Hunting in Nevada:
An Analysis of Hunter Characteristics, Behaviors and Motivations

A thesis submitted in partial fulfillment of the requirements of the degree of Master of Arts in Sociology

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Abstract

Hunting has played a significant role in the development of human societies and continues to play a significant role in defining culture in the present. While hunting is not now necessary to human survival as it was in the time of hunter-gatherer societies, hunting is still widely practiced in the United States and around the world. While research on the social factors of hunting has become more prominent since Hendee’s (1974) work on motivations for hunting, similar research in Nevada has not been pursued. In a state where a greater variety of game can be pursued but opportunities to do so are limited, it is important that hunters are understood to provide the most attractive hunting opportunities to the greatest number of hunters in light of wildlife management efforts. This thesis seeks to fill the void in current research on Nevada hunters by: 1) outlining basic hunter characteristics such as demographic, economic and participation factors associated with hunting, 2) determining the structure of outdoor recreation by analyzing whether hunters are best characterized as recreational specialists or generalists, and 3) determining what motivations influence the selection of hunt locations by hunters. Using data from the Nevada Bureau of Mines and Geology, Nevada Department of Wildlife, Nevada Rangeland Vegetation Survey, U.S. Census Bureau and U.S.
Department of the Interior this thesis finds that hunters in Nevada are similar to other hunters in the United States in terms of basic descriptive characteristics and motivations. Further, this thesis finds that hunters in Nevada are characterized as generalists based on outdoor recreation behaviors.

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CHAPTER 1: INTRODUCTION

STAGE THEORIES OF SOCIETAL PROGRESSION

Social science theories began with the idea that social change progresses from less developed and technologically advanced to more developed and technologically advanced societies (Lenski, Lenski and Nolan 1991). Lenski et al (1991) propose that hunting and gathering societies evolved to industrial societies and beyond because of technological advances and more complex social organizations. The development of stage theories has been very useful as a grand sociological theory used to understand human societies over time, but like all grand theories stage theories do not describe all societies or movements within societies.

The theory of a linear movement of societies is appealing from a macro view of societies but when societies are examined more closely, they do not progress in a simple linear fashion. Throughout history as societies have become more technologically advanced and structurally more complex, societies have continued to embrace outdated activities. For example, hunting was a primary food source throughout most of human history, but hunting continued through subsequent stages when society’s requirements for food were satisfied by agricultural practices. Hunting was an important source of food during early American history for those in rural locations, but most Americans have depended on agricultural food sources for the last 200 years (Gray 2003).

HUNTING AS A POPULAR MODERN RECREATION
Despite the loss of survival-based motivations for hunting, hunting continues to be practiced frequently by a sizable portion of Americans. Roughly five percent of Americans 16 years and older hunt and the average hunter took 15 hunting trips in 2005 (Department of the Interior 2006). In comparison to other more widely studied groups, Asians represented only four percent of the population in 2005 and only about five percent of the population in 2004 indicated they were gay (Department of the Interior 2006; Gates 2004). While hunters do not face the same challenges as these other groups that have led to their prominence in sociological literature, hunting is important to the United States’ history and culture and merits further study.

HUNTING RIGHTS THROUGHOUT HISTORY

The extent that hunters have been able to hunt has been an issue throughout much of European history, since at least since the time of the Middle Ages. Royalty and nobility in the middle ages restricted hunting among the peasants because hunting was one of the most prized recreations of the ruling elite (Gasset 1972). Hunting may have been as important to royalty as governing their country as in the case of Louis XVI (Smith 2007). The lower classes’ lack of hunting rights played a role in the French revolution. On August 4 1789, the National Assembly made the abolition of feudal privileges official with hunting being one of the key rights that were relinquished (Smitha 2002). The practice of hunting has helped to define societies.

From the very beginning, the situation in North America was very different from medieval Europe. In North America, hunting became not only accessible to most colonists, but was a requirement for survival on the frontier (Gray 1993). With the vast
amount of land that was relatively uninhabited by European standards, hunting was available to nearly all, although as the population grew urban residents turned to agricultural sources of food or bought wild game from the native Americans (Gray 1993). Hunting throughout the history of the U.S. has been a right of all citizens. Game animals are typically regulated by state and federal governments as indicated by the U.S. Fish and Wildlife Service’s mission statement and in most cases, a license can be obtained for a minimal fee (U.S. Fish and Wildlife Service 2009).

CURRENT HUNTING TRENDS IN THE U.S.

The ability and willingness to hunt is an issue for hunters in the U.S. The trends over the last three decades in the U.S. indicate that hunting is either not as desirable or not as accessible to most Americans as it once was (Department of the Interior 1991 2006). This issue has not been confined to the last 30 years or to the U.S. although current trends in hunting participation may indicate a shift in the barriers to hunting. While the total population in the U.S. is growing, the total number of hunters is decreasing. There are likely several factors affecting the decline in hunting participation such as families moving to new communities more frequently (Zinn 2003). The amount of land accessible to the public may be decreasing (Stedman, Bhandari, Luloff, Dieffenbach and Finley 2008). The amount of money available to spend on recreation within families may be decreasing. In addition, increasing urban populations may have greater power in defining social norms that do not favor hunting. Hunting in the U.S. as an outdoor recreation may continue to decline in the future and become an activity for the elite if steps are not taken to bolster its popularity.
CURRENT HUNTING TRENDS IN NEVADA

Contrary to the hunting participation trends in other portions of the U.S., in Nevada, hunting is popular. Roughly three times as many individuals apply for tags as there were tags available in 2007 (Nevada Department of Wildlife 2007). The demand for hunting does not appear to be weakening. As the population of Nevada grows, hunting opportunities are unable to keep pace with increased demand. While questions about hunting in the eastern U.S. revolve around whether game managers can maintain a high level of hunter participation in order to maintain quality game populations, the current question in Nevada is whether adequate opportunities can be maintained for hunters in Nevada.

Similarly to trends in European history, Nevada is wrestling with the issue of maintaining hunting opportunities for all Nevada residents as opposed to restricting access to upper class hunters (Gasset 1972; Smitha 2002). With the high demand for hunting in Nevada, it might be assumed that license fees could be increased to collect more revenue. The revenue could be put to use to increase the quantity and quality of game animal populations in the state. There is some dilemma because this course of action would likely be very effective but would make the cost of hunting prohibitively expensive for many local, lower income hunters. The Nevada Department of Wildlife (NDOW) is working to maintain hunting opportunities for all Nevada hunters (NDOW 2009). But, they also have a responsibility to manage wildlife to optimal levels in the state. The wildlife management goals may be best accomplished by increasing fees.
SOCIAL ASPECTS OF WILDLIFE MANAGEMENT

With this dilemma facing wildlife managers, there is a need to shift more attention to the social aspects of wildlife management. In particular attempting to understand hunter characteristics, trends and motivations should be a primary focus for wildlife managers despite their lack of training in the area. Individuals are likely to focus their attention on disciplines that they have been prepared for throughout their lives. For example, you would not expect an astronaut to perform a heart transplant surgery. In a similar vein, you would not expect wildlife biologists to be experts of both wildlife biology and sociology but in the current climate, that is what is what is being expected of wildlife managers. Information in this thesis should help them.

In order to help wildlife managers provide the best services to hunters, social scientists need to focus more attention on issues related to hunting. The research on hunting in some areas of the country has been productive. Universities in many areas of the U.S. have created departments that focus specifically on social aspects of hunting and work directly with state wildlife agencies to improve hunting in those areas. Conversely, Nevada has produced little literature on the social influences on hunting. Even historical accounts of hunting in Nevada are sparse.

THE INTENT OF THIS THESIS

This focus of this thesis will be to develop on understanding of hunters and hunting in Nevada that will serve as a basis for future research within the state. Chapter 1 will describe basic characteristics and tendencies of hunters in the U.S. and in Nevada. The intent is to determine the extent that Nevada hunters are similar to other hunters
across the U.S. Given the lack of research within the state, if Nevada hunter and hunters across the U.S. are similar, a preliminary understanding of hunters can be assumed without having to develop, collect and analyze multiple surveys on Nevada hunter characteristics. The compilation of hunter characteristics will also indicate the importance of hunting to Nevada hunters as well as the economic impact of hunting on the state.

Chapter 2 will focus on the issue of recreational specialization. Recreational specialization is a theory developed by Bryan (1977) to explain progression within a recreation from novice to expert. In the context of this paper, recreational specialization will refer to the extent that outdoor recreationists engage in one activity at the expense of others. For example, a hunter who has not discovered a type of game that is optimally challenging and enjoyable may hunt multiple types of game before they settle on one and cease to hunt the others. In this paper, the latter from of recreational specialization will be analyzed to determine whether Nevada recreationists are specialists or generalists and what affect these recreation patterns have on hunting viability in Nevada where game may not be regularly available. In Chapter 3, an analysis of hunter characteristics, Nevada’s physical environment and department of wildlife harvest results will be combined and represented spatially to determine if traditional motivations for hunters best explain Nevada hunters and add a visual understanding to hunter and hunting patterns within the state.
CHAPTER 2: A COMPARISON OF HUNTERS IN THE U.S. AND NEVADA

There is a lack of research on the influence of social factors on hunting in Nevada. During the course of interviews with some Nevada wildlife management stakeholders, the focus seems to be on biological or economic development. The current thought appears to follow the logic that if the resources are available hunters will utilize them. This may be the proper focus for the time being as the demand is very high for hunting compared to the limited natural resources in the state, but if Nevada hunters are not understood then their needs may not be met properly. Also, hunting opportunities may not be optimized in terms of numbers of hunters or quality of experiences. In addition, if the social, physical or biological conditions change state game managers may not understand how to adjust hunting regulations properly. With the prevalence of wildfires that alter wild life habitat and changes in demographic composition of state residents it will be difficult to predict how hunters will react to changes in hunting conditions and regulations without understanding hunter characteristics. Up to this point, policy changes seem to be largely based on traditional factors. For instance, the drop in deer population in the 1980s resulted in a period of decreased tags (NDOW 2007). The intent was to protect deer herds in the future. But, methods for maintaining hunters were not developed. If hunting is to remain strong in Nevada, those who manage or research natural resources need to develop an understanding of hunter characteristics through systematic research.
To meet the demands of hunters, researchers and game managers need to develop a clear understanding of hunters and appreciate the importance of hunting. A complete definition of what constitutes hunting is often misunderstood even by active hunters. They tend to have a narrow definition that focuses on the type of activities that they engage in and often have a more outdated understanding of motivations. In the past hunting was characterized by economic rather than social motivations. The social forces that influence hunting and hunters are often misunderstood. The type of hunt attracts different hunters and allows different forms of social interaction. For example, duck hunters can socialize more because of the close proximity of hunters and sporadic encounters with the target species. Conversely, big game hunters usually hunt at some distance from one another and there is a greater need to remain silent. In addition, the importance of hunting is downplayed. For example, Stedman et al. (2008) and Brown, Decker, Riley, Enck, Luaber, Curtis and Mattfeld (2000) found that even though hunting remains an important management tool for wildlife species such as deer, hunters do not see themselves as game managers. Even experts in the area of human dimensions of wildlife research have mixed feelings about how best to characterize hunters. The debate about whether hunters are generalists or specialists in their recreational choices has not been settled because of conflicting understandings of different forms of specialization.

After creating a general definition of hunting and outlining its importance, a set of behavioral characteristics needs to be developed to give an accurate description of hunters. For example, we know that different types of hunters are attracted to hunting different game species but what characteristics define hunters within various groups? General data about all hunters in the U.S. will define hunters very broadly and can serve
two purposes in the study of Nevada hunters. First, hunters are likely to have similar behaviors to the extent that they share demographic characteristics. This means that hunters who have a higher income, live in a similarly sized city and are the same gender are likely to exhibit similar hunting characteristics. Secondly, national and state data can be compared to determine the how different Nevada hunters are from all hunters in the U.S. If Nevada hunters are comparable to U.S. hunters as a whole then national data on hunting can be used to describe Nevada hunters in instances where there is not prior data. Because there is a lack of information on hunters in Nevada, other than the FHWAR (Fishing Hunting and Wildlife Associated Recreation) survey, the ability to create a baseline for Nevada hunter characteristics will make further analyses of Nevada hunters more productive. After hunters throughout the country are described and compared to Nevada hunters, the discussion of hunting in Nevada will have greater context and a comparable reference. For example, if it is determined that Nevada hunters tend to hunt big game, small game and migratory game in relatively equal proportions this does not relay the unique features of hunting in Nevada. But, if it is know that nationally big game hunting is by far the most popular type of hunting those studying Nevada hunters can see that hunting in Nevada is different and can begin to make hypotheses about these differences.

