
The results of the logistic regression analysis were interpreted as follows: parcel size, years living in the county, and an increasingly anti-development attitude were all positively related to participation in government programs. The Exp (B) value is interpreted as follows. For each one-unit increase in parcel size, the odds of participating in a government program were 1.021 times greater. For each one-unit increase in years living in the county, the odds of participating in a government program were 1.030 times greater. Finally, for each one-unit change in attitude towards development on a scale representing the strong feeling that there is too little development (1) to the strong feeling that there is too much development (5), the odds of participating in a government program are 1.574 times greater.

Analysis of studentized residuals revealed only one case with a value greater than +3 or less than −3, which was case number 372. As there was nothing apparent that is unusual about this case that would warrant throwing it out of the analysis, it is kept in with the understanding that although it may have an undue influence on results it is part of the data set (Field, 2000).
CHAPTER 5

DISCUSSION

I discuss my results in terms of the models tested and the literature presented at the beginning of this dissertation.

Attitude towards development

The multiple regression equation with attitude towards development as the dependent variable was not very useful as a model for predicting attitude towards development. Only aesthetic purpose in land ownership was significant as a predictor of attitude. Although much has been made in the literature of the relationship between resident status and attitude, resident status was not a significant predictor of attitude. In the analysis, I ran the regression twice, once with years living in the county as the variable for resident status, and another time with resident status broken down into three categories, as newcomer, longer-term, and midterm. The results were the same. These results lead me to believe that in this particular study, resident status was not a good predictor of attitude. This conclusion is consistent with my analysis of the frequencies for the attitude towards development question, separated into categories by length of residence. As stated in the results section, there were splits of opinion within groups. No group could be considered wholly anti-development, or wholly pro-development; the most that could be concluded was that longer-term residents expressed the highest percentage of anti-development sentiment, and newcomers expressed the highest percentage of neutrality towards development (a feeling that there was “the right amount” of development).

It is possible that these results might have been different if the survey had also included landowners who own less than five acres. There might be a difference in the attitude results, given the
research of others that suggests that parcel size is a significant variable (Cockerham and Blevins, 1977). Newcomer landowners who live in subdivisions with quarter acre lots might have very different attitudes towards development than those who live on parcels of five acres or bigger.

Cockerham and Blevins (1977) found that amount of land owned was the key variable that correlated with differences between newcomers and longer-term residents of rural areas regarding attitudes towards planning and development. Longer-term residents, who owned larger tracts of land, did not support additional planning because they saw this as restricting their ability to use land as they wished. Newcomers, who owned smaller tracts of land, wished to preserve rural and scenic values of the community and thus favored additional planning as a means to restrict future development. Future researchers might choose to include smaller parcels in the study to see if the small-parcel-owner-newcomer was different in terms of attitude.

**Preservation**

The logistic regression equation performed to determine whether there was a relationship between the set of demographic variables discussed above and the dependent variable preservation showed that there was a relationship that was significant at the .05 level between preservation and the following independent variables: occupation as a farmer, years living in the county, and residence in Geauga County. Years living in the county and occupation as a farmer were negatively related to preservation while residence in Geauga County was positively related to preservation as a land use. I discuss each of the results in turn.

**Occupation as a farmer was negatively related to preservation.** The results of the logistic regression equation provide support for the Extractive Resource Commodity Theory (Tremblay and Dunlap, 1978), which states that those in extractive resources are more likely to hold utilitarian views of natural resources due to their occupation (see also Lowe and Pinhey, 1982). Occupation in farming, an extractive resource occupation, was negatively related to preservation of natural resources. This result
suggests that farmers prefer land uses such as farming or logging that might be more financially lucrative than preservation. This result is also consistent with some of the adoption and diffusion literature, because farmers would be less likely to adopt preservation strategies because they may not be financially lucrative (Napier et al, 2000). This result is not consistent with other literature from the adoption and diffusion research tradition that has shown that farmers may be intrinsically motivated to adopt conservation practices by such factors as attachment to the land (Ryan, Erickson and DeYoung, 2003).

