Farmer Decision Making and Likelihood to Participate in the Conservation Reserve Program

THESIS

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Abstract

Early successional habitat and grasslands declined across the United States over the last 50 years. This decline is detrimental to both plant and wildlife diversity. The trend is particularly strong throughout the Midwest. Land conservation programs, such as the Conservation Reserve Program (CRP), provide farmers financial incentives to engage in a specific land conservation practice for a period of 10-15 years. Programs such as the CRP can help to combat the loss of early successional habitat; however the programs are conducted via voluntary enrollment. Therefore, understanding factors influencing farmers' decisions to enroll in the CRP, and specifically what factors could increase their willingness to enroll are important to explore. I explored farmer's subjective norms, trust in federal agencies, risk tolerance, self-efficacy, demographic factors, and perceived costs and benefits of the program and their effect on farmer's willingness to enroll in the CRP. A mail-back survey was administered to 6000 farmers in six counties in Ohio. Results indicate that costs and benefits, specifically perceived environmental health benefit is the most important indicator of willingness to enroll in CRP. Geographic region may also influence which factors are most indicative of overall willingness to enroll.

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Fields of Study

Major Field: Environment and Natural Resources

Minor Field: Environmental Social Science

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Chapter 1: Introduction

Introduction

Conservation of wildlife in areas without vast public lands requires the involvement and cooperation of private landowners. The federal Conservation Reserve Program (CRP) has been used for this purpose--that is, to incentivize the conservation of private lands for the benefit of wildlife. This program was made necessary as a result of the steady decline in grassland and early successional habitats throughout the United States (Brennan and Kuvlesky 2005). Habitat loss threatens to negatively impact many species that rely solely on grassland and early successional habitat for survival (Litvaitis 2001). The CRP provides incentives to landowners to create and maintain early successional habitat on land that was previously used to produce agricultural commodities (Brennan & Kuvlesky 2005). However, landowners must voluntarily enroll in the program for the CRP to be effective. Therefore, it is important to understand what influences farmer and landowner enrollment and to identify barriers to enrollment in conservation programs such as the CRP. To this end, a substantial amount of research has investigated CRP enrollment, including studies performed by Lambert and Sullivan (2007), Force and Neison (1989), and Kalaitzandonakes (1994). However, to date there has been insufficient study of these factors for landowners in Ohio, a state that has a particularly high risk of this type of

habitat loss, and many of the studies focus heavily on the economics of the program. The work described below was designed to better understand the psychological factors that influence farmers' willingness to enroll in the CRP in Ohio.

Early Successional Habitat Loss and Importance

Early successional habitat declined substantially across the United States over the last half century. This decline can be attributed to a variety of factors, including the conversion of grasslands into agricultural land, reforestation of previously harvested lands, and the rise of exurban development (Brennan and Kuvlesky 2005). The loss of early successional habitat is occurring throughout the United States (Brennan and Kuvlesky 2005), but is becoming increasingly prevalent across the eastern United States, including Ohio. The decline in early successional habitat is detrimental specifically for grassland-dependent species such as the northern bobwhite quail, the American woodcock, New England cottontails, and other wildlife that rely on such habitat to meet their basic needs (Dessecker and McAuley 2001). Due to a widespread shift in land management strategies that has occurred throughout the US, these species and others have been extremely negatively impacted by their shrinking habitats (Litvaitis 2001).

Over the last half century, the eastern half of the United States has witnessed a 22% loss of agricultural lands, caused by large increases in exurban land development (Brown et al. 2005). Exurban development occurs when farmland is divided into smaller parcels and

sold to developers. The developers then convert it into residential plots, which are often landscaped with Kentucky blue grass. The continued decrease in early successional habitat can, in part, be attributed to this type of land fragmentation across the United States. The rise in economic value of agricultural commodities, resulting in part from agricultural policies that have pushed for fuels from corn, has also led some farmers to put previously uncultivated or fallow land back into production for economic gain (Secchi et al. 2008). Additionally, grasslands in Ohio are also potentially impacted by a long-term transition away from grasslands and early successional habitat toward forests. The forested area of Ohio doubled from 1942 to 2006, and now covers 30% of the state (United States Department of Agriculture 2009). Importantly, 75% of all forest cover in the state is owned by private family-owned lands (United States Department of Agriculture 2009). A recent survey conducted by the U.S. Forest Service demonstrated that land parcel size dramatically affects whether or not a landowner has a written management plan for woodlands on their property (Butler and Ma 2011). That survey also found that family-owned forests decreased from 25 acres on average to 20 acres on average from 1993 to 2006 (Butler and Ma 2011). Therefore, small, private family-owned woodlands may be more likely to become forested and landowners appear inclined to maintain that form of cover, which again leads back to the reduction of early successional habitat and native grasslands.

Ohio has been particularly affected by these changes. Ohio ranked 43rd of the 50 states in terms of the percentage of land owned by the state and federal government in 1995, so

individual landowner decisions can greatly impact land cover in Ohio (Institute 1995). A 2009 survey by the US Department of Agriculture estimated that approximately 1.8 million acres of farmland in Ohio was lost between 1978 and 2007, and a 2002 study found that Ohio was ranked second in states to have lost agricultural lands to exurban development (Irwin and Reece 2002). These factors are combining to cause large losses of early successional habitat and native grasslands, and are likely to negatively impact grassland-dependent wildlife (Kupfer, Malanson, and Runkle 1997). Moreover, these trends— urban expansion, parcelization (and resulting habitat fragmentation), agricultural development and reforestation –are likely to continue on private lands (Langner and Flather 1994; Knight 1997; Tilman et al. 2001). The problem is not going away.

The Conservation Reserve Program

The United States Department of Agriculture's (USDA) Conservation Reserve Program is the largest federally funded agricultural land conservation program in existence. This program provides incentives for landowners to convert environmentally sensitive agricultural land for 10 to 15 years to a specific conservation cover (Allen and Vandever 2003). Farmland is converted to grassland, trees, wildlife cover, or other conservation uses. In exchange, the landowners receive annual rental payments, maintenance payments, and other financial incentives for installing and maintaining the designated cover on their land (Farm Service Agency 2013). The program assists farmers and landowners by providing a dependable source of income, while contributing to environmental goals. In

2011, landowners throughout the United States with agricultural land enrolled in the program received approximately $1.7 billion in annual rental payments for the 31.1-million cropland acres enrolled in the program as a whole (United States Department of Agriculture 2011).

The CRP's primary objective is to provide environmental benefits, including protecting and increasing water quality, enhancing wildlife habitat, sequestering carbon, protecting and enhancing soil productivity, and reducing downstream flood damage. This is achieved by converting environmentally sensitive acreage generally devoted to the production of agricultural commodities to a long-term vegetation cover (Farm Service Agency 2013). The program was initially established by the Food Security Act of 1985, and was later amended by the Food, Agriculture, Conservation, and Trade Act of 1990, the Federal Agriculture Improvement and Reform Act of 1996, the Farm Security and Rural Investment Act of 2002, and the Food, Conservation, and Energy Act of 2008 (United States Department of Agriculture 2013). To be eligible for the CRP, land must be planted cropland, or previously (in the past 4-6 years) planted cropland that is physically and legally capable of being planted with an agricultural commodity (Farm Service Agency 2013). As farmers, ranchers, and private forest landowners now manage two-thirds of our nation's land, the environmental and conservation goals for these landowners have become key factors in the formulation of USDA policies (United States Department of Agriculture 2011).

The Conservation Reserve Program distributed approximately $1.7 billion in payments to conserve approximately 417.7 billion acres of land throughout the United States in 2011 (United States Department of Agriculture 2011). Overall, there were a total of 753,130 total CRP active contracts; approximately 38,400 (5%) of those contracts were with Ohio landowners. The 38,400 contracts specific to Ohio included 21,414 farms, covering 343,604 total acres of land (United States Department of Agriculture 2011). The payments to Ohio landowners totaled over 41.1 million dollars, 2.4% of the total 1.7 billion spent in the United States. In addition, the annual payment to Ohio landowners per acre was $119.54, compared to the national average of $55.17 per acre. There was an estimated 277,540 acres enrolled in CRP in Ohio in 2014, a 19% reduction of total acres enrolled in just 3 years (United States Department of Agriculture 2014).

CRP and the Environment

Environmental benefits of the Conservation Reserve Program (CRP), particularly those associated with wildlife, have been well-documented (Dunn et al. 1993; Ryan, Burger, and Kurzejeski 1998; CH Flather, Brady, and Knowles 1999; Heard et al. 2001). In addition, a sizeable literature exists regarding factors associated with farmers' adoption of conservation programs (C. Ervin and Ervin 1982; Soule, Abebayehu, and Keith 2000; Brimlow 2008). Participation in voluntary conservation programs has attracted considerable research in all areas of the program. It is also well established in the literature that cost sharing generally correlates positively with farmers' willingness to

participate in a program (Corbett 2002; C. Ervin and Ervin 1982; Lubell 2004). Konyar and Osborn (1990) found that farmers generally participate if the expected utility of participation is greater than the expected utility of not participating (Konyar and Osborn 1990). Some research has found that the adoption of CRP can be related to a range of attitudinal and socioeconomic factors (Force and Neison 1989). For example, farmers who own a large parcel of land or who earn off-farm income are more likely to enroll in these programs. Small farmers, especially those with highly erodible land are much less likely to participate, citing lack of resources to comply (Mclean-meyinsse, Hui, and Joseph 1994). Using regional level data for the U.S, it also appears that the probability of participation decreases with higher land values (Mclean-meyinsse, Hui and Joseph 1994). Previous studies indicate that land quality inversely affects likelihood to enroll in programs such as the CRP (Yang and Isik 2004). Additionally, studies have shown that older farmers are more likely to enroll in conservation programs, as are females. Higher income and education have both been shown to increase the likelihood of enrollment, though income has been debated between researchers (Yang and Isik 2004; Goodwin and Smith 2003). Participation can also depend on individual landowner's perceptions of the program's specific costs and benefits. Socio-economic variables such as farm tenure and soil erosion rate have previously been found to be positively related and highly influential in predicting CRP participation (Mclean-meyinsse, Hui, and Joseph 1994; Kalaitzandonakes and Monson 1994; Skaggs and Kirksey 1994; Shoemaker 1989). Cooper and Osborn also demonstrated that individual landowner conservation considerations and preferences also play a role (Cooper and Osborn 1998). Similarly,

research indicates that those who are willing to enroll generally have positive attitudes towards sustainability, demonstrate a high affinity for social responsibility and efficacy, and perceive more benefits than costs associated with these programs (Fielding et al. 2008).

Although a substantial amount of research has been conducted on CRP enrollment, specific examination of Ohio farmers and their enrollment behaviors, barriers to enrollment, and conservation behaviors have not yet been fully explored. Previous studies tend to be narrower in their focus on solely demographics, farm characteristics, or, to a lesser extent, psychological factors. Previous CRP research often has taken on a single theoretical approach when attempting to learn what influences CRP enrollment decisions. This type of approach limits the type and number of potential explanations that researchers are able to explore. In this study, I explore how latent psychological variables, salient costs and benefits, and pertinent demographic factors affect likelihood to enroll in the CRP. This combined approach allows for comparison between factors used separately in previous studies. This has not previously been applied to Ohio landowners and may provide additional insight to what may most affect their enrollment decisions.

Due to Ohio's extensive and ongoing loss of early successional habitat and native grasslands and a high proportion of private lands, Ohio farmers are critical to the conservation of early successional habitat and the species that rely upon it. Food and Agriculture is Ohio's top industry, contributing over $105 billion annually to Ohio's

economy. In 2011 Ohio ranked 8th in the nation for corn production, 6th in soybean production, and 15th overall for agricultural production (Dept of Agriculture 2011). Thus, gaining an understanding of what factors motivate or prevent Ohio farmers from enrolling in land conservation programs could significantly impact wildlife conservation, environmental health, and Ohio's long-term conservation goals. Additional research is also needed to determine what specific factors most influence their likelihood to participate in land conservation programs. A better understanding of how these decisions are made will also contribute to a more productive approach to assisting landowner implementation of practices that are beneficial for land conservation and better inform the future structure of the program to encourage continued and expanded enrollment.

This study is intended to provide additional insight into what factors may be most influential in a farmer's decision to enroll in a conservation program. The CRP is important in promoting conservation goals throughout the United States, and may be critical in the future if the current trends of decline continue. Therefore, it is important to continue to improve our understanding of what factors are most influential in the decision-making process. The more I understand about how and why farmers make their land conservation management decisions, the better equipped I can be to talk to them about conservation practices that could potentially lead to future enrollment and the more effectively I can work to prevent large-scale habitat degradation and disappearance in the future.

Goal of Research

The purpose of this study is to describe what factors are associated with and most impact Ohio landowners' likelihood of enrolling in land conservation programs. The overall goal is to achieve a greater understanding of the potential psychological and demographic factors that underlie landowners' land management practices and likelihood to enroll in Federal Reserve programs. This study is designed to provide previously unexplored insight, using a mailed survey, as to how land management decisions are made, and, in turn, how to best approach landowners to implement practices that help to conserve and create important native grassland and early successional habitat and enroll in reserve programs.

Chapter 2: Methods

Sampling and Participant Selection

The target population for this study was farmers in Ohio, specifically farmers from six Ohio counties—two counties from Central Ohio (Licking and Fairfield), two from Northwestern Ohio (Williams and Fulton), and two from Southwestern Ohio (Clinton and Ross) were selected after consultation with the Ohio Division of Wildlife. Ohio had a total of 73,700 farms, with13.6 million total acres in active farmland (approximately 52% of Ohio's total land area) for an average farm size of 185 acres, in 2011 (United States Department of Agriculture 2012). These counties were selected to maximize variation on land characteristics that could impact CRP enrollment and availability, including county forest cover, number of farms, average farm size, population size, and area of active farmland (table 1).