THE IMPORTANCE OF HUNTING

Hunting is an activity that a minority of the population practices but the influence of hunting extends beyond this limited group. The groups that are primarily associated with hunting are hunters and game managers. Businesses who supply outdoor goods and
government agencies that receive fees from hunting also have a direct relationship with hunting. Hunters buy many goods such as firearms, clothing, food, lodging and ammunition. These expenses put money into local economies as well as large retail companies. Also, hunting fees fund government wildlife improvement projects that can be appreciated by hunters and non-hunters (Utah Division of Wildlife 2009). If hunters were to stop paying for licenses, national wildlife refuge managers would have to find supplemental sources of revenue and there would likely be a drastic reduction in the number of government wildlife managers. It is important emphasize the impact of hunting for all U.S. citizens even if they have no direct ties to hunting or are opposed to the practice.

A WORKING DEFINITION OF HUNTING

Hunting includes any activity where an individual attempts to encounter game species in an attempt to kill an animal. Hunting includes various types of prey. Prey behavior shapes hunter behavior and social interaction. Small game is generally pursued more actively than big or migratory game species. The hunter usually stalks the target species in the hope of getting an open shot. Large game may be pursued similarly to small game but a number of hunters also find a location where game tend to travel and wait for the animal to come to them. Waterfowl hunting generally relies on the animal coming to the hunter.

The social characteristics of hunting also vary among hunt types. Large game hunters generally are attracted to hunting areas that are not in close proximity to another hunter, which limits interaction during the hunt. Also being silent to avoid detection is
important while hunting big game. Even if a hunter hunts in a group they may have little communication with others until they are finished hunting. At the other extreme waterfowl is generally hunted as a group. When the hunter is not engaged in hunting they are free to communicate with one another without disturbing the target species.

**TOWARDS A MORE ACCURATE SOCIAL PORTRAIT**

Many of the characteristics of hunters are contrary to popular beliefs. The general public may believe that hunters are poor, uneducated, rural residents (Heberlein 1987). This assumption is not correct (Heberlein 1987). If some of these popular beliefs are not correct, the traditional perception of hunters is likely to have other inaccuracies. There is a danger that those who are in a position to effect change on the national, state and local level might make decisions based on traditional hunting stereotypes. The result could be that hunting becomes less popular because attractive hunting opportunities are not provided. In Nevada for example, the reduction in tags following the late 1980’s decrease in deer numbers could have been mitigated if game managers were exposed to and inclined to apply current human dimensions of wildlife theories. Thankfully, the conceptualization of hunters has evolved beyond these traditional views.

The width and breath of knowledge pertaining to hunting in the U.S. has evolved greatly over the last thirty years. In the past harvesting game was thought to be the focus of hunters. Researchers now understand that multiple factors such as social, environmental and harvest factors determine the success of a hunt as perceived by the hunter (Hendee 1974). This transition from traditional to current motivations for hunting
has allowed a more accurate description of hunters and explanation of their behaviors but not all stakeholders have accepted and incorporated the new paradigm.

In a state where few scholars have developed knowledge related to hunting, it is difficult to imagine that anyone understands hunters as a whole in the state. The primary source of knowledge about Nevada hunters comes from anecdotal examples and harvest data. Because of the limited knowledge, research needs to begin describing Nevada hunters at a basic level. The first step in understanding Nevada hunters will be to compare national hunter characteristic with state data and determine whether Nevada hunters differ from U.S. hunters in general.

The demographic characteristics of the potential hunting population such as age, race and sex tend to have strong relationships with hunting participation rate. The rate at which each sex hunts is one of the most important demographic concerns for wildlife managers. Not only do women hunt less than men, but differences in the hunting rate for each sex are interpreted as an opportunity by some game management agencies to increase hunting participation. For example, if men hunted more than women, women might have greater potential to increase hunting simply because they hunt less. Because men and women interact within many similar social groups, women should have greater exposure to hunting and a greater likelihood to initiate hunting. Conversely, some minority groups who also have low participation rates but are not exposed to hunting to the same extent should be less likely to hunt. In addition, throughout much of human history women have experienced barriers to hunting due to social, biological and physical characteristics (Lenski et al. 1991) although female hunters were present in some societies (Stange 1997). In the past it was likely more advantageous for men to hunt due
to physical and biological factors for each sex. But, in today’s society, many of these barriers have been removed. High-powered rifles, ATVs and changing social structures have removed many of the physical barriers.

Race and ethnicity is another important factor. Nevada has a large population of ethnic and racial minorities. With many areas of the country experiencing declining percentages of hunters, minority groups have been targeted to increase hunting participation. Minority groups are increasing in size and if they could be influenced to hunt hunting percentages could be stabilized. What makes them an appealing group for game managers to target and is it wise to target this and other minority groups based on their ability to hunt? The biggest issue is whether these groups have the social networks and familiarity with the state to increase hunting.

NEVADA VERSUS U.S. HUNTERS

Because the data is reported on the national and state levels, a comparison will show the differences between the two groups. If the data show that Nevada hunters are similar to other hunters research from other areas of the country, this paradigm can be applied to issues within Nevada. If not, further research needs to develop a depiction of hunters within the state taking into account their unique features. Also, an understanding of all hunters within the U.S. needs to be expanded to incorporate spatial variations between different regions. In this case, the spatial distribution of all hunters, the distance between hunters and hunting locations and the concentration of hunters at hunting destinations. For example, most residents of Nevada live around the Reno and Las Vegas
metropolitan areas, but most prime mule deer hunting locations are roughly four hours away. In many other states hunters are not required to travel such long distances.

It is important for state game managers to understand not only the regional characteristics of the game they are managing but also of those groups that are affected by management decisions. Because the social, physical and biological environments they are managing differ from the east, research originating from the east coast likely does not fully explain hunting behavior in the west. Some of the major concerns in the eastern U.S. such as New York or Pennsylvania revolve around decreasing percentages of hunters and increasing herd populations (Stedman et al. 2008). In Nevada, these issues are likely to be different if for no other reason that the climates are different. As to the eastern U.S., Nevada is arid and not densely populated in large portions of the state. Additionally, Nevada has one of the highest percentages of the population that live in urban areas in the country. This means that there are few game animals and a disproportionally large number of hunters.

NEVADA HUNTERS

Nevada hunters are likely similar to U.S. hunters to the extent that they have similar demographic characteristics. Because Nevada is a unique state in terms of both the social and physical environment, some systematic variation between the two types of hunters is to be expected.

The physical environment is different from many other states and diverse environment allows for more types of game. Nevada is arid and relatively uninhabited outside of major metropolitan areas (McPhee 1982; State Library and Archives 2008).
Also, it is one of the most mountainous states in the country (Mountain Zone 2009). Nevada has many types of game that are not present in other locations. Big game species within the state include mule deer, antelope, elk, big horn sheep and mountain goats. The population size of these animals is limited by water resources. The lack of water limits drinking water and vegetation.

The physical environment has implications for the social environment. Social interaction among hunting parties while hunting is limited due to the vast amount of hunting locations. In other locations, a significant portion of the research has focused on the impact of crowding (Kuentzel and Heberlein 2003). In Nevada, a group of hunters could hunt the entire season without coming into contact with another hunter. This lack of interaction is important in that the chance to build hunting networks is limited. The question here is how much do these differences affect the characteristics of hunters in Nevada as opposed to hunters nationwide?

DATA

The FHWAR survey is largest and most consistent data source recording hunting characteristics in the U.S. Because the methodology, sample size and response rates are similar this information will be reported in ranges for the years 1996 through 2006. The same information for 1991 could not be located and is not reported here. The reporting format for the remaining surveys varies for each survey and approximate numbers are reported for most of the values.

The FHWAR survey sample frame is all residents of the United States. The sample is a stratified cluster sample selected from expired Current Population Surveys.
The initial sample sizes for the 1991 through 2006 surveys are around 80,000. The survey was completed in two phases. The first was a screening interview. In this phase, respondents are asked if they engage in hunting, fishing or wildlife related recreation. The number of completed surveys ranged from about 44,000 to 66,000. Those participants that indicate they engage in outdoor recreation were selected to participate in the second phase that concentrates on the detailed aspects of outdoor recreation. The sportsmen (anyone who hunts or fishes) sample size for the detailed phase of the survey was about 28,000. The number of completed responses ranged from 22,000 to 25,000. (Department of the Interior 1996, 2001, 2006). This survey has been performed approximately every five years since 1955. This survey collects demographic and hunting related data on hunters such as race, age, hunting participation and economic impact of hunting in the United States. The information on hunting is reported as frequencies.

This survey was selected for this analysis because the data is reported on the state and national level and has been collected regularly since 1955. This data is the most continuous and comprehensive national hunting survey. The data is also reported separately for each state. This survey data has many benefits, but due to changes in recall period that make the survey more accurate and small sample sizes in Nevada, not all the collected data can be used in this analysis.

This survey has several issues that make reporting and comparing data difficult if not impossible in specific cases. The methodology and sampling frame was dramatically altered between the 1985 and 1991 surveys making comparisons from surveys before and after this point impossible (Department of the Interior 1991). The sampling frame also changed during this period from age 12 and above to age 16 and above. The recall period
changed from one year to four months. This change is expected to generate more accurate estimates of hunting. The variation in the data between these two surveys does not allow for any type of correction to make the numbers between the two surveys comparable. Some of the responses have decreased as much as 46% but all numbers were at least 30% lower than numbers from the previous study. The detailed phase of the survey also excludes a subset of the hunting population from the survey adding to the depressed numbers. The 12-16 year old age group was eliminated from the 1991-2006 surveys. This is a substantial change because in many states big game animals can be hunted by individuals who are 12 years and older. This may have been adjusted to account for some states that a have later hunter ages. The national survey data has a large sample size, which means that the estimates are reliable in most cases, but for the Nevada sample, reliability becomes an issue in some response categories. For example in multiple categories data are listed based on samples of fewer than 29 individuals. Given what is known about hunting and its relationship to population trends, an argument could be made that the trend for a decreasing hunter population and certainly a decrease in the percentage of hunters is real and will continue to decline rather than random noise across a short span of time.

METHODS

This study will focus on demographic data, participation rates, expenditures, hunt location and type of game hunted. The data will be examined and reported using frequencies and supported with theories from the disciplines of sociology and human dimensions of wildlife research. The data describing all hunters in the U.S. will be
compared to the data describing Nevada hunters. The results of this comparison will be used to indicate whether these groups of hunters differ substantially.

RESULTS

Hunter Demographics

U.S. Hunters by Residence

The distribution of U.S. hunters by the size of the city of residence size is contrary to traditional views of hunting. Figure 1 shows that the vast majority of U.S. residents live in towns greater than 250,000. Roughly five times as many people live in cities of 250,000 or more than live in areas outside of these metropolitan areas. A little more than 60% of all hunters live in metropolitan areas as opposed to non-metropolitan areas. On the other hand, the percentage of hunters is much higher in smaller non-metropolitan communities. Roughly two and a half percent of residents of cities of more than one million people hunt as opposed to twelve and one half percent in non-metropolitan areas. Therefore, hunting is a more popular activity in rural areas rather than cities but the typical hunter is a city dweller.

Nevada Hunter Residence

The relationship between all rural and urban residents is more extreme in Nevada than nationally, which influences hunting patterns in the state (Figure 2). A test of significance of the difference between two proportions shows that the number of hunters
who live in metropolitan areas compared to the total number of hunters are statistically significant at .001. In Nevada, the rural population only accounts for roughly 15% of the population. This distribution heavily influences the distribution of Nevadan hunters. Nearly twice as many hunters live in urban versus rural areas. In addition, the percentage of hunters in urban areas is lower than the national average. Urban hunters account for less than two percent of the metropolitan population while hunters in rural areas account for about eleven percent of the non-metropolitan population.

