

FACTORS ASSOCIATED WITH DECLINING HUNTING
PARTICIPATION IN INDIANA

A THESIS SUBMITTED TO THE GRADUATE SCHOOL IN PARTIAL
FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE MASTER OF
SCIENCE IN NATURAL RESOURCES AND ENVIRONMENTAL MANAGEMENT

BY

JOSEPH R. HOLZINGER II

ADVISOR

DR. AMY GREGG

BALL STATE UNIVERSITY

MUNCIE, INDIANA

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Committee Approval:

Amy Gregg _____ Date
Committee Chairperson

Paul Chandler _____ Date
Committee Member

Timothy Carter _____ Date
Committee Member

Department Approval:

Department Chairperson Date

Dean of Graduate School Date

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MUNCIE, INDIANA
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ABSTRACT

THESIS: Factors associated with declining hunting participation in Indiana
STUDENT: Joseph R. Holzinger II
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This study documents the most salient factors associated with the decline in hunting participation in Indiana. Data for the study were obtained from interviews and a survey of Indiana residents conducted in 2008. Respondents were classified as current hunters, former hunters, nonhunters, or anti-hunters. The most salient reasons respondents cited for the decline in hunting participation in Indiana were: less access to private land, lack of time, urbanization, and changing values among the younger generation. The major reasons that former hunters discontinued participation were lack of time, loss of interest, cost of licenses and equipment, and lack of available hunting partners. For nonhunters, the major reasons for non-participation were that they were not brought up into hunting, had other leisure activities during the hunting season, and were not willing to kill animals. The major reasons anti-hunters did not participate were that they had ethical problems with hunting, were not willing to kill animals, were not brought up into hunting, and don't eat meat. The results of this study found that declining participation in hunting is the result of changing socio-economic factors in American society and not of any adverse ecological factors in America's natural environment.

Based on the results and comments from respondents, wildlife management agencies would gain the most from efforts to retain hunters, as opposed to try to recruit new hunters from the ranks of people who have no interest in it or are former hunters.

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EXPLANATION OF FORMAT

This thesis is divided into three chapters. Chapter One is a general introduction and extended literature review. Chapter Two is the embedded technical paper. Chapter Three is the summary and conclusions.

Chapter One covers the following topics: background of hunting participation, participation trends, public support and economic issues, wildlife management status, and factors associated with the decline in hunting participation. This chapter also reviews hunter retention and recruitment strategies.

Chapter Two is the technical paper. This chapter was written based on the format criteria for peer-reviewed journals with the intent of publication in the *Human Dimensions of Wildlife*. Chapter two includes the following: abstract, introduction, methods, results and discussion, and conclusions.

Chapter Three is a general summary. Data that were not included in the technical paper are presented in this section, such as respondents' view of the change in hunting participation over time. The type of game current and former hunters hunt is also discussed. Management recommendations and suggestions for future research are also noted in this section based on literature, survey data, observations, and study results.

CHAPTER 1: General Introduction

1.1 Introduction

Of all the recreational activities social scientists have studied, hunting may be the most multifaceted in terms of its diverse implications to society and the related dilemmas managers face in regulating it. Hunting is enjoyed by people in every state of the U.S. Hunting is more than a form of recreation to many participants (and nonparticipating acquaintances); it is a way of life and a part of the culture of many Americans. This attribute of hunting, namely involvement by people who do not go afield but who are a part of the larger hunting culture, makes analysis of changes difficult and adds to the importance of understanding hunting trends. The importance of hunting to state and federal wildlife management agencies cannot be overstated.

Hunting participation in the United States is declining (Dietz, Higgins, and Mendelsohn, 1996; Floyd and Lee, 2002; Wright, Rodgers, and Backman, 2001), thereby causing a declining ability to manage wildlife, less money returned to the Federal Aid in Wildlife Restoration Fund (Pitman-Robertson Act) through license sales, and declining support for wildlife conservation programs (Meyerson, 2008; Riley, Decker, Enck, Curtis, Lauber, and Brown, 2003). Hunting is a tool for managing many game populations, and it has many positively associated economic, ecological, conservation, and social aspects (Moyer, 2007; Ward, 2007). Some benefits of hunting include outdoor

physical exercise, recreation, scenery, time spent with family, and management of game populations in the absence of natural predators (Miller and Vaske, 2003). Even though research has been done for the nation as a whole (U.S. Department of Interior, 2008) and results have documented declining hunting participation relative to population growth, there are gaps in the existing research related to the specific factors affecting changes in specific states, such as Indiana. Individual states may show unique patterns not evident in national data. As hunting participation continues to decline, researchers need to identify factors that impact changes in participation. As we lose our hunting revenue streams, Indiana agencies will lose the ability to effectively manage wildlife and the associated habitat. The overall guiding hypothesis guiding this research holds that declining participation in hunting is the result of changing socio-economic factors in American society and not of any adverse ecological factors in America's natural environment.

1.2 Background

Hunting was a necessity to early humans, and it remained so in many societies until recent human history when the move was made from hunting-gathering to the agricultural revolution. At one time, people could only obtain their food if they hunted it. The development of agriculture took emphasis off hunting, although it was still pursued for a variety of reasons.

By the 1800s, most land in the United States was public land and there began to develop a "tragedy of the commons," in that individual hunters had no motive to limit the number of animals they killed. This brought many species to, or very close to, extinction.

To prevent these extinctions, people established game laws, licensing, and hunting seasons to give animals a fair chance to escape, while minimizing the suffering of wounded game (Beinart and Coates, 1995; Floyd and Lee, 2002).

More recently, the 1937 Federal Aid in Wildlife Restoration Act placed excise taxes on firearms, ammunition, and other hunting equipment and earmarked them for conservation and wildlife habitat enhancement programs. Lobbied for and supported by sportsmen, the tax has raised billions of dollars for wildlife habitat restoration (Floyd and Lee, 2002; Swenson, 1983). This money is still needed today to support continuing efforts to conserve game species. The sport's continuing contribution to conservation cannot be overlooked.

Today, hunting is considered a rural pastime (Miller and Vaske, 2003). Compared to past generations, the United States population is becoming older and more urbanized (Floyd and Lee, 2002; Miller and Vaske, 2003; Riley *et al.*, 2003; Stedman and Heberlein, 2001; Wright *et al.*, 2001). These and other factors are thought to relate to the decline in hunting participation, but they are not fully understood. There is a need to add to existing knowledge of the factors impacting declining participation in order to continue to provide support for agencies dependent on hunters for operating funds and support for wildlife programs. Understanding the changes in participation has broad social, cultural, economic, and managerial implications.

1.3 Participation Trends

Even though the reasons may be unclear, trends are that hunter participation is decreasing drastically nationwide. Several studies suggest there was a 0.7% decline in

United States hunting participation from 1980 to 1985 (Dietz *et al.*, 1996). In 1998, hunting participation in the United States declined by 296,000 from the previous year (Carpenter, 1998). Nationally, there was a 7% decline between 1998 and 2003 (*State Legislatures*, 2003), and a 4% decline from 2001 to 2007 (Moyer, 2007).

Out of a total United States population of 230 million, there were about 17 million hunters in 1982. As the population continues to increase, there are more than 300 million Americans today, but only 12.5 million of them hunt (U.S. Department of Interior, 2008). As a percentage of the population, hunting participation has decreased from 7.4 to 4.1 percent in just 25 years (Phillips, 2007).

Based on a national survey, Indiana has seen a decrease in hunting participation from 357,000 in 1996 to 272,000 in 2006 (U.S. Department of Interior, 2008). Researchers presently show that there has not only been a decrease in hunting, but also camping, and fishing as well (Meyerson, 2008). In contrast, there has been a slight increase in wildlife-watching and photography (Phillips, 2007). Hunting and fishing are forms of consumptive recreation, whereas wildlife-watching and photography are non-consumptive recreational activities. Many people have a negative view of consumptive forms of recreation, e.g., trophy hunting. This, combined with urban trends, could be one possible explanation for the decrease in hunting and fishing and the increase in wildlife-watching and photography. The peak of nature recreation spanned the decade between 1981 and 1991. Since then, nature recreation has declined 1.2% per year (Meyerson, 2008).

1.4 Public Support

The decreasing participation in hunting can also cause public support problems. One of the biggest obstacles facing hunter participation today is the lack of social infrastructure and social support mechanisms for hunters. This lack of social support has impacts at every stage of hunter involvement.

A declining constituent base results in a decrease in public support for agency programs associated with managing wildlife resources (Mehmood, Zhang, and Armstrong, 2003). These agencies acquire land to prevent agriculture or urbanization from altering game habitat. There has been a trend of increasing resistance to the acquisition of this land, because many non-hunters believe agricultural and urban development take precedence over wildlife habitat (Miller and Hay, 1981). However, Moyer (2007) and Mueller (2006) argued the opposite, namely that public support is increasing for the role of hunting in wildlife management. This slight increase could be associated with increases in deer and geese populations in urban areas (Moyer, 2007), as well as the increases in deer-vehicle accidents. Increasing pressure for development of natural areas emphasizes the need to improve decisions affecting recreational resources. A clearer understanding of the recreational values associated with hunting is important to manage these activities economically and efficiently. If hunting is to maintain or increase in popularity, public support is critical.

1.5 Economics

Decreases in hunting participation not only cause public support problems, but they also hurt the economy as well. Hunting brings millions of dollars into state

economies each year (Anderson, 2008; Bleech, 2008; *State Legislatures*, 2003). Hunters spend money on things like licenses, hotels, food, transportation, and equipment (*State Legislatures*, 2003). The decrease in hunting participation results in communities losing this income. Hunting clubs have also seen huge decreases in participation rates. Researchers have argued that the decline in license sales, which provide agency operating funds, is one of the biggest problems associated with declining hunting participation.

1.6 Wildlife Management

1.6.1 Game Management

Traditionally, hunting and fishing have been the financial backbone of wildlife management agencies. Hunting can be important for promoting stewardship of all natural resources, not just game species (Holsman, 2000). With the current decline in hunting participation, this does not bode well for the future of wildlife management agencies, which obtain the majority of their operating funds from license sales (Mehmood *et al.*, 2003; Miller and Vaske, 2003; Phillips, 2007). State funding from the Federal Aid in Wildlife Restoration Program is based on the number of hunting licenses sold, land area, and the amount of money spent by individual states managing game species (Floyd and Lee, 2002). For every dollar the state spends on managing game species, the federal government will give \$3. Over 70% of all state wildlife management funding is derived directly from license sales (53.4%) or federal excise taxes (17.1%) (Backman and Wright, 1993). The decline in sales creates problems for wildlife managers (Backman and Wright, 1993) and decreases the effectiveness of an agency's ability to manage wildlife populations (Mehmood *et al.*, 2003). U.S. hunting license

sales peaked in 1983 and have generally declined since then (Phillips, 2007). In West Virginia, the revenue generated from hunting and fishing license sales has declined 26% since 1997, leaving a \$1.8 million budget deficit for the state Division of Natural Resources (Anderson, 2008).