Because very few respondents were engaged in other extractive occupations, and none were engaged in mining, it was not possible to test Freudenburg’s argument (1991) that distinctions can be made between nature-manipulative occupations such as farming and nature-extractive occupations such as mining.

Further analysis of the connection between larger parcel size and farming revealed that large parcel size was significantly, but weakly correlated with occupation as a farmer (.378, at the .01 level). The correlation analysis also suggests that length of residence is correlated with occupation as a farmer (.105, at the .05 level).

Resident status was negatively correlated with preservation in the logistic regression equation. The longer a person lived in the county, the less likely he or she was to voluntarily preserve land. Taken together with research that has shown that longer-term residents tend to own larger parcels of land (Cockerham and Blevins, 1977), this result provides support for the theory that those who own larger tracts of land, who are typically longer-term residents, wish to use land as they see fit, and thus would not necessarily favor preservation over other possible uses; and those who own smaller tracts wish to preserve rural and scenic values, and thus would be in favor of voluntary preservation. The policy implication of this finding is that the smaller landowner may be more supportive of voluntary, non-paid preservation programs for landowners, while the larger landowner may respond more favorably to programs that do not infringe on his or her freedom to use their land as they wish. Thus farmer behavior may be a result of the combination of occupation, ownership of larger parcels, and length of residence.
Residence in Geauga County was positively correlated with voluntary land preservation. This variable was used to represent situational factors, to the extent that there was something different at the county level that would influence land use behavior. Given the multitude of factors that could be present, it is difficult to say with any confidence what factors could lead to the significance of this variable. One factor that stands out is the number and size of farms in Geauga County. Geauga County has the lowest number of farms, the smallest amount of land in farms, and the smallest farm size according to Census data. Geauga has fewer large parcel owners than the other two counties. Given that occupation as a farmer was negatively correlated with preservation, the lower number of farms in the county may have some role in the relationship between residence in Geauga County and voluntary land preservation.

Future studies could identify and highlight specific county-level features in the survey, such as the number of conservation groups, farmers groups, social networks, or programs within the county and ask respondents whether these factors influenced their land use behaviors. These studies would be able to better test the political/cultural theories and the situational factors theories that would suggest that social and cultural factors influence behavior (Hines et al, 1986; Hwang et al, 2000; Schwartz, 1973, 1977; Stern, 2000). At the least, the relationship suggests that there may be some contextual social and physical factors at the county level that may influence individual behavior.

Attitude towards development was not significantly correlated with preservation. Although in my initial study design I believed that the development question “How do you feel about the amount of developed land that currently exists within one mile of this parcel?” would be narrow enough to be a good predictor of preservation behavior, this was not so. A possible reason for this result is that the measure of attitude was not sufficiently complex. The alternative explanation is that attitude is not a good predictor of land use behavior. Given the data concerning factors in land use decisions and the free form responses, I tend to believe the second explanation, and argue that attitude as a variable has been given too much importance as a predictor. This explanation is consistent with deHaven-Smith’s work (1988), which suggests that situational local factors play a greater role in decisions about land use than do broader concepts or concerns about the environment.
Other variables that I predicted would be significantly related to preservation were not. These include age, gender, and aesthetics as a main reason for parcel ownership. The fact that no relationships were found could reflect a problem in the construction of the survey questions, but it also represents a finding that challenges earlier research suggesting relationships between these variables and land preservation.

**Participation in Government Programs**

The logistic regression performed showed that parcel size, years living in the county, and an increasingly anti-development attitude were positively related to participation in government programs. Occupation as a farmer was not significantly related to participation in government programs in the logistic regression equation. Why was it that years living in the county was negatively correlated with preservation, but positively correlated with participation in government programs? Why was parcel size positively related to participation in government programs, but not related to voluntary land preservation?