A further examination of Nevada hunters by residence shows that the largest number of hunters come from larger cities with a population between 250,000 and 1 million people. This category includes the Reno/Sparks metropolitan area. Non-metropolitan areas represent the next highest number of hunters. The sample size for the category metropolitan area less than 250,000 was too small to be reported but the number of hunters appears to be marginal. The total number of hunters in the state was about 60,000 in 2006. The data from Figure 2 shows the distribution of 58,000 hunters leaving a remainder of 2,000 hunters that could not reliably be reported. This data indicates that while there are variations between national and Nevada hunters, the distribution of Nevada hunters by population size are roughly comparable to all hunters in the U.S.

U.S. Hunters by Region

Another important way of determining whether Nevada hunters are different from national hunters is to determine the variation of hunters’ residence between regions in the U.S. The regional distribution of U.S. hunters (Figure 3) shows some variation between regions. While this figure shows that many regions have similar numbers of hunters, the
overall population of the region has some significant variation, which affects the percentage of hunters in the region. For example, the south Atlantic region (Figure 4) which includes coastal states from Virginia to Florida has about the same number of hunters as the west north central, which includes states such as the Dakotas, Nebraska and Iowa. Areas such as the west north central and east south central have some of the highest percentages of hunters. The main factor may be the population density in relation to amount of game and hunting area. This means that the more rural areas correspond with high a percentage of hunters and greater availability of hunting land. So not only are hunting statistics similar between state and national hunters, but hunters as a group, tend to have similar numbers by region. The biggest difference is the percentage of the population they represent. For example if the hunting participation percentage by total population was held constant similarly to the pacific region then hunting rates in the west north central would be reduced by just over 70%.

While the number of hunters is consistent in most regions, the distribution of participation in various hunt types from region to region varies substantially. Although the top two types of hunting for all regions are large game and small game, the remaining categories vary considerably. For example, in the west south central region migratory game is hunted slightly more than small game. Whereas, in the middle Atlantic region small game is hunted by nearly four times as many hunters as migratory game. This variation may be a result of regional hunting opportunities. Some of the variation may be accounted for in regional definitions of game categories. The other category includes several species of furbearing animals such as coyote, fox and raccoon as well as bird species, which are protected in some states and hunted in others. Whether a raccoon is a
small game animal or an “other” would depend on the response options in the survey. For example if the interviewer asked an individual to name all the species they hunt, the response coding would be more consistent but more time consuming. If the respondent selected the game category, the regional differences would be a factor. The FHWAR survey does not tell which method was used. What the difference in distribution indicates is that hunters tend to be similar across the country but region specific differences do have an effect on the type. This means that eastern and western hunters need to be compared with care.

U.S. Hunters by Age

The distribution of hunters by age (Figure 5) shows a normal distribution among individual age groups. It should be noted that the first two groups have much narrower response ranges, which will affect direct comparisons. For instance, the first age range is 16 to 17 while most age ranges are about ten years. Hunting participation is highest in the 35 to 54 age range. These years did coincide with higher population totals but because the number of hunters did not increase when population totals increased in the 65 and above age group, it seems that other factors have an influence on hunting rates. For example, individuals in the 35 to 44 age group have the optimal combination of time and money resources and have not been heavily influenced by the physical limitations of older hunters. This age range corresponds with the highest hunter total.

The percentage of hunters by age by the total population in that range does not vary greatly. For example, the highest percentage is seven percent for the 35-44 age
group while the smallest is three percent for the 65 and over age group. This may mean that once hunters start hunting they generally continue to do so.

Nevada Hunters by Age

The age distribution of Nevadans appears to be similar to the U.S. trends at face value (Figure 6). But, a test of significance of the difference between two proportions shows that the number of hunter who are 35 to 54 years old in Nevada compared to in the U.S. are statistically significant at .001. The State level data did not have a sufficient sample size to reliably report results for four age categories but the age categories that were reported matched the three largest categories (25 to 34, 35 to 44 and 45 to 54) for age. The age distribution of all Nevadans was very similar to national distributions.

U.S. Hunters by Sex

The prominence of male hunters conforms to expectations based on observation and past surveys (Figure 7). Although there are more women in the U.S., male hunters vastly outnumber female for hunting participation: ten percent of men hunt while only about one percent of women do so. This pattern of ten males to one female is not consistent for all types of game. Women represent slightly more than ten percent of the hunters but in the small game, migratory game and other categories this total drops down to around seven percent.

The low number of female hunters may show a demographic group that could increase hunting rates. Through marriage, friends and extended family women are probably exposed to hunting at a level greater than their participation rates indicate. If, as
research has found elsewhere, hunting is a family/social activity, then it should be relatively easy to recruit and maintain female hunters from within the family (Bissell, Duda and Young 1998). The main barrier to women hunting is differing gender roles within culture. While Brown, Decker and Provencher (1987) found that family support for hunting was an important factor in hunting initiation, Stedman and Heberlein (2001) found that a culture supportive towards hunting had an effect on hunting initiation only for males. Gender roles in relation to hunting would be more likely to specify women’s involvement in hunting to be food preparation or childcare.

Nevada Hunters by Sex

The percentage of female hunters in Nevada is slightly higher than compared to national levels (Figure 8). A test of significance of the difference between two proportions shows that the number of male hunters out of all hunters in Nevada compared to the U.S. are statistically significant at .001. Of the hunters in Nevada, about 18% are female. This compares to national data where women represent just fewer than 10% of hunters.

U.S. Hunters by Ethnicity

The ethnicity distribution clearly shows that white hunters are in the majority (Figure 9). Roughly six percent of non-Hispanic individuals are hunters as opposed to roughly one and a half percent of Hispanic hunters (Department of the Interior 2006). The interesting trend here is that while the number of all hunters by game type decreases from big game to migratory game, the number of non-Hispanic hunters drops at a greater
rate than Hispanic hunters. The number of Hispanic hunters per each type of game is: big
game hunters is 424,000, small game hunters 337,000, migratory game hunters 118,000
and other 36,000. The participation by type for non-Hispanic hunters are: 12,085,000 big
game, 10,345,000 small game, 4,594,000 migratory game and 1,092,000 other. This is a
similar trend as exhibited with female hunters. This may be due in part to the low levels
of hunting participation by minority groups across all hunting types, which could reduce
variability among respondents. Also, because the number of Hispanic hunters does not
drop off at the same rate as non-Hispanic hunters, Hispanic hunters tend to hunt multiple
types of game more than non Hispanic hunters (U.S. Department of the Interior 2006).

A major obstacle to increasing numbers in Hispanic hunters may be that they do
not have the social networks, access or income that seems to influence hunting
involvement (Zinn 2003). Non-Hispanic hunters tend to decrease hunting involvement at
a greater rate from big game to small game to migratory and other than Hispanic hunters.
Hispanic hunters do not decrease as rapidly but the numbers involved in each type of
game hunting are much smaller which might mask some variability in the data.

Nevada Hunters by Ethnicity

The percentage of Hispanic hunters in Nevada is slightly higher than national
levels (Figure 10). A test of significance of the difference between two proportions shows
that the number of non-Hispanic hunters out of all hunters in Nevada compared to the
U.S. is statistically significant at .001. While data from the 2006 Nevada hunting survey
could not reliably report the number of Hispanic hunters, the number of non-Hispanic
hunters was reported. The total number of non-Hispanic hunters in Nevada was 58,000.
Since there were about 60,000 hunters in Nevada in 2006, it will be assumed that there are about 2,000 Hispanic hunters in the state. Roughly 0.5% of Nevada’s Hispanic population hunts, while about four percent of Nevada’s non-Hispanic population hunts.

U.S. Hunters by Race

Hunting participation tends to differ among minority groups. In one respect, similarities can be seen between Black and Asian groups. Figure 11 shows that the distribution of hunters within the Asian and Black race categories listed seems to be consistent with one another. For example, the minority groups have similar participation levels for big and small game while the migratory and other categories have a sharp drop off in participation. But, this is one of the few similarities even among minority groups. White hunters tend to decrease participation by 50% from each category from big game to other categories. The most significant aspect represented by this chart is the much lower ratio of hunters among Black and Asian individuals. Roughly 0.7% of Blacks hunt. For Asians the rate is even lower at roughly 0.5%. This compares to just over 6% for white hunters. Again, among different races the most popular hunting is big game followed by small game, migratory and other game types. The zeros represent data from sample sizes too small to be reported.

It is important to remember that income and location of residence factors are not controlled in this analysis. But, the level of participation among these minority groups indicates that hunting is not central to the current culture of the Black and Asian communities in the U.S. One of the main factors may be the percentage of these populations that live in urban areas.
Nevada Hunters by Race

Nevada has fewer minority hunters than reported by the national data (Figure 12). A test of significance of the difference between two proportions shows that the number of are statistically significant at .001. While the sample sizes were too small to be reported for the Black or other categories, the total for white hunters was roughly 60,000. The total number of hunters in Nevada is about 60,000. This indicates that there are few minority hunters in the state.

U.S. Hunters by Income

Hunting is practiced more so by those with higher income. The income level of hunters is an important characteristic for game managers. It describes hunters’ status in society and determines how much is available to spend on hunting. Hunters have a higher income than the average U.S. citizen (Heberlein 1987). But, the most striking aspect of hunters’ income levels (Figure 13) is the high participation of hunters favoring the highest income groups. The top three income groups account for 50% of all hunters. The numbers of hunters represented in each income group tend to be greater and more variable in the higher income groups. However, the percentage of hunters within the $20,000 to $39,999 income categories was consistent. In this group, the number of hunters in each category ranges from 486,000 to 737,000. In comparison, the largest number of hunters per category came from the $40,000 and above range. The number of hunters per category in this range spanned from 1,209,000 to 2,754,000. The lowest bracket has much lower hunting participation rate at around 223,000 individuals.
There could be multiple reasons for the low participation of the poorest groups. It is important to remember that this data is not controlled for the effects of any other demographic variables. However, the most likely reason may be that hunting requires a minimum income threshold and a certain degree of job flexibility (Swanberg, Pitt-Catsouphes, and Drescher-Burke 2005). It is important to note that the individual income groups in this figure are not directly comparable to one another because the individual income groups are not of equal ranges to the previous groups. For example, the $30,000 to $34,999 income group has a range of $5,000. In contrast the $100,000 and above income group is unlimited. This results in a visual amplification of the number of individuals in the lowest and highest income brackets in figure 13. A large group of respondents, including 15,568,000 respondents, did not report income, which has the potential to skew the results heavily. In this chart, those respondents who chose not to report their income represented one of the highest category totals.

Nevada Hunters by Income

The income distribution of hunters in Nevada is similar to the national distribution at face value (Figure 14). But, a test of significance of the difference between two proportions shows that the number of hunter who make over $50,000 in Nevada compared to the U.S. are statistically significant at .001. The Nevada income distribution can only report those hunters who did not report their income and the three highest income levels from $50,000 and above. This does not describe much about lower income levels, but does suggest that the three highest income groups represent the highest total number of hunters per category similar to the national data.
U.S. Hunters by Education

Education has an effect on how much and what type of game hunters hunt (Figure 15). Of those who completed less than 11 years of school, five percent hunted. The next two categories, 12 years and one to three years of college, both represented six percent of the population. Of those who completed four years of school, four percent hunted. The highest education category hunted at three percent. The data is highly influenced by the number of individuals in each education category. For example, participation in different hunt types within an education category generally varied by about 15% between the two extremes. But, there are subtle differences between levels of education. As education increases the percentage of big game hunters decreases. For those who did not complete high school roughly 90% hunted big game. For those with five or more years just fewer than 75% hunted big game. As education increases the percentage of hunters that hunt migratory game increases. Just fewer than 12% of hunters than did not complete high school hunted migratory game. Conversely, nearly 30% of hunters with five or more years of education hunted migratory game. More educated hunters also hunt small game more often with about 35% of the least educated hunters and about 45% of the most educated hunters hunting small game. It also seems that more highly educated hunters hunt more types of game per individual than lesser educated individuals. The distribution of hunters within education groups exhibits some very consistent patterns.

While this data is not controlled for other demographic variables, education seems to effect hunting more than income. Education may be based more so on social factors that are tied to income than income itself. The results may indicate that social
classes prefer specific types of socialization within hunting activities. For instance, the ability to experience nature and solitude while socializing are probably maximized in migratory hunting.

Nevada Hunters by Education

Nevada hunters tend to be better educated than the national data (Figure 16). A test of significance of the difference between two proportions shows that the number of hunters with a college education in Nevada compared to the U.S. are statistically significant at .001. One to three years of college education had the highest percentage of hunters in Nevada by education level. The highest percentage of hunters by education level for the national data was 12 years of high school. Both the national and state data indicate that about six percent of individuals with one to three years of college education hunt. This indicates that more educated hunters do not hunt more in Nevada, but that less educated hunters hunt less.

