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On the Trail of Student Participants: Identifying Barriers to Hunting and Developing a Hunter Recruitment Profile for College Students in Kentucky

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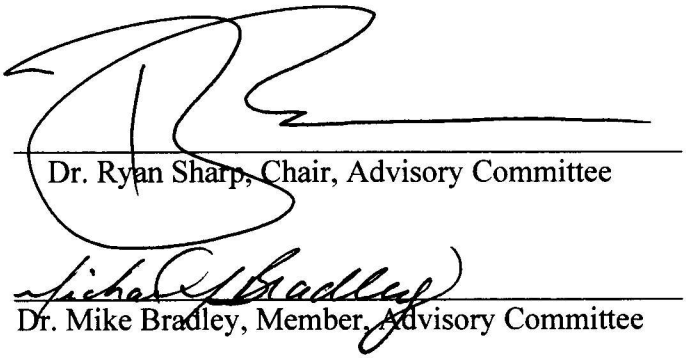

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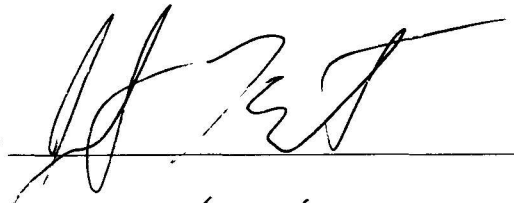
Signature 

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Bachelor of Science
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for the degree of
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DEDICATION

This thesis is dedicated to the two men in my life who first piqued my interested in hunting; my uncle, Mike Mayer who passed away far too early on February 13, 2015, and my father-in-law, Sonny Gay, who gave me my first shotgun at the age of 17.

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Abstract

Over the past several decades the number of individuals participating in hunting has decreased dramatically. This issue is important as hunting plays a major role in the US economy, is also the basis for the modern model of wildlife conservation, and can serve as a conduit for individuals to experience nature.

The purpose of this research was to identify barriers to hunting for college students, as well as identify lifestyle factors that can be used to create a profile for college students who are ideal for hunter recruitment efforts. Students at Eastern Kentucky University, Northern Kentucky University, and Western Kentucky University were surveyed for this study. Researchers discovered that 70% of those surveyed had not participated in hunting in the past three years. However, results also showed that a 71% of respondents approved of hunting while 30% had participated in hunting. The largest barriers for college students to hunter were *Time* and *Lack of Interest*.

Cluster analysis also revealed an Environmentally Inclined group (EINC) of college students who were slightly more interested in hunting than the Environmentally Indifferent group (EIND). A Potential Hunter (PH) group was also made up of individuals who expressed some interest in hunting but had not participated in hunting in the three years prior to this study (2011-2013). This (PH) group accounted for 30% of the overall sample of college students.

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Chapter 1

Introduction

Over the past several decades abundant research has been done in hunting as a recreational activity. Much of the research in this area has focused on hunter recruitment and retention. This includes the study of special populations in connection with hunting including youth (Sofranko & Nolan, 2009), women (Heberlein, Serup, & Ericsson, 2008), and race (Floyd & Lee, 2002). Studies that focus on hunter recruitment and retention are vital considering the continual decline of hunter participation in the United States.

The decline of participation in hunting in the United States (US) has been fairly consistent since the 1980's. Even with declining participation numbers, a recent study noted 79% of US Citizens surveyed still approve of legal hunting and 52% strongly approved of legal hunting (Responsive Management, 2013). In addition, hunting pursuits remain a vital contributor to the U.S. economy (U.S. Fish and Wildlife Service, 2012) and play an important role in the management of wildlife resources (Riley, Decker, Enck, Curtis, Lauber, & Brown, 2003; Campbell & Mackay, 2009). It is for these reasons that there is great concern over falling hunter participation rates.

The economic impact of the hunting industry is also an undeniable factor when considering hunter participation. According to the US Fish and Wildlife Service (2011), American hunters contributed $33.7 billion to the US economy in a combination of trip expenditures (food, transportation, lodging, etc.), guide fees, land use fees, equipment, and hunting licenses among other things. A survey administered by the US Fish and Wildlife Service every five years discovered that in 2011 American hunters spent $2,465 per hunter annually. This total is an increase of over $300 per hunter than when the

survey was produced in 2006 (USFWS, 2012). In 2011, hunters in the commonwealth of Kentucky (the state examined in this study) spent $798 million on hunting and hunting related activities.

Today regulated hunting is the basis for the model of modern wildlife conservation programs (Heffelfinger, Geist, & Wishart, 2013). Hunters purchase licenses that help fund state fish and wildlife agencies. Funds for state and federal wildlife agencies are also generated through a 10% tax on ammunition and firearms as well as other hunting related products (Pittman-Robertson Act, 1937). These fish and wildlife agencies are responsible for game species which hunters and fishermen pursue, and oversee the management of non-game species. In Kentucky, over half of the annual budget for the Kentucky Department of Fish and Wildlife Resources comes directly from the sale of hunting and fishing licenses (KDFWR, 2012). As long as this system of funding exists, it is imperative for the conservation of all wildlife species that hunting remains a viable activity.

Another consideration when understanding the importance of hunting is the connection hunting provides between the natural environment and the hunter. Modern society is increasingly disconnected from the natural environmental surroundings. This lack of connection with the natural environment leads to behavior that shows little concern for the health of nature. Studies have shown that outdoor recreation opportunities (Larson, Whiting, & Green, 2011) and participation in outdoor recreation activities are positively associated with pro-environmental attitudes and behaviors (Tarrant & Green 1999; Dunlap & Heffernan,1975). As people interact with the outdoors, it increases their awareness of natural resources and the importance of protecting those resources. As an

outdoor recreation activity, hunting may provide a connection to the environment that leads greater pro-environmental attitudes and behaviors. However, as previously stated, the number of hunters in the US has declined since the 1980s. A society with declining hunter participation may also be a society where pro-environmental behaviors are less important.

Many recruitment efforts seek to identify and target populations with lower rates of participation. Youth, women, minority groups, and special interest groups are typical hunter recruitment targets. It was discovered that the 18-24 year age bracket is an extremely inactive age group when it comes to hunter participation (Winkler & Warnke 2013). This age group closely relates to the age of traditional college students, however, little research has been published in the area of recruitment and retention specifically targeting college students. This dearth of information in the current body of research may provide insight on ways to improve hunter participation in the future. If management agencies are able to remove or hunting barriers for this group, college students may represent a significant underrepresented hunting population, which can bolster hunter recruitment and retention numbers in the United States. This study seeks to identify barriers to hunting for college students and discover a profile for ideal hunter recruits within this population to aid management agencies in this effort.

Chapter 2

Literature Review

College Students and Recreation

Traditional college students, generally associated with the ages of 18-24, have ample opportunity for recreation. According to the Bureau of Labor Statistics American Time Survey (2014), college students spend more time daily on leisure and sports activities (4 hours) than either educational activities (3.3 hours) or work activities (2.5 hours). Leisure time is nearly the largest category of time use for college students, second only to sleeping (8 hours). Common recreation activities for college students include sports activities, outdoor recreation, exercise, and sedentary activities (reading, video games, etc). There is concern for the growing amount of sedentary leisure time for college students (Pauline, 2013; Mokdad, Serdula, Dietz, Bowman, Marks, & Koplan, 1999).

The college years are a formative time for students. Patterns of behavior that are formed during this time often shape adulthood activity and choices (Sparling & Snow, 2002). This could be said for recreational choices as well. Introduction to new recreational activities during the college years may prove to be lasting in the years that follow the college experience. Though hunting is a historically traditional activity to the majority of college students it is a novel idea for recreation. College may be an ideal time for recruitment into this historical and important recreation activity.

Hunting as Recreation

Humans have been involved in hunting since the beginning of our species. As hunter-gatherers, humans pursued wild animals as a means for sustenance. However one might assume that hunting has been a recreation activity for the human species for almost as long as it has been a means of survival. Some of the oldest art humans produced is found in the form of cave paintings. Cave art found in Lascaux caves in France, dating back 15,000 years ago, depicts humans hunting game (Tedesco, 2000). These paintings might suggest that hunting was more than just a method for acquiring food, it was an activity worthy of communication and story. It is also commonly held by linguists that language developed as a means for coordinating hunting parties and techniques (Buss, 2011).

Even as human cultures developed agricultural practices and the domestication of wild animals, which proved to be a superior means for attaining food, hunting remained a vital part of the human experience. In the well-developed and established Roman society "wealthy and influential Romans owned large villas that often were surrounded by parks designated for hunting" (Jensen & Guthrie, 2006, p.20). In the era of early American history, hunting and trapping were vital parts of the exploration and expansion westward. Fur trappers such as Daniel Boone and mountain men such as Jim Bridger and Jed Smith constantly pushed west to find new hunting grounds (Caesar 1961).