One possible explanation is that the programs that currently exist for landowners specifically target the group identified by the following variables: farmers, larger parcel size, and mid to longer-term parcel ownership. Programs may be specifically designed for on the farm conservation, and may require longer terms of ownership. Why then, was it the case that larger parcel ownership, farming and longer-term residence were correlated with participation in government programs, but not generally in favor of preservation as a land use?

One explanation is found in the literature on adoption and diffusion: farmers will participate in conservation programs, if there is a benefit for the farmer, but otherwise would not preserve land. Notably, farming was not significantly correlated with attitude towards development, suggesting that farmers make decisions based on economic and structural factors rather than attitudes. Also, farmers indicated through their free-responses a high value on intergenerational connections in their desire to keep their farms within their family, and a high value on farming as a way of life. These concerns may translate into participation by farmers and large landowners in government programs. Even though they may not place primary
emphasis on preservation of resources, they do prioritize preservation of the farm, which may be achieved through the government programs, such as those mentioned in this survey, specifically, the current agricultural use value program, and the agricultural security area program. In both of these programs, owners are given financial incentives to continue farming, a land use they might not otherwise be able to continue.

Participation in specific programs by county, however, showed that the role of parcel size in predicting participation in government programs is not clear. Medina, which has the greatest number of farms, had higher levels of participation overall than Delaware, which has fewer farms, but much more total land in farms and a greater on-average farm size than Medina. This may suggest that the number of farmers within a county or other county level contextual factors not measured in this study may also be important variables related to participation in government programs.

Physical Factors

The biggest factors reported to influence land use decisions were local conditions. The two biggest factors were previous use and soil/topography. From a policy perspective, it is notable that the least influential factors were technical support and government cost sharing. This could be due to the low levels of participation in government programs, ineffectiveness of programs, or the fact that other factors come first, such as perpetuating the family farm, or preserving the land for aesthetic reasons.

The findings support deHaven-Smith’s theory (1988) that most conceptualize land use narrowly, in that attitudes towards land use depend on local conditions rather than on more abstract concerns.

The findings on physical factors in the free-responses showed that while some respondents had a specific, narrowly focused reason for development, such as the aesthetic value of the particular piece of property, those who answered “no development” gave no reason for their concerns. Very few responses included justifications for their development decisions that related to a broader ecological context. These findings support a separate deHaven-Smith finding that many people have little or no conceptual basis for
their concerns. The findings also suggest a need to focus on the technical and economic barriers to land conservation, when developing land use policy.

**Aesthetics vs. Economics**

The literature suggests that aesthetic concerns are often important motivators for conservation of natural resources by landowners (Koontz, 2001; Erickson, Ryan and DeYoung, 2002; Brady, 2002). Aesthetics may also be a secondary reason for land use behavior. In the free-form responses, a concern to keep the property in the family and in farming made up a large percentage of responses but technical and structural barriers were an even larger category of responses. It is probably the case than landowners do not systematically rank such factors, but may instead have to roughly weigh a variety of factors, giving some importance to each. The question above concerning factors in land use decisions may more accurately capture this weighing process, and suggests that a weighing of factors is a more accurate description of the way land use decisions are made. This conclusion is consistent with the conflict vs consistency theory of Corraliza and Berenguer (2000), who argue that attitudinal and situational factors interact. It is also consistent with the literature that suggests that personal skill factors play a role in decision making, such that some actors will see legal or technical barriers as constraints due to their level of knowledge of action strategies (Hines, et al, 1986; Hwang et al., 2000).