The six counties selected to participate were Clinton, Fairfield, Fulton, Licking, Ross, and Williams. Clinton County, located in southwest Ohio, had 799 farms total with an average farm size of 273 acres, a total of 218,493 acres (approximately 82.5% of the total county) in farming, a 10% total forest cover, and a population of 49,543 people. Fairfield County, located in central Ohio, had 1,112 farms total with an average farm size of 160

acres, a total of 177,772 acres (approximately 55% of the total county) in farming, a 22% total forest cover, and a population of 122,759 people. Fulton County, located in northwestern Ohio, had 763 farms total with an average farm size of 241 acres, a total of 183,913 acres (approximately 70.5% of the total county) in farming, a 9% total forest cover, and a population of 42,400 people. Licking County, located in central Ohio, had 1427 farms total with an average farm size of 158 acres, a total of 225,792 acres (approximately 51% of the total county) in farming, a 24% total forest cover, and a population of 158,500 people. Ross County, located in southwestern Ohio, had 1,009 farms total with an average farm size of 222 acres, a total of 223,650 acres (approximately 50% of the total county) in farming, a 50% total forest cover, and a population of 73,345 people. Williams County, located in northwestern Ohio, had 1,116 farms total with an average farm size of 190 acres, a total of 212,509 acres (approximately 78% of the total county) in farming, a 13% total forest cover, and a population of over 37,800 people. Of note, there are 277,543 total acres of enrolled CRP land in Ohio; 1,988 acres in Clinton, 4,805 acres in Fairfield, 4,384 acres in Fulton, 906 acres in Licking, 25,423 acres in Ross (by far the highest of any county in Ohio), and 14,566 in Williams (third highest in the state) (United States Department of Agriculture 2007; Table 1).

By selecting six counties in various geographic regions with varying land cover and farm types I hoped to maximize variability and gain varying viewpoints and responses from participants. If the factors impacting enrollment differ across Ohio, then private lands

biologists or other groups working individual farmers can gain a better understanding of how to best communicate with farmers in specific areas.

Questionnaire Development

The survey was created with consultation from the Ohio Division of Wildlife's private lands' biologists. Multi-item scales were developed to assess and create latent variable measures. Wherever possible, previously validated measures were employed using standard psychometric measurement techniques (Nunnally and Bernstein 1994). I used Cronbach's coefficient alpha to assess the reliability of multi-item scales (Cronbach 1951). This is the common practice when measuring latent psychological variables, such as attitudes and norms because other common reliability assessments (i.e., test-retest reliability) are impractical (Chaiken 1993; Moustaki and Knott 2000).

The 10-page survey was split into four sections: 'Land Characteristics,' 'Land Conservation Programs,' 'Land Conservation and Your Community,' and 'About You.' The first section, 'Land Characteristics,' included questions about how landowners use their land, their hunting practices, their attitude toward government involvement in conservation, their attitude toward conservation programs in general, and information about their farmland and current management. Section two, 'Land Conservation Programs,' asked more in-depth questions about their personal enrollment in conservation programs, beliefs about the effect the program may or may not have on their

land, the costs to enrollment, and the benefits to enrollment. Section three, 'Land Conservation and Your Community,' delved into information sources for CRP, individual's trust in governmental agencies, farmer social norms, individual risk tolerance, and self-efficacy. The final section, 'About You,' was a simple demographic section included to gain a better understanding about the individual filling out the survey. A full version of the survey and all the specific questions can be found in Appendix A.

Variables included in the survey were those hypothesized to have some effect on farmers' likelihood to enroll in the Conservation Reserve Program. My purpose was to gain a better understanding of factors that affect farmers' willingness to enroll in the CRP throughout Ohio. The dependent variable used in subsequent analysis asked respondents 'how likely or unlikely are you to enroll (or reenroll) in the CRP.' Based on previous research, I hypothesized that the following measures would be associated with farmers' willingness to enroll in the Conservation Reserve Program: (a) self-efficacy (b) risk tolerance (c) subjective (social) norms, (d) trust in state and federal agencies, (e) attitude toward land and wildlife conservation, (f) perceived benefits, (g) perceived costs, (h) acres owned, (i) gross farm sales, (j) identification as a hunter, and (k) education level. Each of these variables is discussed briefly below.

Self-efficacy: Self- efficacy is a term that was first coined by Bandura and defined as one's belief in their ability to succeed in a given situation (Bandura 1977). It has previously been studied in conjunction with risk. Krueger demonstrated that people who

have a higher self-efficacy are more willing to take risks (Krueger and Dickson 1994). Roy (2009) found farmers were more likely to take on a higher number of crops if their self-efficacy was high (Roy 2009). Self-efficacy is used here as a term to describe a farmer's belief as to whether or not they can personally control their success in farming. The higher a farmer's self-efficacy the greater their belief is that they control their success or failure. Alternately, the lower their perception of self-efficacy the less they perceive their ability to control their farming success or failure. Given prior research (Roy 2009), I believed that efficacy could have an adverse effect on a farmer's willingness to enroll in the CRP. Farmers with a strong conviction that they can succeed in any situation might find the financial appeal of the CRP less attractive, given that it is a guaranteed (non-risky) but albeit small source of income. Efficacy was measured with three items that ask about the individual's perceived control over outcomes on their farm. The items included are 'long-term land management plans are unnecessary since chance determines my farm profitability,' 'whether or not I have yearly crop profitability is mostly a matter of luck,' and 'I have very little ability to protect my crop profitability.' These items were adapted from previous surveys focused on efficacy in farming and with weather (Artikov et al. 2006; Roy 2009).

Risk Tolerance: Risk tolerance is defined as the maximum amount of uncertainty that someone is willing to accept when making a decision (Grable 2000). It has most often been studied in relation to health or financial planning (Hallahan, Faff, and McKenzie 2004; Harlow and Brown 1990). Because the CRP can provide a guaranteed steady

income, albeit lower income than planting crops, I predict that an individual with a low risk tolerance may find the program more appealing. Risk tolerance was created using a combination of three questions that inquire about the individual's risk attitude. The three questions included are: 'how willing are you to take risks,' 'how much do you try to avoid risk,' and 'how willing are you to take risks in your occupation as a farmer.' A four-point scale that ranged from zero to three was used, using the descriptors 'not at all,' 'slightly,' 'moderately,' and 'greatly.' These three questions were adapted from previous farmer risk survey questions (Bard and Barry 2000).

Social Norms: Subjective, or social norms are the perceived social pressure to partake or not partake in a particular behavior (Ajzen 1991). There is a large body of research studying how subjective norms influence behaviors, most of which supports the hypothesis that norms can positively or negatively influence behavior (Beedell and Rehman 2000; Ajzen 1991). Some studies, however, support the hypothesis that norms partially predict behavior indirectly through attitude (Tarkianen and Sundqvist 2005). Previous research by Rogers (1962) suggests that innovations are diffused horizontally, meaning that if a farmer is introduced to the CRP by another trusted farmer he may be more likely to enroll (Rogers 1962). The social norm variable was measured with three items that inquire as to the individual's beliefs about other farmers in their community's enrollment in the CRP. The following questions were adapted from measures developed and refined in previous studies regarding subjective norms (Ajzen 1991; Beedell and Rehman 2000). The three questions included were: 'many farmers in my community are

enrolled in CRP,' 'many farmers in my community think highly of programs like CRP,' and 'most farmers whose opinion matters to me would enroll in conservation programs such as CRP.' A 5-point response scale was presented for the possible answers to questions, described as follows: -2 strongly disagree, -1 disagree, 0 neither, 1 agree, and 2 strongly agree. As with the previous measure the higher the numerical response the more positive the answer.

Trust in State and Federal Agencies: Trust in the institution managing a particular program has previously been found to be an important indicator of adoption of conservation practices (Kollmuss and Agyeman 2002; Sjoberg 1999). In addition, the overall credibility of information source has been shown to alter people's opinions of information they are receiving (Trumbo and McComas 2003). Farmer's opinions of CRP and their willingness to enroll may be influenced, in part, by their trust in the managing agency. The trust variable was created using a combination of six questions. This included questions on how they felt about both the Ohio Division of Wildlife (three indicators) and the US Fish and Wildlife Service (three indicators). The two agencies were combined for a single measure due to how highly correlated they were in final analysis (Cronbach's Alpha =.957). For each agency, respondents were asked three questions that included, I feel that the agency: shares similar values as me, shares similar opinions as me, and thinks in a similar way as me. A 5-point scale was presented for possible answers, described as follows: -2 strongly disagree, -1 disagree, 0 neither, 1 agree, and 2 strongly agree. The six questions were averaged to gain the more reliable

trust measure. The three questions in each set were adapted from five statements originally used by Vasket to measure trust (Vasket, Absher, and Bright 2007).

Attitude toward conservation: Attitude toward conservation has been shown many times to be a positive indicator of willingness to participate in a conservation behavior (Ahnström et al. 2009; Luzar and Diagne 1999; Artikov et al. 2006; Reimer, Thompson, and Prokopy 2011). Ahnstrom is a strong proponent that attitudes can highly impact the decisions, actions, and adoption of new practices by an individual. A 7-point semantic differential scale, adapted from previous established research, was used to create a measure of attitude toward conservation in general terms (Osgood, Suci, and Tannenbaum PH 1957). Respondents were given each of the following phrases: 'land conservation is…' and 'wildlife conservation is…,' then were presented with three word pairs. The first pair was 'wise or foolish,' the second: 'beneficial or harmful,' and the third: 'valuable or worthless.' They were given a scale labeled -3 (most foolish, harmful, or worthless) to 3 (most wise, beneficial, or valuable). The scaling was described as follows: -3 and 3 were both labeled 'extremely', -2 and 2 were labeled quite, -1 and 1 were labeled 'slightly,' and zero was denoted by 'neither.' In this numbering system, the higher the number, the more positive the attitude toward conservation; the more negative the number, the more negative the evaluation of conservation. The combination of the six items were averaged together to create the single attitudinal variable toward general conservation.

Perceived benefits: Benefits have also been explored in relation to the adoption of conservation behaviors. Studies have shown more salient, or higher the perceived benefits the more readily a farmer will participate in CRP. More specifically, the higher the perceived personal benefit (as opposed to public benefit) the more likely the farmer is to enroll in CRP and adopt conservation-minded practices (Brimlow 2008). However, the most commonly explored farmer benefit in previous research is financial. There have been studies into other kinds of benefits, including environmental, but those are not as prevalent and therefore less understood (Brimlow 2008; Rasamoelina, Johnson, and Hull 2010; Reimer, Thompson, and Prokopy 2011). The perception of costs and benefits can influence a farmer's willingness to enroll in the CRP. Two main perceived benefits explored in this study are the perceived environmental health benefit (PEHB) and the perceived financial benefit (PFB). The PEHB was constructed from a combination of three items that inquired as to 'how likely are the following outcomes on your farm due to enrollment in CRP.' The three responses included are 'improved control of soil erosion,' 'improved water quality,' and 'seeing improved overall farm health.' The response scales for these items ranged from: -2 to 2 and labeled 'very unlikely,' 'unlikely,' 'neither,' 'likely,' and 'very unlikely', respectively. Some indicators for the PFB were reverse coded to match directionality. The included indicators for the PFB were 'increased cost of land management on your farm due to your enrollment in CRP,' 'too much cropland taken out of production,' and 'not time consuming to manage.' Questions were adapted from previous research in Wabash and by Cornell (Peel 2011; Dayer et al. 2011).

Perceived costs: Similarly, four main costs of enrolling in CRP were explored in this study: perceived environmental cost (PEC), perceived flexibility cost (PFC), perceived uses cost (PUC), and the perceived aesthetics cost (PAC). For the four cost constructs (i.e., PEC, PFC, PUC, and PAC), respondents were asked, 'to what degree does each of the following issues limit your participation in CRP?' Response scales ranged from 0 to 3, and labeled: 'not at all,' 'slightly,' 'moderately,' and 'greatly', respectively. The PEC was constructed from a combination of three indicators: 'concerns about invasion of unwanted trees or weeds,' 'not satisfied with cover quality,' and 'unwanted wildlife.' The PFC was constructed from three indicators, including: 'length of enrollment,' 'reduces my flexibility to manage my lands,' and 'limits ability to take advantage of rising crop prices.' The PUC was constructed using three indicators: 'other recreational uses for my land,' 'fear of losing or upsetting farm operator/renter,' and 'limits ability to cash rent land.' The PAC was constructed using three items. Items included 'increased weed population,' 'makes farm appear unkempt or poorly managed,' and 'changes in scenic quality of farm or landscape.' The scaling for this last indicator was described as follows: -2 to 2 in order labeled 'very unlikely,' 'unlikely,' 'neither,' 'likely,' and 'very unlikely.' Questions were adapted from previous research done by Peel and Cornell University (Peel 2011; Dayer et al. 2011).

Acres owned: The number of acres owned by a farmer has previously been shown to positively influence their willingness to enroll in conservation programs (Brimlow 2008).

In the survey farmers were asked ‘how many total acres do you own?’ and given a blank space to fill in their exact acreage (United States Department of Agriculture 2007).

Gross farm sales: Similarly, gross farm sales has previously been demonstrated to be an important determining factor of conservation adoption and CRP enrollment, though their has been some debate as to the directionality of influence (Rasamoelina, Johnson, and Hull 2010; Ahnström et al. 2009; Brimlow 2008). This variable was measured by asking the respondents ‘in a normal year, what are the annual gross sales from your farm including farm program payments and crop insurance payments.’ The options farmers were given to check were ‘$0,’ ‘<$50,000,’ ‘$50,000-$99,999,’ ‘$100,000-$149,999,’ ‘$150,000-$299,999,’ and ‘>$300,000’ (United States Department of Agriculture 2007).