1.6.2 Population Control

Historically, hunting has been the primary method for controlling most game populations. Now that natural predators no longer keep wildlife populations in balance, declining hunting participation increases wildlife populations. This makes it difficult to control wildlife populations through recreational harvests, leading to imbalances in wildlife populations throughout the nation (Riley *et al.*, 2003; *State Legislatures*, 2003). The U.S. is now in a situation where many game species exceed people's tolerance levels for problems such as economic loss, health threats, and safety hazards (Riley *et al.*, 2003). For example, with urbanization, white-tailed deer (*Odocoileus virginianus*) are becoming more concentrated and causing more impact by damaging crops. Motor vehicle collisions with deer, elk (*Cervus elaphus*) or moose (*Alces americanus*) are also becoming more common; crops and nurseries, as well as forest regeneration are damaged by deer and elk; beavers (*Castor canadensis*) flood croplands and roads; and ducks and geese are affecting public shorelines (Dietz *et al.*, 1996; Riley *et al.*, 2003). Hunting helps to control wildlife populations, and in turn, it has a direct impact on mitigating these human-wildlife interactions. Hunting may eventually become a community service (e.g. controlled hunts in Indiana state parks) rather than a form of recreation (Riley *et al.*, 2003). Hunters can also donate excess meat to processing stations, which in turn, donate it to shelters or food banks.

1.7 Associated Factors

There are several factors associated with the decline in hunting participation over time. These factors can be separated into three categories: demographic (age, race, gender, residence, etc.), social (family or friends to participate with, introduction to hunting, etc.), and supply (land availability, game availability, etc.).

1.7.1 Demographic Factors

The first of these factors associated with the decline in hunting participation is demographic. The increase in urban residency (Carpenter, 1998; Moyer, 2007; Wright *et al.*, 2001) and declining habitat seem to be the greatest demographic factors associated with the decline in participation (Backman and Wright, 1993; Floyd and Lee, 2002; Miller and Vaske, 2003; Phillips, 2007). As mentioned previously, hunting seems to appeal more to rural residents than to urban residents (Dietz *et al.*, 1996; Floyd and Lee, 2002; Miller and Vaske, 2003; Stedman and Heberlein, 2001).

1.7.1.1 Race

Another demographic variable is race. Traditionally the highest rate of hunting participation has occurred among white males (Floyd and Lee, 2002; Phillips, 2007; Stedman and Heberlein, 2001), in contrast to the United States experiencing an increase in racial and ethnic diversity (Weeks, 1994; Murdock, Loomis, Ditton, and Hoque, 1996). Therefore, hunting in the United States is experiencing a decrease of its traditional constituent base. This increase in racial and ethnic diversity has increased demands on natural resource agencies to provide equitable benefits to a diverse public (Simcox, 1993). Although there is little reason to expect changes in future participation rates among various racial and ethnic groups (Dwyer, 1994; Fedler, Ditton, and Duda, 1998),

these groups are expected to be a majority of any future increases in the number of participants because of increases in the population size of minority groups (Ditton and Hunt, 1996).

Racial and ethnic diversity presents new challenges for resource management professionals, including hypothesized differences from Anglos in patterns of recreational hunting behavior, preferences for hunting property, hunting experience preferences, and even basic orientations towards natural resources and the environment (Dustin, McAvoy, and Rankin, 1991). Further understanding can be reached by systematically sorting out which dependent variables are more or less relevant to race and ethnic factors (Floyd, 1998). Previous research studies focusing on the marginality of minority groups in U.S. society, socialization processes, and social organization provide a rationale for specific variables and hypotheses. For example, marginality theory has been used to explain low participation in wildland recreation by African-Americans (Washburne, 1978). By that theory, African-American participation patterns result from fewer socioeconomic resources, which in turn is a function of historical patterns of discrimination (Washburne, 1978; West, 1989). Because of the unequal distribution of recreational areas and facilities, segregation of housing markets, and unequal distribution of incomes, minority groups are expected to participate in different activities from those of the dominant Anglo culture (Dwyer and Hutchinson, 1990).

At the group level, African-Americans and Hispanics throughout the U.S. have lower incomes and less education than whites, while living closer to urban centers (Murdock, Backman, Ditton, Hoque, and Ellis, 1992; Weeks, 1994; Wright *et al.*, 2001). Because most hunting resources are located in nonurban areas, minority groups have

limited exposure to hunting resources. This results in both a lower rate of participation in hunting and a lower annual hunting frequency among hunters. Also, because of fewer economic resources, minorities may be less likely to live in a household with available hunting equipment.

1.7.1.2 Aging Population

Another very important factor associated with the decline in hunting participation is our aging population. Hunting participation tends to decrease with age (Dietz *et al.*, 1996; Floyd and Lee, 2002; Mehmood *et al.*, 2003; Miller and Vaske, 2003; Wright *et al.*, 2001). Older hunters generally harvest less game and spend fewer days hunting than younger hunters (Mehmood *et al.*, 2003). Moreover, older hunters generally hunt during fewer seasons, tending to concentrate their hunting effort during mild weather. Older hunters tend to have increased health problems and disabilities which limit their hunting activity (Floyd and Lee, 2002).

1.7.1.3 Gender

Hunting has typically been viewed as a male dominant sport in American society. Nationally, 91% of hunting participants are male (U.S. Department of Interior, 2008). Hunting participation has been declining nationally, yet female hunters are growing. There are proportionally more females hunting today than any other time in United States history (Carpenter, 1998; Moyer, 2007).

1.7.2 Social Factors

There are many social factors also associated with the decline in hunting participation. Although hunting is an integral part of many rural areas, many young, rural adults migrate to urban areas searching for employment or education and find fewer

hunting companions. This can introduce them to a different set of values (Dietz *et al.*, 1996), unlike the values they grew up with from childhood. When people migrate from urban areas to rural areas, city values are brought to the rural area.

1.7.2.1 Technology

Another social factor associated with the decline in hunting participation is the increased use of technology. We have become a more technology-based society. As people spend more time interacting with their televisions and computers, they can lose contact with nature and have less interest in conservation. In turn, the offspring of these people are less likely to care about conservation issues as well (Meyerson, 2008). Meyerson (2008) stated that “the time children spend in nature determines their environmental awareness as an adult.” Introducing children to the outdoors at a young age will increase their interest in nature and the surrounding environment.

1.7.2.2 Youth Introduction

Youth remain a constant focus among wildlife management agencies for good reason. Children are more likely to remain involved in hunting if they are introduced at an early age (Miller and Vaske, 2003; Mueller, 2006; Phillips, 2007), especially if they are introduced by members of their immediate family (Dietz *et al.*, 1996; Fedler *et al.*, 1998; Stedman and Heberlein, 2001; Yoesting and Burkhead, 1973). Most hunters are initiated into the sport of hunting before age 20 (Responsive Management, 2003). Researchers have argued that the key to active participation and commitment to hunting by future generations is fostering participation among today’s youth (Responsive Management, 2003).

According to the socialization theory of development (Harris, 1995), children learn from infancy their patterns of behavior and ways of thinking through interaction, observation, and imitation until internalized and habitual (Bates and Plog, 1990). This is the way an individual's leisure activity and experience preferences, among other things, are formed and perpetuated (Kelly, 1990). Past leisure experiences of one's family and extended family influence the types of recreational activities established during childhood, because they produce a familiar lifestyle and values associated with pleasurable childhood experiences with family members or friends (Yoesting and Burkhead, 1973). In terms of socialization, Stedman and Heberlein (2001) argued that the father has the strongest influence over children's hunting behavior. With society experiencing increasing numbers of single-parent families (often female heads of households), the presence of a hunting mentor is often not possible. Hunting is rarely introduced to children by people other than family members (Duda, Bissell, and Young, 1995). Differences in culture and past experiences of previous generations with hunting should therefore affect the hunting activity of cultural groups today (Yoesting and Burkhead, 1973). Consequently, people who begin hunting later in life are more likely to abandon hunting shortly after initiation than are those who begin at an early age (Dietz *et al.*, 1996).

1.7.2.3 Hunting Partners

Another social factor associated with the decline in hunting participation is the lack of companions interested in hunting (Dietz *et al.*, 1996; Mehmood *et al.*, 2003; Wright *et al.*, 2001). Many Americans are working longer days (Bazar, 2006; Phillips, 2007), and "lack of time" is a major factor why they do not participate in hunting (Dietz

et al., 1996; Mehmood *et al.*, 2003; Miller and Vaske, 2003; Moyer, 2007; Wright *et al.*, 2001). As hunters lose hunting partners, they themselves are less likely to continue (Responsive Management, 2003). Other factors include lack of interest, not enough game, cost, and competition with other leisure activities (Backman and Wright, 1993; Dietz *et al.*, 1996; Mehmood *et al.*, 2003; Miller and Vaske, 2003; Wright *et al.*, 2001).

1.7.3 Supply Factors

There are many supply factors associated with the decline in hunting participation. The populations of many game species are increasing due to the decrease in hunting participation, but this is causing more and more human-wildlife interactions (Riley *et al.*, 2003). While some species have grown, others have declined. Deer and wild turkey are very abundant today, while quail, rabbits, woodcock, and grouse are having problems due to declining habitats (Phillips, 2007).

Another supply factor associated with the decline in hunting participation is that hunters are finding land availability to be a problem (Backman and Wright, 1993; Dietz *et al.*, 1996; Mehmood *et al.*, 2003; Miller and Vaske, 2003; Wright *et al.*, 2001). Substantial acreage has been lost to hunting over the decades due to suburban development and the splitting up of rural areas into plots so small that the amount of open space where hunting can occur legally has declined. The amount of hunting that occurs on private lands where these obstacles are not present probably has not changed substantially. In addition, values are not only changing in urban areas, but rural areas as well. Many private landowners are managing their lands with tighter controls and no longer permitting hunting on their property, thereby causing an increase in hunter density on public lands (Miller and Vaske, 2003).

1.8 Anti-hunters

Human attitudes toward hunting and active wildlife management are extremely diverse. With respect to hunting, approximately 15% of the U.S. population either actively opposes it (anti-hunters) or actively participates (hunters). The remaining 70% hold less polar views or have no commitment either way (Armstrong and Hutchins, 1995). This majority may be classified as nonhunters. Seventy-three percent of Americans approve of legal hunting, while 22% disapprove (Duda *et al.*, 1995).

American views of what constitutes “proper” wildlife management are changing. Historically, people gave widespread support to programs that involved the lethal take of animals. Today, such programs face mounting scrutiny. Much of the scrutiny comes from highly vocal special interest groups (anti-hunters). As a result of this conflict, wildlife managers have increasingly found themselves immersed in social conflict (Armstrong and Hutchins, 1995).

While many hunters respect anti-hunters’ opinions about hunting, they believe the opinions are misguided (Einwohner, 1999). Anti-hunters believe that animals have the same right to life as people and are concerned with reducing pain and suffering to the animals (Armstrong and Hutchins, 1995). They have ethical objections to the traditionally-acceptable harvesting of wildlife through hunting and trapping and do not believe hunting is needed as a form of managing wildlife (Armstrong and Hutchins, 1995). The majority of all anti-hunters are female (Einwohner, 1999; Flynn, 2002).

The anti-hunting and anti-management movements are a source of extreme frustration to some hunting enthusiasts (Duda *et al.*, 1995). Although the participants are often cast as a single group, they represent a complex group with equally complex

perspectives. Since both hunting and anti-hunting groups affect future hunting policy, both groups need to understand the attitudes of the other in order to eliminate preconceived notions that might hinder effective communication (Armstrong and Hutchins, 1995). In order to establish some common ground and to gain a better understanding of attitudes and perceptions between groups, key individuals from both groups need to be brought together for discussion (Armstrong and Hutchins, 1995).