US Citizens throughout history have benefited from the pursuit of hunting. The vast wilderness that was the United States in early American history provided sustenance in the form of wildlife at numbers never before witnessed by European settlers. The quantity and accessibility of game made the supply of quarry seem endless. However,

over-hunting, and neglect and abuse of habitat drove many species of wildlife, such as the passenger pigeon and the American bison, to near or complete extinction. Concern over dwindling populations led the development of state and federal government wildlife management agencies. These agencies began to enact laws and regulations regarding wildlife and habitat.

Funding for management agencies was sparse. In 1937 the Federal Aid in Wildlife Restoration Act commonly referred to as the, Pittman-Robertson Act, took an existing 11% excise tax on sporting arms and ammunition, and directed the funds to the Secretary of the Interior, to be apportioned to the states, for the use of wildlife and habitat protection (Pittman-Robertson, 1937). The law has been amended several times since its origination, but it effectively placed hunting and shooting sports as the primary source for the funding of wildlife conservation. Similarly, the Dingell-Johnson Act (1950) provides funding specifically for fish and aquatic habitat restoration and education. The story of the hunter permeates human history and certainly, modern American history, yet we continue to see a decline in hunter participation numbers in the US. Research regarding barriers to participation in hunting is an important tool that may aid the slowing or reversing this trend in the US.

Barriers to Recreation

The field of recreation is dependent on participation by individuals; without individual participants, recreation cannot occur. It is imperative, that recreation professionals and managers are aware of and understand factors that prevent individuals

from participating in a given activity. By recognizing these factors managers may proactively address these issues that make the pathway to their services complicated.

Early research in this area referred to these factors as "barriers" to recreation, though "constraints" may be a more appropriate term. Jackson (1991) suggests the term "constraints" refers to a much broader group of recognized issues that lead one to non-participation in recreation or leisure where as "barriers" indicates specific types of constraints that intervene or prevent participation. While this debate exists in past research, this study uses the term "barrier" as it is as a more readily recognizable term for the general public and the subjects of the study. Recreation and leisure barriers have been defined as "factors that inhibit people's ability to participate in leisure activities, to spend more time doing so, to take advantage of leisure services or to achieve a desired level of satisfaction" (Jackson, 1988, p.203).

The concept of barriers to recreation is a complicated issue. There are many variables to consider with regards to participation in recreation. Recent analysis has revealed a major divide in the opportunity to participate in outdoor recreation along the lines of ethnicity, gender, residency location, and age groups (Ghimire, Green, Poudyal, Cordell, 2014). In addition, barriers and participation do not necessarily operate in an inverse relationship (Wright, Rodgers, & Backman, 2001); therefore, the absence of barriers to recreation does not guarantee and an individual's participation. In the same way the presence of barriers does not guarantee nonparticipation in an activity. Research shows that an individual's perception of an activity as significant may negate the presence of a constraint (Kay & Jackson, 1991; Shaw, Bonen, & McCabe, 1991).

Barriers to Hunting

The number of hunters in the United States has seen a decline over the past several decades, exemplified by the number of paying license holders has decreasing almost every year since the 1980's (Robinson & Ridenour, 2012). From the late 1970's to 2003 annual hunting license purchases fell approximately 25% (Robinson et. al. 2012). In 2006 hunter participation reached a low of 12.5 million participants, roughly 5% of the US population (USFWS, 2012).

However, according to the 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (2012), hunter participation numbers increased to 13.7 million participants or 6% of the population. According to a report by Responsive Management (2013), there is no single reason for this recent increase, but likely it is a result of a combination of factors. Reasons may include: "economic factors and the building industry, the desire to hunt and fish to obtain a natural or 'green' food as well as to supplement food budgets, and even the weather" (Responsive Management, 2013). The recent increase participation is significant and encouraging as it represents the only increase in participation numbers since the US Fish and Wildlife Service began this survey. Yet, participation levels are still well below the peak of the hunting population of 16.7 million people in 1982 (Winkler & Warnke, 2013).

The understanding of why hunter participation numbers are in decline is incomplete; there are a number of theories that have been suggested. One of the most significant barriers for recreation in America, including hunting, is a lack of discretionary time w. Miller and Vaske (2003) reported that 21% of survey respondents cited time as a significant barrier; the most for perceived barriers to hunting. Responsive Management

(2008) found 29% of hunters surveyed listed lack of time as a cause for decreasing hunting participation over a five year period, second only to age and/or poor health.

A possible explanation for this decrease in time available may be that Americans report spending more time at work. In her book, The Overworked American (1997), Juliet Schor writes that in 1990 Americans worked one month more per year than in 1970. Americans spend more time at work, have less discretionary time for leisure, take fewer vacations, are more likely to work late nights or weekends, and are more likely to feel pressured for time than other countries of similar affluence (Hamermesh, 2014).

Beyond spending more time at work, other time constraints exist for US Citizens. Wright et. al (2001) grouped family and work commitments together and found that those who had decreased participation in hunting were more likely to cite family and work commitments as barriers. Family time commitments such as caring for family members, attending family member leisure activities (youth sports, etc.), and household activities limit time for individual recreation activities.

Costs can be another significant barrier to hunting. In 2011, US Citizens spent an average of $2,465 per hunter (USFWS, 2012). This amount includes expenditures for hunting licenses, transportation, guide fees, equipment, memberships, private land leases, and various other related items. For many, the thought of spending upwards of $2,000 for a recreational activity is daunting. This is especially true for those new to the activity and are required to make the initial investment in equipment and supplies. Miller & Vaske (2003) reported that “lack of financial resources” was commonly cited as a perceived personal barrier.

Access to hunting land is another significant barrier for hunters. Miller and Vaske (2003) suggest that of situational barriers "no land available for hunting" was the greatest barrier of any they tested (p. 273, 2003). Wright et al. (2001) also found that lack of access and opportunity was a significant barrier for those who reported decreasing hunting activity. Similarly, a study in Alabama showed that 18% of former hunters cited lack of public hunting areas as the reason they stopped hunting (Mehmood, Zhang, & Armstrong, 2003).

It is important to note that access to land can be divided into two separate issues: the actual existence of land for hunting and the ability for the hunter to access that land (Responsive Management 2008). It has been well documented that rural and forested landscapes are continually giving way to development (Thompson, 2006). In the 1990's forest lost to development reached at rate of 1 million acres per year (Thompson, 2006). As the rural landscape in the US continues to erode due to urban sprawl, less land is available for hunters to utilize (Poudyal, Hodges, & Cho, 2008). While urban populations and cities grow, the trend of low density rural development into wildland areas contributes to less hunting land (Poudyal, Hodges, & Cho, 2008).

Access to hunting land is also limited beyond its decreasing existence to include the ability of hunters to actually get to the land. Coinciding with the development of rural land is the fragmentation and privatization of rural landscapes. These private landowners may restrict access to their property because of potential liabilities, past problems with recreational users, concerns about property rights, and safety (Jagnow, Stedman, Luloff, San Julian, Findley, & Steele 2006). The restriction of access to private lands also serves as a restriction of access to public hunting areas as private landowners prevent hunters

from passing through to reach public land. It has also been proposed that there is less access to private land for hunting due to changes in agricultural practices and shifting public values (Miller, 2002).

The urbanization of the United States also resonates with the cultural shift to more urbanized family life. According the US Census Bureau 80.7 % of US Citizens live in urban areas (US Census Bureau, 2012). It has been suggested that one of the most significant indicators for hunter participation as youth is introduction to the activity by parents (Heberlein, 1987; Sofranko & Nolan, 2009; Winkler & Warnke, 2013). With the urbanization of family life, adults have less access to hunting land and therefore have less opportunity to pass down hunting traditions. Also individuals are more likely to participate in a recreational activity, including hunting, if peers participate (Shultz, Millspaugh, Zekor, & Washburn, 2003) but with less rural land to roam, fewer youth are interested in hunting and fewer of their friends are influenced to participate.

Another barrier to participation in hunting stems from the changing world of information and technology. Hi his book Last Child in the Woods, Richard Louv (2008) suggests that children are spending less time outside for recreation, which creates what he terms a *nature deficit disorder*. In this theory the decrease in outdoor play results in a lack of curiosity about nature and wildlife. As a result, children become less connected to the natural world and may be less likely to participate in activities that connect humans to nature. Hunting at its base is a human-nature interaction and currently, fewer children are experiencing this interaction than have in decades past.

Backman & Wright (1993) found that lack of interest was a significant barrier for participating in hunting. The most common avenue for development of interest to hunting

comes as young children are mentored by family members or close friends (Bissel, Duda, & Young, 1998). Research also shows that past hunting experience serves as a significant predictor for future hunting participation (Miller & Vaske, 2003). As fewer children are introduced to the outdoors, specifically hunting, future participation for these individuals as adults is less likely.

Finally, it has been suggested that the most significant predictor for hunter participation was the age of the individual and that an aging population was a significant factor in hunter decline (Winkler & Warnke. 2013). As a greater number of baby boomers reach an age where it is physically more difficult to participate in hunting, the number of total participants also decreases. The decline of the baby boom generation is particularly troubling to hunting advocates, as the problem of hunter decline is much more complicated than a simple aging population. Winkler et al. (2013) suggest that while the aging population may not be a singular factor for hunter decline it at the very least will compound the problem for the foreseeable future as more and more baby boomers reach an age where they are physically no longer able to hunt.