U.S. Hunting Participation Patterns and Trends

Participation Trends

While the number of hunters has not dropped drastically in successive years, the trend over the last twenty years shows a steady decrease in hunting participation (Figure 17). It appears that the population of hunters has displayed a steady decline from 1991 to 2001. Also, from 1975 to 1985 it seems that a decline in hunting numbers occurred. In 1991, the FHWAR reported about 14 million hunters but by 2006 the number had
dropped to just over 12 million. This contrasts with the increase of the total U.S. population over the same period (U.S. Department of the Interior 1991, 2006). With the exception of 1975, which reported a 0.7% increase in the hunting participation, the percentage of hunters has been dropping in relation to the overall population since 1960. Although it appears that the number of hunters in the U.S. dropped significantly in 1991, this drop is likely exaggerated because of methodological changes in the survey between 1985 and 1991 (U.S. Department of the Interior 1991).

The Nevada hunting trends show an interesting pattern in hunting that is different from national trends. Nationally hunting seemed to spike in 1996 and decline from that point. In Nevada, participation decreased from 1991 to 2001 and then in 2006 increased sharply. It is possible that the increase in population in the state over the last decade has had a direct impact on hunting participation. The increase in hunting does not seem to coincide with any major increase in game populations (NDOW 2008c). Because the demand is high, hunting participation is not as responsive to changes in populations as might be seen in other states.

Nevada Hunters versus Hunting in Nevada

Nevada is a unique state. You would expect a large number of hunters from California consistently hunting in Nevada compared to the number of Nevada hunters given the population density and proximity of California. You would also expect a net gain of revenue in Nevada. This is not the case.

A comparison of the participation in hunting by Nevadans who hunt anywhere (Nevada residents) and any hunter who hunts in Nevada (resident and non-resident
hunters) indicates whether Nevada draws hunters to the state or if hunters choose to go to other states (Figure 18). This comparison does not show the extent Nevada hunters hunt in Nevada. For example, the category of hunters in Nevada could have multiple distributions. It is possible that most Nevada hunters hunt in other states while out of state residents by definition hunt in Nevada. The main intent is to show whether Nevada attracts more hunters from other states than the number of resident hunters it loses to other states. This relationship is largely equal in 2006. But, the 2006 data does show that more hunters hunted in Nevada than left the state to hunt elsewhere. This is beneficial for the state’s economy because Nevada should see expenditures in the state increasing.

Hunting Participation Trends in Nevada

The ratio of in state to out of state residents who hunt in Nevada have remained relatively stable from 1991 to 2006 (Figure 18). In 1991 and 2001, these categories were nearly equal at 47,000 and 48,000 in 2001 and 57,000 for both categories in 1991. In 1996 there were 60,000 hunters in Nevada, but only 52,000 hunters hunted in Nevada. In 2006 slightly more hunters hunted in the state (63,000) than there were Nevada hunters (60,000) (U.S. Department of the Interior 2006). The largest variation in hunting participation was in 2001. In 2001 the number of out of state and Nevada hunters was around 47-48,000 while in all other years the rate was around 60,000. It is interesting that whatever factor influenced hunting rates in 2001 in Nevada affected both groups equally. This indicates that the possible cause of this decline was a factor that affected hunting groups beyond Nevada hunters. However, these trends differ from national trends during that period indicating a regional influence on hunting.
Instate Versus Out of State Hunting Days

The surplus or deficit of hunters needs to be examined in light of how much these hunters hunt. For example, 50 hunters may hunt in Nevada and 50 Nevadans may be hunters, but individuals who hunt in Nevada might hunt for four days and Nevadans who hunt anywhere might hunt for 10 days. This pattern would indicate that total hunting trips would be greater outside of Nevada and would represent a possible loss in revenue for the state of Nevada.

The previous data describing where hunters hunt (Figure 19) is coupled with the number of days each group hunts. In 2006, more hunters hunted in Nevada than there were Nevada hunters but the number of days hunting did not favor Nevada. The number of days hunted in Nevada (615,000) was about ten percent less than the number of days that Nevadans hunted (692,000). The result is a hunting deficit for Nevada. While a positive influx of total hunters into Nevada is beneficial for the economy the number of days hunting out of state probably indicates that more money is spent out of state than in state.

Instate Versus Out of State Hunting Days Trends

The trend of spending more days hunting outside Nevada is consistent from 1991 to 2006 (Figure 19). This is contrary to what might be expected based on the variation in the number of hunters and because many other states have greater access to hunting and larger game populations. In this environment, hunters should be able to access game faster and have more opportunities to shoot game. This should result in shorter hunting
trips. Because Nevada does not have more days of hunting, there is some other factor beyond harvest factors that is inducing hunters to hunt more out of state.

Hunting by Type and Number of Days

National Days Hunting

The number of days that a hunter hunts describes the importance of hunting for hunters (Figures 20 – 23). If hunting were not central to their lifestyle, you would expect hunters to hunt a few days per year. In 2006 the average number of days spent hunting per hunter for all game combined was 18. Most hunters hunt around 10 to 15 days per year for big game, small game or migratory animals. The number of days for big game was 15. For small game, the average number of days was 11. The average number of days for migratory bird hunters was 9. Big game hunting likely reports the largest number of days hunting because big game hunting is the most popular type of game to hunt. Most hunters hunt in their state of residence. For all types of hunting 92% of all days of hunting took place in the hunter’s state of residence. Some likely contributors to these results are the cost of obtaining an out of state license and the lack of familiarity with distant hunting areas.

The data also indicate that not all hunters are specialists. This can be observed by comparing the number of hunters for each hunt type to the total number of hunters. The number of hunters by category is much larger than the total number of hunters. In this data, hunters identify once as hunters and once for each type of game they hunt. If hunters tended to hunt only one species, the total of all hunters would be closer to the
sum of the hunt categories. For example, in 2006 12,510,000 hunters hunted in the U.S. The total of hunters of each big game, small game and migratory game was 18,800,000.

National Days Hunting Trends

Data from 1991 to 2006 indicates that hunting participation is slowly declining. In 1991 a total of 235,806,000 days were spent hunting in the U.S. (Figures 20 – 23). In 2006, hunters spent 219,925,000 days hunting. The participation of hunters among various types of game categories has similar relationships. For instance, hunters hunt around a total of eighteen days per year in all four surveys. But, the four cross sections of survey data have some variation in relation to the ratios of hunters to days hunting. Some of the noticeable trends include the increase in big game hunting days from 128,411,000 in 1991 to 164,061,000 in 2006. Small game and migratory game both indicate that hunting days have dropped when the 1991 and 2006 data is compared, but unlike the steady decline of small game migratory game increased from 1991 at 22,235,000 days to 2001 at 29,310,000 days before dropping to 19,770,000 days in 2006.

Understanding the number of times a hunter hunts and the number of trips shows the effect of hunting on the state. Game managers across the country have been worried about the possibility of declining numbers of hunting participation rates because of a lack of revenue and an inability to control wildlife populations (Whitetail deer in particular). Also, Businesses related to hunting such as retail stores and hotels are affected by hunting.

U.S. Hunting by game type
Big Game

The distribution of categories of big game hunting heavily favors deer hunting (Figure 24 - 27). The most common type of big game to hunt is either mule or whitetail deer. In 2006, 10,062,000 hunters hunted deer compared to 2,569,000 for turkey, which is the next highest total number of hunters. This is likely because deer are present across most of the country. The drop off after deer is quite drastic. The next closest is turkey which is likely elevated in recent years as turkey populations have expanded nationally from 1.15 million in 1969 to 5.46 million in 1999 (The Wild Turkey Zone 2009). Other species are lower likely due to limited availability. The average number of days spent hunting big game is around 10 for all types.

The number of hunters and the number of days spent hunting has been steadily increasing for most types of big game. The increase in big game hunting could be attributed to increasing game populations, increasing length of hunting seasons or the increased number of tags being sold for big game. The total number of hunters is not increasing but the number of big game hunters is increasing.

Small Game

Small game hunting is not focused around any one type of game (Figures 28 – 31). Hunting rabbit and squirrel are the most popular types of small game to hunt, but are usually only hunted twice as much as the least popular game types. Small game hunters tend to hunt more species on average than big game hunters. The big game hunting graphs show that almost all big game hunters hunt deer. The small game graphs indicate
that less than half of small game hunters hunt any one type of small game. Small game
hunters tend to hunt birds less than other types of game but a comparison of bird hunters
to other types of small game does not show a drastic drop off for bird hunters. It is
possible that small game hunters tend to hunt more than one type of small game during
each hunt. For instance, a hunter may go hunting primarily for pheasant but pursue other
animals such as grouse or quail as the opportunity arises. This opportunistic hunting
could account for the even distribution of number of hunting trips for each type of game.

Waterfowl

Waterfowl is hunted more than other type of migratory bird (Figures 32 - 35).
This is to be expected because waterfowl is a category that includes many types of swan,
geese and ducks. Ducks are hunted more than geese. This is probably because there are
greater numbers and more types of ducks than geese. The characteristics of duck and
goose hunts are very similar and normally both ducks and geese are hunted at the same
time. The species that constitute the remainder of the migratory birds are doves and a few
varieties of shore birds such as woodcock and snipe. Doves are hunted less frequently
than waterfowl. One reason for this may be that they produce little meat and they fly in
flocks that are harder to get within shooting range than flocks of ducks or geese. The
“other” category of migratory bird hunting can be hunted at the same time as waterfowl
or pheasant but animals such as woodcock are located in areas that are more difficult to
access than waterfowl. In addition, woodcock are difficult to shoot due to their size and
erratic flight patterns, which may account for why they are hunted less. Woodcock are
small birds that live around wetland margins. A hunter may often hunt woodcock in
addition to hunting waterfowl but rarely the other way around. The type of game hunted is not clustered around one type of hunt as it is for big game. Hunters also hunt waterfowl about ten days a year but not for the more marginal types of game.

The trends for migratory bird hunters among the types of migratory bird are similar for each type of game over the last twenty years. There was a high point from 1996 to 2001 for migratory game. This is a longer spike than for big or small game. It is interesting that hunting doves was at one time more popular than any other type of migratory game. This may be the result of population patterns or regulation of hunting this species by state management agencies.

Hunting by Game Type in Nevada

The relationship between the number of hunters and amount of hunting in relation to the number of times each hunter hunts by type of game is central to determining hunting demand (Figure 36). In Nevada, like the rest of the U.S., big game hunting is the most popular type of hunting. While Nevada is at a disadvantage in terms of big game population compared to hunting demand (NDOW 2007) it has a comparative advantage in terms of the hunting environment, the variety of game and the attractiveness of the game species present. For example, animals such as bighorn sheep and mountain goat live in limited areas of the country. Also, the social rewards for bagging an animal of this type are much greater than a migratory bird or small game. These factors should make big game hunting in Nevada more attractive than other areas of the U.S.

Big game hunting is the most prevalent type of hunting in Nevada. However, Nevada does have a lower level of big game hunting than in the U.S. For example, in
2006 just over half of all Nevada hunters hunted big game. Nationally around 80% of
hunters hunted big game. The likely limiting factor here is probably the number of
licenses that are distributed based on a relatively small population of big game species in
Nevada.

The distribution of hunters between hunt types is mostly equal. This is an unusual
pattern not only because big game numbers are not higher but also because migratory
hunt participation is not lower. On the national level in 2006, about twice as many people
hunted small game as hunted migratory game. In Nevada, a direct comparison cannot be
made because of a small sample size, but based on 2001 numbers and trends in hunting,
migratory hunting likely had more participants than small game. This could be partially
accounted for because of the quality of hunting opportunities of migratory game versus
small game in the state. Because water is a limiting factor in Nevada ducks are funneled
into small areas. By contrast, for small game this likely means populations are more
scattered.