1.9 Recruitment

As previously stated, the decline in hunting participation causes public support problems for wildlife management, negatively affects the economy, and decreases the effectiveness of agencies that manage wildlife populations, because of the decrease in agency operating funds. Similarly, this increase in wildlife populations can cause economic loss, health threats, and safety hazards from human-wildlife interactions. If hunting participation cannot be increased, managers will need to develop alternatives to recreational hunting in order to achieve wildlife management objectives.

1.9.1 Mentoring Programs

In recruitment efforts, the trend has been to recruit women and the youth in order to stabilize or increase participation given household changes (*State Legislatures*, 2003). Forty-nine states require first-time license holders to complete a hunter safety-education course. Dietz *et al.* (1996) argues that while many children have completed the course, they do not have a mentor to take them hunting. This is where hunting programs or camps can be of great importance. There are many places throughout the nation that provide programs or camps dedicated to getting today's youth into the woods.

An example of one of these hunting programs is the South Carolina Department of Natural Resources' Youth Waterfowl Days, which allows hunters 15 years and younger to hunt waterfowl. Each group of hunters had their own chaperone and guide. The chaperones and guides did not hunt, but they mentored the children on different aspects of hunter safety and conservation issues (Holshouser, 2008). Mehmood *et al.* (2003) found that agencies would be better off trying to retain hunters rather than recruiting new hunters.

Another example of mentoring is taking place in Wyoming, where the state is currently working to pass legislation that would provide people who have not taken the hunter safety education course to apply for a one-time exemption to hunt with a mentor. The mentor must have a valid Wyoming hunting license. This program would be open to anyone, not just residents of Wyoming. The hope is that this program will attract more hunters into the state and that more people will be interested in taking the hunter safety-education course (Dynes, 2008).

1.9.2 Family Interaction

As previously stated, hunting initiation usually occurs within the family (Duda *et al.*, 1995). The relationships derived from these hunting experiences can provide great satisfaction and drive future family values. Wildlife management agencies must manage for family involvement; and any recruitment campaigns for hunting should incorporate “family values” as main points of interest in the selling point. Many people often hunt just to spend time with friends and family (Duda *et al.*, 1995).

1.9.3 Religion

Another issue is that eleven states currently ban hunting on Sundays. A state representative of Pennsylvania has proposed legislation to lift the ban on Sunday hunting (Bazar, 2006). If this legislation is passed in Pennsylvania, the other ten states could follow suit and lift the hunting ban as well. This could potentially be a way to recruit many non-hunters in these eleven states, as well as provide more hunting opportunities for current hunters. Many people in these states work during the week and are off on weekends, giving them only Saturdays to hunt.

1.9.4 License Availability

Many other states provide big game hunting licenses only in a lottery fashion due to game population constraints. Some states do not sell hunting licenses over the counter. Instead, the hunters are required to sign up to be in a drawing, in which the state will draw a certain amount of hunters, and each hunter is eligible to purchase a license. Participation could potentially increase if more licenses were added to the pool of availability (Nguyen, Shaw, Woodward, Paterson, and Boyle, 2007; Scrogin, Berrens, and Bohara, 2000).

1.9.5 Incentives

Another recruitment option would be to give potential hunters an incentive. Incentives could be used in a wide variety of ways. One example is in the state of Wisconsin where monetary incentives were offered in an attempt to prevent the spread of chronic wasting disease (CWD) in the state. Hunters were given the opportunity to earn \$200 for shooting a CWD-positive deer (Petchenik, 2006). CWD is a big problem in

many states. This could be used in other states like Indiana in order to recruit more hunters, as well as to potentially prevent the spread of CWD.

1.9.6 Public Education

Public education has long been advocated as a means to achieve public acceptance of wildlife management practices. An informed and cooperative public are key to successfully manage wildlife and their associated habitats (Mehmood *et al.*, 2003). Curtis (1995) noted that wildlife managers can be leaders in public policy education, and emphasize the need for both decision-makers and their constituents to be aware of the costs, benefits, and outcomes of different wildlife management options.

1.9.7 Cultural Heritage

Hunting has traditionally been thought of as a large part of the American cultural heritage. We are losing a large part of our cultural heritage with this decline in hunting participation, which has crucial implications for conservation efforts. Less time spent outdoors means less contact with nature and, eventually, less interest in conservation. Today's youth are no longer experiencing this aspect of the American cultural heritage. Although overall national trends show a decline in hunting participation, we don't completely understand the reasons for this decline. There is more to understand on a state by state basis. Wildlife agencies need to determine what actions to take based on the trends of their specific state.

1.10 Project Overview

This research will identify the most salient factors associated with the changes in hunting participation in Indiana. This project seeks to address the social factors

influencing the change in hunting participation. Many stakeholders, agencies, citizens, and wildlife biologists are interested in the changes in hunting participation.

Perceptions of Indiana residents were gathered and tested against current theories found in the research literature. Indiana data were compared to existing national data provided through national surveys, such as the U.S. Fish and Wildlife National Survey on Hunting, Fishing, and Wildlife Recreation with specific reports on Indiana. This information will be used in order to assist in the development of policy to retain and recruit hunters in the future, e.g., for wildlife management agencies. The results of this study will be shared with the Indiana Department of Natural Resources Division of Fish and Wildlife. If we can stabilize or increase hunting participation in the United States, we could take a giant step towards improving the health of our ecosystem and maintaining wildlife conservation.

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CHAPTER 2: TECHNICAL PAPER

Factors associated with declining hunting participation in Indiana

2.1 Abstract

This study documents the most salient factors associated with the decline in hunting participation in Indiana. Data for the study were obtained from interviews and a survey of Indiana residents conducted in 2008. Respondents were classified as current hunters, former hunters, nonhunters, or anti-hunters. The most salient reasons respondents cited for the decline in hunting participation in Indiana were: less access to private land, lack of time, urbanization, and changing values among the younger generation. The major reasons that former hunters discontinued participation were lack of time, loss of interest, cost of licenses and equipment, and lack of available hunting partners. For nonhunters, the major reasons for non-participation were that they were not brought up into hunting, had other leisure activities during the hunting season, and were not willing to kill animals. The major reasons anti-hunters did not participate were that they had ethical problems with hunting, were not willing to kill animals, were not brought up into hunting, and don't eat meat. The results of this study found that declining participation in hunting is the result of changing socio-economic factors in American society and not of any adverse ecological factors in America's natural environment. Based on the results and comments from respondents, wildlife management agencies

would gain the most from efforts to retain hunters, as opposed to try to recruit new hunters from the ranks of people who have no interest in it or are former hunters.

2.2 Introduction

Hunting participation in the United States is declining (Dietz, Higgins, and Mendelsohn, 1996; Floyd and Lee, 2002; Wright, Rodgers, and Backman, 2001), thereby causing a declining ability to manage wildlife, less money returned to the Federal Aid in Wildlife Restoration Fund (Pitman-Robertson Act) through license sales, and declining support for wildlife conservation programs (Meyerson, 2008; Riley, Decker, Enck, Curtis, Lauber, and Brown, 2003). Hunting is a tool for managing many game populations and it has many positively associated economic, ecological, conservation, and social aspects (Moyer, 2007; Ward, 2007). Some benefits of hunting include outdoor physical exercise, recreation, scenery, time spent with family, and management of game populations in the absence of natural predators (Miller and Vaske, 2003).

Out of a total United States population of 230 million, there were about 17 million hunters in 1982. As the population continues to increase, there are more than 300 million Americans today, but only 12.5 million of them hunt (U.S. Department of Interior, 2008). As a percentage of the population, hunting participation has decreased from 7.4 to 4.1 percent in just 25 years (Phillips, 2007).

Even though research has been done for the nation as a whole (U.S. Department of Interior, 2008), and results have documented declining hunting participation relative to population growth, there are gaps in the existing research related to the specific factors affecting changes in specific states, such as Indiana. Individual states may show unique

patterns not evident in national data. Based on a national survey, Indiana has seen a decrease in hunting participation from 357,000 in 1996 to 272,000 in 2006 (U.S. Department of Interior, 2008).

2.2.1 Associated Factors

Past research has indicated that there is not just one, but several factors associated with the decline in hunting participation over time. In this study, these factors were separated into three categories: demographic (age, race, gender, residence, etc.), social (family or friends to participate with, introduction to hunting, etc.), and supply (land availability, game availability, etc.).

2.2.1.1 Demographic Factors

Since the early 1960s, research has consistently documented relationships between hunting participation and demographic variables (Mueller and Gurin, 1962). Regarding place of residence, 38% of hunters in 2006 lived outside a Metropolitan Statistical Area (MSA) (U.S. Department of Interior, 2008). Heberlein and Thomson (1996) found a negative relationship between urban residence and hunting participation. In their analysis, rural residence was identified as the most important variable explaining the declining rates of hunting participation over the 1980 to 1990 time period. Applegate, Lyons, and Page (1984) also suggested that the proportion of a state's population living in urban areas negatively affects recruitment and retention efforts.

Although hunting is an integral part of many rural areas, many young, rural adults migrate to urban areas searching for employment or education and find fewer hunting companions. This can also introduce them to a different set of values (Dietz *et al.*, 1996), unlike the values they grew up with from childhood. When people migrate from urban

areas to rural areas, city values are brought to the rural area. These city values in rural areas can cause a decrease in interest or support for hunting. Therefore, we hypothesize:

H₁ Hunting participation is decreasing because society is becoming more urbanized, whereas hunting has historically been a rural phenomenon; therefore, people have less interest in hunting than in previous generations.

2.2.1.2 Social Factors

Youth remain a constant focus among wildlife management agencies for good reason. Children are more likely to remain involved in hunting if they are introduced at an early age (Miller and Vaske, 2003; Mueller, 2006; Phillips, 2007), especially if they are introduced by members of their immediate family (Dietz *et al.*, 1996; Fedler *et al.*, 1998; Stedman and Heberlein, 2001; Yoesting and Burkhead, 1973). Most hunters are initiated into the sport of hunting before age 20 (Responsive Management, 2003).

Researchers have argued that the key to active participation and commitment to hunting by future generations is fostering participation among today's youth (Responsive Management, 2003). Therefore, we hypothesize:

H₂ Hunting participation is decreasing because fewer individuals are socialized into hunting at an early age, compared to past generations.

Past leisure experiences of one's family and extended family influence the types of recreational activities established during childhood, because they produce a familiar

lifestyle and values associated with pleasurable childhood experiences with family members or friends (Yoesting and Burkhead, 1973). Hunters may hunt less or even quit hunting to participate in other sports or leisure activities (Applegate, 1989). Therefore, we hypothesize:

H₃ Hunting participation is decreasing because participants are substituting other types of leisure activities in place of hunting.

2.2.1.3 Supply Factors

There are many supply factors associated with the decline in hunting participation. The populations of many game species are increasing due to the decrease in hunting participation, but this is causing more and more human-wildlife interactions (Riley *et al.*, 2003). While some species have grown in population size, others have declined. Deer and wild turkey are very abundant today, while quail, rabbits, woodcock, and grouse are having problems due to declining habitats (Phillips, 2007).