Hunter Recruitment Programs

Currently, many specific efforts of hunter recruitment and retention focus on youth (Gude, Cunningham, Herbert & Baumeister, 2011), women, or minority groups (Ryan & Shaw, 2011). This reveals a common hunter recruitment method; identifying populations who traditionally have lower rates of hunter participation and develop programs to increase participation.

One of the most traditional methods of hunter recruitment is to focus on developing programs for youth. Research suggests that 80% of hunters are introduced into hunting at a young age through relationships with family and friends (Ryan & Shaw, 2011). Because of this, much time, effort, and resources have been directed toward establishing youth hunter development programs. Most of these programs take the form of some type of mentor relationship. The Merriam-Webster Diction (2015) defines mentor as "a trusted counselor or guide." With declining hunting participation numbers there are fewer of these natural family hunting mentor relationships. Agencies and advocacy groups seek opportunities to set up youth with willing adults to form a mentorship. However, it has also been shown that without the continued social support from a mentor that helps create a "hunter identity," mentorship programs with youth may be limited (Enck, Decker, & Brown, 2000). Youth recruitment efforts in Kentucky are included to some degree through the National Archery in the School Program, Explore Bowhunting, KDFWR Conservation Camps, Project WILD, and specific youth mentor hunts.

Agencies also recognize the lack of diversity of ethnic groups that participate in hunting. Traditionally, those who participate in hunting have been described as middle aged white males from a rural background (Ryan & Shaw, 2011). Hispanics and African Americans are significantly less likely to purchase hunting and fishing licenses (Floyd & Lee, 2002). In 2011, 94% of those who reported hunting were white (USFWS, 2012). Thomas, Lueck, and Farrell (2007) explain that for minorities a shortage of role models, lack of education about hunting, and feeling unwelcome are significant barriers for participation. It has also been suggested that a lack of historical or cultural connection to

hunting is a significant issue for recruiting African American or Hispanic individuals (Ryan & Shaw, 2011). There have been several attempts at seeking minority group hunting recruits however many of them have been unsuccessful to this point (DJ Case & Associates, 2009).

As most traditional hunters are males, specific efforts have been made to recruit more females. Programs such as Becoming an Outdoors- Woman (BOW) have been somewhat successful at introducing women to hunting and creating the social environment that leads to a hunter identity (Ryan & Shaw, 2011). It may be that programs like BOW are the reason behind the national trend of increased female participation (Bissel et. al, 1998) though the percentage of female hunters remains very low (11%) despite decades of targeted effort (Larson, Stedman, Decker, Siemer, & Baumer, 2014; USFWS, 2012). In addition, others have suggested that women tend to participate in hunting as a means for activity with husbands or significant others (Schorr, Lukacus, & Gude, 2014; Adams & Steen, 1997). These ideas imply the importance of mentor or social relationships for hunting participation for females.

Another current trend in hunter recruitment is the placement of hunting as a sustainable and organic food source (Pontius, Greenwood, Ryan, & Greenwood, 2013; Tidball, Tidball, & Curtis, 2013). This approach seeks to recruit individuals who see the value of local and organic food choices and introduce them to hunting and fishing as an opportunity to harvest meat in an environmentally friendly manner. These individuals, often termed "locavores" seek to enjoy what they eat while understanding the implications their choices have on the environment (Tidball et. al, 2013). It is fitting then that some locavores are beginning to view hunting as a sustainable source for food. An

avid, hunter, conservationist, and author, Steven Rinella is a national proponent of this type of recruitment. In a New York Times op-ed piece Rinella wrote "Hunters need to push a new public image based on deeper traditions: we are stewards of the land, hunting on ground that we know and love, collecting indigenous, environmentally sustainable food for ourselves and our families" (2007). While this is a growing sentiment among many, few significant recruitment efforts have been made based on this premise.

A Profile for Recruitment

It has been established that the current profile for a majority of hunters today are rural white males who were introduced to hunting at a young age, had a parent or close friend or relative who hunted or felt positively about hunting (Duda, Bissell, & Young, 1995, USFWS, 2012). Motivations for modern hunters vary but can be generally summarized into several categories; for sport/recreation, to harvest food, to be close to nature, to be with friends and family (Duda, et. al, 1995), or to be environmentally responsible (Cahoone, 2009; Pontius, et. al, 2013).

Knowing the profile of individuals who hunt is important for hunter recruitment. It may also be important to know the profile of individuals who do not hunt but who do show positive attitudes toward hunting. Backman and Wright (1993) performed important research in identifying characteristics of non-hunters. Researchers found that individuals who were non-participants or former hunting participants with positive attitudes toward hunting; achieved lower levels of education than those who held negative views of hunting, had parents who held a positive attitude towards hunting, were more likely to live in rural area at some point of their life. Backman and Wright (1993)

also noted that lack of interest, and lack of opportunity for hunting were more significant barriers for non-hunters.

Understanding the profile of individuals who may be interested in hunting but who do not participate in hunting is important for the conservation of wildlife. Currently, funding for the agencies charged with protection and conservation of wildlife is tied directly to hunter participation. As participation rates decline, new programs for the recruitment and retention of various demographics that are underrepresented in the hunting population are necessary. This study seeks to better understand barriers to hunting for the specific population of college students to better aid recruitment efforts.

Purpose of Research

While a significant amount of research has been done to study hunter decline and the factors that cause it, little has been directed to the study college students. It was discovered that the 18-24 year age bracket is the least active group when it comes to hunter participation (Winkler & Warnke 2013). Specifically, researchers have found that male hunters were relatively active at age 15, but a significant drop in participation occurred between the ages of 18 and 24, before a leveling off period between ages 25-51. A larger drop in participation again occurred after age 65, when more hunters reached an age where they were no longer able to hunt.

The time when hunters were least likely to be active is between the ages of 18-24. This gap in hunting activity correlates most directly with the age of most traditional college students. It is important for wildlife and recreation managers to understand the barriers specific for this cohort group to make participation in hunting more accessible.

This segment of the population may include a higher number of potential hunters that are currently inactive.

To provide necessary information, it is also important then to identify characteristics for individuals who display a propensity for participation in hunting so that a profile may be developed to aid conservation agencies in their recruitment of college students as hunters. This is especially important to state agencies such as the Kentucky Department of Fish and Wildlife Resources that has developed a small program for recruitment of college students. The "Hunter's Legacy" program coordinates the introduction of experienced hunters with non-experienced hunters on college campuses in order to introduce individuals to hunting. This is a mentor-based program complete with hunter education instruction culminating with a mentored hunt. The Hunter's Legacy program started in 2012 with 12 participants and mentors and has grown each subsequent year. In order for programs such as this to reach full potential, researcher must identify ideal student candidates for recruitment and continued participation must be identified.

Chapter 3

Methods

Purpose Statement:

The purpose of this study is to identify barriers to hunting as a recreation activity, as well as identify lifestyle factors that can be used to create a profile of college students who are ideal for hunter recruitment efforts.

Objective 1. To identify barriers which prevent college students in Kentucky from participating in hunting as a recreational activity

Hypotheses

H_{1a} - The number of students who *approve* of hunting as a recreational activity is greater than the number of students who *participate* in hunting.

H_{1b} - Time and money are the greatest barriers to hunting for college students who reported hunting within the last three years.

H_{1c} - Those who reported no hunting within the last three years, showed *Lack of Interest* as a significant barrier to hunting.

Objective 2. To identify a group of students who are ideal candidates for hunting recruitment.

Hypotheses

H_{2a} - Students who rate "environmentally friendly" behaviors as important lifestyle factors will be more interested in hunting than those who rate these factors as less important.

H_{2b} - Presenting hunting as a social activity increases the interest of participation for the "environmentally friendly" behavior profile group.

H_{2c} – There will be a large group of students who express interest in hunting but have participated 0 times from 2011 through 2013.

Site Description

College students from three Kentucky universities were identified as the target population for this study. Invitations to participate in the study were sent by email to students at Eastern Kentucky University (EKU), Western Kentucky University (WKU), and Northern Kentucky University (NKU). These universities were chosen specifically to gain access to a population sample with varied geographic distribution through the regions of service for each university. These schools also serve varied demographics as EKU and WKU students tend to come from more rural areas and NKU students come from a more urban area close to Cincinnati, OH.

EKU is located in Richmond, Kentucky (population 30,000) in the central part of the commonwealth. In 2013 EKU had a total enrollment of 16, 111 students. The university population is 83% white. In 2013, 13,546 students were residents of the commonwealth of Kentucky. Of these 13, 546, 49% held residence in the EKU service region comprised of the rural southeastern Kentucky counties.

WKU is located in the western part of the commonwealth in Bowling Green Kentucky (population 60,000), the third larges city in the commonwealth. WKU had a total enrollment of 20,546 in 2013. The university population is 77% white. 16,088 students were residents of the commonwealth of Kentucky with 10,726 (52%) of the

students coming from the WKU area of geographic responsibility in the western part of the commonwealth. Many of the counties in the WKU region of service are rural in nature.