Hunter Identification: Whether or not the respondent hunted was determined by a single question. This question simply asked the respondent ‘do you hunt?’ In previous studies about adoption of CRP, hunting can have a positive influence on enrollment (Burger 2008).

Education level: Similarly, education level was determined by a single question asked in the ‘About You’ section of the survey. The question asked ‘what is the highest level of education you have completed?’ The respondent was provided with 7 possible answers: less than 9^{th} grade, some high school, high school diploma or GED, some college, Associate’s Degree, Bachelor’s Degree, or Graduate/Professional Degree.

County Models

The dependent variable, likelihood to enroll in the CRP, was measured using a scale ranging from 1 to 5, whereby 1 = highly unlikely and 5 = highly likely. In order to perform the desired statistical analysis the variable was transformed into a dichotomous variable. The dependent variable was dichotomized in subsequent analysis such that zero was equivalent to low likelihood of enrolling in CRP and one was equivalent to high likelihood of enrolling in CRP. Initial analyses revealed that the bivariate correlation between the independent and dependent measures differed regionally (table 4). Consequently, factors impacting individuals' likelihood of enrolling in CRP were modeled in each of the three regions and statewide. The first, Ohio-wide model included all the Ohio farmers in our sample, *n*=857. The Northern region included Williams and Fulton counties; the Central region included Fairfield and Licking counties; and the Southern region included Clinton and Ross counties.

Sampling & Data Collection

Lists of property owners with parcels of land zoned for agricultural use were collected via tax records from county auditors for each of the counties. Individuals that owned five or more acres of agriculturally zoned land were included in the potential list of participants

in each county. There were between 4,000 and 10,000 potential participants for each of the six counties. I then used simple random selection to choose 1,000 participants from each county. The goal of this sampling approach was to obtain approximately 400 usable questionnaires, thereby limiting the margin of error to +/- 5%, with a 95% level of confidence for each of the counties in the sample.

We administered a mail survey following a modified version of Dillman's Tailored Design Method (Dillman 2000). An announcement letter was sent via the U.S. Postal Service on April 7, 2013 informing the selected participants of the upcoming survey and its purpose. A full mailing, including cover letter and a survey booklet with prepaid return postage was sent out to the participants a week and a half later, complete with an individual tracking ID on each booklet to allow us to keep track of the responses. A second complete mailing including a cover letter, survey booklet, and prepaid return postage was sent out to those individuals who had yet to return a completed survey in early June 2013. The Ohio State University Office of Responsible Research Practices Institutional Review Board approved all materials sent out to the participants prior to the mailings [protocol #2013E0073].

Surveys that were returned were each recorded in a Microsoft Excel® spreadsheet that electronically tracked the individual tracking ID number, the date the survey was received, and which mailing they responded to. Responses that indicated a refusal to complete the survey, an inability to complete the survey, or an undeliverable piece of

mail were also recorded in the spreadsheet. This method allowed us to track respondents in order to only send subsequent mailings to individuals who had yet to complete the survey, but were still eligible to do so.

Returned surveys were sent to Entry Time (Pittsburg, PA) for data entry. Surveys were entered on a double pass system, where each survey was entered twice and responses were checked against one another and fixed recorded responses differed; this method reduces entry error. Reverse coding was performed on response items that needed to be directionally changed to match other items assessing the same construct, and data were checked and cleaned accordingly, including removing invalid data and checking for outliers, and missing data. Missing data were imputed using the program Hot Deck, a software package used to impute missing data based on selected demographic factors (Myers 2011). Factor analyses were used to determine the dimensionality of multi-item scales, and Cronbach's alpha was used to determine the internal consistency (or reliability) of scales. Factor analysis helps to ensure that the individual indicators all load on the same factor, or the same hypothesized construct (Russell 2002). I used a Varimax rotation in our principles components factor analysis, with the number of factors retained determined by Eigenvalues greater than 1.0.

Statistical Analysis

Logistic regression was used to explain individuals' likelihood of enrolling in CRP. I predicted, consistent with previous studies, that income, land size, identification as a hunter, education, conservation attitude, social norms, risk tolerance, personal efficacy, and perceived costs and benefits of CRP would be associated with individuals' self-reported likelihood to participate in the conservation program. I further predicted that increased land size, higher income, positive identification as a hunter, and a high education level would increase the probability of being willing to enroll. In addition, I predicted that positive attitudes towards conservation, positive social norms, high levels of trust, low levels of efficacy combined with low risk tolerance, high perceived benefits, and low perceived costs are correlated with increased willingness to enroll.

The Statistical Package for the Social Sciences version 20 (SPSS 20.0.0) was used to fit logistic regression models. SPSS was also utilized to calculate basic, descriptive statistics (i.e., means, medians, modes, standard deviations, frequency distributions) for each of the variables and calculate bivariate correlations between predictor variables and the response variable.

Chapter 3: Results

Results

A total of 1,000 surveys total were sent out to each of the six selected counties, for a total of 6,000 surveys mailed. Of the 6,000 surveys sent out 1,250 were returned, for a response rate of 21%. Adjusting the response rate to account for undeliverable mail and refusals yielded an adjusted response rate of 24%. Shortly after the initial mailing I learned that our survey followed closely behind the USDA's Census of Agriculture (http://www.agcensus.usda.gov/). Consequently, survey fatigue may have factored into the lower than expected response rate from our participants.

Reliability of Multi-item Measures

A series of factor analyses were used to explore the factor structure of the latent variables of interest. Using a Varimax rotation and factor retaining criteria of Eigenvalues greater than 1.0, I created our latent variables (DeVellis 2003). All of the response items used to create our latent variables had factor loadings between 0.605 and 0.925 (Noar 2003). Generally, loadings that fall between 0.4 and 0.7 are considered moderate and acceptable,

and loadings that are 0.8 and above are considered high (Osborne and Costello 2005). Cronbach's alpha was also acceptable (ranging from 0.603 to 0.957) for each of the scaled measures (Chaiken 1993; DeVellis 2003; Table 20).

A scale measure of landowners' general attitude toward conservation was created using 6 response items. The six items were averaged to create the attitude toward conservation measure with a resulting Cronbach's Alpha of 0.939. The social norms variable comprised the average of three response items (Cronbach's Alpha = 0.821).
Trust was created by combining the three trust items included in the survey for both trust in the Ohio Division of Wildlife and in the United States Fish and Wildlife Service. Both organizational trust measures were combined to create a trust in state and federal governmental organizations. These two measures were combined due to their high collinearity. This high correlation suggests that respondents did not differentiate between the state and federal agencies involved. The six items were averaged to create the trust measure with a resulting Cronbach's Alpha of 0.957. Risk tolerance was created using a combination of three of the four survey risk questions. The three items were averaged to create the risk measure with a resulting Cronbach's Alpha of 0.785. Self-efficacy was created using a combination of three of the six total personal efficacy survey questions. The three items were averaged to create the efficacy measure with a resulting Cronbach's Alpha of 0.617 (table 20).

Environmental health benefit was created using three items from the larger section asking about how likely certain outcomes are on respondents' farm from enrolling in CRP. The three items were chosen using factor analysis on the bank of 16 questions asked in that section. These three items loaded highly on the same factor, and all three focused on increased environmental health as a result of the CRP. These three items were averaged to create the perceived environmental health benefit measure with a resulting Cronbach's Alpha of 0.859. Perceived financial benefits was created using three items from the same section as the above perceived environmental health benefit. These three items were chosen out of the same bank of 16 questions. These three items all loaded on the same factor when analyzed in factor analysis and were selected for the measure. The items were averaged to create the perceived financial benefit measure with a resulting Cronbach's Alpha of 0.603 (table 20).

The following three perceived cost measures were created from a bank of items that inquired as to what degree each of the following issues limit their participation in the CRP. Respondents were asked to rate 16 items, which were analyzed with factor analysis to determine reduce the number of variables. The first perceived cost, environmental, was created using three of the 16 items (appendix A). All three items loaded highly on the same factor and were averaged to create the measure. The resulting measure has a Cronbach's Alpha of 0.712. The measure, perceived flexibility cost, was created using three of the 16 items from the scale. These three items loaded highly on the same factor and all indicated a lack of flexibility or high time investment involved with the CRP. The

three factors were averaged to create the measure with a resulting Cronbach's Alpha of 0.738. 'Perceived uses cost' was creating using 3 of the 16 items described above. These three items all loaded on the same factor and indicated that the CRP prevented them from using their land in alternate ways or limited their ability to use the land in the way they prefer. The three items were averaged to create the perceived uses cost measure with a resulting Cronbach's Alpha of 0.638. 'Perceived aesthetic cost' was created using three items from the same bank of 16 questions. These three items all loaded on the same factor when analyzed in factor analysis and were averaged to create the 'perceived aesthetic cost' measure with a resulting Cronbach's Alpha of 0.621 (table 20).

Descriptive Results

Of the 1250 total respondents, 857 (68.6%) answered 'yes' when asked if they farmed at least some of the land they owned. Due to this study's focus on CRP enrollment, only the 857 respondents that answered 'yes' to this question were included in subsequent analyses. From this point on, all analysis will include only the self-reported farmers (n=857).

Social and Demographic Characteristics of Respondents

Farmer participants in this study ranged in age from 27 to 94, with a mean age of 63. A large male majority (83%) of respondents were male, with only 17% female respondents. Only 1.8% of the respondents reported having less than a 9^{th} grade education, 1.8%

reported having some high school, 33.3% reported having a high school diploma or GED, 19.3% reported having some college, 8.2% reported having an associates degree, 18.9% reported having a bachelor's degree, and 16.6% reported having a graduate or professional degree.

The item assessing when respondents plan to retire was heavily skewed, with 42.2% indicating they never plan on retiring, 2.6% planning to retire in greater than 30 years, 5.5% planning on retiring in 21-30 years, 9.3% planning on retiring in 16-20 years, 7.8% planning on retiring in 11 to 15 years, 13.7% planning on retiring in 6 to 10 years, 13.7% planning on retiring in 1 to 5 years, and 5.1% planning on retiring within the year. There was approximately equal variation across how many generations their families have been farming, with 42% of respondents being first generation farmers, 22.1% of respondents being second-generation farmers, and 35.9 % of respondents being third generation or greater farmers. The number of years individuals reported being involved in farming ranged from less than 1 to 93 years, with a mean of 32 total years farming. The mean number of acres owned ranged from 5 to 4300, with a mean of 190.92 acres.

Farmers were also asked about the uses and type of land they own. When asked how the farmers use their land, 63% responded 'yes' to using at least some of their land for recreational purposes, 50% responded 'yes' for hunting, 25% responded 'yes' for hiking, 24% responded 'yes' for fishing, 9% responded 'yes' for camping, 12% responded 'yes' for off-roading, 15% responded 'yes' for photography, 41.5% responded 'yes' for

wildlife observation, and 33% responded ‘yes’ for shooting or firearm practice. Of the total farmer respondents, 437 (51%) reported that they hunt, and 642 (75%) reported that they currently, or have previously allowed others to use at least some of their land for hunting.

The participants were asked multiple questions regarding income sources. The annual gross sales from their farm were as follows: 17.6% zero dollars, 50.2% less than $50,000, 10% between $50,000 and $99,999, 4.9% between $100,000 and $149,999, 6.6% between $150,000 and $299,999, and 10.6% equal to or above $300,000. Their total annual off-farm income reported was 13.4% zero dollars, 11.2% less than $50,000, 32.9% between $50,000 and $99,999, 26.3% between $100,000 and $149,999, 10.9% between $150,000 and $299,999, and 5.4% equal to or above $300,000. Respondents were also asked how much of their total income comes from their enrollment in CRP; responses were positively skewed, with 89.5% reporting 1-10%, 4.3% reporting 11-25%, 2% reporting 26-50%, 1.3% reporting 51-75%, 0.7% reporting 76-90%, and 2.2% reporting 91-100%. Calculating total income from the reported annual incomes, 7.4% of the respondents reported making between $0 and $50,000, 10.6% reported making between $50,001 and $100,000, 23.3% reported making between $100,001 and $150,000, 25% reported making between $150,001 and $250,000, and 33.7% reported making more than $250,000.

Taking a look at Ohio Census data from 2012, the average age of a farm operator is 56.8, similar to our age of 63. In the state of Ohio principle farm operators are 86% men and 14% women, again similar to our 83% and 17%. Comparisons between our sample and farmers across the United States indicate our population was not substantively different in terms of age, 58.3 years old, or in gender of operator, 86% men and 14% women. Farms by economic class also do not vary greatly between the US, Ohio, and our sample. In the United States farms that make less that $50,000/year account for 75% of all farms, 72% of farms in Ohio, and 68% of farms in our sample. In the United States farms that make $50,000 – $250,000/year account for 13% of all farms, 17% of farms in Ohio, and 21.5% of farms in our sample. In the United States farms that make above $250,000/year account for 12% of all farms, 11% of farms in Ohio, and 10.5% of farms in our sample (United States Department of Agriculture 2013). These similarities suggest that the farmers in our sample appear demographically similar to farmers in the Unites States as a whole.

Farmer respondents were asked about their enrollment in conservation programs. All respondents were asked if they were currently enrolled in CRP; in total, 260 (30.3%) indicated that they were currently enrolled in CRP. From the 260 who reported current CRP enrollment, 95 (36.5%) described their CRP acres as ‘non-native grasses’, 99 (38%) as ‘native grasses’, 30 (11.5%) as ‘trees or woodland’, 3 (1%) as ‘wetlands’, and 33 (13%) as ‘other. Respondents were also asked about enrollment in other programs. Enrollment varied across programs, but 100 farmers (11.7% of the total respondents)

indicated they were currently enrolled in the Conservation Reserve Enhancement Program (CREP), 13 farmers (1.5%) in the Wetland Reserve Program (WRP), 70 farmers (8.2%) in the Environmental Quality Incentive Program (EQIP), 31 farmers (3.6%) in the Conservation Stewardship Program (CSP), and 31 farmers (3.6%) reported being enrolled in some other conservation program. In total, 352 (41%) of all farmers reported that they were enrolled in at least one conservation program.