Another supply factor associated with the decline in hunting participation is that hunters are finding land availability to be a problem (Backman and Wright, 1993; Dietz *et al.*, 1996; Mehmood, Zhang, and Armstrong, 2003; Miller and Vaske, 2003; Wright, Rodgers, and Backman, 2001). Substantial acreage has been lost to hunting over the decades due to suburban development and the splitting up of rural areas into plots so small that the amount of open space where hunting can occur legally has declined. The amount of hunting that occurs on private lands where these obstacles are not present probably has not changed substantially. In addition, values are not only changing in

urban areas, but rural areas as well. Many private landowners are managing their lands with tighter controls and no longer permitting hunting on their property, thereby causing an increase in hunter density on public lands (Miller and Vaske, 2003).

There are many factors associated with the decline in hunting participation. A 1986 national study conducted by National Family Opinion Research, Inc. listed the top five factors curtailing hunting as: 1) access to hunting land, 2) crowded hunting areas, 3) finding time to go hunting, 4) less landowner cooperation, and 5) less game in general (National Shooting Sports Foundation, 1986). Therefore, we hypothesize:

H₄ Declining participation in hunting is the result of changing socio-economic factors in American society and not of any adverse ecological factors in America's natural environment.

H₅ Hunting participation is decreasing due to ecological factors, including reduced wildlife populations and habitat.

2.2.2 Study Objective

As hunting participation continues to decline, researchers need to identify factors that impact changes in participation. As we lose our hunting revenue streams, Indiana agencies will lose the ability to effectively manage wildlife and the associated habitat. The overall guiding hypothesis guiding this research holds that declining participation in hunting is the result of changing socio-economic factors in American society and not of any adverse ecological factors in America's natural environment.

This research sought to identify the most salient factors associated with the decline in hunting participation in Indiana, and to address the social factors influencing the change in hunting participation. Many stakeholders, agencies, citizens, and wildlife biologists are interested in the changes in hunting participation.

Perceptions of Indiana residents were gathered and tested against current theories found in the research literature. Indiana data were compared to existing national data provided through national surveys, such as the 2006 National Survey on Hunting, Fishing, and Wildlife Recreation (U.S. Department of Interior, 2008) with specific reports on Indiana. This information will be used in order to assist in the development of policy to retain and recruit hunters in the future, i.e., for wildlife management agencies.

2.3 Methods

A mix of hunters and nonhunters were interviewed and surveyed to represent the diversity of opinions about hunting across Indiana's population. For the purposes of this study, a current hunter was defined as someone who has purchased any type of hunting license within the last three years. In contrast, a former hunter was defined as someone who hunted more than three years ago, but who has not hunted since that time (Mehmood *et al.*, 2003). Nonhunters are those who have never hunted, but are not against hunting, while anti-hunters are those who are against hunting.

2.3.1 Initial Interviews

Interviews and a survey were used as tools to gather the perceptions and opinions of Indiana residents, while providing qualitative interpretive data. To further develop the survey questionnaire, subjects were interviewed to identify salient issues about the

changes in hunting participation in Indiana. The subjects were recruited as they entered a local Bureau of Motor Vehicles and asked a series of questions. Subjects were interviewed until their answers became repetitive and the domain was exhausted for each question. The answers the subjects provided were used to test the hypotheses, provide the choices that were input into the final questionnaire, and identify problem questions. This was done in order to remove bias from the development of the questionnaire (P. Chandler, personal communication, March 7, 2008).

Current hunters were asked questions about their introduction into hunting, whether or not they had family members who hunt, and whether or not they have ever introduced a child into hunting. In contrast, former hunters were asked why they no longer participate in hunting and if they have moved to another leisure activity in place of hunting, while nonhunters and anti-hunters were asked why they do not participate in hunting. All respondents were asked to answer demographic questions, to state what they believe has caused the change in hunting participation, and to list their leisure activities during the hunting season.

The salience of the responses elicited from the interviews guided the development of a questionnaire that was administered to a sample population of Indiana residents 18 years of age and older (Chandler, 2006). Table 1 shows the salience of the responses elicited from interview respondents when asked why they don't participate in hunting, and Table 2 shows the salience of the responses elicited from interview respondents when asked why they no longer participate in hunting. The most salient responses were input into the final questionnaire as choices respondents could check when asked the identical question.

Table 1. Reasons interview respondents don't participate in hunting. (n = 18)

Reasons for nonparticipation	Salience¹
Not brought up into hunting	6.19
Not willing to kill animals	2.61
Have other leisure activities during hunting season	1.76
Cost of licenses and equipment	1.76
Don't like guns	1.71
Ethical problems with hunting	0.96
Don't eat meat	0.96
Lack of hunting partners	0.96
Declining habitat	0.9
Lack of game	0.9
Lack of interest	0.21
Not willing to take hunter education course	0.21
Disability	0.19
Don't want to field dress an animal	0.19

¹ $S_x = f \times (n - r_x)$

Table 2. Reasons interview respondents no longer participate in hunting. (n = 8)

Reasons for discontinuing participation	Salience¹
Lack of time	6.0
Loss of interest	1.38
Cost of licenses and equipment	1.25
Lack of hunting partners	1.25
Less access to private land	0.75
Disability	0.63
Declining habitat	0.5
Lack of game	0.125
Don't like cold weather	0.125
Buy food at store	0.125

¹ $S_x = f \times (n - r_x)$

The questionnaire was not pretested because the survey questions were derived directly from the initial interviews (Dietz *et al.*, 1996). The initial interviews were completed during October 2008. The survey was administered from mid-November to early December 2008 because this is the height of the hunting season, and hunting issues should have been fresh in people's minds.

2.3.2 Mail Survey

A self-administered mail survey was developed from issues gathered from interviews and used as the method to reach current and former hunters. The Indiana Department of Natural Resources Division of Fish and Wildlife provided mailing addresses of a sample of Indiana current hunters (n = 250) and former hunters (n = 250). Potential subjects were pulled from a database created from hunting license information. The query used to generate the sample population pulled the potential subjects from Indiana counties based on population. Counties with higher populations generated more potential subjects.

Current and former hunters were mailed a questionnaire, cover letter explaining the purpose of the survey, and a pre-addressed, postage paid envelope. Each subject was asked to identify themselves as either a current hunter or former hunter. The three-page questionnaire was organized in sections that were answered depending on how each subject identified themselves. Current hunters were asked 23 questions that addressed issues related to previous hunting experiences, introduction into hunting, observations of hunting in Indiana, leisure activities and demographics. Former hunters were asked the same questions as current hunters, plus a question about reasons why they no longer hunt.

2.3.3 Face-to-face Survey

To access the nonhunting public, subjects were recruited as they entered a local Bureau of Motor Vehicles. This method was used in order to reach nonhunters and anti-hunters. Each subject ($n = 77$) was asked to complete a voluntary questionnaire about society's views and perceptions of the state of hunting participation in Indiana. The same questionnaire used for the mail survey was taken to onsite locations and used in the face-to-face survey method. Nonhunters and anti-hunters were asked 19 questions that addressed issues related to reasons for nonparticipation, observations of hunting in Indiana, leisure activities and demographics.

To further access the nonhunting public, subjects were recruited from a local bowling alley ($n = 18$) and an elementary school staff ($n = 25$). Questionnaires were administered until responses became repetitive and the domain was exhausted for each question. The subjects' answers to the questionnaires provided interpretive data that was then used to test the hypotheses.

2.3.4 Response Rate

The initial interviews were completed at a local Bureau of Motor Vehicles and the response rate was 38.8% (38 out of 98). When adjusted for non-deliverable surveys, the response rate for the mail survey was 16.4% (74 out of 451). The face-to-face survey response rate for the Muncie BMV was 40.3% (31 out of 77); for the Rose Bowl was 94.4% (17 out of 18); and for the Blue River Valley Elementary School was 100% (25 out of 25). The total combined response rate for face-to-face surveys was 60.8% (73 out of 120).

Socioeconomic data were checked against population data for Indiana as a whole to see how the sample compared to the state population in order to deal with nonresponse error. The variables used to compare the sample and population data were: age, gender, ethnicity, residence, annual household income, and educational background. The demographics of the respondents were found to be representative of Indiana as a whole. Nonresponse bias is not considered a problem in studies of attitude (Manfredo, Sneegas, Driver, and Bright, 1989).

Some existing data for Indiana are available from the U.S. Fish and Wildlife Service. The U.S. Fish and Wildlife Service has conducted a national survey of hunting (as well as fishing and wildlife-associated recreation) approximately every 5 years since 1955. The data obtained from this survey were then broken down into state by state information. The demographic results from the current hunter respondents were compared to the results of the 2006 data for Indiana. Age, gender, ethnicity, residence, annual household income, and educational background were the variables used to compare the current hunter sample to the 2006 data for Indiana. The current hunter sample was found to be very similar.

2.3.5 Statistical Analyses

SPSS was the statistical software used to analyze the data. Chi-squared analyses (Ott and Longnecker, 2001) and correlations were used to examine the significance of associations between the respondent's attitudes towards wildlife, hunters, and demographic characteristics. Relationships were considered statistically significant if $p \leq 0.05$. The data were entered into SPSS and salience calculated. Salience was calculated by the following formula:

$$S_x = f_x (n - r_x)$$

where:

- S_x is the salience of item x
- f_x is the frequency of item x in the lists of those offering responses
- n is the total number of different items in all lists
- r_x is the mean of the rank order of item x across all responsive lists (Chandler, 2006, p. 32).

2.4 Results and Discussion

2.4.1 Descriptive Analyses

A total of 12 current hunters (12.2%) responded to the initial interviews and 75 current hunters (16.6%) responded to the survey. The number of respondents in the former hunter, nonhunter, and anti-hunter groups for the initial interviews were 8, 8 and 10, representing a response rate of 8.2%, 8.2% and 10.2%, respectively. The number of respondents in the former hunter, nonhunter, and anti-hunter groups for the survey were 19, 43 and 10, representing a response rate of 4.2%, 9.5% and 2.2%, respectively.

2.4.2 Demographic Factors

Table 3 shows the demographics of responding current hunters, former hunters, nonhunters, and anti-hunters to the survey. The Chi-square test indicates that gender, children living at home, and educational background are different among these groups, as $p \leq 0.05$. Distribution of age, ethnicity, marital status, number of people living in household, and annual household income are not different among these groups, as $p \geq 0.05$. In particular, current hunters were predominantly white males. They were young,

TABLE 3. Demographic characteristics of survey respondents.

	Current hunters (%) (n = 75)	Former hunters (%) (n = 19)	Non-hunters (%) (n = 43)	Anti-hunters (%) (n = 10)	Chi-square ¹
Age					
18-30	27	16	14	30	12.53
31-40	17	21	24	30	
41-50	23	5	31	20	
51-60	20	42	21	20	
Over 60	13	16	10	0	
Gender					
Male	97	95	30	10	83.97**
Ethnicity					
White	100	100	95	100	4.97
Status					
Single	24	21	14	20	6.34
Married	64	63	77	70	
Divorced	12	11	7	10	
Widowed	0	5	2	0	
Children at home					
Yes	36	32	63	30	10.08*
People in household under 18					
2 or less	94	100	80	100	9.17
3 or more	6	0	20	0	
People in household 18 and over					
2 or less	75	88	87	90	3.33
3 or more	25	13	13	10	
Education					
High school graduate or less	41	32	16	10	22.68**
Some college	25	32	12	40	
College degree	21	21	35	20	
Some graduate school or above	12	16	37	30	
Annual household income					
\$9,999 or less	3	0	0	0	16.21
\$10,000 to \$19,999	3	0	5	10	
\$20,000 to \$29,999	11	16	5	0	
\$30,000 to \$39,999	17	5	7	20	
\$40,000 to \$49,999	17	21	12	10	
\$50,000 to \$74,999	28	32	37	40	
\$75,000 to \$99,999	8	16	15	20	
\$100,000 or above	14	11	20	0	

¹Test of homogeneity, conducted by using the number of respondents in each category.