NKU is located in the northern part of the commonwealth in Highland Heights Kentucky just south of the Kentucky/Ohio border south of Cincinnati, OH area. The 2013 enrollment for NKU was 15,283 students. 12,677 (83%) of students were white. NKU serves the eight northern most counties in Kentucky. Close to 80% (of their students in 2013 made their permanent residence in this area with the largest percentage of students originating from the Kentucky counties that make up the greater Cincinnati, Ohio area.

Study Implementation

The survey questionnaire contained six sections (See Appendix A) and questions for the survey were developed with the help of the KDFWR employees. Individual questions were formed with consideration to previous surveys related to hunter recruitment and retention as well as areas of particular interest for the KDFWR.

Section one was designed to establish recent experience with hunting and fishing and plans for hunting and fishing in the coming year. (Note: While fishing was not the primary focus of this study, hunting and fishing are often grouped together as related activities, and thus both were included to compare participation levels of the two activities. The focus of this study is hunting and Section One is the only section that contained questions related to fishing). It included four questions. Section two consisted of ten questions involving various lifestyle factors that influence recreation habits. Participants rated each barrier on a five point Likert scale from “Not Important” to “Very

Important." The third section of three questions dealt specifically with the participant's opinion of hunting as a recreation activity. Section four consisted of two questions that addressed the participant's opinion on hunting as a means for gathering food. The fifth section contained 11 questions and dealt with two areas. The first nine questions addressed specific barriers to hunting for the individual. Participants rated each barrier on a five point Likert scale from "Not a Barrier for Me" to "A Significant Barrier for Me." The last two questions of section five dealt with the interest level in hunting based on social factors. The final section of the survey, eight questions, asked for demographics of the individual participant. Finally, the last page of the survey provided a place for the participant to enter his or her email address to be a part of the random drawing for a $50.00 Visa gift card.

The survey instrument was first tested on five individuals for length and clarity of question. A pilot study was then conducted to identify complications within the survey instrument. Sixty-three individuals within the Department of Recreation and Park Administration at Eastern Kentucky University participated in the pilot study.

Finally an invitation to participate in the final research survey was sent to students at each of the three identified universities. A total of 27,529 individuals received invitations via email to participate in the online survey (Table 1). The number of survey invitations distributed to each university was based on access to student email addresses that individual institutions granted to the researcher through each university's Institutional Review Board.

Table 1

Number of invitations to participate sent to Kentucky universities

	Number of Invitations
Western Kentucky University	18,852
Northern Kentucky University	7,048
Eastern Kentucky University	1,629

This study was conducted as an online survey with invitations to participate sent by email. Initial invitations to participate were sent out in the spring of 2014. The first email invitation was sent to WKU and EKU students on March 26th, 2014 and to NKU on April 17th, 2014. Two Follow-up or reminder invitations were sent out to WKU and EKU at two week intervals and in one and half week intervals for NKU because of the proximity to the end of the semester.

The invitation email contained plain text explaining the nature of the research study and a link to access the survey on a Qualtrics (an online survey program) website. The subject of each email contained the title: "A 10 minute survey could earn you a $50 Visa Gift Card." A significant limitation of internet surveys is the response rate because of the ease of disregard for the invitation to participate. In order to encourage responses to a survey that may have otherwise been of no interest to the individual participants an incentive was offered. The incentive of a $50.00 Visa Gift Card was provided by the Kentucky Department of Fish and Wildlife Resources (KDFWR) and was administered by a random drawing. Upon completion of the survey participants were given the option

to enter their email address to be included in the random drawing. All email addresses were destroyed after the random drawing took place.

Of the 27,529 invitations to participate 3,128 (11%) total surveys were returned with 2,804 completed for a total response rate of 10%. As Vaske (2008) suggests, low response rates warranted a non-response bias check (See Appendix B) which was initiated. Since no other contact information was available for the sample, a follow up email with a shortened survey was offered to those who did not respond to the original invitation to participate.

A total of 247 individuals participated in the non-response bias check survey. Of the questions asked on both surveys, no meaningful difference existed between the results of the non-bias check and the original survey (Table 2). Vaske (2008) and others (Crompton & Tian-Cole, 2001) note that an effective non-response bias check may be more important than a high response rate in allowing for confidence in survey results.

Additionally statistical analysis was performed to determine if results were skewed in any way because of differences in the number of responses from the three universities. No meaningful relationships existed for demographic variables or the cluster analysis that was performed in this study (Table 3). Strength of relationship was determined using eta (η) and Cramer's V (Vaske, 2008 p. 108; Gravetter & Wallnau 2004 p. 605).

Table 2

Comparison of full survey and non-response check survey

	Full Survey		Non-Response Check		
	Mean	**SD**	**Mean**	**SD**	***d***
Interested in Hunting[a]	3.12	1.48	3.53	1.40	.285
Interested in Hunting with Group[a]	3.05	1.43	3.58	1.31	.386
Time[b]	3.26	1.40	3.02	1.58	.161
Knowledge[b]	3.10	1.46	2.98	1.59	.079
Safety[b]	2.43	1.3	2.36	1.52	.050
Age	24.71	8.72	27.26	10.24	.268

	Full Survey	**Non-Response Check**	**X^2**	***df***	***p***
Male	32.4	30.9	1.93	1	.159
Female	67.6	69.1			
White	86.1	88.6	1.461	1	.227
Non-White	13.9	11.4			

[a] Scale: 1= strongly agree 5=strongly disagree

[b] Scale 1=Definitely not a barrier for me 5=A significant barrier for me

Table 3

Statistical analysis of demographic differences among respondents by university

Chi-Square					Effect size
	X^2	*df*	n	p	Cramer's V
Gender	12.05	2	2804	0.002	0.066
Race	20.556	2	2804	0.000	0.086
ANOVA					
	F	*df*	n	p	η
Age	15.472	2	2804	0.000	0.105
PH Group	3.077	2	2804	.046	.047
EINC Cluster	.030	2	2804	.970	.005

Data Analysis

Analysis on the data gathered in this survey was performed in a number of ways. Frequency and descriptive statistics were used to identify key barriers to hunting among college students in Kentucky. In addition, a cluster analysis was used to divide participants into purposeful groups. The primary goal in this endeavor was to identify specific variables that are associated with an "environmentally friendly" attitude. The cluster analysis then forced each individual into a group that was considered environmentally friendly or not environmentally friendly. Combining several variables that expressed a respondent's interest and level of participation in hunting a Potential Hunter (PH) variable was created. Finally, One-Way ANOVA was also used to identify

relationships among variables. Eta was used to determine effect size of significant relationships found using One-Way ANOVA as suggested by Vaske (2008).

Limitations

There are several limitations to this study, the first was the method of survey administration. While invitations to participate in the survey were sent without bias those who chose to participate in the survey may have already had some association with hunting. Students who had no interest in hunting may have seen the invitation to participate in a survey about hunting in Kentucky, and disregarded the invitation altogether.

It is also possible that the date or timing of invitation to participate in the survey caused some students not to participate. With some universities on spring break or just returning from spring break many may have disregarded the invitation to participate. The same could be true for the academic calendar with regard to midterms or finals before dismissal of the spring semester.

This study was implemented in the commonwealth of KY at three specific universities. It is possible that results may not be representative of other states or universities.

Chapter 4

Results

Demographics

Of the 2,804 respondents to the survey 67.6% (n=1,895) were female and 32.4% (n=909) were male. For the ethnicity variable, 86.1% (n=2,413) of the participants described themselves as white, 5.5% (n=154) described themselves as black, 3.6% (n=100) described themselves as two or more races, and 2.6% (n=74) described themselves as Asian with the remainder of the respondents selecting other race. Of the three universities Western Kentucky University made up the largest percentage of the sample at 65.4% (n=1,833), followed by Northern Kentucky University at 21.6% (n=607), and Eastern Kentucky University at 13% (n=364). Respondents were equally divided on urban (50.6% n=1,420) or rural (49.4% n=1,384) residency (urban defined as a population greater than 30,000, rural less). Kentucky residents made up 80.1% (n=2,246) of the respondents with Ohio (6.8% n=190) and Tennessee (4.9% n=136) the second and third largest states of residence for the respondent population. The sample was overall representative of the population surveyed (Figure 1).