**Social and Policy Considerations**

Given the above analysis, one can conclude that certain variables emerge from the analysis as aids in predicting land use behavior. **Years living in the county** was significant in both logistic regression equations. **Occupation as a farmer** was significantly negatively related to preservation. **Residence in Geauga County** was positively related to preservation. **Parcel size** was significantly related to participation in government programs. However, gaps remain to be filled. Future studies should not only include more social context variables, but should include the variables that emerged from the free-form responses, as described below.
**Rural Character**

This study provides some important information on rural character, namely, that farming as a way of life and a rural aesthetic are both important in development decisions. Structural aspects to property ownership however, such as physical and technical barriers, remain as important components of decisions, as does price. Aesthetic concerns are also important, and might motivate certain groups to participate in land conservation. In terms of theory, these results are closest to the arguments in deHaven-Smith’s work (1988), that situational, local factors are ranked high by decision-makers. A weakness of my study is that there is not much information about values and beliefs to really test whether these local factors are more important than broader conceptions of environmental concern, or social factors such as social networks, as was discussed by the political/cultural theories in the literature review. Future research on the topic would necessarily include a more well-rounded measure of attitude as well as measures of social factors.

Despite the challenges of developing effective land use policy, the results of this study suggest that most landowners believe that there is too much development. The disagreement arises in how to deal with this issue. Though motivated by different concerns, landowners can be effectively targeted with conservation programs to achieve societal land use goals including farmland preservation, reduction of rural sprawl, and preservation of a unique rural way of life. I discuss these programs and other conclusions of this study in the following chapter.
CHAPTER 6

CONCLUSIONS

Summary

The behavior of the private property owner and conflicts between newcomers and longer-term residents have been at the heart of debates about land use and the environment since the first explorers set foot on this continent so many years ago. Land use policy today has been shaped over time by the importance of property rights in American history, as discussed in the first chapter of this dissertation. Although the issues faced by policy makers today may seem current and novel, the fundamental conflict between the rights of the public to protect common resources and the rights of the private property owner to use his or her own land is not a new conflict. What is new however, is the recent change in demographics at the urban/rural fringe driven by reverse migration from city to country, a trend that has been called the rural rebound.

Understanding the behavior of private landowners is an important subject for study given the rural rebound and the potential for social, economic, and environmental consequences as a result of population growth at the urban/rural fringe. The body of knowledge that has examined the differences between newcomers and longer-term residents has offered a variety of explanations for differences between these two groups, but has not provided a comprehensive model to predict landowner behavior. Although much work on the social aspects of rapid growth has been done in the boomtowns of the West, relatively few studies have focused on the effects of growth at the urban/rural fringe in the Midwest.

In this study I have tested two models for predicting land use behavior and a model for predicting attitude towards development. In the preceding section I discussed the findings of this study in the context of the literature, based on my analysis of the data. Although the multiple regression analysis used to test the hypothesis that attitude may be predicted by length of residence and a set of demographic variables was
not useful, the two logistic regression equations showed that occupation as a farmer, length of residence, County of residence, parcel size, and attitude were found to be significant as predictors of land use. I turn now to the policy implications of this study.

I suggest the following three areas of policy that could utilize the results of this study, based on the literature and the results of the study: farmland conservation, technical assistance, and stakeholder processes. I then conclude this section with a discussion of future research that could build on the results of this study.

**Farmland Conservation**

Results suggest several avenues for policy makers to better target policy tools for farmland conservation. At present, many policies aimed at farmland preservation center on financial payments, such as purchase of development rights or contractual programs such as the federal Conservation Reserve Program. My analysis suggests that financial incentives might have a greater impact on landowners with larger parcel acreage and occupational positions as farmers, as these owners demonstrate greater concern for economic benefits. In contrast, owners of smaller parcels and non-farmers, who tend to be newer residents, express greater focus on aesthetic benefits. Thus policy makers could more effectively match voluntary program benefits with different landowners by linking financial payments to minimum acreage requirements, and farmer-oriented efforts, while linking non-monetary benefits to owners of smaller parcels who are not farmers.

Given the data showing the importance to farmers of keeping the family in the farm, and of keeping land in farming, policy-makers should address these concerns by designing ways to achieve conservation goals while maintaining family ownership of farms. Such a program might require intergenerational transfers or deal with aspects of estate administration, including tax assessment, transfer fees, or other barriers to keeping land in family farms. The proposed programs already in progress, such as the CAUV program, could be supplemented with newer programs that deal with intergenerational taxation issues.
A second method of farmland conservation involves the use of innovative planning and zoning tools. Instead of a farmer selling parcels of land for conventional subdivision development, the farm owner continues to operate the farm and sells his development rights through a legal procedure called a transfer of development rights. Landowners from a sending zone, such as the farmer, sell their development rights to a developer in an area of town where a greater density of development would be appropriate, such as a town center.