* $p < .05$. ** $p < .01$. *** $p < .001$.

with 44% of the current hunters being under 40 years old and only 13% over 60 years old. In contrast, 58% of former hunters were over 50 years old. Former hunters were also predominantly white males. Anti-hunters were more likely to be female and less likely to have children. The demographic characteristics of the current hunter sample were consistent with those reported by the U.S. Department of Interior (2008).

2.4.2.1 Gender

In this survey, current and former hunters were overwhelmingly male, 97% and 95% respectively. This is consistent with the U.S. Department of Interior (2008). In 2006, men comprised 91% of hunters in Indiana (U.S. Department of Interior, 2008). This is also consistent with Floyd and Lee (2002) who found a gender difference in purchasers of hunting licenses.

While current and former hunters were overwhelmingly male, nonhunters and anti-hunters were predominately female, 70% and 90% respectively. Female members of the family may participate but it is less common. This represents another place where the weaving of hunting into the social structure may be critical. If females accept the activity of hunting then they may, in turn, be more supportive of the activity in legislation.

2.4.2.2 Age

Like gender and hunting, the relationship between age and hunting is very predictable. Youth remain a constant focus among state fish and wildlife agencies for good reason. As previously stated, most hunters are initiated into the sport of hunting before age 20 (Responsive Management, 2003). Table 4 shows the ages that current and former hunter survey respondents were introduced into hunting. Over 91% of current and

former hunter survey respondents were initiated into the sport of hunting before age 20. Similarly, 100% of current and former hunter initial interview respondents were initiated into the sport of hunting before age 20. The average age respondents were initiated into the sport of hunting is 12.07.

Table 4. Age current and former hunter respondents were introduced into hunting.

Age	Frequency	Cumulative percent
1-9 yrs	30	31.9
10-19 yrs	56	91.5
20-29 yrs	5	96.8
30 or more yrs	3	100.0
Total	94	

While most hunter respondents were initiated into the sport of hunting at an early age, there was no statistical difference found in age introduced into hunting between current and former hunters. The average age current hunters were introduced into hunting was 12.36, whereas the average age former hunters were introduced was 10.95. The hypothesis that hunting participation is decreasing because individuals are not socialized into hunting at an early age as in past generations was not supported statistically. The hypothesis was tested with a correlation between the age that current and former hunter respondents were introduced into hunting and respondents' current age. It was found not significant ($p > 0.05$).

Most studies show that frequency of participation in hunting decreases with age. Former hunters are generally older than current hunters. The average age of current

hunter respondents was 43.5, while the average age of former hunter respondents was 47.0. An older respondent is more likely to have a higher number of adults in the family. Supporting and managing a larger family may also put a constraint on time and money available for leisure pursuits.

2.4.2.3 Residence

A person growing up in a rural area is more likely to be introduced to hunting than someone raised in a city. In response to the survey, 80% of anti-hunter respondents had an urban residence, while the other 20% was suburban. Sixty-two percent of nonhunter respondents had a rural residence. Over fifty-three percent of current and former hunter respondents reported a rural residence (Table 5). Brown, Decker, Purdy, and Mattfield (1987) suggested that urban residence was a “barrier” to hunting socialization (i.e., learning to hunt). They found that urban recruits were more likely to cease participation than individuals recruited from rural areas.

Table 5. Survey respondents place of residence.

	Rural	Urban	Suburb	Total	Chi-square¹
Current hunters	39	21	13	73	16.785***
Former hunters	10	7	2	19	
Nonhunters	26	8	8	42	
Anti-hunters	0	8	2	10	
Total	75	44	25	144	

¹Test of homogeneity, conducted by using the number of respondents in each category.
* $p < .05$. ** $p < .01$. *** $p < .001$.

2.4.3 Social Factors

Family values play a critical role in hunting initiation. In this study, 79.8% of respondents were initiated by a family member. Over 60% of respondents were initiated by their father. Hunters who are initiated in this manner hunt more frequently and are more likely to hunt avidly throughout their lifetime (Duda, Bissell, and Young, 1995), especially if socialized at a young age (Purdy, Decker, and Brown, 1989; Stedman and Heberlein, 2001).

Research suggests that the immediate family is the most important source of initiation into hunting participation. In this study, 92% of respondents believed that hunters are introduced to the sport of hunting in Indiana by family members. Eighty percent of responding current hunters had family members that hunt, in contrast to the 57.9% of former hunters that had family members that hunt (Table 6). Sixty-two percent of respondents to the 1985 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation described their immediate family members as the most important influence on their initiation into hunting (U.S. Department of Interior, 1988).

Table 6. Current and former hunter respondents who have family members that hunt.

	Frequency (n = 94)	Percent	Chi-square¹
Current hunters	60	80%	4.008*
Former hunters	11	57.9%	
Total	71		

¹Test of homogeneity, conducted by using the number of respondents in each category.

* $p < .05$. ** $p < .01$. *** $p < .001$.

As hunters lose hunting partners, they themselves are less likely to continue (Responsive Management, 2003). Table 6 supports this, in that as hunters lose family members (i.e., hunting partners), hunters will discontinue participation. Twenty-five percent of initial interview respondents cited “lack of hunting partners” as a reason for discontinuing hunting participation.

When asked for reasons why former hunters no longer participated in hunting, 87.5% of initial interview respondents indicated they no longer had the time to participate. Twenty-five percent cited “loss of interest” as the reason they no longer participate, while 25% indicated that the cost of licenses and equipment was the reason for discontinuing participation. Less access to private land (12.5%), disability (12.5%), and declining habitat (12.5%) were also cited as reasons for discontinuing hunting (Table 7).

Table 7. Reasons former hunters interviewed gave for discontinued participation.

Reasons for discontinuing participation	Percentage (n = 8)
Lack of time	87.5
Loss of interest	25.0
Cost of licenses and equipment	25.0
Lack of hunting partners	25.0
Less access to private land	12.5
Disability	12.5
Declining habitat	12.5

Although many studies show that lack of hunting partners is a major reason for discontinuing hunting participation, none of the former hunter respondents to the survey chose lack of hunting partners as a reason for discontinuing hunting participation. When asked for reasons why former hunters no longer participated in hunting, 42.1% of survey respondents indicated they no longer had the time to participate. Over thirty-one percent cited “loss of interest” as the reason they no longer participate, while 15.8% indicated that the cost of licenses and equipment was the reason for discontinuing participation. Less access to private land (15.8%) and declining habitat (10.5%) were also cited as reasons for discontinuing hunting (Table 8). In a similar study, Dietz, Higgins, and Mendelsohn (1996) also found that lack of time and loss of interest were the two reasons given most often for decreased participation.

Table 8. Reasons former hunter survey respondents discontinued hunting participation.

Reasons for discontinuing participation	Percentage (n = 19)
Lack of time	42.1
Loss of interest	31.6
Cost of licenses and equipment	15.8
Less access to private land	15.8
Declining habitat	10.5
Lack of game	5.3
Lack of processing locations	5.3

2.4.4 Supply Factors

Ninety-nine percent of current and former hunter respondents indicated that they hunted on private land. This result is higher than the Indiana results (88%) from the 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (U.S. Department of Interior, 2008). It is more expensive to hunt on private land, and perhaps some of the former hunters who used to hunt on private land stopped because the additional cost of hunting on private land proved to be too expensive for them. Nonhunters, on the other hand, prefer public lands that provide ample opportunities for inexpensive recreation (Wright *et al.*, 2001). Fifty-four percent of current and former hunter respondents indicated that they hunted on public land.

2.4.5 Socio-economic vs. Ecological Factors

When asked what has caused the change in hunting participation in Indiana, the most salient response indicated by initial interview respondents was less access to private land (Table 9). Table 9 shows the initial interview respondents' most salient reasons for the change in hunting participation in Indiana. Other responses of note were an aging population (6%), no longer a necessity (6%), and increased deer-vehicle-collisions (6%).

Less access to private land was also the most salient response indicated by the survey respondents (Table 10). Table 10 shows the survey respondents' most salient reasons for the change in hunting participation in Indiana. Other responses of note were lack of outdoor interaction (3.8%), an aging hunting class (2.8%), single parent households (1.9%), and decreased initiation at an early age (1.9%).

Table 9. Initial interview respondents’ most salient reasons for the changes in hunting participation in Indiana.

Reasons for change	Salience¹	Percentage of respondents (n = 36)
Less access to private land	5.11	25.0
Urbanization	3.96	19.0
Lack of time	3.86	19.0
Cost of licenses and equipment; economical constraints	3.43	17.0
Increased rules and regulations	2.8	14.0
Changing values in younger generation; more technology based society	2.63	14.0
Lack of game	2.26	11.0
No longer passing down tradition	2.2	11.0

¹ $S_x = f \times (n - r_x)$

This study, as well as other studies (Gilbert, 1977; Mehmood *et al.*, 2003; Miller and Vaske, 2003), found that socio-economic factors were the primary cause for the decrease in hunting participation. These results support the hypothesis that declining participation in hunting is the result of changing socio-economic factors in American society and not of any adverse ecological factors in America’s natural environment.

However, a small percentage of initial interview respondents (Table 9) and survey respondents (Table 10) cited “lack of game” and “declining habitat” as reasons for the changes in hunting participation in Indiana. This is partial evidence supporting the hypothesis that hunting participation is decreasing due to ecological factors, including reduced wildlife populations and habitat.

Table 10. Survey respondents' most salient reasons for hunting participation changes.

Reasons for change	Saliency¹	Percentage of respondents (n = 106)
Less access to private land	9.56	37.7
Changing values in younger generation; more technology based society	4.31	17.0
Lack of time	4.09	16.0
Urbanization	4.06	16.0
Cost of licenses and equipment; economical constraints	4.04	16.0
No longer a necessity	3.14	12.3
Decreasing popularity; media portraying bad image	2.17	8.5
Lack of game	1.9	7.5
Less interest	1.67	6.6
Declining habitat	1.42	5.7

¹ $S_x = f \times (n - r_x)$

One of the socio-economic factors associated with the change in hunting participation is the increase in urbanization. When asked what has caused the change in hunting participation in Indiana, the second most salient response from the initial interview respondents was urbanization (Table 9). Urbanization was also among the most salient responses from survey respondents (Table 10). This evidence supports the hypothesis that hunting participation is decreasing because society is becoming more urbanized; therefore, people have less interest in hunting.

Over six percent of survey respondents indicated they lost interest in hunting participation (Table 10). Twenty-five percent of former hunter respondents to the initial interviews discontinued hunting because they lost interest (Table 7). Similarly, 31.6% of former hunter survey respondents no longer participate due to loss of interest (Table 8).

This further supports the hypothesis that hunting participation is decreasing because society is becoming more urbanized; therefore, people have less interest in hunting.