A majority of farmers felt a high level of self-efficacy, with 533 (62%) responding that they disagreed or strongly disagreed with the notion that they had little to no ability to protect their farm profitability, 196 (23%) neither agreeing nor disagreeing, and the remaining 128 (15%) agreeing or strongly agreeing that they have very little ability to protect their profitability. When asked about risk tolerance the respondents were fairly evenly split-- 484 (56.5%) responded that they were either not at all willing or only slightly willing to take risks, while 373 (43.5%) responded that they were either moderately or greatly willing to take risks.

The subjective norm toward enrollment in the conservation reserve program varied among the respondents with 244 (28.5%) responding negatively, or strongly disagreeing or disagreeing that the norm is enrolling in the CRP, 344 (40%) had a neutral response, and 269 (31.5%) agreeing or strongly agreeing that enrollment is the norm. Trust in state or federal agency had a similar range, with 201 (23.5%) responding negatively, 284 (33.1%) responding neutrally, and 387 (43.4%) responding positively toward the Ohio

Division of Wildlife and the U.S. Fish and Wildlife Service. The majority of our farmers had a positive attitude toward conservation with 39 (5%) responding negatively towards conservation, 58 (7%) responding neutrally, and 760 (88%) responding slightly positively to extremely positively (table 2)

Farmer perceptions varied greatly among our sample. In terms of farmer perceived environmental health benefits, 476 (55.5%) believed that improved environmental health would be either unlikely or neither likely nor unlikely on their farms while 381 (44.5%) believed environmental health benefits were either likely or very likely. A majority, 671 (78%), of farmers believed that it was unlikely or neither likely nor unlikely that there would be financial benefit resulting from enrollment in the CRP, while 186 (22%) thought it would be likely.

Perceived costs also varied across our sample. Perceived environmental cost was low among our farmer respondents. A total of 649 (75.5%) farmers perceiving slight to no environmental cost, and 208 (24.5%) perceived moderate to great environmental cost associated with enrolling in the CRP. Perceived flexibility cost was more split among our farmers, with 515 (60%) perceiving slight to no flexibility cost and 342 (40%) perceiving moderate to great flexibility cost. Perceived uses cost was also low among our farmers with a majority, 697 (81.5%), perceiving slight to no uses cost, and 160 farmers (18.5%) perceiving either a moderate or great uses cost (Table 2).

Correlation Results

Bivariate correlations were calculated between all independent variables and likelihood to enroll in the CRP for both the Ohio-wide sample and each of the three geographic regions (table 4).

The 16 potential indicators varied considerably in correlational strength across regional samples (table 4). Efficacy was significantly related to our dichotomized dependent variable 'likelihood to enroll' in three of the four regions, however the two variables were not strongly correlated, $r(279) = -0.163$, $p < .005$. Risk tolerance was significantly correlated in two of the regions, however neither were strong correlations, $r(292) = 0.194$, $p < .005$. Social norm was significantly correlated in all four regions, with the strongest correlation in the southern sample, $r(292) = 0.263$, $p < .005$. Trust was also significantly correlated in all four regions, with the strongest correlation in the northern sample, $r(276) = 0.232$, $p < .005$. Attitude toward conservation was significantly correlated in all four regions, with the strongest correlation in the southern region, $r(292) = 0.250$, $p < .005$.

Perceived environmental health benefit was significantly correlated in all four regions, with the strongest correlation in the southern region, $r(292) = 0.424$, $p < .005$. Perceived financial benefit was significantly correlated in three of the regions, with the strongest correlation also to the southern region, $r(292) = 0.272$, $p < .005$. Perceived environmental cost was significantly correlated in three regions, with the strongest correlation in the

south, $r(292) = 0.203$, $p < .005$. Perceived flexibility cost was significantly correlated in all four regions, with the strongest correlation in the north, $r(276) = -.260$, $p < .005$. Perceived uses cost was significantly correlated in three regions, with the strongest correlation in the north, $r(276) = -.218$, $p < .005$. Perceived aesthetic cost was significantly correlated in three regions, however none of the correlations were strong $r(292) = -0.117$, $p < .05$. Acres owned was positively significantly correlated in three of the regions, but had weak correlations in all three $r(279) = 0.139$, $p < .005$. Gross farm sales failed to be significantly correlated in any of the counties. The highest correlation coefficient was reached in the central region, but was not significant, $r(279) = 0.113$, $p = .093$. Age was not significantly correlated in any of the regions, while education was significantly correlated in both the Ohio wide sample $r(857) = 0.113$, $p < .005$ and the north $r(276) = 0.157$, $p < .005$. Hunting was most highly correlated in the Ohio sample $r(827) = 0.120$, $p < .005$.

Logistic Regression Results

Binary logistic regressions were performed to assess the relationship between the predictor variables of interest and farmers' likelihood to enroll in the CRP. Data was checked to ensure that the assumptions of a binary logistic regression were met, including acceptable sample size for independent variables used and multicollinearity (Pallant 2010). Collinearity diagnostics were performed to ensure tolerance levels were acceptable and outliers were checked (Pallant 2010) (table 21). A three-set model was

used in the analysis for each of the regional samples and the Ohio-wide sample. The first model includes five demographic factors that are often noted as having an effect on intention to enroll in CRP. The second model includes only psychological factors that have previously been noted as having either a positive or negative effect on likelihood to enroll. The third model includes the statistically significant variables from the first two models to determine how the statistically significant factors from each interact. The Akaike Information Criterion (AICc), a measure of statistical model quality, was then calculated for each model to help determine the 'goodness of fit' of each model.

All County Model

Model 1

The first model for the Ohio regional area (n=857) was statistically significant (Chi-square = 47.31, df=5, $p<.001$). The model explained only 6%-8.7% of the variance (Cox & Snell R^2, Nagelkerke R^2) in the likelihood to enroll in the CRP. The model correctly classified 71.9% of the cases (96.7% of unlikely and 9.3% of likely cases), only .3% more correctly identified cases than the baseline model (71.6%). The calculated AICc value for the model was 872.73 (table 5). Three of the five variables were statistically significant, and one additional variable was moderately significant ($p<.07$). The four variables include education, gross farm sales, hunter identification, and total acres owned (table 5). The strongest predictor of likelihood to enroll in the CRP is total acres owned, with an odds ratio of 2.52. This indicates that for each unit increase in total acres owned

respondents were two and a half times more likely to enroll in the CRP. Each of the significant predictors was positively related to likelihood to enroll.

Model 2

The second model for the Ohio regional area (n=857) was statistically significant (Chi-square = 278.93, df=11, p<.001). The model explained 27.8%-40.2% of the variance (Cox & Snell R^2, Nagelkerke R^2) in the likelihood to enroll in the CRP. The model correctly classified 80.6% of the cases (91.5% of unlikely and 51.9% of likely cases), 8% more correctly identified cases than the baseline model (72.6%). The calculated AICc value for the model was 752.25, indicating it is a stronger model than 1 (table 6). Six of the eleven variables were statistically significant. The six variables include risk tolerance, social norms, attitude toward conservation, perceived environmental health benefit, perceived financial benefit, and perceived flexibility cost (table 6). The strongest predictor of likelihood to enroll in the CRP was perceived environmental health benefit, with an odds ratio of 3.474. The second strongest predictor was social norms.

Model 3

The final model for the Ohio regional area (n=857) was statistically significant (Chi-square = 265.36, df=10, p<.001). The model explained 29.4%-42.3% of the variance (Cox & Snell R^2, Nagelkerke R^2) in the likelihood to enroll in the CRP. The model correctly classified 81.3% of the cases (92.3% of unlikely and 53.7% of likely cases), 9.7% more correctly identified cases than the baseline model (71.6%). The calculated

AICc value for the model was 664.89, indicating it is a stronger model than both models 1 and 2 (table 7). Eight of the ten variables were statistically significant. The eight variables include education, hunter identification, total aces owned, social norms, attitude toward conservation, perceived environmental health benefit, perceived financial benefit, and perceived flexibility cost (table 7). The strongest predictor of likelihood to enroll in the CRP was perceived environmental health benefit, with an odds ratio of 3.3. The second strongest predictor was hunter identification, with an odds ratio of 2.4. All significant factors except perceived flexibility cost are positive indicators of likelihood to enroll.

Southern Region

Model 1

The first model for the Southern region (n=294) was statistically significant (Chi-square = 24.66, df=5, p<.001). The model explained only 8.9%-12.4% of the variance (Cox & Snell R^2, Nagelkerke R^2) in the likelihood to enroll in the CRP. The model correctly classified 69.2% of the cases (92.6% of unlikely and 21.8% of likely cases), only 2.3% more correctly identified cases than the baseline model (66.9%). The calculated AICc value for the model was 321.51 (table 8). Three of the five variables were statistically significant. The three variables include gross farm sales, hunter identification, and total acres owned (table 8). The strongest predictor of likelihood to enroll in the CRP was total acres owned, with an odds ratio of 4.6. This indicates that for each unit increase in total

acres owned respondents were four and a half times more likely to be willing to enroll in the CRP. Two of the significant predictors were positively related to likelihood to enroll, with gross farm sales adversely affecting likelihood to enroll.

Model 2

The second model for the Southern region (n=294) was statistically significant (Chi-square = 119.07, df=11, p<.001). The model explained 33.3%-46.9% of the variance (Cox & Snell R^2, Nagelkerke R^2) in the likelihood to enroll in the CRP. The model correctly classified 81.3% of the cases (92.1% of unlikely and 57.1% of likely cases), 12.4% more correctly identified cases than the baseline model (69%). The calculated AICc value for the model was 269.84, indicating it is a stronger model than 1 (table 9). Four of the eleven variables were statistically significant, and one additional variable was moderately significant (p<.07). The five variables include risk tolerance, social norms, attitude toward conservation, perceived environmental health benefit, and perceived financial benefit (table 9). The strongest predictor of likelihood to enroll in the CRP was perceived environmental health benefit, with an odds ratio of 3.56. The second strongest predictor was perceived financial benefit.

Model 3

The final model for the Southern region (n=294) was statistically significant (Chi-square = 111.90, df=8, p<.001). The model explained 34.7%-48.2% of the variance (Cox & Snell R^2, Nagelkerke R^2) in the likelihood to enroll in the CRP. The model correctly

classified 79.1% of the cases (90.3% of unlikely and 56.3% of likely cases), 12.2% more correctly identified cases than the baseline model (66.9%). The calculated AICc value for the model was 240.61, indicating it is a stronger model than both models 1 and 2 (table 10). Four of the eight variables were statistically significant. The four variables include hunter identification, social norms, perceived environmental health benefit, and perceived financial benefit (table 10). The strongest predictor of likelihood to enroll in the CRP was perceived environmental health benefit, with an odds ratio of 3.66. The second strongest predictor was hunter identification, with an odds ratio of 3.02. All significant factors were positive indicators of likelihood to enroll.

Northern Region

Model 1

The first model for the Northern region (n=278) was statistically significant (Chi-square = 12.47, df=5, p=.029). The model explained only 5%-7.4% of the variance (Cox & Snell R^2, Nagelkerke R^2) in the likelihood to enroll in the CRP. The model correctly classified 74% of the cases (98% of unlikely and 6.3% of likely cases), exactly the same number of correctly identified cases as the baseline model (74%). The calculated AICc value for the model was 277.36 (table 11). One of the five variables was statistically significant (table 11). Education was the only significant predictor of likelihood to enroll in the CRP, with an odds ratio of 1.31. This indicates that for each unit increase in education level respondents were 1.3 times more likely to be willing to enroll in the CRP.

Model 2

The second model for the Northern region (n=278) was statistically significant (Chi-square = 102.2, df=11, p<.001). The model explained 30.8%-45.6% of the variance (Cox & Snell R^2, Nagelkerke R^2) in the likelihood to enroll in the CRP. The model correctly classified 82.4% of the cases (91.4% of unlikely and 55.1% of likely cases), 7.2% more correctly identified cases than the baseline model (75.2%). The calculated AICc value for the model was 234.54, indicating it is a stronger model than 1 (table 12). Two of the eleven variables were statistically significant, and one additional variable was moderately significant (p<.07). The three variables include perceived environmental health benefit, risk tolerance, and perceived flexibility cost (table 12). The strongest predictor of likelihood to enroll in the CRP was perceived environmental health benefit, with an odds ratio of 4.03. The second strongest predictor was perceived flexibility cost.

Model 3

The final model for the Northern region (n=278) was statistically significant (Chi-square = 90.02, df=4, p<.001). The model explained 27.7%-41% of the variance (Cox & Snell R^2, Nagelkerke R^2) in the likelihood to enroll in the CRP. The model correctly classified 82.7% of the cases (92.3% of unlikely and 53.6% of likely cases), 7.5% more correctly identified cases than the baseline model (75.2%). The calculated AICc value for the model was 231.75, indicating it is a stronger model than both models 1 and 2 (table 13). Two of the four variables were statistically significant. The two variables perceived

environmental health benefit and perceived flexibility cost (table 13). The strongest predictor of likelihood to enroll in the CRP was perceived environmental health benefit, with an odds ratio of 4.65, followed by perceived flexibility cost, with an odds ratio of 0.39.