A third method for farmland conservation involves the use of open-space cluster style developments, instead of conventional subdivisions. Cluster developments have smaller lot sizes and usually have an open space or preservation area, which is often farmland. The farmer may even be involved in a cooperative relationship with the development, in which residents receive produce or other farm products from the farmer in exchange for payments through a homeowner’s association.

Finally, for those groups motivated by aesthetics, land conservation programs could be developed to preserve areas with unique environmental aesthetic character or historical significance, similarly to historic preservation programs that preserve unique buildings as historic landmarks. Such a program would not only help planners and policy makers preserve aesthetic features of areas, but would also provide economic benefits through tourism or other consumer behavior of those who visit, photograph, or otherwise experience such areas. Additionally, designation of such areas for conservation of preservation purposes would help planners discourage land fragmentation, to combat negative environmental effects of rural sprawl.

Many areas of the country actively protect such features, and the distinctive features of these areas not only help to achieve conservation goals, but also increase property values and add to local revenue. A town can designate certain areas, or unique natural areas, in its master plan and revise its zoning ordinance to protect such places from development, in order to further the public purpose of natural resources conservation. One route to this kind of preservation could be through cultural preservation programs that provide incentives to unique groups to continue farming, such as the Amish, who might be otherwise motivated by economic concerns to sell their land for development.
Technical/structural considerations

Despite the best efforts of outreach programs, some land will not be conserved due to technical or structural considerations. Another way of stating this is in terms of the literature on situation factors, which uses the term “knowledge of action strategies” (Hwang et al, 2000). Some landowners require not resources or motivation, but knowledge of techniques and practices to effectively preserve land and manage that land. Thus there will continue to be a role for educators and technicians in helping landowners conserve natural resources. This is particularly true for types of conservation in which the landowner cannot just “let it go,” such as in the protection of riparian corridors. In such cases the landowner may need ongoing technical assistance to make periodic improvements to the land or to actively manage the land to achieve conservation goals.

In other cases, landowners may require greater assistance in understanding their special role in protecting wildlife habitat, aquifers, shorelands, and wetlands. By developing partnerships with landowners, instead of using “command and control” policies as discussed in the first chapter of this dissertation, policy makers may have a greater chance of seeing their conservation goals realized.

Stakeholder Processes

A major focus of this study was to determine what differences if any exist between newcomers and longer-term residents. Although the study showed that in fact, the two groups were not as polarized as many have posited in the literature (Salamon, 2003) the perception of difference exists, and could lead to community conflict. Despite the finding that newcomers and longer-term residents may not be as different as some studies have suggested in terms of attitude, one finding of this study is that farmers as a group are different in terms of the land use behavior of voluntary preservation. This suggests that there may be differences between farmers and non-farmers. Because such differences could eventually lead to conflict situations between neighboring landowners as well as inconsistent land uses on contiguous parcels.
identified as important for conservation purposes, improving communication between farmers and non-farmers is an important goal. Encouraging more direct communication between farmers and nonfarmers has been found to increase the chance that neighbors will take steps to resolve conflicts (Kelsey and Vaserstein, 2000). Further, stakeholder processes may offer the best way for policy-makers to interact with landowners at the local level and actively solicit the input of landowners so that state and federal policies may be more locally appropriate (Rural Policy Research Institute, 1995).