2.4.6 Leisure Activities

As mentioned previously, hunters may hunt less or even quit hunting to participate in other sports or leisure activities. The hypothesis that hunting participation is decreasing because participants are moving to other types of leisure activities was not supported statistically. Only 12.5% of respondents stated that their leisure activities took the place of or substituted for hunting. Table 11 shows the respondents most salient leisure activities during the hunting season. The leisure activities elicited in this study are similar to the findings of a study done by Dietz, Higgins, and Mendelsohn (1996).

Table 11. Survey respondents most salient leisure activities during the hunting season.

Leisure activity	Salience¹	Percentage of respondents (n = 120)
Spending time with family and friends	8.42	20
Play sports	7.78	18.3
None	7.18	16.7
Fishing	6.74	15.8
Watching television	6.66	15.8
Reading	6.33	15.0
Exercise	3.14	7.5
Hiking	3.11	7.5
Camping	2.84	6.7
Target shooting	2.13	5.0

¹ $S_x = f \times (n - r_x)$

2.4.7 Anti-hunters

Ninety percent of anti-hunter respondents were females, which is consistent with Einwohner (1999). Nationally representative data also show that women are more likely to support animal rights issues than are men (Peek, Bell, and Dunham, 1996). This could be one possible explanation for a minimal amount of women hunters.

When asked for reasons why respondents don't participate in hunting, 100% of anti-hunter survey respondents indicated they had ethical problems with hunting (Table 12). Table 12 shows the reasons nonhunter and anti-hunter survey respondents don't participate in hunting. For anti-hunter respondents, views and perceptions of hunting seem to be the primary reason for lack of hunting participation. Thirty percent of anti-hunter respondents indicated they were not brought up into hunting (Table 12).

Table 12. Reasons nonhunter and anti-hunter respondents don't participate in hunting.

Reasons for non-participation	Percentage of nonhunters (n = 43)	Percentage of anti-hunters (n = 10)
Not brought up into hunting	58.1	30.0
Other leisure activities during hunting season	34.9	0.0
Not willing to kill animals	23.3	90.0
Lack of interest	16.3	0.0
Don't like guns	16.3	10.0
Costs of licenses and equipment	9.3	0.0
Ethical problems with hunting	7.0	100.0
Don't eat meat	4.7	30.0
Not willing to take hunter education course	2.3	0.0
Disability	2.3	0.0

2.5 Summary and Conclusions

2.5.1 Data Analysis

This study, as well as other studies (Dietz *et al.*, 1996; Gilbert, 1977; Mehmood *et al.*, 2003; Miller and Vaske, 2003), found that socio-economic factors were the primary cause for the decrease in hunting participation. The results of this study support the hypothesis that declining participation in hunting is the result of changing socio-economic factors in American society and not of any adverse ecological factors in America's natural environment.

While the decline in hunting participation in Indiana is likely found to be the result of changing socio-economic factors, there is minimal evidence supporting the hypothesis that hunting participation is decreasing due to ecological factors, including reduced wildlife populations and habitat. However, the results of this study found that the majority of the evidence rejects this hypothesis.

While most respondents were initiated into the sport of hunting at an early age, there was no statistical difference found in age introduced into hunting between current and former hunters. The hypothesis that hunting participation is decreasing because individuals are not socialized into hunting at an early age as in past generations was not supported statistically. The hypothesis was tested with a correlation between the age current and former hunter respondents were introduced into hunting and respondents' current age. It was found not significant ($p > 0.05$). The hypothesis did not address the number of youth introduced into hunting, only that current and former hunters had similar ages of introduction. Therefore, this study did not address the total number of youth being introduced and how that has changed over time.

One of the socio-economic factors associated with the change in hunting participation is the increase in urbanization. Urbanization was perceived to be one of the primary reasons for the decline in hunting participation in Indiana. This evidence supports the hypothesis that hunting participation is decreasing because society is becoming more urbanized; therefore, people have less interest in hunting. Further supporting the hypothesis, many respondents discontinued hunting participation due to a loss of interest.

Another proposed factor associated with the decline in hunting participation in Indiana is that hunters may hunt less or even quit hunting to participate in other leisure activities. The hypothesis that hunting participation is decreasing because participants are moving to other types of leisure activities was not supported statistically. Most respondents' leisure activities did not affect their decision on whether or not to participate in hunting.

2.5.2 Management Recommendations

This study surveyed several factors that may affect an individual's decision to participate in hunting. One problem with surveying public opinion is that wildlife management agencies will modify their programs to what the majority of the public wants and not what is best for wildlife, i.e., increasing game bag limits. These agencies should use public opinion as a tool rather than a means of wildlife management (Dietz *et al.*, 1996). While Indiana agencies need to be aware of public attitudes, they must also view attitudes within the context of their mission, goals, and objectives.

The level of anti-hunting sentiment in the U.S. is minimal and is having little impact on hunter recruitment, satisfaction, retention or desertion. Furthermore, the public

supports legal hunting and feels that hunting should remain legal (Duda *et al.*, 1995). Efforts toward improving hunter behavior will go far in increasing positive public attitudes toward hunting.

Land access for hunting is a growing concern among wildlife agencies, particularly in the Midwest, where the proportion of private to public land makes access to private land a very important component of hunting. Providing access to private land and having such lands within reasonable proximity to hunters throughout Indiana may contribute to hunter retention and recruitment efforts. If hunting is to increase in popularity, public support is critical.

A major reason for desertion by hunters is the breakdown in the social support (Duda *et al.*, 1995). Providing and enhancing social support for hunters is the key to future hunting participation. Efforts to increase participation should focus on “becoming a hunter” and not on “going hunting.” How someone develops a personal/cultural identity as a hunter is a long-term process involving numerous activities and always occurring in a particular social context. Any individual can go hunting once or even multiple times, but development of a personal/cultural identity is necessary for long-term commitment and participation. Agencies are limited in their ability to directly influence many aspects of social support issues, but they can and should be catalysts in this regard.

The issue of social support for hunters and hunting is complex. It is far beyond the scope of any single program, agency, or organization to solve by itself. However, there are many actions that individual programs, agencies, and organizations can take to move in the right direction to help introduce more people to hunting activities and to

increase their participation at every stage in their hunting careers. How we reach adults, youth, females, former hunters, etc., can vary greatly and our actions need to reflect that.

The development of social competence is critical to the development of a long-term hunter. Education programs can be used to create a more loyal hunter by instilling knowledge on opportunities, skills, biology, ethics, and much more. Hunter education programs have largely focused on technical competence with little or no consideration for influencing social competence. Wildlife management agencies should conduct outreach programs to educate the youth about the ecological benefits hunting provides.

Apprenticeship experiences provide opportunities for interested people to become socialized into hunting. Special adult-youth hunts could be established to encourage participation. Through these experiences, the individual develops technical competence in a set of skills and techniques, as well as a social competence through recognition and adoption of qualities and beliefs that are associated with being a hunter.

While the youth remain a constant focus for wildlife management agencies, there are other groups that need to be addressed as well. There are many adults who have not been brought up into hunting. Some of these adults may want to pick up hunting later in life, but have no family members or friends who hunt. Without family members or friends to introduce them into hunting, these adults are likely to remain nonhunters. In order to address this group of people, wildlife management agencies could partner with local hunting clubs to provide a program where people of any age can be introduced into hunting. Wildlife management professionals could give presentations on the ecological benefits of hunting, harvest techniques, rules and regulations, etc. Local hunting club members could be present to share their unique club attributes, previous hunting

experiences, etc. Interested individuals will be able to learn the basic technical aspect of hunting, as well as the social aspect. They will be able to meet and talk with others who have similar interests and potentially find hunting partners for future hunts.

Shaw and Gilbert (1974) found that 100% of male and 44% of female college students hunted if both their parents participated, while only 75% of males and 14% of females participated if only the father hunted. Therefore, more family participation could be encouraged by making available a combination family hunting license with little or no additional cost over a single license. The standard license could be for 2 adults and 2 children (up to age 18). Additional children could be added for an additional fee.

The results of this study suggest that agencies would gain the most from efforts to retain current hunters, while recruiting young adult males. Many youth educational programs or hunting camps to introduce the basics of hunting are available in many other states, but very few are found in Indiana. This type of basic introduction is needed, especially for young adults who do not have family members or friends that can initiate them into the sport. Providing opportunities for these young adults to become socialized into the sport of hunting can create more loyal and avid hunters, thereby increasing hunting participation rates for future generations.

Many respondents have expressed their dissatisfaction with the current price of hunting licenses. A decrease in licenses could potentially increase hunting participation rates. Current hunting season lengths were also a cause for concern among many respondents. Many respondents, especially former hunters hunting during the deer firearms season, felt they were only able to hunt a few days out of the year due to the current season lengths. An increase in season length could also stabilize or increase

hunting participation rates in Indiana. Finally, efforts to keep hunting woven into the social structure of the community would ensure that hunting maintains the critical support and acceptance of the nonhunting community.

As agencies are dependent on hunters for operating funds and support for wildlife programs, we must broaden our understanding of the diverse nature of hunter involvement if hunters are to continue to provide this support. If we can stabilize or increase hunting participation in the United States, we could take a giant step towards improving the health of our ecosystem and maintaining wildlife conservation.

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Chapter 3: General Summary

Trends in hunter recruitment and retention reflect the demand for hunting participation. These trends also may indicate changes in the number of people supportive of some conservation programs and number of people available to help achieve wildlife management goals. For example, declining hunting participation may make it more difficult to reduce populations of nuisance or overabundant wildlife species.

Several factors have been found to be associated with the decline in hunting participation in Indiana. In this study, these factors have been separated into three categories: demographic (age, race, gender, residence, etc.), social (family or friends to participate with, introduction to hunting, etc.), and supply (land availability, game availability, etc.). Results from this study show that socio-economic factors were the primary cause for the decrease in hunting participation. These results support the hypothesis that declining participation in hunting is the result of changing socio-economic factors in American society and not of any adverse ecological factors in America's natural environment.

However, a small percentage of respondents indicated ecological reasons for the changes in hunting participation in Indiana. This is minimal evidence supporting the hypothesis that hunting participation is decreasing due to ecological factors, including reduced wildlife populations and habitat.

3.1 Study Results

3.1.1 Demographic Factors

The results of this study show that the demographics of current hunters, former hunters, nonhunters, and anti-hunters were somewhat different. The Chi square test indicated that gender, children living at home, and educational background are different among these groups, while the distribution of age, ethnicity, marital status, number of people living in household, and annual household income are not. In particular, current hunters were predominantly white males. They were young, with 44% of the current hunters being under 40 years old and only 13% over 60 years old. In contrast, 58% of former hunters were over 50 years old. Former hunters were also predominantly white males. The demographic characteristics of the current hunter sample were consistent with those reported by the U.S. Department of Interior (2008).

3.1.2 Social Factors

When asked what has caused the change in hunting participation in Indiana, the most salient response indicated by initial interview respondents was less access to private land. Other responses of note from the initial interviews were an aging population (6%), no longer a necessity (6%), increased deer-vehicle-collisions (6%). Access to private land was also the most salient response indicated by the survey respondents. Survey respondents indicated that lack of outdoor interaction (3.8%), an aging hunting class (2.8%), single parent households (1.9%), and decreased initiation at an early age (1.9%) were also reasons for the change in hunting participation in Indiana.

3.1.3 Supply Factors

While socio-economic factors were the primary reasons for the decline in hunting participation in Indiana, a small percentage of initial interview respondents and survey respondents cited “lack of game” and “declining habitat” as reasons for the changes in hunting participation in Indiana. Surprisingly, over 50% of respondents citing “lack of game” and “declining habitat” were nonhunters.