Central Region

Model 1

The first model for the Central region (n=281) was statistically significant (Chi-square = 15.32, df=5, p=.009). The model explained only 5.9%-8.7% of the variance (Cox & Snell R^2, Nagelkerke R^2) in the likelihood to enroll in the CRP. The model correctly classified 73.4% of the cases (97.9% of unlikely and 3.1% of likely cases), less than the baseline model (74.2%). The calculated AICc value for the model was 284.71 (table 14). Two of the five variables were statistically significant, and one additional variable was moderately significant (p<.07). The three variables education, hunter identification, and total acres owned (table 14). The strongest predictor of likelihood to enroll in the CRP was total acres owned, with an odds ratio of 2.2. This indicates that for each unit increase in total acres owned respondents were over two times more likely to be likely to enroll in the CRP. All three were positive predictors of likelihood to enroll.

Model 2

The second model for the Central region (n=281) was statistically significant (Chi-square = 77.67, df=11, p<.001). The model explained 24.2%-35.3% of the variance (Cox & Snell R^2, Nagelkerke R^2) in the likelihood to enroll in the CRP. The model correctly classified 79.7% of the cases (91.3% of unlikely and 47.3% of likely cases), 6% more correctly identified cases than the baseline model (73.7%). The calculated AICc value for the model was 271.5, indicating it is a stronger model than model 1 (table 15). One of the eleven variables was statistically significant, and two additional variables were moderately significant (p<.07). The three variables include social norms, attitude toward conservation, and perceived environmental health benefit (table 15). The strongest predictor of likelihood to enroll in the CRP was perceived environmental health benefit, with an odds ratio of 3.96.

Model 3

The final model for the Central region (n=281) was statistically significant (Chi-square = 77.76, df=6, p<.001). The model explained 24.2%-35.4% of the variance (Cox & Snell R^2, Nagelkerke R^2) in the likelihood to enroll in the CRP. The model correctly classified 80.4% of the cases (92.2% of unlikely and 47.3% of likely cases), 6.8% more correctly identified cases than the baseline model (73.6%). The calculated AICc value for the model was 260.05, indicating it is a stronger model than both models 1 and 2 (table 16). Three of the six variables were statistically significant. The six variables include hunter identification, social norms, and perceived environmental health benefit (table 16). The

strongest predictor of likelihood to enroll in the CRP was perceived environmental health benefit, with an odds ratio of 4.24. The second strongest predictor was hunter identification, with an odds ratio of 2.05. All significant factors were positive indicators of likelihood to enroll.

Chapter 4: Discussion

Discussion

This study aimed to provide insight into the most important factors that influence farmer willingness to enroll in the CRP, a federal land conservation program. The focus on Ohio, and specifically three regions in Ohio, helped to provide insight on a unique scale with a population of potential high future conservation importance. Dividing the larger Ohio sample into the three, smaller geographic regions demonstrated that regional differences might affect the factors that influence farmers' willingness to enroll in the Conservation Reserve Program. These differences could include average farm size, income, level of education achieved, or other cultural differences in the regions throughout Ohio.

A number of factors that were hypothesized to be important were not highly correlated with willingness to enroll in CRP in this study. Previous CRP research suggests that both high gross farm sales (income) and high total acres owned should be important factors positively influencing likelihood to enroll (C. Ervin and Ervin 1982; Mclean-meyinsse, Hui, and Joseph 1994; Buttel et al. 1981; Miranowski 1982). Income specifically is often cited as a highly significant determining factor (Cooper and Osborn 1998; Konyar and

Osborn 1990; Lambert, Sullivan, and Claassen 2007). Interestingly, in the third model (the best fit model in all cases) gross farm sales was not a significant factor contributing to likelihood to enroll in CRP in any of the regions examined. Additionally, in the analysis that included only demographic factors gross farm sales was only correlated ($p<.05$) in a single region (Southern). Farm size (i.e., acres owned) was only significantly related with likelihood to enroll in one of the four regions in the third models, but was a strong factor in the first model that included only demographics. In three of the four areas farm size was highly significant, and in one county had a log odds of 4.5, meaning that one single unit increase in acres owned increased the likelihood of an individual to enroll in the CRP four and a half times. However, when added to the psychological variables the effect and significance of total acres owned greatly decreased. This is interesting to note because in many previous studies demographic factors and psychological variables have been studied separately (Konyar and Osborn 1990; Shoemaker 1989), whereas here the data demonstrates that the presence of perceived environmental health benefit and perceived financial benefit greatly reduce the relative impact acres owned has on predicting likelihood to enroll.

Risk tolerance and self-efficacy are also often studied as factors that may influence conservation practices and enrolling in the CRP (Hallahan, Faff, and McKenzie 2004). Both factors have previously been demonstrated to have an effect on enrollment behaviors and enrollment decision-making. Specifically, it has been shown that the higher the risk tolerance and self-efficacy the less likely an individual is to enroll in the

CRP (Roy 2009; Greiner, Patterson, and Miller 2009). However, in our study neither risk tolerance nor self-efficacy has any significant effect in the final models. This may be attributable to differences in the populations studied.

The four final regional bivariate logistic regression models demonstrate a number of interesting findings. First, the models vary in the strength of each factor's influence on willingness to enroll and the significance of each factor. Second, the three regional models also vary considerably from the Ohio-wide model, indicating that scale and geographic differences may be important moderators, and suggesting a 'one-size-fits-all' approach to communicating with landowners could provide less than optimal results when attempting to encourage enrollment. Across models one and two for each of the geographic regions, gross farm sales was only significant in the South, education was only significant in the North, and being a hunter was significant in only the South and Central regions. Similarly, total acres owned was significant in the South and Central regions, but in the South it increased the likelihood by almost double what it was in the Central region. Risk tolerance, social norms, and perceived financial benefit were only significantly related to likelihood to enroll in the South. Perceived environmental health benefit was the only factor that was significant in all regions, with the effect size (one unit increase in PEHB results in being 4 times more likely to enroll) being similar in all three. In the final model for all regions, PEHB was significant in all four, PFC was significant in three, and being a hunter was also significant in three.

In the Ohio-wide model social norms, attitude toward conservation, perceived environmental health benefits, perceived financial benefit, and perceived flexibility cost were all significantly correlated with likelihood to enroll in the CRP. This is consistent with previous farmer CRP willingness research (Force and Neison 1989; Lubell 2004; Fielding et al. 2008). In addition, level of education, identification as a hunter, and acres owned are also statistically significant. It is interesting to note that in this model perceived environmental health benefit had the strongest effect on willingness, followed by hunter identification, acres owned, social norms, perceived financial benefit, perceived flexibility cost (negative effect), attitude toward conservation, and education level respectively. Previous studies have emphasized social norms, attitude, and income, as important determining factors of CRP enrollment, whereas the most impactful factor in this model overall is a perceived benefit. Nowak (1987) argued that before adopting a new innovation, farmers must first believe that an environmental problem exists and then believe that the innovation can effectively address the problem. In this study, perceived environmental health benefit has the strongest effect in all models and regions on likelihood to enroll in the CRP, which lends support to Nowak's second postulate. If a respondent believes that the CRP can effectively increase environmental health they are much more likely to enroll.

Perceived aesthetic cost, perceived environmental cost, perceived uses cost, and trust in federal and state agency were not statistically significant in any of the models. In previous literature (Rasamoelina, Johnson, and Hull 2010), trust in the managing agency

has been found to be a significant factor, especially when related to measuring costs and benefits or determining management decisions, however in our data it is shown to be non-significant (Kollmuss and Agyeman 2002).

In all four models, perceived environmental health benefit is significant and has the highest association with willingness to enroll, with an odds ratio ranging from 3.31-4.65. This means that, depending on the geographic region, a one unit increase in perceived environmental health benefit results in an individual being almost three and a half to four and a half times more likely to enroll in the CRP. Interestingly, it demonstrates that farmers' perceptions of environmental health benefits can most effectively increase their willingness to enroll in the CRP. From a policy perspective this is significant and lends practical information for how to approach a farmer to most effectively encourage them to enroll. Our data demonstrates that instead of income, which is often found to be one of the most important factors (Konyar and Osborn 1990), increased perceived environmental benefit may be more central to increasing farmers overall willingness to enroll. Increasing communication about the environmental benefits, and making that information more salient while also emphasizing any flexibility that the program offers would be an effective approach.

The Northern regional model performed the best, correctly predicting 82.7% of the cases. Aside from perceived environmental health benefit, which was the most influential factor, perceived flexibility cost was also statistically significant. This is interesting to note

because the best-fit model found only costs and benefits to be statistically significantly related to likelihood of enrollment.

Given the results of our data, scale may be an important consideration for future research and to inform policy decisions and approach strategy to farmers for the CRP. The substantive differences between how the four models performed points to some county or regional level differences in the factors that influence farmers' likelihood to enroll in CRP. Most prior studies examining CRP enrollment were conducted at a statewide level. Our results suggest that looking only statewide may result in certain important factors being either overlooked or over emphasized. Perhaps there are county-level factors or cultural factors that are influencing how important these variables are. For example, some Ohio counties have high Amish populations that may or may not find CRP more useful. Hunting communities may also have an impact. Counties with a high percentage of hunters, or where hunting is common may have a higher enrollment. There are also varying average farm sizes across counties in Ohio, which may be affecting that county's likelihood of enrollment. Without further study at this scale, there may be a link missing in predicted CRP willingness to enroll theory. There are a number of differences between the counties and regions, some of which were discussed in the methods chapter above that informed how the counties were originally selected to maximize variation on 6 specific factors. Additionally, the two counties combined for the southern region have a lower per capita income than either the Northern or Central regions (Southern: $18,000; Northern: $19,000; Central: $21,000). They also have a much higher percentage of

residents under the poverty line, with 10%, while both the Northern and Central regions average to only approximately 6% (United States Department of Agriculture 2007), which may be influencing why perceived financial benefit is emphasized in this county.

Conclusion and Implications for Management

Our research suggests that future studies on CRP enrollment behaviors and enrollment willingness may benefit from looking on a smaller geographic scale. Focusing on counties or communities may result in more specific and pared down significant factors. The scaled approach could also lead to more targeted and effective approaches to encourage enrollment in landowners. The variance in our models and factors demonstrate scales' effect, importance, and informative power.

There are a number of important results presented here from a management and policy perspective. First, perceived environmental health benefit was by far the most important explanatory factor. Therefore, this may be an important factor to focus on and emphasize when discussing potential enrollment with farmers. The costs and benefits as a whole explained a fair amount of the variance in our models, and there is support in this study that the costs and benefits could potentially be more explanatory than previously emphasized factors. For example, contrary to expectation and previous research, farmer income and farm acres owned were not very explanatory for predicting likelihood to enroll in our sample of Ohio farmers.

In order to more effectively communicate with Ohio farmers and encourage their enrollment there are a number of strategies that this research suggests could be employed. The significant variation throughout the regional models suggests that slightly different strategies should be utilized based on the region being targeted. In the Northern region for example, emphasizing environmental health benefit and addressing flexibility concerns would be the most effective approach to encouraging enrollment. In contrast, a communication method in the Southern region would be most effective if information about both the environmental health benefits and financial benefits were included along with addressing flexibility concerns. In addition, having an understanding of the demographics of the region being communicated with can be useful (Mclean-meyinsse, Hui and Joseph 1994). For example, identifying as a hunter was significant in three of the four final models, indicating that emphasizing the benefits to wildlife and hunting may be beneficial in regions where hunting is pervasive.

With the decline in early successional habitat and grassland habitats throughout the United States, it is important to better understand how to most effectively approach farmers and landowners about enrolling their land into conservation programs. This study suggests that addressing concerns about the potential cost (or negative effects) of enrollment, while emphasizing the environmental and financial benefits of the program could result in higher willingness to enroll. Moving away from focusing on income and parcel size might improve the response from farmers in their willingness to enroll in the

Conservation Reserve Program. It may also be important to look at specific county differences when approaching farmers in that county. Particular County or regional characteristics and scale may play a larger role than previously though. From a general perspective, our models suggest that the most effective way to increase likelihood to enroll is to increase the perception of environmental health benefits resulting from enrollment, reduce the perception that enrollment limits farmers' crop and land flexibility, and promote enrollment as a common farmer norm.