Big Game Expenditures

There are many expenses associated with hunting. Not all big game hunters
exhibit the same pattern of spending. For instance, not all hunters use both a bow and
arrow and rifles. Figure 37 displays the total of all hunting expenses for big game
hunters. The big game expenditures chart shows us that the largest expenditures for big
game hunting are food, transportation and firearms. The category special items is not
indicated as a large expense because the category is defined as large expenses and
includes many unusual items such as boats, vehicles and houses. It is interesting that
transportation is the largest expense associated with hunting. Based on the cost of ammunition some might expect this expense to be higher in relation to other expenses and transportation in particular. One of the reasons that transportation may be higher than other costs is that all hunters have some expense related to transportation but if a hunter uses only a bow and arrow they would have no firearms expenses. For example if hunter A had $20 in transportation costs and $20 in firearm costs and hunter B had $20 in transportation costs and $20 in bow and arrow costs, the combination of expenses for these hunters would be $40 for transportation and $20 for firearms or bow and arrow. This would indicate that transportation accounted for twice as much of the expense when in reality the expenses were equal for each hunter. Regardless of the ratio of transportation to the respective hunting methods, the expenses on transportation indicate that hunters are traveling either long distances or many times or both when hunting.

Food is another big expense. Preparing food before the hunting trip and transporting it to the hunt location should be relatively inexpensive. Based on the costs associated with transportation and the assumption that this cost is based on longer trips to hunting locations, and based on the assumption that food prepared before the hunt should be relatively inexpensive, it might be inferred that hunters are eating in restaurants during some part of the hunting trip.

Firearms are an infrequent purchase but tend to be more expensive than ammunition or transportation. From a financial position, this may be the largest barrier to hunting. This expense could also be inflated due to range of prices for firearms. For example, all hunters will pay for gas to get to a hunting location but the range of prices within a region is relatively narrow. In comparison, an elaborate firearm may be many
times more expensive than a basic model. The costs for firearms are even more extreme when it is considered that a portion of hunters has their firearm handed down from previous generations.

Big Game Expenditure Trends

The trends associated with hunting expenses do vary but the expense of transportation, food and firearms are consistently the top three. Food was the largest expense in 1991 ($1,033,272,000), 1996 ($1,283,799,000) and 2001 ($1,377,078,000) with transportation and firearms alternating for the second largest expense (Figures 37 – 40). In 2006, the transportation became the largest expense ($1,692,619,000). Part of this expense is likely due to the increasing cost of fuel in the last decade. Hunting was more expensive in 2006 than any other year. While expenses have varied over the last twenty years, the expenses in 1991, 1996 and 2001 indicated that total costs have been increasing from about $5 to $11 billion.

Small Game Expenses

Small game hunting seems to have similar spending distributions as big game hunting (Figure 41). The main difference is that small game hunters, in part due to smaller numbers, spend about 33% of the money that big game hunters spend. There are some differences that are specific to the type of hunting being preformed. For instance, more money is spent on dogs for small game because dogs are more involved in small game hunting more than for big game. It was surprising to see that a high percentage of expenditures were spent on food when small game hunts tend to be shorter in duration
(spanning fewer meals). There were fewer purchases of auxiliary equipment compared to big game hunting. This is because equipment in the auxiliary category for small game tends to be less expensive and auxiliary equipment purchase options are more limited and less in demand.

Small Game Expenditure Trends

The trends for small game expenses show more variability than large game expenses (Figures 41 to 44). The largest expenses associated with small game hunting are food, transportation and ammunition similar to big game expenses, but expenses alternately increase and decreased from 1991 to 2006. For instance, 1996 and 2006 were the most expensive times to hunt. Interestingly the fourth largest cost, hunting dogs, has remained relatively constant. The increase in costs for all items varies but the cost of dogs, food and accessories has changed little. Transportation costs were largest in 2006 as it was in the case of big game.

Small game is not as prevalent in Nevada as other states. This is the great barrier for small town Nevada businesses. There is a sufficient population of hunters, but not enough game to draw larger out of town crowds.

Migratory Game Expenses

Expenses for migratory game are distributed similarly to large and small game with food, transportation and firearms accounting for the highest expenditure totals. The biggest difference is that several other expenses are higher than small game or big game. These other expenditures are to be expected given the methods used to hunt waterfowl.
These other expenses are decoys and ammunition along with dog expenses. Decoys are used mainly for hunting waterfowl and ammunition is used more often because the game is elusive. Some expenses are not applicable for migratory game hunting. Examples would be scopes or archery equipment, which is not used to hunt migratory game. Waterfowl hunters spend about 20% of the money that large game hunters spend. Land fees are higher relative to other expenses than big or small game expenses. This is likely a result of hunting clubs that charge a fee to allow hunting.

Migratory Game Expenditure Trends

The trends associated with migratory hunting expenses take a jump from $685,407,000 in 1991 to $1,295,513,000 in 1996 surveys, but become more consistent after that point (Figures 45 – 48). The largest expense in 1996 was food followed by firearms, private transportation, dog, ammunition and decoys. The 2006 data showed a different distribution. Like small and large game, public transportation was the largest expense. Other cost such as food and firearms were lower than in previous surveys. In 2006, the increase in public transportation was offset by a decrease in food and firearm expenses. The 2006 data indicates that less money was spent on hunting overall in 2006 than in 2001, which was not the case for big or small game.

Nevada Expenditures

According to the results from the 2006 FHWAR survey, equipment is the largest expense for hunting and fishing in Nevada (Figure 49). It is important to note here that these results are not for hunting alone because they were not reported separately in the
FHWAR survey results for the Nevada. In Nevada over 550 million dollars was spent on hunting and fishing. The biggest expense was equipment at about 420 million dollars. Trip related and other expenses had similar expenses in the state. In all categories spending by Nevada residents exceeded spending in Nevada. This indicates that there is a spending deficit in Nevada.

The amount that is spent in the state of Nevada on hunting and fishing is less than the amount spent out of state in all chart categories in the four surveys that are reported (Figures 49 - 52). Spending in the state has been increasing from about $360 million in 1996 to about $550 million in 2006. Out of state spending has been increasing as well from about $180 million in 1991 to nearly $750 million in 2006. Expenditures declined slightly in 2001 but increased sharply in 2006. The ratio between trip related and the other category is decreasing. For example in 1996 sportsmen spent roughly six times as much on trip related costs as on other costs. In 2006 these expenses were nearly equal.

Nevada Equipment Expenditures

Equipment expenditures in Nevada have an unusual distribution. The special equipment category, which is not listed due to its small sample size, appears to be heavily skewing the distribution on the individual categories in relation to total equipment expenditures (Figure 53). It is difficult to interpret these numbers because of the sample size but there may be an explanation for this distribution. The distribution may indicate that special gear is needed in Nevada that is not needed in other states or that there is a small group of hunters who hunt game such as mountain goats that require a larger investment relative to other types of hunting in Nevada. From this data set the answer is
not readily available but a substantial amount of money is spent on hunting nation wide
and transportation is one of the highest expenses. In Nevada, because the distance from
population areas to hunt sights is so great, transportation costs should be higher and
represent an increase in overall hunting costs.

Nevada Trip Expenditures

Food and lodging are substantial components of most hunters’ trip expenses in
Nevada (Figure 54). The totals for food and lodging and transportation are nearly equal.
This is similar to national data for trip expenditures. You could make a case that you
would expect one category or the other should have higher costs because of Nevada’s
unique characteristics. For example, hunters have to travel long distances to get to
hunting locations so transportation costs should be higher or lodging is scarce in prime
hunting locations so lodging should be account for a higher proportion of the costs. It is
likely that these expenses are positively associated with each other.

The results of the data described previously showed that nearly equal numbers of
hunters hunt in Nevada as there are Nevada residents who hunt. In contrast, the number
of days these hunters hunt is greater for Nevada residents who hunt. This was described
as having a potential adverse affect for the state of Nevada. Figure 54 confirms that the
amount of money spent by Nevada residents is greater than the amount spent in Nevada.
The amount spent by individuals who hunt and fish in Nevadan 2006 is about 75% of the
amount spent by Nevada residents. Most of the difference is accounted for by
transportation and other costs. The data indicate that Nevada residents are travelling more
often or further than those engaging in hunting and fishing in Nevada and that more
auxiliary gear is purchased by Nevada residents. This may mean that most sportsmen (individuals who hunt or fish) coming into Nevada are close to the state while those leaving the state are travelling further. Also, it might be assumed that because of Nevada’s unique forms of hunting and fishing more auxiliary equipment might be needed but this is not the case. The basic equipment items such as a rifle or ammunition are equal for Nevada hunters and hunters hunting in Nevada.

Hunting Equipment Expenditure Trends in Nevada

The trends in hunting equipment expenditures in Nevada are contrary to what might be expected based on hunting participation in corresponding years (Figure 53). The largest expenditures occurred in 2001 when the hunt participation was lowest. The equipment directly related to hunting did not show as much of an increase as the auxiliary equipment, which includes items such as sleeping bags and clothing. The sample size for the special equipment category was too small to report over these years and appears to have effected the distribution in 1996 and 2001 similarly to 2006. The 1991 survey data could not be reported because this data was not reported individually for Nevada.

Hunting Trip Expenditure Trends in Nevada

The trends associated with trip expenditures in Nevada are similar to national trends (Figure 54). Trip expenditures changed very little in 1996 and 2001, but the 2006 expenses were much higher than previous years. Expenses in 2006 were nearly twice the expenses in 1996 and 2001. This increase does correspond to higher hunting participation in 2006. The trip expenses are more likely to follow hunting participation than equipment
expenditures. Equipment costs can vary year to year because the largest portion of equipment costs is reusable goods such as firearms or clothing. Trip costs will be incurred for each hunt because food and lodging are not carried over from year to year.

DISCUSSION

Demographics

The national FHWAR survey confirms current research on the new hunting paradigm. Hunters are most likely to live in metropolitan areas. The highest percentage of hunters by population size of residence comes from non-metropolitan areas. The highest percentage of hunters per region lives mostly in regions with lower population densities. Hunting participation is highest in the middle age groups (35 – 44 and 45 – 54). Males hunt much more than females with less than 10% of females hunting. Non-Hispanic hunters are much more common than Hispanic hunters with Hispanic hunters accounting for about three percent of hunters. Whites hunt more than non-white hunters with non-white hunters representing less than four percent of hunters. A higher percentage of wealthy hunters hunt than poor hunters. Roughly 33% of hunters make less than $40,000 dollars, while roughly 66% make more than $40,000. Less educated hunters tend to hunt big game, while more educated hunters tend to hunt migratory game.

In Nevada, the demographic characteristics are similar except for education and sex. The distribution of Nevada hunters within individual demographic characteristics such as age and income tend to be similar as well. This is true of the distribution of all Nevadans as well as Nevada hunters. Some of the variation can be attributed to the
physical characteristics of Nevada versus the entire U.S. For example, in Nevada hunters are more clustered in metropolitan areas. This is a direct result of the distribution of Nevada residents based on physical conditions in Nevada.

**Hunting Participation**

The percentage of hunters in the U.S. is decreasing. In addition, the number of hunters in the U.S. is decreasing. This trend is causing concern within game managers because of a loss in revenue and a diminished ability to control wildlife populations. In Nevada, the trends were similar except for 2006 when hunting increased dramatically. The number of hunters in Nevada is not currently an issue as the demand is much greater than supply, which might account for the variation in participation from national trends. In Nevada, hunting participation is much more likely to be influenced by the number of licenses distributed.

**Hunting by Game Type**

Nationally the most popular type of game to hunt is big game. The most popular type of big game is by far deer. The popularity of deer hunting is likely a result of deer being present in great numbers across much of the country. The next most popular types of game to hunt are small game followed by migratory game. The most popular type of game is rabbits but the distribution is more even among small game species than big game. In Nevada, big game is still the most popular type of game, but it is not much more popular than small game or migratory game. Big game is likely not more popular due to the limited number of big game animals in the state.
Hunters by Location and Amount of Hunting

Most hunters in the U.S. hunt in their state of residence. They also make the majority of their trips within the state and spend the greatest number of days hunting in their state of residence. In Nevada this is not the case. While there is some variation between the surveys, the number of Nevada hunters is nearly equal to the number of hunters hunting in Nevada. Additionally, the trend is reversed for the number of days hunting in the hunter’s state of residence. In a consistent trend in the four surveys examined, the number of days Nevada hunters hunted was higher than the number of days hunters hunted in Nevada. This means that hunters are more likely to spend money out of state.