3.1.4 Respondents View of Participation

The Chi square test indicated that survey respondents view of the change in hunting participation over time were different among current hunters, former hunters, nonhunters, and anti-hunters. Current hunters, former hunters, and nonhunters seem to realize that hunting participation is decreasing (Table 13). On the other hand, anti-hunters seem to perceive that the percentage of people participating in hunting has stayed the same over time (Table 13). Interestingly, a smaller percentage of nonhunters and

Table 13. Survey respondents view of the change in hunting participation over time.
(n = 143)

Change over time	Current hunters (%)	Former hunters (%)	Non-hunters (%)	Anti-hunters (%)	Chi-square¹
More people hunt now than in previous generations.	32.4	21.1	4.9	0.0	33.69***
Less people hunt now than in previous generations.	56.8	57.9	73.2	22.2	
The percentage of people participating in hunting has stayed the same over time.	10.8	21.1	22.0	77.8	

¹Test of homogeneity, conducted by using the number of respondents in each category.
* $p < .05$. ** $p < .01$. *** $p < .001$.

anti-hunters believed that more people hunt now than in previous generations than current and former hunters (Table 13).

3.1.5 Game Type

Small game was found to be hunted most by most respondents (Table 14). The percentage of current hunter respondents indicating big game hunting activity was consistent with the Indiana results from the 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (U.S. Department of Interior, 2008). On average, respondents hunting small game and migratory birds were the youngest hunters, while respondents hunting big game and other animals were the oldest.

Table 14. Type of game current and former hunter survey respondents hunt.

Game type	Percentage of current hunters (n = 75)	Percentage of former hunters (n = 19)	Chi-square¹
Big game	84.0	52.6	8.6**
Small game	98.7	89.5	4.15*
Migratory bird	58.7	36.8	2.91
Other animals	41.3	36.8	0.13

¹Test of homogeneity, conducted by using the number of respondents in each category.
* $p < .05$. ** $p < .01$. *** $p < .001$.

3.2 Hypotheses

This study, as well as other studies (Gilbert, 1977; Mehmood *et al.*, 2003; Miller and Vaske, 2003), found that socio-economic factors were the primary cause for the decrease in hunting participation. As stated previously, the results of this study support the hypothesis that declining participation in hunting is the result of changing socio-

economic factors in American society and not of any adverse ecological factors in America's natural environment.

While the decline in hunting participation in Indiana has been found to be the result of changing socio-economic factors, there is minimal evidence supporting the hypothesis that hunting participation is decreasing due to ecological factors, including reduced wildlife populations and habitat. However, the results of this study found that the majority of the evidence rejects this hypothesis.

While most respondents were initiated into the sport of hunting at an early age, there was no statistical difference found in age introduced into hunting between current and former hunters. The hypothesis that hunting participation is decreasing because individuals are not socialized into hunting at an early age as in past generations was not supported statistically. The hypothesis was tested with a correlation between the age current and former hunter respondents were introduced into hunting and respondents' current age. It was found not significant ($p > 0.05$).

One of the socio-economic factors associated with the change in hunting participation is the increase in urbanization. Urbanization was found to be one of the primary reasons for the decline in hunting participation in Indiana. This evidence supports the hypothesis that hunting participation is decreasing because society is becoming more urbanized; therefore, people have less interest in hunting. Further supporting the hypothesis, many respondents discontinued hunting participation due to a loss of interest.

Another proposed factor associated with the decline in hunting participation in Indiana is that hunters may hunt less or even quit hunting to participate in other leisure

activities. The hypothesis that hunting participation is decreasing because participants are moving to other types of leisure activities was not supported statistically. Most respondents' leisure activities did not affect their decision on whether or not to participate in hunting.

3.3 Management and Future Research

3.3.1 Management Recommendations

This study surveyed several factors that may affect an individual's decision to participate in hunting. One problem with surveying public opinion is that wildlife management agencies will modify their programs to what the majority of the public wants and not what is best for wildlife. These agencies should use public opinion as a tool rather than a means of wildlife management (Dietz *et al.*, 1996). While Indiana agencies need to be aware of public attitudes, they must also view attitudes within the context of their mission, goals, and objectives.

The results of this study suggest that agencies would gain the most from efforts to retain current hunters, while recruiting young adult males. Many youth educational programs or hunting camps to introduce the basics of hunting are available in many other states, but very few are found in Indiana. This type of basic introduction is needed, especially for young adults who do not have family members or friends that can initiate them into the sport. Providing opportunities for these young adults to become socialized into the sport of hunting can create loyal and avid hunters, thereby increasing hunting participation rates for future generations.

Many respondents have expressed their dissatisfaction with the current price of hunting licenses. A decrease in licenses could potentially increase hunting participation rates. Current hunting season lengths were also a cause for concern among many respondents. Many respondents, especially former hunters hunting during the deer firearms season, felt they were only able to hunt a few days out of the year due to the current season lengths. An increase in season length could also stabilize or increase hunting participation rates in Indiana. Finally, efforts to keep hunting woven into the social structure of the community would ensure that hunting maintains the critical support and acceptance of the nonhunting community.

3.3.2 Future Research

This study used a state wide survey of Indiana residents age 18 and over. Due to budget constraints the sample size of the mailing survey was limited to 500. While the demographics of respondents were consistent with previous studies on hunting participation (U.S. Department of Interior, 2008), a larger sample size could give a better representation of Indiana current and former hunters.

Lifetime license holders and private landowners were limitations to this study. An individual holding a lifetime license was not included in the mailing survey sample population ($n = 500$). Certain private landowners were also not included in the mailing survey sample population, as owners of farmland and their families that hunt on the property where they live can hunt without a license. Although the mailing survey did not reach these two groups, the face-to-face surveys could have. Future research should focus on including these two groups into the sample population.

3.4 References

- Dietz, N. J., Higgins, K. F., and Mendelsohn, R. D. (1996). Factors associated with declining proportion of citizens hunting in South Dakota. *The Prairie Naturalist*, 27(4), 223-236.
- Gilbert, A. H. (1977). Influence of hunter attitudes and characteristics on wildlife management. *Transatlantic North American Wildlife & Natural Resource Conference*, 42, 226-236.
- Mehmood, S., Zhang, D., and Armstrong, J. (2003). Factors associated with declining hunting license sales in Alabama. *Human Dimensions of Wildlife*, 8, 243-262.
- Miller, C. A., and Vaske, J. J. (2003). Individual and situational influences on declining hunter effort in Illinois. *Human Dimensions of Wildlife*, 8, 263-276.
- U.S. Fish and Wildlife Service, U.S. Department of the Interior, and U.S. Department of Commerce, U.S. Census Bureau. (2008). *2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation*.

APPENDIX A

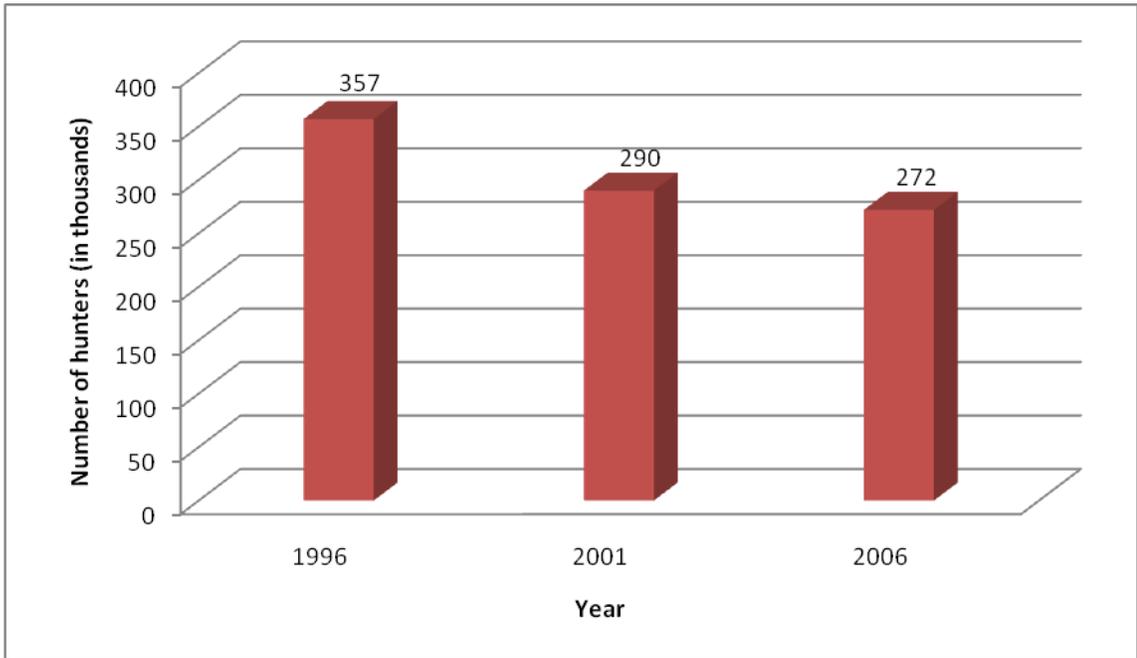


Figure 1. Number of people who hunted in Indiana: 1996-2006.

U.S. Department of the Interior, U.S. Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau. (2008). *2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation*.

APPENDIX B

September, 2008

**Indiana Department of Natural Resources Division of Fish and Wildlife
402 W. Washington, Rm W273
Indianapolis, IN 46204**

Dear Sir or Madam:

Much research has been conducted on hunting participation in the United States, but there is a gap in the research on hunting participation in Indiana. For this reason I am conducting research as a graduate student in Natural Resources and Environmental Management at Ball State University to identify the factors most important to understanding hunting participation in Indiana. The main goal of this research is to identify the most salient factors associated with the changes in hunting participation in Indiana.

I am interested in obtaining mailing addresses and phone numbers of a sample of Indiana resident current and former hunters. These identified subjects will be asked to complete a short, voluntary questionnaire that will assess people's opinions and behaviors related to hunting in Indiana. In no way will the results be identifiable to individual names but rather generalized to the whole state. We would be willing to share the results of the statewide survey upon request.

Your signature below, under "confirmed by," will indicate that you will agree to permit the researcher to utilize mailing addresses and phone numbers of a sample of Indiana resident current and former hunters. Please let us know if you have any questions concerning this survey.

Thank you for your help with this matter and we look forward to hearing from you.

Sincerely,

Joseph R. Holzinger II

Confirmed by:

For more information, feel free to contact researcher or Ball State advisor:

Principal Investigator:

Joseph R. Holzinger II, Graduate Student
Natural Res. & Environmental Man.
WQ 111
Ball State University
Muncie, IN 47306
(765) 524-7011
jrholzinger@bsu.edu

Faculty Supervisor:

Dr. Amy Gregg
Natural Res. & Environmental Man.
WQ 114
Ball State University
Muncie, IN 47306
(765) 285-5781
algregg2@bsu.edu

September, 2008

**Muncie Bureau of Motor Vehicles
2904 E. McGalliard Road
Muncie, IN 47303**

Dear Sir or Madam:

Much research has been conducted on hunting participation in the United States, but there is a gap in the research on hunting participation in Indiana. For this reason I am conducting research as a graduate student in Natural Resources and Environmental Management at Ball State University to identify the factors most important to understanding hunting participation in Indiana. This study is supported by Ball State University and the Indiana Department of Natural Resources.