Table 1. County Descriptive Statistics

	Total Farms	Average farm size (acres)	County acres farmed	County in forest cover	Farmland in CRP	Population
Clinton	799	273	83%	10%	1%	49,543
Fairfield	1112	160	55%	22%	3%	122,759
Fulton	763	241	71%	9%	2%	42,400
Licking	1427	158	51%	24%	0.40%	158,500
Ross	1009	222	50%	50%	11%	73,345
Williams	1116	190	78%	13%	7%	37,800

Table 2. Summary of farmer responses

	Negatively	Neutrally	Positively
Social norm	28.5%	40%	31.5%
Trust	23.5%	33%	33.5%
Attitude toward conservation	4.5%	6.5%	89%
Self-efficacy	62%	23%	15%
Risk Tolerance	56.5%	--	43.5%

Note: Total farmer respondents=857

Table 3. Descriptive statistics for variables of interest

	Scale	Mean	Median	Std. Dev	Skewness	Kurtosis
Efficacy	0-4	1.51	1.67	0.73	0.21	-0.04
Risk tolerance	0-3	1.35	1.33	0.69	-0.14	-0.48
Social norms	0-4	2.07	2.00	0.75	-0.25	0.76
Trust	0-4	2.23	2.00	0.92	-0.27	0.07
Attitude toward conservation	0-6	4.82	5.00	1.10	-0.94	0.54
PEHB	0-4	2.34	2.00	0.81	0.22	0.64
PFB	0-4	2.04	2.00	0.04	0.16	2.90
PEC	0-3	1.00	1.00	0.87	0.76	-0.22
PFC	0-3	1.32	1.00	0.96	0.17	-1.08
PUC	0-3	0.76	0.67	0.85	1.06	0.19
PAC	0-4	2.11	2.00	0.65	0.50	2.07
Age	0-100	62.60	62.00	0.45	-0.30	-0.31
Education	0-6	3.69	3.00	1.60	0.03	-1.13
Hunter	0-1	0.60	1.00	0.49	-0.41	-1.85
Acres owned	1-3.4	1.98	1.97	0.50	0.39	-0.28
Gross farm sales	0-5	1.35	1.38	1.50	1.18	0.24

Notes: Valid N = 857

Table 4. Bivariate Correlation of variables of interest with dependent variable 'Likelihood to Enroll in the Conservation Reserve Program' by region

	Ohio	**Southern**	**Northern**	**Central**
Valid N	857	294	278	281
Efficacy	-.109**	-.105*	-.064	-.163**
Risk tolerance	.120**	.194**	.107	.092
Social norms	.218**	.263**	.197**	.183**
Trust	.189**	.207**	.232**	.119*
Attitude toward conservation	.213**	.250**	.229**	.149**
PEHB	.404**	.424**	.405**	.420**
PFB	.189**	.272**	.238**	.037
PEC	-.159**	-.203**	-.182**	-.146*
PFC	-.203**	-.200**	-.260**	-.153**
PUC	-.135**	-.153**	-.218**	-.061
PAC	-.106**	-.117*	-.114*	-.071
Acres owned	.112**	.117*	.100	.139**
Age	-.038	-.074	-.002	-.041
Education	.113**	.067	.157**	.104
Hunter	.120**	.143*	.115	.077
Gross farm sales	.025	.025	.008	.087

Notes: Pearson correlation coefficients; **Correlation is significant at the .005 level (two-tailed); *Significant at the .05 level (two-tailed), unmarked if not significant

Table 5. Ohio-wide Model 1 with demographic information

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Age	-.006	.007	.657	1	.418	.994	.981	1.008
Education	.160	.052	9.360	1	.002	1.174	1.059	1.300
Gross farm sales	-.138	.072	3.706	1	.054	.871	.757	1.003
Hunter	.659	.173	14.564	1	.000	1.932	1.378	2.710
Acres owned	.924	.214	18.601	1	.000	2.520	1.656	3.836
Constant	-3.139	.588	28.540	1	.000	.043		

Table 6. Ohio-wide Model 2 with psychological variables

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Efficacy	-.027	.128	.044	1	.834	.973	.757	1.252
Risk tolerance	.431	.144	8.939	1	.003	1.538	1.160	2.040
Social norms	.478	.134	12.688	1	.000	1.613	1.240	2.097
Trust in agency	.160	.124	1.652	1	.199	1.173	.920	1.497
Attitude toward conservation	.325	.109	8.979	1	.003	1.384	1.119	1.712
PEHB	1.245	.130	91.944	1	.000	3.474	2.693	4.481
PAC	-.119	.163	.536	1	.464	.888	.646	1.221
PFB	.450	.195	5.320	1	.021	1.568	1.070	2.299
PEC	-.257	.145	3.134	1	.077	.773	.581	1.028
PFC	-.285	.133	4.599	1	.032	.752	.580	.976
PUC	-.062	.141	.193	1	.660	.940	.713	1.239
Constant	-7.829	.987	62.939	1	.000	.000		

Note: PEHB (perceived environmental health benefit); PAC (perceived aesthetic cost); PFB (perceived financial benefit); PEC (perceived environmental cost); PFC (perceived flexibility cost); PUC (perceived uses cost).

Table 7. Ohio-wide Model 3 with significant variables

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Risk tolerance	.265	.155	2.902	1	.088	1.303	.961	1.767
Social norms	.593	.140	17.966	1	.000	1.810	1.376	2.381
Attitude toward conservation	.317	.113	7.795	1	.005	1.373	1.099	1.714
PEHB	1.196	.140	72.759	1	.000	3.307	2.512	4.353
PFB	.480	.186	6.666	1	.010	1.616	1.123	2.327
PFC	-.483	.122	15.764	1	.000	.617	.486	.783
Education	.150	.063	5.590	1	.018	1.162	1.026	1.315
Gross farm sales	-.100	.085	1.388	1	.239	.905	.766	1.069
Hunter	.876	.207	17.883	1	.000	2.400	1.600	3.602
Acres owned	.682	.241	8.020	1	.005	1.978	1.234	3.172
Constant	-9.887	.984	101.040	1	.000	.000		

Table 8. Southern region Model 1 with demographic information

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Age	-.016	.013	1.626	1	.202	.984	.959	1.009
Education	.050	.088	.332	1	.564	1.052	.886	1.249
Gross farm sales	-.282	.133	4.482	1	.034	.754	.581	.979
Hunter	.756	.300	6.348	1	.012	2.129	1.183	3.831
Acres owned	1.520	.397	14.671	1	.000	4.574	2.101	9.959
Constant	-3.008	1.021	8.674	1	.003	.049		

Table 9. Southern regional Model 2 with psychological variables

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Efficacy	.070	.232	.090	1	.764	1.072	.680	1.690
Risk tolerance	.543	.267	4.156	1	.041	1.722	1.021	2.903
Social norms	.610	.247	6.108	1	.013	1.840	1.134	2.984
Trust in agency	.188	.209	.805	1	.370	1.207	.800	1.819
Attitude toward conservation	.339	.186	3.321	1	.068	1.404	.975	2.022
PEHB	1.269	.226	31.613	1	.000	3.559	2.286	5.539
PAC	.088	.348	.064	1	.800	1.092	.552	2.160
PFB	.975	.402	5.881	1	.015	2.651	1.206	5.831
PEC	-.439	.262	2.808	1	.094	.644	.385	1.077
PFC	-.110	.230	.228	1	.633	.896	.570	1.407
PUC	-.069	.245	.079	1	.779	.934	.578	1.509
Constant	-9.896	1.942	25.972	1	.000	.000		

Note: PEHB (perceived environmental health benefit); PAC (perceived aesthetic cost); PFB (perceived financial benefit); PEC (perceived environmental cost); PFC (perceived flexibility cost); PUC (perceived uses cost).

Table 10. Southern regional Model 3 with significant variables

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Risk tolerance	.532	.272	3.817	1	.051	1.703	.998	2.904
Social norms	.609	.249	5.966	1	.015	1.838	1.128	2.995
PEHB	1.297	.246	27.683	1	.000	3.657	2.256	5.927
Attitude toward conservation	.363	.192	3.586	1	.058	1.438	.987	2.095
PFB	1.092	.362	9.098	1	.003	2.979	1.466	6.056
Gross farm sales	-.133	.174	.591	1	.442	.875	.623	1.230
Hunter	1.107	.367	9.092	1	.003	3.026	1.473	6.215
Acres owned	.762	.454	2.812	1	.094	2.143	.879	5.222
Constant	-12.063	1.719	49.249	1	.000	.000		

Table 11. Northern region Model 1 with demographic information

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Age	.007	.012	.361	1	.548	1.008	.983	1.032
Education	.271	.100	7.413	1	.006	1.312	1.079	1.594
Gross farm sales	-.036	.127	.082	1	.775	.964	.753	1.236
Hunter	.523	.311	2.838	1	.092	1.688	.918	3.102
Acres owned	.479	.365	1.722	1	.189	1.615	.789	3.304
Constant	-3.572	1.060	11.359	1	.001	.028		

Table 12. Northern regional Model 2 with psychological variables

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Efficacy	.113	.229	.243	1	.622	1.120	.714	1.755
Risk tolerance	.507	.275	3.403	1	.065	1.661	.969	2.847
Social norms	.371	.244	2.313	1	.128	1.449	.899	2.336
Trust in agency	.305	.253	1.451	1	.228	1.356	.826	2.227
Attitude toward conservation	.250	.206	1.478	1	.224	1.284	.858	1.921
PEHB	1.394	.257	29.431	1	.000	4.031	2.436	6.670
PAC	-.047	.292	.026	1	.871	.954	.538	1.691
PFB	.470	.343	1.873	1	.171	1.600	.816	3.137
PEC	.020	.291	.005	1	.945	1.020	.577	1.805
PFC	-.602	.274	4.827	1	.028	.548	.320	.937
PUC	-.342	.306	1.253	1	.263	.710	.390	1.293
Constant	-8.562	1.875	20.853	1	.000	.000		

Note: PEHB (perceived environmental health benefit); PAC (perceived aesthetic cost); PFB (perceived financial benefit); PEC (perceived environmental cost); PFC (perceived flexibility cost); PUC (perceived uses cost).

Table 13. Northern regional Model 3 with significant variables

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
PEHB	1.537	.242	40.305	1	.000	4.649	2.893	7.471
PFC	-.932	.216	18.569	1	.000	.394	.258	.602
Education	0.141	0.109	1.651	1	0.199	1.151	.929	1.427
Risk tolerance	.461	.266	3.017	1	.082	1.586	.943	2.669
Constant	-5.500	.902	37.210	1	.000	.004		

Table 14. Central region Model 1 with demographic information

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Age	-.012	.012	.978	1	.323	.988	.964	1.012
Education	0.178	.094	3.616	1	.057	1.195	.995	1.437
Gross farm sales	-.026	0.125	.044	1	.834	.974	.763	1.244
Hunter	.652	.305	4.568	1	.033	1.919	1.056	3.487
Acres owned	.786	.375	4.399	1	.036	2.195	1.053	4.576
Constant	-2.863	1.030	7.730	1	.005	.057		

Table 15. Central regional Model 2 with psychological variables

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Efficacy	-0.187	.245	.579	1	.447	.830	.513	1.342
Risk tolerance	.217	.239	.827	1	.363	1.243	.778	1.984
Social norms	.443	.237	3.495	1	.062	1.557	.979	2.477
Trust in agency	-.068	.206	0.109	1	.741	.934	.623	1.400
Attitude toward conservation	.372	0.195	3.648	1	.056	1.450	.990	2.123
PEHB	1.376	.240	32.775	1	.000	3.958	2.471	6.340
PAC	-.227	.264	.736	1	.391	.797	.475	1.338
PFB	-.027	.325	.007	1	.934	.973	.515	1.840
PEC	-.284	.244	1.358	1	.244	.753	.467	1.214
PFC	-.265	.225	1.386	1	.239	.767	.493	1.193
PUC	.084	.231	0.133	1	.715	1.088	.692	1.711
Constant	-6.260	1.662	14.187	1	.000	.002		

Note: PEHB (perceived environmental health benefit); PAC (perceived aesthetic cost); PFB (perceived financial benefit); PEC (perceived environmental cost); PFC (perceived flexibility cost); PUC (perceived uses cost).

Table 16. Central regional Model 3 with significant variables

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
PEHB	1.444	.237	36.963	1	.000	4.237	2.660	6.749
Hunter	.718	.333	4.633	1	.031	2.049	1.066	3.939
Social norms	.535	.237	5.111	1	.024	1.708	1.074	2.717
Attitude toward conservation	.367	.191	3.676	1	.055	1.443	.992	2.099
Education	.182	.108	2.842	1	.092	1.199	.971	1.481
Acres owned	.470	.303	2.401	1	.121	1.600	.883	2.901
Constant	-9.734	1.530	40.458	1	.000	.000		

Table 17. Model 1 and 2 significant factors in predicted likelihood to enroll in the CRP for each of the regional areas

	Ohio	Northern	Southern	Central
Age				
Education	1.174**	1.312*		
Gross farm sales			0.754*	
Hunter	1.932**		2.129*	1.919*
Acres owned	2.52**		4.574**	2.195*
Efficacy				
Risk tolerance	1.538**		1.722*	
Social norms	1.613**		1.84*	
Trust in agency				
Attitude toward conservation	1.384**			
PEHB	3.474**	4.031**	3.559**	3.958**
PAC				
PFB	1.568*		2.651*	
PEC				
PFC	0.752*	0.548*		
PUC				

Note: PEHB (perceived environmental health benefit); PAC (perceived aesthetic cost); PFB (perceived financial benefit); PEC (perceived environmental cost); PFC (perceived flexibility cost); PUC (perceived uses cost). ** Significant at the 0.01 level, *Significant at the 0.05 level.

Table 18. Model 3 of predicted likelihood to enroll in the CRP

	Ohio	Northern	Southern	Central
Efficacy				
Risk tolerance	1.303	1.586	1.703	
Social norms	1.810**		1.838*	1.708*
Trust in agency				
Attitude toward conservation	1.373**		1.438	1.443
PEHB	3.307**	4.649**	3.657**	4.237**
PAC				
PFB	1.616*		2.979**	
PEC				
PFC	.617**	.394**	0.548*	
PUC				
Age				
Education	1.162*	1.151	1.312*	1.199
Gross farm sales	0.905		0.875	
Hunter	2.400**		3.026**	2.049*
Acres owned	1.978**		2.143	1.6

Note: PEHB (perceived environmental health benefit); PAC (perceived aesthetic cost); PFB (perceived financial benefit); PEC (perceived environmental cost); PFC (perceived flexibility cost); PUC (perceived uses cost). ** Significant at the 0.01 level, *Significant at the 0.05 level.