Hunting Expenditures

U.S. hunters’ greatest expenses are food, transportation and firearms. For big game these are the primary expenses. In addition, small game has a fourth primary expense in dog-related items. Migratory game has the added expenses related to dogs as well as ammunition costs. In Nevada, equipment costs are higher which may be a result of special equipment that is needed to hunt game in the west. This is more so true with big game. The distribution of expenses within trip, equipment and “other” expenses is similar to national distributions. In addition, in Nevada more money is spent outside the state than is spent in the state. This data was not reported on the national level here due to the heavy emphasis on hunting in a hunter’s state of residence on the national level. It
would be extremely unlikely that nationally hunters spend more outside their state of residence on hunting.

CONCLUSION

The FHWAR surveys indicate that at face value Nevada hunters are similar to U.S. hunters. It appears that the main variations between Nevada hunters and U.S. hunters can be attributed to various social and physical differences. For example, hunters are more concentrated in urban areas in Nevada because Nevada’s overall population is more concentrated in urban areas. In addition, hunters will differ between the state and national levels by type of game hunted because hunters have access to different types of game in Nevada that are not available in other regions of the U.S.

The similarities between Nevada hunters and U.S. hunters will enable future researchers to make assumptions about Nevada hunters based on national data when research specific to Nevada is lacking. There is a little information on hunting in Nevada, but there is a considerable amount of research that has been performed in other states. This data can be incorporated into the understanding of Nevada hunters given that basic social, physical and spatial differences in the regions being compared are accounted for.

The deficit of hunting expenditures for the state of Nevada indicates that future research should be performed to determine how Nevada hunters could be influenced to spend more money in the state than out of state. With the limited game population and demand for hunting in the state, it is unlikely that hunting expenditure trend will be reversed in the near future but alterations to hunting regulations in the state may allow game managers and related businesses to collect more revenue while maintaining the
quality of hunting in the state. For example, hunters do not need to harvest an animal in order to enjoy hunting. Therefore, a possible solution to low levels of hunting in Nevada resulting from the limited number of big game animals in the state might be to allow a modified system of party hunting. In this system hunters would be guaranteed a tag if they applied as a group. The group would be issued one tag but all members of the hunting party could participate in the hunt.

The inclusion of national data on hunting in the management of Nevada hunters will help to ensure that hunting in Nevada is managed to maximize the quality of hunting in the state. In addition, the possible added revenue to the state will allow game managers to improve wildlife populations, which can be enjoyed by hunters and non-hunters alike. These improvements will serve to maintain Nevada’s reputation as a popular destination for outdoor recreationists of all types.
CHAPTER 3: HUNTING CULTURE

Most Americans no longer depend on hunting for food and for some hunters the amount invested in hunting is greater than the value of the food produced. With the loss of economic value associated with hunting, the availability of cheaper, more reliable food sources and increasing percentage of the population living in urban areas where hunting is not as common, it is not readily apparent why hunting continues to exist as a popular outdoor activity.

Marx (1936) proposed that the mode of production would determine a community’s societal organization. This is the classic substructure/superstructure model. Because hunting is no longer a means of production in the sense that communities use hunting to obtain food, hunting should be becoming less popular as societies become increasingly urban. The reason hunting has not decreased relative to a society’s dependence for food is that hunting has become to a recreation and a way individuals to identify themselves within a social structure (Kuentzel 2000). The effects of the substructure/superstructure model on outdoor recreation and hunting in particular call into question whether hunting will continue if the means of production do not support hunting. For example, in agricultural societies, hunting may have existed because hunting provided a valuable supplemental food source to agricultural activities. In modern societies this is not the case. Nevertheless, hunting maintains popularity among recreationists.

Hunting may exist contrary to Marx’s understanding of social organization for several reasons. Hunting may be a form of escapism from modern society and the
subjective rules created in societies (Gasset 1943). It might also be a result of the
destructive nature of men with hunting being a natural extension of this brutality (King
1991). Finally, some see hunting as a cultural practice arising from traditional family
socialization (Decker, Provencher and Brown 1984).

Of these arguments, the cultural argument will be the focus of this analysis. The
economic reasons for hunting are becoming less of a factor in hunting and economic
gains from hunting are not available to many hunters. Hunting is best thought of as an
activity performed as part of a subculture in the U.S.

The 2006 National Survey of Fishing, Hunting, and Wildlife-Associated
Recreation (FHWAR) reports that over 12.5 million hunters bought licenses and pursued
animals for sport (U.S. Department of the Interior 2006). This represents about five and a
half percent of all U.S. residents over age 16. This may be a small subset of the U.S.
population, but this population is vital to controlling wildlife populations and funding
various habitat management programs.

While data have been collected on the national and state level, research pertaining
to the West and Nevada in particular is lacking. Research on hunting conducted in the
eastern United States provides a basis for understanding hunting, but the application of
these theories in the West is problematic. Some of the difficulties arise because of
unproven theory, as in the case of specialization as it pertains to exclusion of other
recreations. Other problems are the result of environmental and cultural differences such
as deer populations, length of season, hunting access, hunting traditions etc...

The focus of this chapter is to whether Nevada hunters are recreational specialists
or generalists. Within this analysis, special attention will be paid to how recreation
patterns affect hunting participation in Nevada. Recreational specialization will be analyzed, in light of hunting and population trends, to describe how recreations are practiced. Trends in hunting will be reported to show how past social factors (such the number of recreations an individual performs and whether recreations engage in similar types of activities) affect hunting. The result of this analysis will be an indication of whether hunting in Nevada will be a viable recreation in the future.

NEVADA POPULATION TRENDS

The population of Nevada has increased greatly over the last 15 years. Even when compared with a state like California that is experiencing rapid expansion, Nevada’s population increase is incredible. The distribution of the incoming population between metropolitan and non-metropolitan areas has direct implications for hunting participation rates in the future. The nature of this population increase in Nevada directly affects hunting participation rates.

The populations of many areas in the U.S. are increasing but Nevada has experienced one of the largest proportionate increases in population, relative to its former population, in the west (U.S. Department of the Interior 1991, 1996, 2001, 2006). The increase in population transformed Nevada from a state that was sparsely populated with small urban areas to a state that is popularly characterized by large isolated urban areas.

In 1991 the population of Nevada was 914,000. In 2006 the population grew to 1,895,000 (U.S. Department of the Interior 1991, 2006). By comparison, California had a population of 22,366,000 in 1991. This population increased to 27,299,000 in 2006 (U.S. Department of the Interior 1991, 2006). While California’s population increase was about
five times greater than Nevada’s, the increase relative to the original population in 1991 was much greater in Nevada. Nevada’s population increased by 107% over 15 years. In comparison, California’s population increased by only 22% in the same period.

This increase is magnified by the total area where each state experienced an increase. California is the third largest state in the union while Nevada is the seventh. California, while populated more densely in the south, along the coast and in the bay area, is populated throughout much of the land area where as Nevada’s population is clustered in the Las Vegas metropolitan area and the Reno/Carson City areas. Outside of a handful of smaller communities, much of the rest of Nevada is very sparsely populated. The result is a disproportionate increase of residents in a few urban areas of the state.

The metropolitan population trends are different from those in non-metropolitan areas. In 1996 the population within metropolitan areas was 1,020,000. By 2006 this portion of the population had increased to 1,701,000. This represents a 67% increase in population. By contrast, the population of non-metropolitan areas was 194,000 in 1996 and 2006. The 2001 data indicates that the non-metropolitan areas of the state saw a decrease from 1996 to 2001 by about 10,000 individuals (U.S. Department of the Interior 1996b, 2001b, 2006b). The fact that the metropolitan population has increased by 67% while the non-metropolitan areas have the same population in 1996 as in 2006 indicates that rural areas are not experiencing population increases proportionate to their urban counterparts.

The demographic characteristics of the state are heavily influenced by the metropolitan areas in the state. The percentage of Nevadans that live in non-metropolitan areas, experiencing a rural lifestyle, was small initially and is decreasing rapidly. This is
magnified when the decrease of 10,000 residents in 2001 is taken into account (U.S. Department of the Interior 2001b). This means that at least five percent of the 2006 non-metropolitan population is comprised of individuals that have moved to rural Nevada from other locations. It is likely that more than five percent of the non-metropolitan population has relocated and that a large proportion of the incoming residents were from metropolitan areas. The result is that more residents are familiar with metropolitan lifestyles than is evident in the data.

**HUNTER TRENDS IN NEVADA**

The hunting participation trends have been erratic in Nevada from 1991 to 2006. The overall trends have been affected by participation trends among different game types. For example, an increase in big game hunting may be offset by a decrease in small game hunting. The participation in individual game types have been affected by multiple factors such as habitat conditions, human population trends and the introduction of games species.

First, the number of hunters in Nevada decreased steadily from 1991 to 2001. This is consistent with national trends over the same period. The number of hunters in Nevada rebounded from a low of 47,000 in 2001 to 63,000 in 2006 (U.S. Department of the Interior 1991b, 1996b, 2001b, 2006b). This trend is contrary to national trends that depict a gradual decline in the total number of hunters.

While the there are several types of hunts that contribute to the total number of hunters, the increase in big game hunting appears to be the driving force behind the
overall hunting participation increase in Nevada (Department of the Interior 1991b, 1996b, 2001b, 2006b). The number of big game, small game and migratory game hunters has been relatively equal to one another from 1991 to 2001. However, big game hunting showed a large increase from 2001 to 2006. Both small game and migratory game hunts have increased in recent surveys but the increase is not as large as with big game hunting.

The high demand for hunting in the state is likely affected by the increase in the human population over this period, doubling in the last fifteen years, as noted above. This indicates that a vast pool of potential hunters exists in Nevada. However, these large increases in the number people in the state have occurred during a time when hunting opportunities have decreased because game populations are declining in response to loss of habitat (Wasley 2004). These influences make it difficult to gauge the true demand for hunting in the state.

While most of the increase in population in Nevada has occurred in the metropolitan areas of the state where the percentage of hunters is lower, the population increase is so large that it has a strong effect on hunting demand. The residents of metropolitan areas hunt at a rate much lower than non-metropolitan hunters: Only 2% of metropolitan residents hunt, as opposed to 8% of non-metropolitan residents. The total number of people living outside of Nevada’s metropolitan areas in 2006 was about 194 thousand (U.S. Department of the Interior 2006b:38). Because the number of residents in Nevada’s metropolitan areas in 2006 is about 1.7 million the two percent of metropolitan hunters represent 65% of the hunters in Nevada (U.S. Department of the Interior 2006b:38).
The distribution of Nevadans among rural and urban areas is influenced by social factors such as the location of tourist-based businesses but the main influence on distribution is the climate. Much of Nevada is very dry and lacks resources for food and shelter. It is no coincidence that the largest metropolitan areas are built near locations with large water resources such as Lake Tahoe and Lake Mead. The population of hunters reflects this distribution. Nevada hunters are limited in where they can live. Jobs are located in relatively few areas that are densely populated.

**BARRIERS TO HUNTING**

Many factors make hunting in Nevada more difficult than in many other states. The distance to hunting locations is one of the major factors. Another factor is the scarcity of game animals relative to the size of Nevada and number of residents. In light of these barriers, alternate outdoor recreations such as hiking and wildlife watching become more appealing. In spite of the barriers to hunting, there are some benefits that Nevada can offer hunters that are not readily experienced in other states such as open spaces and unique scenery. Survey data and tag quota data will be used to determine the magnitude of the barriers and benefits for hunting in Nevada.

The survey “Nevada Rangeland Vegetation Management Survey” (Rollins, Castledine, Swanson, Evans, McAdoo, Schultz, Havercamp and Wilson 2007) sampled hunters who had applied for a tag in Nevada in the last five years. The sample included 1600 Nevada hunters. Of the sample of Nevada hunters, less than five claimed residency in the center of the state, which appears to account for roughly a third of the state. The lack of rural representation is particularly striking because this sub sample of
the survey consisted of Nevada hunters who had purchased a hunting license in the five years prior to the survey. Because of the survey’s focus on hunters, who are proportionately more likely to live in rural areas as opposed to the average Nevadan, rural Nevadans received heavier weighting. The largest numbers of hunters come from the Reno and Las Vegas areas (Rollins, Castledine, Swanson, Evans, McAdoo, Schultz, Havercamp, Wilson 2007). Again, this is due to the large numbers of individuals living in these areas.