An important tool for dealing with community conflict and for helping diverse groups of stakeholders discuss common problems in a community is the use of stakeholder processes. This policy tool is ideally suited to the urban/rural fringe due to the diversity of stakeholder groups and the nature of issues such as sprawl, farmland protection, and community well being that will be impacted by the rural rebound. There are multiple types of stakeholder processes that could be used by citizens at the urban/rural fringe, and there is a history of the use of such processes in rural settings (Swanson, 2001). Policy makers and community leaders should encourage the use of these processes while being mindful that the success of stakeholder processes will depend in large part upon social, economic and environmental conditions in a community. Stakeholder processes have the negative potential to “reproduce the power of local elites” but also the positive potential to “provide a framework for democratic and inclusive decision-making” (Swanson, 2001). Based on his historical case study analysis, Swanson suggests that the success of stakeholder processes depends on the community possessing the infrastructure for informed discussion, and broad dialogue, inclusion of stakeholders, the presence of local democratic decision-making processes, partnerships with extralocal stakeholders such as government agencies and NGOs, and the capacity for sustained problem solving (2001).

Land use decisions are ideally suited to the stakeholder process, and most communities have a history of dealing with development decisions through local planning, zoning, and conservation boards. The findings of this study could be used by these local boards as communities increasingly utilize stakeholder processes to bring together diverse groups in the community to resolve common problems.
Suggestions for Further Research

There are several ways that the findings of this study could serve as a springboard for further research. These areas of research include longitudinal studies, case studies, studies that include social context, research to determine the influence of outsiders on landowner behavior, and studies of the impact and effectiveness of “rural planning” on landowner behavior at the urban/rural fringe.

Longitudinal Studies

Further research to complement my study would include several types of longitudinal research on the same counties with a similar study design to test whether attitudes and other demographic aspects of the counties are changing, and to specifically address the question of whether the rural rebound represents widespread social change. In this research, I would not only continue research at the county level, but also work at smaller levels, at the level of the village and town. The three counties were very similar in their demographic characteristics, with very small differences found in attitude and other statistics. Comparing two villages in separate counties, with different demographic statistics, might yield results that could increase understanding of the effects of the rural rebound. For example, a village with very few newcomers could be compared with one that has seen rapid growth to determine whether newcomers have a great effect.

Case Studies

A second type of study that would complement this research would be a case study of a particular community or a set of communities, using a qualitative study design that allowed for more interviews and free-responses of respondents. I found that in this study the free responses were very helpful in explaining the category of “other” as a response to some questions. In addition, the free responses often revealed reasons for behavior that were not offered as response choices in the questionnaire. This type of study would be modeled on the Boomtown studies done in the West, but would instead be applied to the Midwest and Northeast to determine whether “social disruption” and other effects of rapid population growth would
be found in rapidly developing areas in the Midwest and Northeast. An ideal setting for this kind of study would be in the small towns in the state of New Hampshire, my current state of residence. This state is experiencing substantial population growth due to immigration from the neighboring state of Massachusetts, specifically the Boston area, as residents there flee the high cost of living for a more rural (and far less expensive) way of life in New Hampshire.

Another type of case study would include information on environmental narratives, as discussed in the literature on aesthetics. This study would be partly based on the finding from this dissertation that prior land use was a significant factor in land use decisions. In this study, respondents would be questioned regarding their knowledge of prior land use, and asked whether this knowledge influenced their land use decisions. A model would also be developed for policy makers and managers to collect environmental narrative information to use for the purposes of environmental planning, historic preservation, and town-level master plans.

Social Context

My future research on landowner behavior would give more attention to social context as a variable. My survey design would include questions pertaining to membership in a variety of community, professional, and environmental organizations to determine whether these social networks were related to landowner behavior. I would also examine the personal networks of landowners, as well as their media information sources, to try to determine what sources of information were most important to landowners. Respondents would be asked whether they owned a computer, how they used the computer to receive news and information related to land use, and what other sources of information they rely on to make land use decisions. This research would be more effective in testing the political and cultural theories such as the New Voice Thesis and Value/Belief Norm Theories (Fortman and Kusel, 1990; Schwartz, 1973, 1977; Stern, 2000). Respondents also would be asked whether they had received information from a variety of sources or had connections through membership or interest in outside organizations. Similarly, respondents
would be asked about their political affiliations, and also asked whether information from their political party influenced their attitudes towards land use or land use decisions.