Table 19. AICc Model ratings for each region

	Ohio	Northern	Southern	Central
Model 1	872.73	277.36	321.51	284.71
Model 2	752.25	234.54	269.84	271.5
Model 3	664.89	231.75	240.61	260.05

Table 20. Latent variable measurement

	Factor Loading
Perceived Uses Cost (Cronbach's A = 0.638)	
To what degree does the following limit your participation in CRP…	
Fear of losing or upsetting farm operator/renter	0.801
Limits ability to cash rent land	0.812
Other recreational uses for my land	0.68
Perceived flexibility cost (Cronbach's A= 0.738)	
To what degree does the following limit your participation in CRP…	
Length of enrollment	0.828
Reduces my flexibility to manage my lands	0.873
Limits ability to take advantage of rising crop prices	0.730
Perceived environmental cost (Cronbach's A= 0.712)	
To what degree does the following limit your participation in CRP…	
Concerns about invasion of unwanted trees or weeds	0.814
Not satisfied with cover quality	0.786
Unwanted wildlife	0.794
Perceived aesthetics cost (Cronbach's A = 0.621)	
How likely is…	
Increased weeds on your farm due to your enrollment in CRP	0.784
Making your farm appear unkempt or poorly managed due to your enrollment in CRP	0.848
Changes in scenic quality of landscape on your farm due to your enrollment in CRP	0.615
Perceived financial benefit (Cronbach's A= 0.603)	
How likely is seeing…	
Reverse code cropland out of production	0.735
Reverse code increased cost of land management	0.605
Not time consuming	0.802
Perceived environmental benefit (Cronbach's A= 0.859)	
How likely is seeing improved…	
Control of soil erosion on your farm due to your enrollment in CRP	0.887
Water quality on your farm due to your enrollment in CRP	0.881
Overall farm health on your farm due to your enrollment in CRP	0.885

Attitude toward conservation (Cronbach's A= 0.939)	
Wise…foolish, beneficial… harmful, valuable...worthless:	
Land conservation programs are	0.866
Land conservation programs are	0.875
Land conservation programs are	0.867
Wildlife conservation programs are	0.878
Wildlife conservation programs are	0.89
Wildlife conservation programs are	0.886
Trust in Federal and State Agencies (Cronbach's A= 0.957)	
I feel that ODW shares similar values as me	0.883
I feel that ODW shares similar opinions as me	0.906
I feel that ODW thinks in a similar way to me	0.895
I feel that US Fish and Wildlife shares similar values as me	0.916
I feel that US Fish and Wildlife shares similar opinions as me	0.925
I feel that US Fish and Wildlife thinks in a similar way as me	0.922
Social Norms (Cronbach's A= 0.821)	
Many farmers in my community are enrolled in CRP	0.841
Many farmers in my community think highly of programs like CRP	0.905
Most farmers whose opinion matters to me would enroll in conservation programs such as CRP	0.834
Risk Tolerance (Cronbach's A= 0.785)	
How willing are you to take risks	0.827
How willing are you to take risks with your investments	0.866
How willing are you to take risks in your occupation as a farmer	0.816
Personal Efficacy (Cronbach's A= 0.617)	
Long term management plans are unnecessary since chance determines my farm profitability	0.638
Whether or not I have yearly crop profitability is mostly a matter of luck	0.831
I have very little ability to protect my crop profitability	0.788

Table 21. Collinearity tests on variables

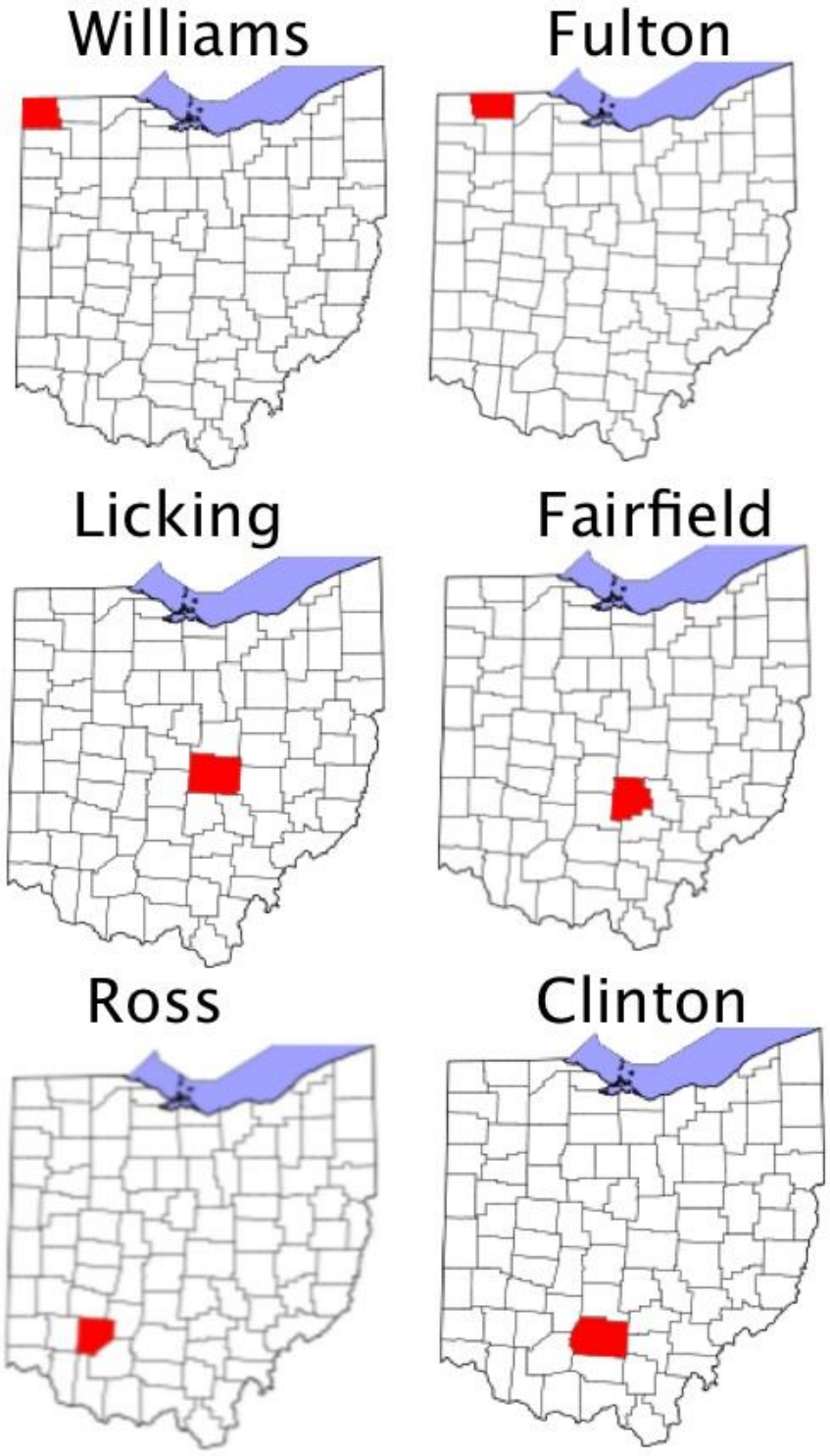
Variable	Collinearity Statistics	
	Tolerance	VIF
Age	.865	1.156
Gender	.844	1.185
Education	.820	1.220
Gross farm sales	.430	2.325
Hunter	.853	1.172
Acres owned	.426	2.347
Efficacy	.753	1.327
Risk tolerance	.882	1.133
Social norms	.845	1.183
Trust in agency	.701	1.427
Attitude toward conservation	.754	1.327
PEHB	.772	1.295
PAC	.744	1.345
PFB	.707	1.413
PEC	.728	1.374
PFC	.638	1.568
PUC	.680	1.471

Note: PEHB (perceived environmental health benefit); PAC (perceived aesthetic cost); PFB (perceived financial benefit); PEC (perceived environmental cost); PFC (perceived flexibility cost); PUC (perceived uses cost).

Table 22. Percentage likelihood of enrollment by region

	Yes %	No %	Valid n
All	27.4	72.6	857
North	24.8	75.2	278
Central	26.3	73.3	281
South	31	69	294

Figure 1. County locations



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Appendix A: Survey Instrument and corresponding cover letters

PRIVATE LANDS CONSERVATION IN OHIO

THE OHIO STATE UNIVERSITY

Study Overview: This study is being conducted by researchers at The Ohio State University in cooperation with the Ohio Division of Wildlife to better understand the actions Ohio landowners take to manage and conserve their lands.

A study conducted by The Ohio State University
College of Food, Agricultural & Environmental Sciences
School of Environment and Natural Resources
210 Kottman Hall, 2021 Coffey Rd
Columbus, OH 43119

Section A. Land Characteristics

1. Please select the option that best describes who the primary decision maker for your operation (land) is:

❑ Me alone or with my spouse ❑ My family and I ❑ Other (please specify) ________________
❑ The landowner ❑ The landowner and I ❑ The lessee

2. Do you use your land for recreational purposes? ❑ Yes ❑ No

a. If yes, check all that apply:

❑ Hunting ❑ Hiking ❑ Fishing ❑ Camping
❑ Off-roading ❑ Snowmobiling ❑ Education ❑ Photography
❑ Wildlife observations ❑ Shooting/firearm practice ❑ Other______________

3. Do you hunt? ❑ Yes ❑ No

a. If yes, what game do you pursue on your land? *(Check all that apply)*

❑ Deer ❑ Turkey ❑ Waterfowl ❑ Small game ❑ Trapping of furbearers ❑ Varmints ❑ Other

4. Have you previously, or are you currently, allowing others to use part of your land for hunting? ❑ Yes ❑ No

a. If yes, to whom?

❑ Anyone who asks ❑ Members of my family only ❑ Friends and relatives only
❑ Sportsman's groups ❑ A guide or outfitter ❑ Other (please specify) _____________

b. If yes, are you aware of Ohio's recreational user liability laws? ❑ Yes ❑ No

5. Please indicate how strongly you disagree or agree with the following statements.

(Circle one for each item)	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Whether or not I use some of my acres for wildlife conservation is an individual choice	-2	-1	0	1	2
The government should not be able to tell farmers what land to conserve	-2	-1	0	1	2
The government is useful in conservation of wildlife habitat on private land	-2	-1	0	1	2
The government should only be involved in wildlife conservation on public lands	-2	-1	0	1	2

6. Please circle the number that best describe your opinions. *(Circle one for each item)*

		Extremely	Quite	Slightly	Neither	Slightly	Quite	Extremely	
a. Land conservation programs are…									
a.	*Wise*	3	2	1	0	-1	-2	-3	*Foolish*
b.	*Beneficial*	3	2	1	0	-1	-2	-3	*Harmful*
c.	*Valuable*	3	2	1	0	-1	-2	-3	*Worthless*
b. Wildlife conservation programs are…									
a.	*Wise*	3	2	1	0	-1	-2	-3	*Foolish*
b.	*Beneficial*	3	2	1	0	-1	-2	-3	*Harmful*
c.	*Valuable*	3	2	1	0	-1	-2	-3	*Worthless*
c. The Conservation Reserve Program is…									
a.	*Wise*	3	2	1	0	-1	-2	-3	*Foolish*
b.	*Beneficial*	3	2	1	0	-1	-2	-3	*Harmful*
c.	*Valuable*	3	2	1	0	-1	-2	-3	*Worthless*
d. My participation in the Conservation Reserve Program is…									
a.	*Wise*	3	2	1	0	-1	-2	-3	*Foolish*
b.	*Beneficial*	3	2	1	0	-1	-2	-3	*Harmful*
c.	*Valuable*	3	2	1	0	-1	-2	-3	*Worthless*

7. Do you farm at least some of the land you own? ❑ Yes ❑ No

a. How many years have you been farming in Ohio? _____ ☐ N/A

b. How many total acres do you own? _____

c. How many acres did you plant last year? _____ ☐ N/A

d. In 2012, how many total acres, if any, did you rent/lease *from* others? _____ ☐ N/A

e. In 2012, how many total acres, if any, did you rent/lease *to* others? _____ ☐ N/A

8. In 2012, of the acres that you own, how many did you have in… ?

Residential and Buildings_____ Forest and Woodlot _____ Small Grains _____

Corn and Beans _____ Scrubland and Fallow _____ Pasture _____

Hay and Alfalfa _____ Grassland and Prairie _____ Other _____

9. If you had 100 points to assign to the following three goals to demonstrate their relative importance when making land management decisions, how would you do that? Assign the points in the way that best reflects the importance of each goal to you. Be sure the total adds up to 100.