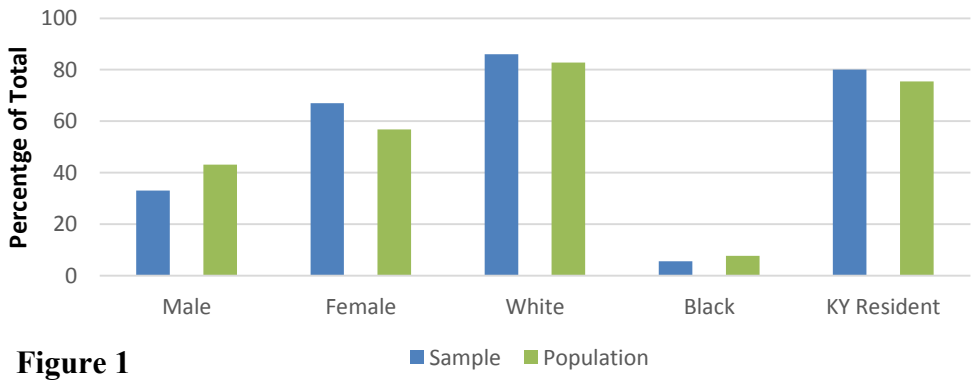

Figure 1

Comparison of EKU, WKU, and NKU and sample demographics

Barrier Analysis

H_{1a} states that the number of students who approve of hunting as a recreational activity is greater than the number of students who participate in hunting. Data supported this hypothesis. Of those students surveyed, 71% stated that they approved of legal hunting on some level, with 44% reporting a strong approval of hunting. Students who answered with some level of disapproval of hunting made up 11% of the sample. Further confirming the general approval of hunting among college students in Kentucky, 17% cited disapproval of hunting as some level of barrier to participation. In contrast to the overwhelming approval of hunting, 70% of those surveyed had not participated in hunting in the last three years (2011-2013) and only 25% of students had or planned to participate in hunting in 2014.

H_{1b} states that issues of time and money would be the greatest barriers to hunting for college students in Kentucky who had participated in hunting over the previous three years (2011-2013). This hypothesis was supported by the data. Not only did this group report these variables as barriers, these are the only variables for which means were greater than neutral (Table 4). Every other barrier variable had a mean of less than three indicating that these variables were perceived as less of a barrier to their participation.

H_{1c} states that those who reported no hunting in 2011-2013 showed *Lack of Interest* as a significant barrier. ANOVA revealed statistically significant relationships between certain barrier variables and number of times individuals had hunted in 2011-2013. Significant relationships existed between number of times hunted in 2011 -2013 and *Time, Knowledge*, *Cost of License, Cost of Equipment, Lack of Safety, Lack of Game, Lack of Interest, and Disapproval of Hunting* (Table 5). *Lack of Interest*, *Knowledge*,

Table 4

Barriers for Kentucky college students who hunted in 2011-2013

Barriers	Mean	SD
Time	**3.81**	1.188
Knowledge About Hunting	2.39	1.273
Cost of License	2.66	1.297
Cost of Equipment	**3.09**	1.317
Lack of Access	2.73	1.477
Lack of Safety	1.84	1.095
Lack of Game	2.22	1.125
Lack of Interest	1.87	1.179
Disapproval of Hunting	1.43	.88

Scale 1=Definitely not a barrier for me 5=A significant barrier for me

Cost of Equipment, and *Time* were all perceived as barriers for those who did not hunt in 2011-2013 (Table 5). H_{1c}, lack of interest in hunting is a significant barrier for those who had not been hunting in 2011-2013 was supported.

According to Vaske (2008) effect size measurements of η .243 - .370 reveal typical relationships and η of .371 or greater means a substantial relationship exists. Minimal relationships between *Hunting in 2011-2013* and the barriers of *Cost of License* and *Lack of Game* existed (Table 5). Typical relationships existed for *Time*, and *Lack of Safety*. Substantial relationships existed for *Lack of Interest*, *Knowledge*, and *Disapproval of Hunting*. Though statistically significant relationships existed for *Cost of Equipment* and *Lack of Access* the effect size revealed a less than minimal relationship.

Table 5

Relationship of barriers to hunting for number of times hunted 2011-2013

	F	*df*	n	p	η
Time	66.336	3	2812	0.000	0.257
Knowledge	174.257	3	2812	0.000	0.395
Cost of License	10.641	3	2812	0.000	0.106
Cost of Equipment	8.865	3	2812	0.000	0.009
Lack of Access	1.637	3	2812	0.179	0.002
Lack of Safety	115.718	3	2812	0.000	0.295
Lack of Game	11.129	3	2812	0.000	0.108
Lack of Interest	395.516	3	2812	0.000	0.510
Disapproval of Hunting	145.869	3	2812	0.000	0.355

It is also significant that the means for many barrier variables differed based on number of times an individual hunted in 2011-2013. A prime example is the barrier of *Knowledge* about hunting. Means for *Knowledge* had an inverse relationship with amount of days spent hunting. As the reported number of times in the field increased, reporting *Knowledge* as a barrier decreased. Figure 2 shows this relationship is true for the barriers *Lack of Game*, *Lack of Interest*, and *Disapproval of Hunting*.

Differences in barriers for different genders existed. ANOVA revealed statistically significant relationship between gender and *Time, Knowledge, Lack of Access, Lack of Safety, Lack of Interest,* and *Disapproval of Hunting* (Table 6). Males reported *Time* and *Lack of Access* were significant barriers. *Knowledge, Lack of Safety, Lack of Interest, and Disapproval of Hunting* were reported as more restrictive barriers for females (Table 6).

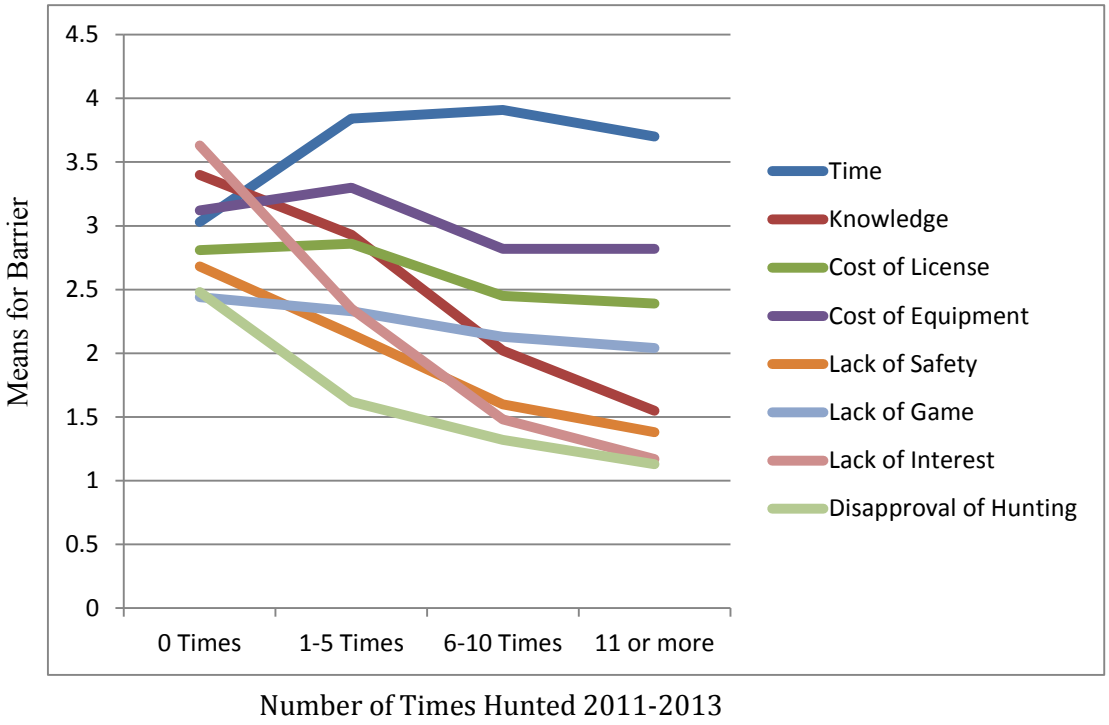

Figure 2

Means of barrier variables for number of times hunted 2011-2013

Table 6

Significant relationships of barriers to hunting and gender

						Male		Female	
	F	***df***	**n**	**p**	**η**	**Mean**	**SD**	**Mean**	**SD**
Time	69.470	1	2804	.000	.156	3.58	1.341	3.11	1.403
Knowledge	37.671	1	2804	.000	.115	2.86	1.482	3.22	1.443
Lack of Access	48.261	1	2804	.000	.130	3.04	1.451	2.64	1.396
Lack of Safety	88.644	1	2804	.000	.175	2.1	1.207	2.58	1.312
Lack of Interest	139.893	1	2804	.000	.218	2.61	1.536	3.34	1.539
Disapproval of Hunting	86.778	1	2804	.000	.173	1.83	1.201	2.33	1.353

Scale 1=Definitely not a barrier for me 5=A significant barrier for me

The sample of college students in this study was made up of predominantly white individuals (86%). This statistic is consistent with the population of the three universities included in this study. Because of the low number of individuals of races other than white who participated in this survey, for the purposes of this study ethnicity was simplified to White/Non-white.

As with gender, ANOVA revealed statistically significant relationship between barriers and ethnicity. Minimal relationships existed between ethnicity and barrier variables for *Time* $F(1,2804)=44.665$, $p=.000$ ($\eta= .125$), *Lack of Safety* $F(1,2804)=50.484$, $p=.000$ ($\eta= .133$), and *Disapproval of Hunting* $F(1,2804)=43.767$, $p=.000$ ($\eta= .124$). White students tended to report that *Time* ($M=3.33$, $sd=1.373$) was a more significant barrier than non-white students (*Time* $M=2.83$, $sd=1.488$). *Lack of Safety* and *Disapproval of Hunting* were greater barriers for non-white students; however, means for these variables were less than neutral suggesting that they are relatively small barriers for both white and non-white students.