I am interested in setting up outside the entrance to your building during the week of October 5, 2008 to administer a voluntary survey entitled "Identifying the Factors with Changing Hunting Participation in Indiana Survey." The survey is voluntary and will take approximately 10 minutes of the respondents' time.

Your signature below, under "confirmed by," will indicate that you will agree to permit the survey to be administered. Please let us know if you have any questions concerning this survey.

Thank you for your help with this matter and we look forward to hearing from you.

Sincerely,

Joseph R. Holzinger II

Confirmed by:

For more information, feel free to contact researcher or Ball State advisor:

Principal Investigator:

Joseph R. Holzinger II, Graduate Student
Natural Res. & Environmental Man.
WQ 111
Ball State University
Muncie, IN 47306
(765) 524-7011
jrholzinger@bsu.edu

Faculty Supervisor:

Dr. Amy Gregg
Natural Res. & Environmental Man.
WQ 114
Ball State University
Muncie, IN 47306
(765) 285-5781
algregg2@bsu.edu

November, 2008

**Ball State University
Department of Natural Resources and Environmental Management
West Quad 111
Muncie, IN 47306**

Identifying the Factors with Changing Hunting Participation in Indiana Survey

Dear Indiana Resident:

Much research has been conducted on hunting participation in the United States, but there is a gap in the research on hunting participation in Indiana. For this reason I am conducting research as a graduate student in Natural Resources and Environmental Management at Ball State University to identify the factors most important to understanding hunting participation in Indiana. This study is supported by Ball State University and the Indiana Department of Natural Resources. We are very interested in your opinions and behaviors. Your responses to the following survey are very important and will be kept confidential. In no way will the results be identifiable to individual names but rather generalized to the whole state. Thank you in advance for your help. We would be willing to share the results of the statewide survey upon request.

To be eligible to participate in this study, you must be an Indiana resident age 18 or older. For this project, you will be asked to complete a questionnaire about hunting participation in Indiana. It will take approximately 10 minutes of your time to complete. Then you will be asked to return it to Ball State University in the envelope provided. The mailing survey will be returned in a postage paid sealed envelope directly to the researcher and remain confidential. Names will not be collected on any of the questionnaires and subjects will remain confidential. Individual data will not be linked to names of participants and data reporting will be for the whole sample, not individual participants. The questionnaires will be kept in a lock box until the research is completed. The researcher will be the only one who will have access to the data. Upon completion of the research, the questionnaires will be shredded. Thank you for your participation in this very important survey.

Sincerely,

Joseph R. Holzinger II

For more information, feel free to contact researcher or Ball State advisor:

Principal Investigator:

Joseph R. Holzinger II, Graduate Student
Natural Res. & Environmental Man.
WQ 111
Ball State University
Muncie, IN 47306
(765) 524-7011
jrholzinger@bsu.edu

Faculty Supervisor:

Dr. Amy Gregg
Natural Res. & Environmental Man.
WQ 114
Ball State University
Muncie, IN 47306
(765) 285-5781
algregg2@bsu.edu

APPENDIX C

Interview Questions

Introduction: We are interested in learning about your opinions and behaviors as they relate to hunting or not hunting in Indiana.

1. Which of these best describes you, the respondent? Check one:
 - a. ___ Current hunter: purchased any type of hunting license within the last 3 years.
 - b. ___ Former hunter: have hunted more than 3 years ago, but have not hunted since that time.
 - c. ___ Nonhunter: have never hunted.
 - d. ___ Anti-hunter: against hunting.

If they answered 1a or 1b, go to Question 2. If they answered 1c or 1d, go to Question 6.

Current Hunters and Former Hunters:

2. At what age were you introduced into hunting? _____
3. Who introduced you into hunting? _____
 - I will then ask that persons relation.
4. Do any of your family members hunt? ___ Yes ___ No
If yes, please specify: _____
5. Have you ever introduced a child to hunting? ___ Yes ___ No
If yes, please specify your relation to the child: _____

If they answered 1c or 1d, please answer Question 6, then skip to Question 9.

Nonhunters and Anti-hunters:

6. What is the reason you don't participate in hunting?
 - I will continue to ask the subject "What else" until the respondent no longer has any answers.

If they answered 1b, please answer Question 7, otherwise go to Question 9.

Former Hunters:

7. What is the reason you no longer participate in hunting?
 - I will continue to ask the subject "What else" until the respondent no longer has any answers.
8. Have you moved to another type of leisure activity? ___ Yes ___ No

All subjects will be asked the following questions regardless of their answer to Question 1.

Demographic questions: Please tell us a little bit about yourself. This allows us to compare our respondents to the general population of Indiana.

9. What is your gender? ___ male ___ female
10. What was your age on your last birthday? ___ years

11. What is your role in the household? _____
12. Which of these best describes you?
 Single Married
 Divorced Widowed
13. Do you have children living at home? Yes No
14. How many people live in your household? Under 18 18 and older
15. What is your ethnicity? _____
16. What is your highest level of education completed?
 Some high school Completed high school
 Completed associates degree Some college
 Completed college degree Some graduate school
 Completed graduate degree
17. What is your annual household income?
 Less than \$10,000 \$10,000 to \$19,999
 \$20,000 to \$29,999 \$30,000 to \$39,999
 \$40,000 to \$49,999 \$50,000 to \$74,999
 \$75,000 or more
18. What is your occupation? _____
19. Please classify your residence. Check one:
 Rural Urban Suburb

All subjects will be asked the following questions regardless of their answer to Question 1.
Respondent feedback: We would like to hear more about your opinions, thoughts, observations, etc.

20. What do you believe is the reason why the number of people hunting in Indiana has changed?
 - I will continue to ask the subject “What else” until the respondent no longer has any answers.
21. What other leisure activities do you do during the hunting season?
 - I will continue to ask the subject “What else” until the respondent no longer has any answers.
22. Is there anything I have not asked that you feel is relevant? _____

Thank you very much for your responses.

Survey on Hunting Participation in Indiana

Introduction: We are interested in learning about your opinions and behaviors as they relate to hunting or not hunting in Indiana.

1. Which of these best describes you, the respondent? Check one:
 - a. ___ Current hunter: You have purchased any type of hunting license within the last 3 years.
 - b. ___ Former hunter: You have hunted more than 3 years ago, but have not hunted since then.
 - c. ___ Nonhunter: You have never hunted.
 - d. ___ Anti-hunter: You are against hunting.

If you answered 1a or 1b, go to Question 2.

If you answered 1c or 1d, please answer Question 8 and 9, then skip to Question 11.

Current Hunters and Former Hunters:

2. At what age were you introduced into hunting? _____
3. Who introduced you into hunting?
___ Family member ___ Nonfamily member
Please explain who: _____
4. Do any of your family members hunt? ___ Yes ___ No
If yes, please specify which family members hunt: _____
5. Have you ever introduced a child to hunting? ___ Yes ___ No
If yes, please specify your relation to the child: _____
6. Have you ever hunted for any of the following? Check all that apply:
___ Big game ___ Small game ___ Migratory bird ___ Other animals
7. What type of land do/did you hunt? Check all that apply:
___ Public land (e.g., national forest) ___ Private land (e.g., personal family farm)

Nonhunters and Anti-hunters:

8. What is the reason you don't participate in hunting? Check all that apply:
___ Don't eat meat ___ Not willing to kill animals
___ Don't like guns ___ Not brought up hunting
___ Lack of hunting partners ___ Ethical problems with hunting
___ Declining habitat ___ Costs of licenses and equipment
___ Lack of game ___ Have other leisure activities during hunting season
___ Other, please explain: _____
9. What other reasons, if any, help explain why you don't participate in hunting? _____

If you answered 1b, please answer Question 10, otherwise please go to Question 11.
Former Hunters:

10. What is the reason you no longer participate in hunting? Check all that apply:

- | | |
|---|---|
| <input type="checkbox"/> Lack of interest | <input type="checkbox"/> Poor health/disability |
| <input type="checkbox"/> Lack of time | <input type="checkbox"/> Lack of game |
| <input type="checkbox"/> Declining habitat | <input type="checkbox"/> Lack of hunting partners |
| <input type="checkbox"/> Land availability | <input type="checkbox"/> Cost of licenses and equipment |
| <input type="checkbox"/> Other, please explain: _____ | |

Please answer the following questions regardless of your answer to Question 1.

Demographic questions: Please tell us a little bit about yourself.

This allows us to compare survey respondents to the general population of Indiana.

11. What is your gender? male female

12. What was your age on your last birthday? years

13. What is your role in the household? Check all that apply:

- | | |
|---|------------------------------------|
| <input type="checkbox"/> Head of household | <input type="checkbox"/> Parent |
| <input type="checkbox"/> Spouse | <input type="checkbox"/> Dependent |
| <input type="checkbox"/> Other, please specify: _____ | |

14. Which of these best describes you?

- | | |
|-----------------------------------|----------------------------------|
| <input type="checkbox"/> Single | <input type="checkbox"/> Married |
| <input type="checkbox"/> Divorced | <input type="checkbox"/> Widowed |

15. Do you have children living at home? Yes No

16. How many people live in your household? Under 18 18 and older

17. What is your race/ethnicity? Check all that apply:

- | | |
|---|---|
| <input type="checkbox"/> White (Caucasian) | <input type="checkbox"/> Black (African American) |
| <input type="checkbox"/> Asian/Asian American | <input type="checkbox"/> Hispanic/Hispanic American |
| <input type="checkbox"/> Native American | <input type="checkbox"/> Other: _____ |

18. What is your highest level of education completed?

- | | |
|--|--|
| <input type="checkbox"/> Some high school | <input type="checkbox"/> Completed associates degree |
| <input type="checkbox"/> GED | <input type="checkbox"/> Completed college degree |
| <input type="checkbox"/> Completed high school | <input type="checkbox"/> Some graduate school |
| <input type="checkbox"/> Some college | <input type="checkbox"/> Completed graduate degree |

19. What is your annual household income before taxes?

- | | |
|---|---|
| <input type="checkbox"/> \$9,999 or less | <input type="checkbox"/> \$10,000 to \$19,999 |
| <input type="checkbox"/> \$20,000 to \$29,999 | <input type="checkbox"/> \$30,000 to \$39,999 |
| <input type="checkbox"/> \$40,000 to \$49,999 | <input type="checkbox"/> \$50,000 to \$74,999 |
| <input type="checkbox"/> \$75,000 to \$99,999 | <input type="checkbox"/> \$100,000 or above |

20. What is your occupation? _____

21. Please classify your residence. Check one:

Rural Urban Suburb

Have you always lived in this type of residence? Yes No

Please answer the following questions regardless of your answer to Question 1.
Respondent feedback: We would like to hear more about your opinions, thoughts, observations, etc.

22. How do you think hunters are introduced to the sport of hunting in Indiana? Has this process changed over your lifetime? _____

23. How do you think hunting participation has changed over time?
a. More people hunt now than in previous generations.
b. Less people hunt now than in previous generations.
c. The percentage of people participating in hunting has stayed the same over time.

24. If you answered 23 a or b, what do you believe has caused any changes in hunting participation that you have observed in Indiana over your lifetime? _____

25. What other leisure activities do you do during the hunting season? Do these leisure activities take place of or substitute for hunting? _____

26. Please provide any additional comments: _____

Thank you very much for your response.