Most hunters in Nevada need to travel long distances when hunting. The distances to popular hunting locations are a result of the relationship between the distribution of game species and people. For example, big game is the most popular type of hunting in the state (U.S. Department of the Interior 2006b). The place where most big game hunters live and hunt are on different ends of the state. The two main hunter residence locations Reno and Las Vegas are each about four hours away from the closest popular big game hunting locations. For example, Reno is four hours away from Elko. This is a likely destination for hunters from Reno because it is along a major highway, Elko is in the heart of mule deer territory and the town has a number of hotels (Wasley 2004). Similarly, Las Vegas is about four hours from Ely. While this area does not have as many hotels as Elko, it is closer to Las Vegas. Ely is located along Highway 93 leading to the main mule deer hunting territory in the northeast. Ely is located on the southern edge of the main mule deer territories.

The biggest obstacle that potential hunters in Nevada confront is the number of available tags. The tag allocations are based on the size of animal populations. Because game species are limited by the lack of water and vegetation populations are lower than
other states with more water and vegetation resources. For example, hunters can only receive one tag to hunt Mountain Goat in a lifetime (Cox et al. 2008). For game in Nevada with higher populations, the odds are better but on average three times as many hunters apply for tags as the number of tags available (NDOW 2009). In eastern states wildlife managers are having difficulty controlling increasing deer populations and are offering multiple tags to hunters (Brown, Decker, Riley, Enck, Lauber, Curtis and Mattfeld 2000; Ward, Stedman, Shortle and Finely 2008).

In addition to barriers that directly affect hunting participation, hunting is indirectly affected by non-hunting options for outdoor recreation activities. Virtually all areas of the country provide opportunities for bicycling, camping, waterskiing etc. However, because Nevada is mountainous, residents of this state can also go skiing, rock climbing, whitewater rafting or kayaking etc. In addition, the state’s vast tracks of undeveloped land makes off road vehicle use a popular recreation (Rollins et al, 2007). The availability of non-hunting recreation activities within the state allows Nevadans to choose from a wide range of activities.

Despite these barriers, several factors make hunting in Nevada attractive. Many types of game are available for hunting in Nevada. For example, migratory game that passes through Nevada is concentrated in the relatively few areas where open water is located. Therefore, a migratory game hunter in Nevada has a good chance of seeing many types of waterfowl. Moreover, an appealing variety of big game species is available. A hunter in Nevada can hunt big horn sheep, mountain goat, elk, mule deer, antelope and mountain lion. These species are highly desirable as trophy animals. The environment represents another satisfaction that is attractive to hunters (Hendee 1974). Nevada is
characterized by rugged mountain ranges and wide-open spaces. Also, in some parts of the country it is difficult for hunters to find a location that provides enough space to make hunting safe and enjoyable (Manning and Valliere 2001). However, in Nevada, hunters are far less likely to encounter another hunter because there are so few in such a large area.

VIABILITY OF HUNTING

Because the barriers to hunting in Nevada are substantial, hunting viability in the state needs to be analyzed. Nevada offers hunters vast open spaces, beautiful scenery and variety of game species. These factors increase demand for outdoor recreation. Demand for hunting licenses indicates that resident hunters are eager to hunt in the state (NDOW 2009). This high demand exists in spite of competing outdoor recreations that are available to satisfy Nevadans’ need for outdoor recreation. Activities such as skiing, rock climbing, mountain biking wildlife viewing and hiking are all potential alternatives to hunting. In addition to competition from other forms of recreation, the distances to hunting locations, population trends and limited hunt opportunities all discourage hunting in Nevada. In spite of these factors, hunters continue to apply for hunting permits in great numbers. While the current level of hunting participation in the state appears to be positive, there are reasons for concern as to whether this high demand will continue.

If the current human population increases continue, hunting will continue to experience high demand in Nevada. As a result, there are likely to be hunters from other parts of the U.S. moving to Nevada and will want to continue to practice hunting. While
Nevada has been expanding rapidly, it is unlikely that the population growth will continue to increase at the record levels witnessed over the last 15 years. Because of the large population relative to hunting opportunities, the demand for hunting should remain high.

Despite a potential leveling in state population growth, the population increases of the last fifteen years would indicate that hunting will remain strong in the near future. But, will the animal populations be able to satisfy the demand for hunting? Government agencies such as NDOW and the Bureau of Land Management are implementing practices that will increase the number of game animals in the state. Nevada restricted the number of antlerless mule deer tags in an attempt to increase herd numbers. Watering holes, which were built largely for cattle and guzzlers, built for wildlife helped wildlife species to survive in the arid climate of Nevada (NDOW 2009). These practices, while beneficial to wildlife, have not increased game numbers enough to meet the increased demand resulting from the increase in population.

Not all individuals that have recently moved to the state and want to hunt will be able to hunt because of restricted hunting opportunities (NDOW 2008). These individuals will likely still have a desire to enjoy outdoor recreation. As a result, recreationists in Nevada may adopt non-hunting recreations as a substitute. Individuals tend to establish preferred recreational habits over time (Decker et al. 1984). Hence, if they cannot hunt on a regular basis because of tag scarcity hunters may be more likely to stop hunting.

The discontinuation of hunting is also a concern because the low percentage of hunters in metropolitan areas results in a limited hunting culture. As the population has increased, the number of hunting opportunities per hunter has decreased (NDOW 2008b:}
In 1991 six percent of Nevadans hunted. However, in 2006 only three percent of Nevadans hunted (U.S. Department of the Interior 1991b, 2006b). If the percentage of hunters in Nevada continues to diminish it is likely that in future year’s recruitment of hunters will be more difficult because they will be less likely than previous years to be exposed to the hunting culture.

RECREATIONAL SPECIALIZATION

A key component of hunting viability in Nevada is the extent to which recreationist are specialists or generalists. Recreational specialization was initially developed by Bryan (1977) as a way to classify recreationists. This theory has been used extensively in the leisure research. In spite of the theory's prominence, portions of this theory are not clearly defined. In addition, the concept of exclusivity in this research has not been pursued as heavily as progression. The extent that Nevada recreationists engage in recreations to the exclusion of others will determine the viability of hunting in the future. In order to understand the implications of this theory a working definition as it applies to this paper must be developed.

The theoretical basis for studying recreational specialization comes from Bryan’s (1977) study of anglers in Idaho, Montana and Wyoming. The theory proposed that individuals who fished tended to become more specialized over time. His original theory focused on three indicators of level of specialization: type of equipment, techniques employed and the preferred recreational setting. These factors indicated where on the continuum of recreational specialization a person who fished was located. One of the main conclusions was that the most highly specialized individuals within a recreational
activity progressed from a generalist, whose skills were basic and had little commitment to the activity, to a specialist, who was very skilled and was highly committed.

Scott and Shafer (2001) argue that Bryan’s (1977) definition of specialization incorporates two separate ideas: specialization exclusivity and specialization progression. Exclusivity in relation to specialization can be conceptualized as the range of activities that an individual performs. An example of a generalist, according to the exclusivity definition, would be someone who hunts, fishes, skis and other activities. A specialist, according to this definition, would be an individual who concentrated on fishing and stops performing other activities. The second meaning of specialization concerning progression is more closely tied with expertise. For example, an individual may become a specialist (expert) at a particular style of fly-fishing while someone who is not a specialist has a low level of knowledge and commitment. Specialization progression has a hierarchical and longitudinal connotation.

The first definition, which is central to this chapter, frames specialization in terms the range of activities that an individual will engage in. What this definition does not tell us is to what range of activities that the continuum pertains. This range could be all outdoor activities. It could also be applied to one recreation type within outdoor activities such as fishing. It is difficult to tell which range the authors intend.

The classification of recreationists along these lines has largely been limited to theoretical arguments. By contrast, the approach in this paper is empirical: Statistical analysis of hunters and non-hunters will indicate whether individual hunt types are practiced to the exclusion of other types of outdoor recreation or whether hunting is
practiced in conjunction with other outdoor recreation activities. The analysis will also
determine what types of recreations are likely to be engaged by the same person.

The current research will indicate whether hunters are generalists in terms of
being committed to one activity to the exclusion of others. This information is relevant to
Nevada game managers because the percentage of hunters is decreasing. The increase in
population ensured that hunting remained a high demand activity, but with the increase
subsiding there is a concern that the demand for hunting could decrease. In addition,
multiple alternative outdoor recreations may draw potential hunters into other activities if
the limited natural resources deny Nevadans the opportunity to hunt on a regular basis. If
recreationists choose a limited number of activities to the exclusion of others, the
potential pool of hunters may dwindle. If, on the other hand, Nevada recreationists
embrace a wide range of activities and are opportunistic (willing to hunt when the
opportunity is presented) in their selection then the potential pool of hunters should be
adequate to manage wildlife populations.

DATA

This analysis is based on data drawn from the Nevada Rangeland Vegetation
Survey (Rollins et al, 2007). The purpose of the survey was to determine how Nevadans’
use and value rangelands in an effort to create more effective management practices. In
addition, the survey collected data on the recreations that Nevada residents performed.
These activities included both consumptive (i.e. hunting and fishing) and non-
consumptive (i.e. hiking and bicycling) recreations. A framework of average recreation
tendencies will be developed by including multiple categories of recreation.
The sampling design included two lists of names and addresses of Nevada residents obtained from a private third party company. The first list was a random sample of 1000 Nevada residents proportionate to 2000 census data. The second sample was restricted to rural residents. In this sample Elko, White Pine, Humboldt, and Washoe Counties received heavier weighting. The questionnaire was to be completed by the individual to whom it was addressed.

The Nevada Rangeland Vegetation survey was conducted by mail using Dillman’s (2000) Total Design Method. Six weeks after the first individually addressed mailing was sent to the sample a reminder post card was mailed to those who had not responded. Six weeks after the reminder post card a second survey was sent to non-respondents. Three percent (53) of the original 2,000 surveys were undeliverable. From the 1,947 surveys sent out, 576 surveys were completed yielding a response rate of 30% (calculated as the number of returned, completed surveys divided by the total number of surveys less the number of undeliverable surveys). The response rates tended to be higher in rural counties. The overall response rate ranged from a high of 53% in Lincoln County to a low of 17% in Clark County (Las Vegas).

**MEASUREMENT**

This analysis focuses on question one of the Nevada Rangeland Management Survey (Rollins et al, 2007). This question asks Nevada residents to indicate which recreations they engage in and how often. The response items include 14 different types of recreation. Participants were instructed to check all types of activities they performed
in the last year. There was also a space for respondents to write in other types of recreation not listed.

The question was posed in a module where the possible responses were “None”, “1 to 4 times” and “5 or more times.” For the purposes of statistical analysis the response “None” was given a value of zero, “1 to 4 times” was given a value of two and “5 or more times” was given a value of six. The values assigned are derived from an estimation of the average respondent's actual number of events per year. The estimation is based on the assumption of a skewed response distribution and the response category range. For example, the value 2 was selected for a response of 1 to 4 because it is assumed that most individuals engage in recreations on the lower end of each range. There is no data to indicate that this assumption is unreasonable.

ANALYSIS

The analysis consists of frequencies, correlations and a factor analysis of the data. First, to examine the prevalence of the different activities, especially to see how these activities relate to hunting, the frequency, mean and standard deviation for each activity is reported. Next, as a preliminary assessment of the specialization hypothesis, for each respondent, the average number of recreation activities was calculated.

Correlations were calculated to explore whether recreations are isolated, specialized activities or if participation is associated with particular sets of recreations. For example, does an individual tend to participate in activities as part of a recreational culture where hunting and fishing are practices or is recreation intensely focused on a
specific activity such as fly-fishing? The results of the correlation analysis are used to perform a factor analysis.

The factor analysis assesses the isolation or integration of recreations more systematically, by measuring the degree to which participation in different recreations measures the same motivating factor. Responses to income, education, sex, age and years lived in Nevada questions are used as criterion variables to measure the reliability of the factor analysis. The data are rotated (Varimax) to clarify the relationship between factors.

Because the focus of the current research is to determine whether Nevada outdoor recreationists are best characterized as recreational specialists or generalists in reference to the exclusion or inclusion of multiple recreational activities, a disproportionate stratified sample will be adequate to illustrate the extent of specialization by recreationists. In addition, even though the sample is not proportionate all major rural and urban regions within the state are represented in the data.

RESULTS

Frequencies

For the hunting item, 482 responses were recorded (Table 1). Most Nevadans did not hunt in the last year: 66% of the sample. Those who reported hunting were approximately evenly divided between the categories “1 – 4” and “5 or more”: 18% “1 – 4” times in the preceding year and 16% hunted “5 or more” times. The mean number of hunting trips, for the hunting item was 1.34 hunting trips per year. For those who hunted,
3.93 was the mean number of hunting trips. The mean and number of respondents were in the middle of the distribution compared to all other items.