Residence type proved to reveal the greatest differences in barriers for demographic groups. ANOVA revealed minimal relationships between *Residence Type* and K*nowledge, Lack of Access, Lack of Safety, Lack of Game, Lack of Interest, and Disapproval of Hunting* (Table 7). Each of these barriers was greater for students whose home residence was urban in nature.

Table 7

Significant relationships of barriers to hunting and residency type

						Urban		Rural	
	F	***df***	**n**	**p**	**η**	**Mean**	**SD**	**Mean**	**SD**
Knowledge	36.765	1	2804	.000	.114	3.26	1.472	2.93	1.439
Lack of Access	49.974	1	2804	.000	.132	2.96	1.434	2.58	1.393
Lack of Safety	61.778	1	2804	.000	.154	2.61	1.343	2.23	1.222
Lack of Game	44.339	1	2804	.000	.125	2.51	1.204	2.23	1.087
Lack of Interest	67.832	1	2804	.000	.154	3.34	1.558	2.86	1.557
Disapproval of Hunting	102.624	1	2804	.000	.188	2.41	1.41	1.91	1.242

Scale 1=Definitely not a barrier for me 5=A significant barrier for me

Environmentally Inclined/ Environmentally Indifferent Groups

Cluster analysis of lifestyle factors revealed differences for college students concerning environmentally friendly behaviors. A K-Means cluster using the ten variables: *Eating Healthy, Eating Locally Grown Foods, Eating Organic Foods, Harvesting My Own Foods, Exercise, Being Active* Outdoors*, Enjoying Nature, Living in an Environmentally Friendly Way, Activities that Challenge, and Activities with Friends* was performed. The results of the cluster analysis revealed two distinct groups. The Environmentally Inclined (EINC) group (n=1,576) tended to report that environmentally friendly behaviors were more important in their lifestyle as opposed to the Environmentally Indifferent (EIND) group (n=1,322) who reported that environmentally friendly behaviors were less important. Table 8 shows the means for each of these lifestyle variables.

ANOVA revealed statistically significant relationships between the EINC and EIND clusters and *Interested in Hunting* $F(1, 2{,}881)=31.443$, $p=.000$. Examining effect size showed the relationship was minimal ($\eta=.104$). The EINC group agreed slightly more (Table 8) with the statement "I am very interested in hunting as a recreational activity" than did the EIND group. The EINC group also reported hunting slightly more in 2011-2013 than the EIND group. There was also a minimal relationship ($\eta=.124$) between the EINC and EIND clusters and *Number of Times Hunted* $F(1, 2{,}895)=45.381$, $p=.000$.

Table 8

Differences in lifestyle factors for Environmentally Inclined group and Environmentally Indifferent group

	Environmentally Inclined		**Environmentally Indifferent**	
Lifestyle Factors	**Mean**	**S.D.**	**Mean**	**S.D.**
Eating Healthy	4.69	.503	4.03	.799
Eating Local	4.33	.643	2.72	1.059
Eating Organic Foods	3.97	.963	2.19	1.016
Harvesting Own Food	3.82	1.060	1.92	.968
Exercise	4.59	.597	4.04	.880
Being Active Outdoors	4.66	.572	3.95	.936
Enjoying Nature	4.72	.495	4.08	.922
Environmentally Friendly Living	4.57	.586	3.62	.966
Activities that Are Challenging	4.47	.654	3.88	.911
Activities with Friends	4.58	.674	4.32	.829

Scale: 1=not important at all 5= very important

ANOVA also revealed statistically significant relationships between the barriers *Time* F(1, 2828)=6.365, p=.012)*, Knowledge* F(1, 2828)=12.043, p=.001), and *Lack of Interest* F(1, 2828)=33.882, p=.000, and the clusters; with *Lack of Interest* (η=.109) a minimal relationship. Table 9 shows the EIND group reported *Lack of Interest* as more of a barrier than did the EINC group. H_{2a} "Students who rate "environmentally friendly behaviors as important lifestyle factors will be more interested in hunting than those who do not" was supported.

As Table 9 shows the EINC group showed slightly higher means for *Interest in Hunting with an Experienced Hunter* and *Interest in Hunting with a Group of Friends* than did the EIND group. These differences were statistically significant, (*Interest in Hunting with an Experienced Hunter* F(1, 2828)= 26.651, p=.000 and *Interest in Hunting with a Group of Friends* F(1, 2828)=11.668, p=.001) however, measures of association revealed little relationship between these variables (η=.097, η=.064 respectively). H_{2b} "Students who rate "environmentally friendly" behaviors as important lifestyle factors, will be more interested in participating in hunting as a social activity" was not supported.

Potential Hunter Group

Using the variables *Number of Times Hunted* in 2011-2013 and *Interested in Hunting, Interested in Hunting with an Experienced Hunter,* and *Interested in Hunting with a Group of Friends* a Potential Hunter (PH) group was created. This variable was designed to isolate respondents who expressed some level of interest in participating in hunting, determined by responses of moderate or strong agreement with one or all of the

Table 9

Means of barriers and interest in hunting for Environmentally Inclined group and Environmentally Indifferent group

	EINC		EIND	
	Mean	**SD**	**Mean**	**SD**
Barriers[a]				
Time	3.32	1.387	3.19	1.415
Knowledge	3.01	1.469	3.20	1.451
Cost of License	2.78	1.306	2.74	1.314
Cost of Equipment	3.10	1.345	3.12	1.399
Lack of Access	2.76	1.421	2.79	1.429
Lack of Safety	2.45	1.325	2.40	1.265
Lack of Game	2.40	1.173	2.34	1.136
Lack of Interest	2.95	1.568	3.29	1.564
Disapproval of Hunting	2.19	1.382	2.13	1.321
Interest Variables[b]				
Interest in hunting with experienced hunter	2.90	1.438	3.18	1.382
Interest in hunting with a group	2.96	1.460	3.15	1.398
Interested in hunting	2.98	1.510	3.29	1.420

[a] Scale: 1=Definitely not a barrier for me 5=A significant barrier for me
[b] Scale: 1= strongly agree 5=strongly disagree

interest statements, but hunted 0 times in 2011-2013. The PH group (n=818) represents 28% of the overall sample. H_{2c} "A large group of students who express interest in hunting but have participated 0 times in 2011-2013" was supported by this data.

Demographics of the PH group were consistent with demographics of the overall sample. ANOVA revealed no statistically significant relationships for demographics for this group. Additionally, no statistically significant relationships were found in the Lifestyle Factor for the PH group.

ANOVA revealed statistically significant relationships between Barriers to hunting for the PH group and those outside of it, with the exception of *Lack of Safety*, *Lack of Game,* and *Lack of Interes*t (Table 10). Within statistically significant results, minimal relationships existed for the barriers of *Time*, *Cost of License*, *Cost of Equipment*, *Lack of Access*, and *Disapproval of Hunting*. A typical relationship between the barrier *Knowledge* and the PH group existed. As Table 11 shows he PH group reported greater barriers for every variable with the exception of *Lack of Interest* and *Disapproval of Hunting*.

Table 10

Relationship of barriers to hunting and PH Group

	F	df	n	p	η
Time	33.705	1	2828	0.000	0.109
Knowledge	302.23	1	2828	0.000	0.311
Cost of License	65.606	1	2828	0.000	0.151
Cost of Equipment	106.6	1	2828	0.000	0.191
Lack of Access	86.856	1	2828	0.000	0.173
Lack of Safety	13.14	1	2828	0.000	0.068
Lack of Game	7.069	1	2828	0.008	0.050
Lack of Interest	3.525	1	2828	0.061	0.035
Disapproval of Hunting	53.791	1	2828	0.000	0.137

Table 11

Means of barriers to hunting for those inside and outside the PH group

	Potential Hunter Group		**Outside of PH Group**	
Barriers	**Mean**	**S.D.**	**Mean**	**S.D.**
Time	3.50	1.313	3.16	1.424
Knowledge About Hunting	3.82	1.301	2.81	1.425
Cost of License	3.07	1.290	2.64	1.297
Cost of Equipment	3.52	1.307	2.94	1.360
Lack of Access	3.16	1.434	2.62	1.391
Lack of Safety	2.57	1.248	2.37	1.314
Lack of Game	2.46	1.135	2.33	1.163
Lack of Interest	3.02	1.333	3.14	1.661
Disapproval of Hunting	1.87	1.110	2.28	1.424

Scale: 1=Definitely not a barrier for me 5=A significant barrier for me

Chapter 5

Discussion

Barriers

Data revealed that 71% of students surveyed approved of legal hunting and yet only 17% of the sample had participated in hunting in the last three years (2011-2013). This statistic seems consistent with the general sentiment towards hunting in the US, where approval of hunting is high, but participation remains low. Studying barriers to hunting may then provide useful information for ways to increase participation of specific groups within the study population.