**Rural Planning**

Although this study addresses some land conservation programs, future studies might address local zoning ordinances as well as “rural planning” designed to foster responsible and sustainable development modeled after the New Urbanism or other planning attempts to lessen the negative effects of sprawl. In this study, I would examine several land use planning tools at the level of the town, and evaluate the effectiveness of these tools in achieving their goals, in the tradition of Elmore’s (1983) forward- and backward-mapping. I would first examine town zoning ordinances to determine which tools were made a part of each town’s ordinance. I would then interview town conservation commission members to determine which tools they had successfully used and attempt to quantify the number of uses of each tool. I would then survey landowners regarding whether they had used these tools and their opinions of the effectiveness of the tools. The tools discussed would include, but not be limited to: transfer of development rights, nodal zoning, mixed-use zoning ordinances for small communities, cluster development, impact fees, the use of agricultural and historic districts, and phasing of development. The results of the study could be used by planners, citizens, and town officials to revise their current ordinances to allow them to use a greater variety of tools to achieve their land use goals.

Just as citizens, planners and policy-makers have lamented the growth and development of suburban areas, so must citizens and policy-makers now turn their attention to rural areas, so that we do not repeat the mistakes made by allowing rural sprawl, farmland loss, and community degradation. Instead, we can recognize the great potential of private landowners, who are passionate about their property ownership, to engage in partnerships that will reduce social conflict, conserve natural resources, preserve cultural resources, control rural sprawl, and sustain rural communities.
Conclusion

The private property owner is a central actor in land use decision-making. Private lands make up at much as 66 percent of all land in the United States and as much as 80 percent of all wildlife habitats (Benson, 2001). A recurring theme in natural resources literature is the need to enfranchise private landowners to encourage their cooperation in managing natural resources (Benson, 2001). Given the importance of private property rights in American history in conjunction with the importance of private land in protecting species diversity, water resources, ecosystem functions, and other goals of conservation policy, it is essential that we continue to work to understand the factors help to explain private landowner behavior.

This study provides support for three key arguments. First, land use decisions are largely motivated by local, situational factors, rather than broader concepts of concern for the environment (deHaven-Smith, 1988). Second, the behavior of landowners differs based on resident status, parcel size, and occupation as a farmer. Third, important variables such as intergenerational concerns and aesthetic values may be missing from prior work on predicting landowner behavior and should be included in future studies.

Given these findings, programs that effectively target landowners must be implemented at the local level, and meet the needs of landowners based on their situational concerns. For some landowners, this will mean financial incentives to continue farming, because they value farming as a way of life. For others, specifically newcomers who own smaller tracts of land, the most effective programs will be based on the value those landowners place on aesthetics. Many landowners however will continue to make site-specific, personal land use decisions, based on factors such as previous land use, soil type, and tax concerns. Large landowners may respond best to programs that do not infringe on their freedom to use land as they wish: programs that allow them to develop their own conservation plans with some technical assistance. To effectively reach these landowners, policy makers must work at the local level to develop partnerships with landowners to identify concerns, develop appropriate technical assistance, and implement
local-level strategies to achieve societal conservation goals while protecting the rights of the private landowner.