Making a profit _____

Being an environmental steward _____

Personal recreation use _____

Total _____/100

10. Which of the following have you done to actively manage your land for wildlife? (check all that apply)

❑ Plant trees, bushes, or meadow seedings for food and shelter ❑ Let fence rows grow up in brush ❑ Protect game cover in fence rows, along ditches, thickets, and in small areas from fire, mowing, and grazing ❑ Planted a food plot

❑ Allow ditch banks to grow up in grass/weeds ❑ Left den and nut trees standing ❑ Allowed fields (or part of field) to stand unharvested ❑ Burned

❑ Cut a patch of trees ❑ I don't do anything ❑ Other _____

Section B. Land Conservation Programs

1. Are you or have you ever been enrolled in any of the following programs (check all that apply):

❑ Conservation Reserve Enhancement Program (CREP) ❑ Environmental Quality Incentive Program (EQIP) ❑ Conservation Reserve Program (CRP)

❑ Wetland Reserve Program (WRP) ❑ Conservation Stewardship Program (CSP) ❑ Other_____

2. Are you <u>currently</u> enrolled in the Conservation Reserve Program (CRP)? ❑ Yes ❑ No

a. If yes, for how many total years have you been enrolled? _____

b. Approximately how many acres do you have currently enrolled in CRP? _____

c. How would you describe your CRP acres? (Mark the *one* answer that most accurately describes the majority of your CRP acres)

❑ Non-native grasses (ex: fescue, brome, etc…) ❑ Trees/Woodland ❑ Wetlands

❑ Native Grasses (ex: switchgrass, big bluestem, etc…) ❑ Other _____

d. How do you currently manage your CRP lands for wildlife? *(check all that apply)*

❑ Mowing ❑ Disking ❑ Edge feathering ❑ Forb or wildflower interseeding

❑ Burning ❑ Food plots ❑ Spot Spraying Wildlife ❑ None, Other _____

3. If given the option, what is the maximum number of years that you would be willing to enroll a portion of your land into a reserve program (eg. CRP, WRP, CREP)? _____years

4. How likely are the following outcomes on your farm due to your enrollment in CRP?

(Circle one for each item)	Very Unlikely	Unlikely	Neither	Likely	Very likely
Improved control of soil erosion	-2	-1	0	1	2
Increased cost of land management	-2	-1	0	1	2
Increases in unwanted wildlife	-2	-1	0	1	2
Improved water quality	-2	-1	0	1	2
Increases in unwanted requests for permission to hunt	-2	-1	0	1	2
Improved overall farm health	-2	-1	0	1	2
Source of weeds	-2	-1	0	1	2
Desired increases in wildlife population	-2	-1	0	1	2
Decreased personal income	-2	-1	0	1	2
Increased opportunities to personally hunt	-2	-1	0	1	2
Makes farm appear unkempt or poorly managed	-2	-1	0	1	2
Increased opportunities to lease land for hunting	-2	-1	0	1	2
Too much cropland taken out of production	-2	-1	0	1	2
Changes in scenic quality of farm or landscape	-2	-1	0	1	2
Increase in personal income	-2	-1	0	1	2
Too time consuming to manage	-2	-1	0	1	2
Other (please specify) _____	-2	-1	0	1	2

5. How likely or unlikely are you to….

(Circle one for each item)	Very Unlikely	Unlikely	Neither	Likely	Very Likely
Enroll (or reenroll) in CRP	-2	-1	0	1	2
Enroll in other land conservation programs (eg. WRP)	-2	-1	0	1	2

6. To what degree does each of the following issues limit your participation in CRP?

(Circle one for each item)	Not at all	Slightly	Moderately	Greatly
Lack of government funds for cost share	0	1	2	3
Availability of equipment for installation and maintenance	0	1	2	3
Lack of information about the program	0	1	2	3
Concerns about invasion of unwanted trees or weeds	0	1	2	3
Approval of my neighbors/fellow farmers	0	1	2	3
Don't want to participate in government programs	0	1	2	3
Length of enrollment	0	1	2	3
Reduces my flexibility to manage my lands	0	1	2	3
Not satisfied with cover quality	0	1	2	3
Limits ability to take advantage of rising crop prices	0	1	2	3
Time investment	0	1	2	3
Limits ability to cash rent land	0	1	2	3
Other recreational uses for my land	0	1	2	3
Denied enrollment	0	1	2	3
Fear of losing or upsetting farm operator/renter	0	1	2	3
Unwanted wildlife	0	1	2	3
Other (please specify) _____	0	1	2	3

7. To what extent would the following increase your willingness to enroll in CRP?

(Circle one for each item)	Not at all	Slightly	Moderately	Greatly
Increased financial assistance	0	1	2	3
Advice from an expert	0	1	2	3
Creation of a long-term land management plan	0	1	2	3
Use of free equipment to perform upkeep	0	1	2	3

	Not at all	Slightly	Moderately	Greatly
Learned the benefits to wildlife	0	1	2	3
Learned the benefits to game	0	1	2	3
Found more farmers doing it in my area	0	1	2	3
Found that very few farmers are doing it in my area	0	1	2	3
Earned recognition at a state level	0	1	2	3
Owned a larger parcel of land	0	1	2	3
Greater flexibility in length of enrollment	0	1	2	3
Ability to profit from haying or grazing without penalty	0	1	2	3
Ability to plant crops in some years without penalty	0	1	2	3
Contractor available to do work	0	1	2	3
Other (please specify) _____	0	1	2	3

***Early successional habitat (ESH)* is a land type that includes grasses, forbs, and shrubs, and provides habitat for many wildlife species. ESH can be established in shrubby grassland, old fields and fencerows, forest edges, and managed or young forests. Early successional habitat can be created by thinning the edge of a woodlot or forested area, leaving fencerows to grow, and mowing unused fields to encourage native grass growth.**

8. To what extent would any of the following conditions increase your willingness to create more early successional habitat (ESH, i.e. edge feathering, cutting trees) on your land than you do now?

(*Circle one for each item*)	Not at all	Slightly	Moderately	Greatly
Received financial assistance or tax reduction	0	1	2	3
Found a market for the cut wood	0	1	2	3
Received advice from an expert about this activity	0	1	2	3
Free access to necessary equipment	0	1	2	3
Free labor to conduct the activity	0	1	2	3
Learned the benefits to wildlife	0	1	2	3
Found more farmers doing it in my area	0	1	2	3
Owned a larger parcel of land	0	1	2	3
Other (Please specify) _____	0	1	2	3

Section C. Land Conservation and Your Community

1. Where are you most likely to seek information about land and habitat management?

❑ Television ❑ Other Farmers ❑ Ohio Division of Wildlife ❑ Workshops/ Meetings
❑ Radio ❑ Trade Publications ❑ Scientific Journals ❑ Members of my community
❑ Internet search ❑ Newsletters/Factsheets ❑ Private Lands Biologists ❑ Other _____

2. When it comes to land conservation, I feel that the Ohio Division of Wildlife…

(*Circle one for each item*)	Strongly disagree	Disagree	Neither	Agree	Strongly agree
Shares similar values as me	-2	-1	0	1	2
Share similar opinions as me	-2	-1	0	1	2
Thinks in a similar way as me	-2	-1	0	1	2

3. When it comes to land conservation, I feel that the US Fish & Wildlife Service….

(*Circle one for each item*)	Strongly disagree	Disagree	Neither	Agree	Strongly agree
Shares similar values as me	-2	-1	0	1	2
Share similar opinions as me	-2	-1	0	1	2
Thinks in a similar way as me	-2	-1	0	1	2

4. Please answer the following questions based on your beliefs about other farmers in your community.

(*Circle one for each item*)	Strongly disagree	Disagree	Neither	Agree	Strongly agree
Many farmers in my community are enrolled in CRP.	-2	-1	0	1	2
Many farmers in my community think highly of programs like CRP.	-2	-1	0	1	2
Most farmers whose opinion matters to me would enroll in conservation programs such as CRP	-2	-1	0	1	2

5. Please answer the following based on how you feel about risks.

(*Check one for each item*)	Not at all	Slightly	Moderately	Greatly
Generally, how willing are you to take risks?	0	1	2	3
Generally, how much do you try to avoid risks?	0	1	2	3
How willing are you to take risks with your investments?	0	1	2	3
How willing are you to take risks in your occupation as a farmer?	0	1	2	3

6. Please indicate how strongly you disagree or agree with the following statements. I believe…

(*Circle one for each item*)	Strongly disagree	Disagree	Neither	Agree	Strongly agree
Long-term land management plans are unnecessary since chance determines my farm profitability	-2	-1	0	1	2
I have the ability to protect my crops and ensure profitability	-2	-1	0	1	2
Whether or not I have yearly crop profitability is mostly a matter of luck	-2	-1	0	1	2
Crop failure is not a matter of luck, rather bad personal decision making	-2	-1	0	1	2
I have very little ability to protect my crop profitability	-2	-1	0	1	2
I am vulnerable to the risks posed by yearly weather variation	-2	-1	0	1	2

Section D. About You

1. In a normal year, what are the annual gross sales from your farm including farm program payments (include crop insurance payments)?

❑ $0 ❑ < $50,000 ❑ $50,000-$99,999 ❑ $100,000-$149,999 ❑ $150,000-$299,999 ❑ >$300,000

2. In a normal year, what is your total annual off-farm income?

❑ $0 ❑ < $10,000 ❑ $10,000-$49,999 ❑ $50,000-$99,999 ❑ $100,000-$150,000 ❑ >$150,000

3. How much of your total FARMING income comes from your enrollment in the CRP program?

❑ 0-10% ❑ 11-25% ❑ 26-50% ❑ 51-75% ❑ 75-90% ❑ 91-100%

4. How many generations has your family been farming some portion of your current operation?

❑ First generation farmer ❑ Second generation farmer ❑ Third generation farmer or more

5. When, if at all, do you plan on retiring from farming?

❑ Within the next year ❑ 1-5 years ❑ 6-10 years ❑ 11-15 years
❑ 16-20 years ❑ 21-30 years ❑ >31 years ❑ Never

6. Are you? (*Check one*) ❑ Male ❑ Female **7. What is your age?** _____

8. What is the highest level of education you have completed?

❑ Less than 9th grade ❑ Associate's Degree
❑ Some High School ❑ Bachelor's Degree
❑ High School Diploma or GED ❑ Graduate/Professional Degree
❑ Some College

9. Please indicate the extent to which you identify yourself as a/an…

(*Circle one for each item*)	Do not identify with group	1	2	3	4	5	Strongly identify with group
Wildlife advocate	0	1	2	3	4	5	6
Hunter	0	1	2	3	4	5	6
Gun rights advocate	0	1	2	3	4	5	6
Environmentalist	0	1	2	3	4	5	6
Conservationist	0	1	2	3	4	5	6
Property rights advocate	0	1	2	3	4	5	6

Please make any additional comments you may have in the space below.

Thank you!

«Date»

«First_name» «Last_name»
«Address»
«City», «STATE» «ZIP»

Dear «First_name»,

I am contacting you today to ask for your help on an upcoming study of land management in Ohio. The Ohio Division of Wildlife is conducting this study to offer landowners and producers the chance to share their opinions about land management and to tell how they feel about the overall land management and conservation programs throughout Ohio.

I encourage you to take advantage of this opportunity to share your opinions about land management in Ohio. Not all landowners have a chance to participate in the study and your participation will help ensure the success of our project. We would like to do everything we can to accommodate you and make your participation an enjoyable experience!

Please watch your mail for the survey questionnaire, which should arrive at your home in less than one week. If you do not receive a questionnaire in the mail please contact me at 614-247-2118 or by email at bruskotter.9@osu.edu., and I will be sure that you do.

Thank you for considering this opportunity to participate and share your thoughts and views regarding the conservation of this important resource.

Sincerely,

Jeremy Bruskotter
Assistant Professor and Principle Investigator

For questions about your rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact Ms. Sandra Meadows in the Office of Responsible Research Practices at (800)678-6251.

«ID»

«Date»
«First_name» «Last_name»
«Address»
«City», «STATE» «ZIP»

Dear «First_name»,

We are writing to ask for your help in a study of land management in Ohio that is being conducted by researchers from the College of Food, Agricultural & Environmental Sciences at The Ohio State University in collaboration with the Ohio Division of Wildlife. This study is part of an ongoing effort by Ohio Division of Wildlife to better know landowners' opinions in Ohio.

You were randomly selected from all landowners in your county who own five or more acres of land that is zoned for agriculture or a similar use. The study covers a number of important topics, including your land management practices, potential enrollment in conservation programs, and your preferences regarding land management.

We are interested in a wide range of opinions about land management in Ohio; everyone's opinion is important! No matter where you live or your current management practices, we still would love to hear from you.

Please remember there are no right or wrong answers, and your answers are completely confidential. Your participation in this survey is voluntary. The questionnaire has an identifying number for mailing purposes only; your name will be removed from the mailing list as soon as we receive your completed questionnaire. The survey will only take about fifteen minutes to complete. Please help us determine the direction for future land management and conservation programs in Ohio!

We are aware there was a mix-up in the mailings and some people were previously sent the wrong letter. Please accept our apologies for this mix-up. In addition, if the name associated with your mailing is incorrect it is due to inaccurate county auditor records. We would appreciate if you'd still fill out the survey if you own five acres or more of land in Ohio.

After you complete the questionnaire, please place it in your mailbox to return it (no postage is necessary, it is already paid). If there are any questions you feel uncomfortable answering please feel free to skip them and answer the other questions.

Thank you very much for your assistance! If you have any questions about this study, please feel free to contact me by phone at 614-247-2118 or by email at bruskotter.9@osu.edu.

Sincerely,

Jeremy Bruskotter, *Assistant Professor and Principle Investigator*

For questions about your rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact Ms. Sandra Meadows in the Office of Responsible Research Practices at (800)678-6251.

«ID»

«Date»

«First_name» «Last_name»
«Address»
«City», «STATE» «ZIP»

Dear «First_name»,
A few weeks ago you received a questionnaire in the mail from us asking for your opinions about the conservation and management of lands in Ohio. This study is being conducted by researchers from the college of Food, Agricultural & Environmental Sciences at The Ohio State University in collaboration with the Ohio Division of Wildlife. This study is part of an ongoing effort by Ohio Division of Wildlife to better know landowner's opinions in Ohio. So far, we have not received your completed questionnaire.

We are still very interested in what you think about these issues! If you have already mailed your completed questionnaire, please disregard this letter and accept our sincere thanks for your participation! If you did not already receive a questionnaire or lost the original, please complete the questionnaire found in this package today. Your participation in this survey is voluntary.

Many people in your community have already responded. The responses so far show that there is a wide range of opinions about land management and conservation in Ohio.

After you complete the questionnaire, please place it in your mailbox to return it (no postage is necessary, it is already paid). If there are any questions you feel uncomfortable answering please feel free to skip them and answer the other questions.

The questionnaire has an identifying number for mailing purposes only. As soon as we receive your completed questionnaire we will remove your name from the mailing list and destroy the records containing your contact information. Your name and address will never be associated with your answers, nor used for any other purpose. Protecting the confidentiality of people's responses is very important to us. Thank you for your time and participation!

Sincerely,

Jeremy Bruskotter,
Assistant Professor, College of Food, Agricultural & Environmental Sciences
Bruskotter.9@osu.edu (614) 247-2118
210 Kottman Hall, 2021 Coffey Rd., Columbus, OH 43210
For questions about your rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact Ms. Sandra Meadows in the Office of Responsible Research Practices at (800)678-6251.

«ID»