Gender

Females were less likely to have hunted in 2011-2013 with 76% of females hunting 0 times as compared to 55% of males. These findings are consistent with existing research. Other studies found that females who hunt tend to be introduced into hunting later in life by male partners, i.e. husbands and boyfriends (Adams & Steen, 1997). Duda, et al. (2001) found that women cited spending time with friends or loved ones as a primary motivation for hunting. Through time spent in the field with a loved one or close friend, barriers for these women are reduced. However, research has also shown that individuals who are introduced into activities during youth have a stronger attachment to those activities than those who are introduced later in life. Females who are introduced later in life and whose primary interest is not necessarily the activity of hunting, but the person with whom the activity is shared, will likely have more barriers to overcome in regard to hunting.

Females also tended to report barriers that can be connected to education about hunting and its potential merit and benefits (*Knowledge, Lack of Safety, Lack of Interest, and Disapproval of Hunting*). This is of particular interest to management agencies who are seeking ways to recruit more female hunters. This may be linked to why education programs such as Becoming an Outdoors Woman can be successful recruitment tools. More research would be helpful in finding ways increase initial interest in education programs for women.

Barriers of *Knowledge, Lack of Safety, Lack of Interest,* and *Disapproval of Hunting* may also all be related. For instance, if an individual disapproves of hunting, they are likely to also cite a lack of interest in it. Lack of interest likely leads to minimal knowledge about hunting and the proper safety practices of the activity. If one of these barriers is lessened through education, there is significant potential for all of them to be lessened and female participation to be increased.

Barriers cited in this study as more restrictive by males (*Time* and *Lack of Access*) tend to be tangible barriers of opportunity, where the desire to hunt may be present but something prevents participation. Education about access programs and public hunting areas may also help mitigate these types of barriers for male college students. Additionally, some states such as Montana offer services that connect private landowners with hunters looking for land to hunt on. This type of program targeted toward college students who are away from familiar areas and my struggle to make contacts within the local community may be especially helpful.

Residence Type

Residence type held the greatest relationship to barriers of the demographic variables. Of the barriers for which ANOVA revealed significant relationships those individuals with urban residency consistently reported greater barriers to hunting. These findings are consistent with past research. Barriers to outdoor recreation have been found to be greater for urban residents (Ghimire et al., 2014).

It is logical that individuals from urban residences would face more significant barriers than those from rural backgrounds as it is urban residences are inconsistent with the description of a traditional hunter. Many of these barriers can be addressed through education about hunting. It may be beneficial for management agencies to develop or increase education programs specifically targeting urban populations. This is especially true considering the increasing urbanization in America. With 80.7% of the US population now residing in urban areas (an increase from 79% in 2000) a trend is emerging; a trend that suggests hunter recruitment in urban areas will become increasingly more important than it already is (US Census Bureau, 2012).

Education about hunting is an important piece to reducing hunting barriers. For participants in this study, however, the most significant factor that indicated barrier reduction was time spent hunting. As exemplified in Figure 2 the more days spent hunting the less significant many barriers became. This study does not reveal causation; whether more days were spent in the field because barriers were less significant or if barriers were perceived as less significant because an individual's desire to hunt superseded barriers. However, it is important that a relationship exists between these

variables. This may suggest that programs that provide hunting experiences along with education can be valuable tools to reduce barriers to future hunting.

Environmentally Inclined/ Environmentally Indifferent Groups

Legal hunting can be an environmentally responsible behavior. Hunting helps control wildlife populations and provides funding for the management of game and non-game species. There are also many independent sportsmen's groups that are integral in the process of wildlife habitat protection and restoration. Many hunters are advocates for the protection of public lands in the form of national parks, forests, and wildlife management areas. In a study from upstate New York, researchers found that wildlife recreationists were 4-5 times more likely to engage in conservation behaviors (Cooper, Larson, Dayer, Stedman, Decker, 2015). Hunters are wildlife recreationists by definition; in this way hunting can fit as a part of an environmentally friendly lifestyle.

In this study, students who placed more importance on environmentally friendly behaviors (EINC) were slightly more likely to be interested in hunting and slightly more active hunters in 2011-2013. This is an interesting finding that may show many college students see a link between environmentally friendly/responsible living and hunting. However, of the 1,576 individuals who made up the EINC group 65% had not gone hunting in 2011-2013 and roughly 55% had never been hunting in their lifetime. This statistic shows that there is significant room for the growth of the number of hunters within the EINC group. In order for an increase in the number of hunters who fall in the EINC group to occur however, significant targeted and intentional education may need to occur.

University campuses may be a prime area for hunter recruitment to take place. Universities are often hotbeds of new and progressive ideas. Some have suggested that universities are places where environmental attitudes and behaviors are fostered and developed and that young adults, who reside at universities, will make the new push for environmental progression (McDougle, Greenspan, & Handy, 2011). In this way universities may be an ideal locations to include education regarding hunting as a pro-environmental behavior.

Hunting may also find a place within the "locavore" movement. Individuals in this movement seek to become more aware of the origins of food and take an active role in harvesting it. Wild game represents an optimum source for organic meat. By its nature there are no foreign hormones or connection to industrialized meat plants. Hunting also means taking an active role in the harvesting and gathering of food. Some hunter recruitment efforts in this realm do exist, however these programs are small and experimental; often lacking the funding necessary to make a real impact.

Potential Hunter Group

Another promising outcome of this study is the Potential Hunter (PH) group. The PH group was created in an attempt to isolate individuals who expressed some form of interest in hunting, but had not been hunting in the past three years (2011-2013). Theoretically, these individuals from this study would be prime subjects for hunter recruitment, as the desire to participate exists, but a combination of barriers may be preventing participation. Examining barriers to hunting for this group may also give clues

to managers about increasing participation for other groups who have low participation rates.

The construction of the PH group revealed an interesting fact. The variable *Interested in Hunting* addresses an individual's general interest in hunting using a Likert scale for the statement "I am very interested in hunting as a recreational activity". Within the PH group 391 respondents indicated some level of agreement with the statement of interest in hunting. However the population of the PH group is 818, which indicates that not all of the PH group showed interest in hunting specifically. In fact, 201 individuals actively disagreed with a statement of interest. However, the 427 individuals who did not express interest in hunting were included in the PH group because they responded positively to one or both of the other interest statements, "I would be interested in participating in hunting with an experienced hunter who attends my university" or "I would be interested in participating in hunting with a *group* of friends who attend my university". This may indicate that though some individuals within the sample of this study are not expressly interested in hunting, there may be potential for them to be recruited and introduced into hunting through a social context.

The social element of this group reiterates the importance of mentor relationships in hunting, even during the college years. University campuses hold great potential for this type of social recruitment. College offers ample opportunities for new experiences with new and varied groups of people. Management agencies may consider the development of hunter clubs on university campuses for the purposes of encouraging current hunters to reach out to friends who do not currently participate. These existing and natural friendships are the most effective hunter mentoring relationships as they

better contribute to identity as a hunter (Enck et. al, 2000), which is linked to increased participation (Schroeder, Fulton, Lawrence, & Cordts, 2013).

The PH group represented 28% of the overall sample. When the sample is limited to only 18-24 year old (ages associated with traditional college students) the percentage that the PH group represents raises to 30%. This number is significant when compared to the overall 5% hunting participation rate for the 18-24 year old age bracket in the United States (USFWS 2012). This may show that there is a significant amount of interest for participation in hunting among college students that is not currently being realized.

Examining the barriers that may prevent participation may aid in the effort to open up opportunities for hunting for the PH group. Means for barriers for the PH group were greater for every barrier variable except *Lack of Interest* and *Disapproval of Hunting,* than for those outside the group. That *Lack of Interest* and *Disapproval of Hunting* are less significant for the PH group, which is defined by some level of interest in hunting, seems logical. However, the result that all other barriers variables are greater for those with some interest in hunting is surprising. This may suggest that the perception of a barrier as present or significant depends on interest level. For instance, an individual who is not interested in hunting, may not be aware of the cost of hunting equipment or perceive that his/her lack of knowledge about hunting is a barrier to participate; therefore these barriers are not significant for him/her.

The barrier with the most significant relationship associated with the PH group is *Knowledge*, though there were minimal relationships with other barriers. Consistent with previous research, this suggests that hunting requires special knowledge and equipment that may prevent casual participation (Miller & Graefe, 2000; Scott & Shafer, 2001).

Individuals interested in hunting may perceive that they do not adequately poses the knowledge to successfully and safely go hunting on their own.

Education about hunting whether the justification for, history of, or technique based, may provide some relief for a barrier of knowledge. Although classroom type education could aid some of the PH group to participate, a more effective tool in addressing barriers of knowledge may be mentor relationships. As results of this study indicate barriers to hunting decrease with the number of times an individual participates. Mentoring provides access to one element that reduces every barrier we tested for; experience. Mentoring allows an individual to participate in hunting by using the knowledge and experience of the mentor to overcome his/her own lack of knowledge that could otherwise lead to an unsuccessful or unsafe experience.