103


### APPENDIX

#### CORRELATION TABLE

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pearson Correlation</th>
<th>Sig. (2-tailed)</th>
<th>N</th>
<th>Pearson Correlation</th>
<th>Sig. (2-tailed)</th>
<th>N</th>
<th>Pearson Correlation</th>
<th>Sig. (2-tailed)</th>
<th>N</th>
<th>Pearson Correlation</th>
<th>Sig. (2-tailed)</th>
<th>N</th>
<th>Pearson Correlation</th>
<th>Sig. (2-tailed)</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>antidevel</td>
<td>-0.065</td>
<td>.114</td>
<td>.030</td>
<td>-0.071</td>
<td>.109</td>
<td>.099</td>
<td>-0.098</td>
<td>.081</td>
<td>.076</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>preserv</td>
<td>.285</td>
<td>.064</td>
<td>.638</td>
<td>.252</td>
<td>.103</td>
<td>.079</td>
<td>.113</td>
<td>.190</td>
<td>.214</td>
<td>.225(**)</td>
<td>.098(*)</td>
<td>.011</td>
<td>.077</td>
<td>.029</td>
<td>.075</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>goprog</td>
<td>.000</td>
<td>.033</td>
<td>.000</td>
<td>.822</td>
<td>.094</td>
<td>.533</td>
<td>.114</td>
<td>.034</td>
<td>.001</td>
<td>.007</td>
<td>.070</td>
<td>.517</td>
<td>.046</td>
<td>.170(*)</td>
<td>.024</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>gea</td>
<td>1</td>
<td>.019</td>
<td>.016</td>
<td>.083</td>
<td>.451(**)</td>
<td>.039</td>
<td>.045</td>
<td>.030</td>
<td></td>
<td>520</td>
<td>.485</td>
<td>.459</td>
<td>.520</td>
<td>.458</td>
<td>.492</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>aesthet</td>
<td>.019</td>
<td>1</td>
<td>-0.093</td>
<td>.071</td>
<td>-.010</td>
<td>.008</td>
<td>.038</td>
<td>.015</td>
<td>-.056</td>
<td>485</td>
<td>.485</td>
<td>.435</td>
<td>.485</td>
<td>.458</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>job</td>
<td>.016</td>
<td>-.093</td>
<td>1</td>
<td>.153(**)</td>
<td>-.038</td>
<td>.105(*)</td>
<td>.270(**)</td>
<td>.378(**)</td>
<td></td>
<td>476</td>
<td>.447</td>
<td>.446</td>
<td>.447</td>
<td>.446</td>
<td>.446</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>sex</td>
<td>.083</td>
<td>.071</td>
<td>1</td>
<td>-.116(*)</td>
<td>.028</td>
<td>.020</td>
<td>-.055</td>
<td>-.052</td>
<td></td>
<td>459</td>
<td>.453</td>
<td>.459</td>
<td>.459</td>
<td>.456</td>
<td>.455</td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).
<table>
<thead>
<tr>
<th></th>
<th>Pearson Correlation</th>
<th>Sig. (2-tailed)</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>32/33Income</td>
<td>-0.46</td>
<td>-0.10</td>
<td>-0.38</td>
</tr>
<tr>
<td></td>
<td>0.291</td>
<td>0.831</td>
<td>0.421</td>
</tr>
<tr>
<td></td>
<td>520</td>
<td>485</td>
<td>447</td>
</tr>
<tr>
<td>31Years</td>
<td>0.451(**)</td>
<td>0.008</td>
<td>0.105(*)</td>
</tr>
<tr>
<td></td>
<td>0.000</td>
<td>0.858</td>
<td>0.026</td>
</tr>
<tr>
<td></td>
<td>520</td>
<td>485</td>
<td>447</td>
</tr>
<tr>
<td>28Educ</td>
<td>-0.039</td>
<td>0.038</td>
<td>0.270(**)</td>
</tr>
<tr>
<td></td>
<td>0.411</td>
<td>0.424</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>458</td>
<td>452</td>
<td>446</td>
</tr>
<tr>
<td>26Born</td>
<td>-0.045</td>
<td>0.015</td>
<td>0.172(**)</td>
</tr>
<tr>
<td></td>
<td>0.339</td>
<td>0.754</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>458</td>
<td>452</td>
<td>443</td>
</tr>
<tr>
<td>1Size</td>
<td>0.030</td>
<td>-0.056</td>
<td>0.378(**)</td>
</tr>
<tr>
<td></td>
<td>0.500</td>
<td>0.222</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>492</td>
<td>484</td>
<td>446</td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).