It is also interesting that among the PH group who participated in hunting 0 times in 2011-2013, 73% had gone fishing at least 1 time during that same period. This is somewhat consistent with the USFWS (2012) report that more individuals for this age group participate in fishing (10%) than do hunting (5%). Future research would be helpful to identity additional reasons why these two activities that are similar in nature, differ in levels of participation.

Conclusions and Recommendations

The results of this study have great implications for wildlife management agencies. The small percentage of college age (18-24) individuals who participate in hunting nationwide is a concern. As the baby boom generation ages to the point of non-

participation, today's college students represent a significant demographic that must replenish the hunting population. Management agencies are tasked with discovering new ways to recruit hunters in an environment that is increasingly less conducive to traditional or natural recruitment.

The results of this study may provide clues to enact recruitment opportunities for college students. In this study, 28% of the sample expressed interest in participation in hunting but had not participated in the previous three years. Management agencies should find ways to partner with universities in order to provide opportunities for this significantly available population.

One method may be through agency-sponsored clubs on university campuses. These clubs designed specifically for mentorship recruitment efforts could yield immediate results through increased license sales. The KDFWR currently has a program designed to connect interested college students with other students from the same university who are experienced hunters and who have expressed willingness to mentor new hunters. It may be beneficial in programs such as this to recruit current hunters to participate in this program by asking current friends who do not hunt to participate with them. This mentor program may be even more effective it specifically includes natural mentor relationships stemming from existing friendships that may lead to continued participation beyond the initial introduction.

There may also be opportunities within certain college departments for representatives of wildlife management agencies to serve as guest speakers or take other active roles in the instruction of certain classes. These types of outreach and education

opportunities may be particularly effective in recruitment of individuals who would identify with the EINC group.

In this study over half of the individuals identified in the PH group also fell into the EINC group (Table 12). Environmental Science, Biology, Recreation and Park Administration, Wildlife Management, Agriculture, and other similar departments may hold higher concentrations of EINC type students yielding better results for recruitment efforts of this type. At the most extreme level there may be potential for an abbreviated class (1 credit hour) for college credit. A class of this type could be designed as a much more in-depth hunter education course, be offered to students who had not previously held a hunting license, and would culminate with a mentored hunting experience.

Table 12

Members of Potential Hunter and Environmentally Inclined groups

	EIND	**EINC**
Not interested in hunting	927	1109
PH Group	386	**432**

This study serves as a starting point for research in a currently understudied population of hunter recruitment and retention. Findings may be tempered by a low response rate but still add important contributions to the existing body of research. Further research is necessary to establish what tools are most effective to reduce certain barriers to participation for college students. University campuses provide a unique

opportunity to reach a large varied population from all sorts of demographic backgrounds. In this way, recruitment efforts at universities could provide a significant source of individuals for hunter recruitment in the United States.

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APPENDIX A:

Survey Instrument

Informed Consent Page

Discloser of all information in this study is voluntary.

The following is an academic research study. Any records associated with this study will be kept confidential under appropriate security. No private information is collected in the process of answering the survey.

This process should take no longer than 10 minutes to complete.

No one under the age of 18 shall participate in this study.

I understand that by continuing I have read the terms above and agree to participate in this study.

Thank you for you participation in this survey. As a way of saying thank you for your completed survey we would like to offer you a chance at a random drawing for a Visa gift card in the amount of **$50.00**. At the end of the survey you may enter your email address for consideration. All information will be kept confidential on a protected computer, and will be destroyed once the drawing takes place.

Hunting as a Recreational Activity for College Students

Section 1- Hunting and Fishing- Please provide us with information about your past experience with hunting or fishing.

1. Have you ever been hunting or fishing?
   I have been…
   Fishing
   Hunting
   Both Hunting and Fishing
   Neither Hunting nor Fishing

<*If hunting, fishing, or both is selected, display this page*>

1a. How many different times have you participated in *hunting* in the past 3 calendar years (2011-2013)?
   0 times
   1-5 times
   6-10 times
   11 or more times

1b. How many different times have you participated in *fishing* in the past 3 calendar years (2011-2013)?
   0 times
   1-5 times
   6-10 times
   11 or more times

1c. Do you plan to hunt or fish in 2014, or have you done either already this year?
   In 2014 I have already or plan to go…
   Fishing
   Hunting
   Both Hunting and Fishing
   Neither Hunting nor Fishing

Section 2- Lifestyle factors- Various lifestyle factors influence our recreational habits. Please provide us with information about the following lifestyle factors to help us better understand your recreational choices.

2. How important are the following lifestyle factors to you? Please select the level of importance to you for each factor.

	Not Important ⟷ Very Important				
Eating healthy	1	2	3	4	5
Eating locally grown foods whenever possible	1	2	3	4	5
Eating Organic foods whenever possible	1	2	3	4	5
Harvesting my own foods whenever possible	1	2	3	4	5
Regular physical exercise	1	2	3	4	5
Being active outdoors	1	2	3	4	5
Enjoying nature	1	2	3	4	5
Living in an environmentally friendly way	1	2	3	4	5
Activities that challenge me	1	2	3	4	5
Activities with friends	1	2	3	4	5

Section 3- Hunting as Recreation- Please share with us about your opinion of hunting as a recreational activity.

3. In general, do you approve or disapprove of legal hunting?
   - Strongly approve
   - Moderately approve
   - Neither approve nor disapprove
   - Moderately disapprove
   - Strongly disapprove

4. Do you agree or disagree with this statement? I am very interested in hunting as a recreational activity.
   - Strongly agree
   - Moderately agree
   - Neither approve nor disapprove
   - Moderately disagree
   - Strongly Disagree

5. Do you agree or disagree with this statement? Hunting is a safe recreational activity.
   - Strongly agree
   - Moderately agree
   - Neither agree nor disagree
   - Moderately disagree
   - Strongly Disagree

Section 4- Hunting For Food- Please share with us your opinion about hunting as a means for acquiring food.

6. Do you agree or disagree with this statement? Hunting wild animals for food is ok.
   Strongly agree
   Moderately agree
   Neither agree nor disagree
   Moderately disagree
   Strongly Disagree

7. Do you agree or disagree with this statement? Regulated hunting is a sustainable way of obtaining food.
   Strongly agree
   Moderately agree
   Neither agree nor disagree
   Moderately disagree
   Strongly Disagree

Section 5- Specific Barriers to Hunting- Please share with us about specific reasons you may or may not hunt.

8. Please rate the impact of the following potential barriers to your participation in hunting.

	Not an barrier for me				**Significant barrier for me**
Lack of time to hunt	1	2	3	4	5
Lack of knowledge about hunting	1	2	3	4	5
Cost of hunting license	1	2	3	4	5
Cost of hunting equipment	1	2	3	4	5
Lack of access to hunting land	1	2	3	4	5
Safety of hunting	1	2	3	4	5
Lack of game to hunt	1	2	3	4	5
Lack of interest in hunting	1	2	3	4	5
Disapproval of hunting	1	2	3	4	5

9. Do you agree or disagree with this statement? I would be interested in participating in hunting with an experienced hunter who attends my university.
   Strongly agree
   Moderately agree
   Neither agree nor disagree
   Moderately disagree
   Strongly Disagree

10. Do you agree or disagree with this statement? I would be interested in participating in hunting with a *group* of friends who attend my university.
    Strongly agree
    Moderately agree
    Neither agree nor disagree
    Moderately disagree
    Strongly Disagree

Section 6-Demographic Information – Please tell us a little about yourself. All information is kept confidential.

Age:
Gender:
Race:
Year in school:
University you attend:
State of Residence while not at school:
Residential type:
- Urban-area population greater than 30,000 people
- Rural-area population less than 30,000 people

Growing up did you have a family member or close friend who participated in hunting?
Yes
No

Thank you for you participation in this survey. As a way of saying thank you for your participation we would like to offer you a chance at a random drawing for a Visa gift card in the amount of $50.00.

If you would like to be considered for this random drawing please enter your email in the space below.
All information will be kept confidential on a protected computer, and will be destroyed once the drawing takes place.

(Enter email here)

You have now completed the survey.

If you are interested in more information about hunting or fishing in Kentucky click here.

{link: http://fw.ky.gov]

APPENDIX B:

Non-Response Bias Check Instrument

Hunting As a Recreational Activity for College Students

1. Do you agree or disagree with this statement? I am very interested in hunting as a recreational activity.
   Strongly agree
   Moderately agree
   Neither approve nor disapprove
   Moderately disagree
   Strongly Disagree

2. Please rate the impact of the following potential barriers to your participation in hunting.

	Not an barrier for me				**Significant barrier for me**
Lack of time to hunt	1	2	3	4	5
Lack of knowledge about hunting	1	2	3	4	5
Safety of hunting	1	2	3	4	5

3. Do you agree or disagree with this statement? I would be interested in participating in hunting with a *group* of friends who attend my university.
   Strongly agree
   Moderately agree
   Neither agree nor disagree
   Moderately disagree
   Strongly Disagree

   Demographic Information
   Age:
   Gender:
   Race

Enter your email address here if you would like to be considered for the $50 Visa Gift Card drawing

_____