More people participated in fishing than in hunting. Just under half of the respondents indicated that they had not fished in the last year. Twenty nine percent of the respondents went fishing one to four times and 23% went fishing more than five times in the last year. The mean number of trips for all respondents was 1.98. For those who fished, 3.77 was the mean number of fishing trips.

The results for target shooting were similar to fishing. The participation distribution was more equally distributed than hunting. The largest difference is that there is more missing data on this item with only 292 responses were recorded for this item. This is the lowest item response for question one.

The response distribution for camping indicates that most respondents camped in the last year. Unlike the three previous items, more respondents camped "1 - 4" times than did not camp. The mean number of camping trips was similar to the mean for fishing at 1.99.

Off road vehicle use exhibited a similar response pattern to antler collecting (searching for antlers shed by deer). This item was not practiced by 88% of item respondents. Eight percent of respondents who used off road vehicles “1 – 4” times in the last year. Only five percent of the respondents indicated five or more trips. The mean number of trips for all respondents was 0.49.

Compared to these consumptive activities, the participation profiles for non-consumptive activities (hiking, sightseeing/photography and wildlife viewing) were similar across activities. The percentage of respondents who did not engage in these
activities was the lower than both the one to four and five or more times a year categories. The percentage of those who engaged in the activity one to four times and five or more times was similar for all items and ranged from a low of 31% to a high of 40%. The mean number of trips for this group included the three highest mean participation rates ranging from 2.62 to 3.12. Rock hounding (collecting rocks) had a similarly high participation rate at 2.42. The distribution for participation was not as evenly distributed with 44% indicating that they did not collect rocks. The categories one to four and five or more accounted for 24 and 32% of the responses respectively.

The remaining items tended to have low participation. The percentage of respondents to antler collecting, nut or berry collecting, bicycling, horseback riding and ranching ranged from 62% to 88%. The mean trips for these items ranged from 0.57 to 1.43.

Most Nevadans participate in more than one type of recreation (Figure 55). The first group consists of those who engaged in none of the listed recreations in the last year. This category represents just under 10% of the respondents. The second group primarily includes those who engage in 3 to 8 recreations in the last year. Each of the units in this range represents over 10% of the respondents and as a whole, this group represents about 60% of all respondents. The tail of this distribution declines sharply between 9 and 12 recreations and then levels out for 12 to 14 recreations. The last three recreations account for less than two percent of the distribution. On average recreationalists in Nevada engaged in just over five different types of recreation in the last year (Figure 56). The frequency data indicated that most individuals engage in more than five recreational activities. To determine which activities tend to be performed by the same individual the
analysis of recreational specialization was continued through a correlation analysis of the response data from question one (Table 2 and Figure 57).

**Correlation**

Hunting correlates highly with fishing, target shooting, camping and off road vehicle use at 0.59, 0.58, 0.47 and 0.44 respectively (Table 2 and Figure 57). Similarly, fishing correlates with target shooting, camping and off road vehicle use at 0.50, 0.56 and 0.40 respectively. The correlations for camping and off road vehicle use correlate similarly. Of these five factors, the lowest correlation is 0.40. All correlations are within 0.20 of one another. The similarity of the observed correlations among hunting, fishing, target shooting, camping and off-road vehicle use indicate that they measure the same underlying factor. That suggests that rather than being recreational specialists, hunters tend to engage in a set of multiple activities, i.e. that they are also likely to fish, to target shoot, to camp, and to engage in off-road vehicle use. This strengthens the implication from the activity count that specialist are atypical. Moreover, the correlations provide preliminary evidence in favor of the hypothesis that hunting is part of an integrated recreational life style.

**Factor analysis**

For a more systematic assessment of whether there is a single dimension indicating a single integrated recreational life style uniting participation in hunting, fishing, target shooting, camping, and off-road vehicle use a factor analysis is performed. The factor analysis discovered two factors with Eigen values greater than one. As
suggested by the correlations, the factor analysis finds that hunting, fishing, target shooting, camping and off-road vehicle use loaded onto Factor One, characterized by consumptive recreations. The factors loadings on Factor One ranged from 0.56 for camping to 0.81 for hunting (Figure 58). A second factor evidently underlies items characterized by non-consumptive recreations consisting of hiking, sightseeing/photography, wildlife viewing and rock hounding.

The classic measurement model requires that items measuring the same underlying concept or dimension must have the same pattern of correlations with criterion variables. To test whether the two factors meet this standard, the correlations of their items with these criterion variables: income, education, sex, age, and number of years living in Nevada were examined. The items loading on Factor One, the factor measuring consumptive recreations, correlated similarly with all criterion variables. For example, income correlated with the variables of Factor One at 0.14, 0.04, 0.06, 0.03 and 0.07. Correlations of the other variables in Factor One with the criterion variables were similar (Table 2). Thus, Factor One meets the standards of the classic measurement model. The items on Factor Two, measuring non-consumptive recreations did not correlate similarly with the criterion variables. In particular, the correlations of hiking with the criterion variables are very different from the correlations of the other items included in factor two. For example, hiking correlated to age at -0.14 while the others items in factor two correlated to age at 0.13, 0.07 and 0.15. Hence, hiking is not an appropriate measure of this recreational life style, but the other measures meet the criterion of similar patterns of correlations.
DISCUSSION

The analysis of data from the Nevada Rangeland Management Survey indicates that recreationists tend to be generalists. These results do not contradict Bryan’s (1977) conceptualization of recreational specialization because he indicated that individuals might not exclude other recreations (Bryan 1977). However, recreationalists may commit to a larger “super group” of activities to the exclusion of others such as consumptive versus non-consumptive activities. Possible explanations of recreationists’ commitment to a super group of recreations could be recreationists’ cultural background or social network. In light of the results, it appears that hunting in Nevada will remain viable in the near future.

The results of the frequency and factor analysis indicate that outdoor recreation, for the average Nevadan, is not an activity that is practiced to the exclusion of other activities. If this had been the case the average number of recreations per respondent would have been lower and the response items would not have loaded together as well as observed for Factors One and Two. The remaining items on the survey are more indicative of a pattern that would result if most individuals engaged in one activity to the exclusion of others. These activities have an occasional high correlation such as with ranching and horseback riding at 0.36 but they lack any systematic relationship between multiple variables.

The fact that recreations loaded onto two factors were recreations for each factor were distinctively different from the recreations on the other factor supports the theory that individual's specialize in a super group, such as consumptive vs. non-consumptive recreations, to the exclusion of other super groups. For instance where Scott and Shafer
(2001) proposed that progression within a recreation such as fishing tended to exclude involvement in an activity such as hunting, the true expression of exclusion may be that those who perform consumptive recreation may exclude non-consumptive recreation. Research by Ditton and Sutton (2004) also supports the theory that outdoor recreationists engage in recreations along either consumptive or non-consumptive super groups. In their study on substitutability of fishing, camping and hunting were two of the top three most desirable alternative recreations for both men and women.

Another explanation for the division between consumptive and non-consumptive recreation may be the individual’s recreational background as a result of the parents’ activities and the community and environment that the individual was socialized within. This explanation would support the idea that hunting is culturally based. For many hunters the act of hunting may be a time for families to come together (Decker et al. 1984). For example, deer hunting seasons in many states are open over Thanksgiving. This may be an important time for families to converse and enjoy shared recreations.

Alternatively, initiation could be explained by participation in a particular activity such as hunting or fishing, which creates a social network where the individual has access to information about locations, practices and equipment (Zinn 2003). This idea seems to underlie Stedman and Heberlein’s (2001) article on the power of “rural” on hunting initiation.
CONCLUSION

The data tend to support the idea that most individuals are generalists. These findings do not contradict Bryan’s (1977) original hypothesis about progression within a sport.

Because recreationists can be more accurately classified as consumptive or non-consumptive recreationalists, the demand for hunting in the future should remain high in Nevada. Using Hendee’s (1974) multiple satisfactions theory, recreationalists will continue to engage in consumptive recreations as long as their recreational needs are being met through set of substitutable recreations. This means that the type of consumptive recreations may change over time based on opportunity or preference but as long as they engage primarily in consumptive activities then any activity within the hunting group is a viable option.

The lack of hunting availability in Nevada may lead to lower levels of commitment, and in turn lower demand, by hunters who are not able to hunt on a regular basis. This reduction in demand should be experienced for hunting categories where game types have the most restricted harvests. This reduction in demand due to intermittent hunting availability should be offset by recreationists who are opportunistic and willing to substitute other recreations (Ditton and Sutton 2004). It seems that as long as fishing, camping and other consumptive activities are practiced Nevadans will hunt when the opportunity presents itself.
FUTURE RESEARCH

Regression analysis is needed to analyze who engages in each of these groups of activities (and who in neither). Some of the explanatory variables should be those discussed above in the comparison of Nevada and U.S. hunters using the FHWAR survey. The opportunistic nature of hunters needs to be examined in detail. Because hunters are recreational generalists they tend to engage in more than one outdoor recreation but Nevada does not supply enough hunting opportunities for all game species to allow for regular yearly hunt such as for mule deer, but the opportunistic nature of hunters may be indicated by other research. Duda, Bissell and Young (2005) suggested that the total number of hunters is suppressed in surveys such as the FHWAR survey (U.S. Department of the Interior 1991, 1996, 2001, 2006). Duda, Bissell and Young’s (2005) hunting survey offers an alternate conceptualization of hunters. The survey asks hunters to identify themselves not based on behaviors but on cognitive identification. In the eastern U.S., this may not be the best indicator of hunting intentions because hunting opportunities are plentiful. In the western U.S., the lack of hunting opportunities makes this distinction a good indicator of the opportunistic nature of consumptive recreationists.
Environmental sociology as a discipline focuses on how the environment interacts with material and social conditions of existence to create social reality. This understanding of the effects of nature is similar to Weber’s work on the Protestant ethic in that both the material and social forces affect each other (Weber 2008). From an environmental sociologist’s perspective, the social structure and physical environment, which includes natural features and biological factors, interact to the extent that individuals become co-actors with the natural world in the development of social organization and evolution. In addition to social and environmental interactions, sensory connections with the environment effect society’s relationship with the physical world. In addition, sensory attachment to place can influence individuals’ attraction to certain physical locations (Beckley et al. 2007). When we combine cognitions and material conditions with sensory reactions, we are able to more fully understand the environment’s relationship with humans. The subdiscipline of Human Dimensions of Wildlife studies the effect that natural and social factors affect our understanding of the world.

Sensory interpretations are often difficult to study because they are not concrete objects or fully realized cognitions. For instance, the smell of sagebrush or a cloudy day may trigger memories of significant events without thinking about it. Also, the senses are specific to the individual. A sunny day may be welcomed by one, while to another it is
hot and uncomfortable. It is often because the senses cannot be fully explained that they hold power (Macnaghten and Urry 2001). Because attachment to outdoor locations is not rational individuals sense that something greater than ourselves is affecting us. Also, sense of place and its attachments may result from the senses and previous reinforcement.

Outdoor recreationists may see the natural environment as a pure, objective place. When people interact with nature, some propose that the constraints of human society have been breached (Gasset 1972). Proponents of this view may reference pre-modern societies, where nature was the primary adversary. In modern times, the prominent adversary is human. This human adversary is interpreted as subjective and arbitrary. The fact that nature exists as it is for no reason other than its physical and chemical laws removes subjectivity on the part of nature. As opposed to symbolic interactionism, our reflection, in this environment, is not moderated by another subjective being.

Hunting is governed by many social and psychological constructs but it is not fully understood without examining its physical and spatial and influences. Human dimensions research is a logical place to implement this theory with new methods and the new application of known methods because of the importance of the spatial and physical environment (Beckly, Stedman, Wallace and Ambard 2007). Human Dimensions research is closely related to the natural world in ways that other sociological sub-disciplines are not. For example, Marx’s theories of power relations are most often applied to urban centers. In some cases, rural conflicts are included, but the physical attributes of rural areas are not of great interest. Human Dimensions research includes the natural world as a prominent force in shaping society.
NEVADA CHARACTERISTICS

Nevada is a unique state in terms of landscape and population distribution. Many states share some of its physical features, but the combination and extremity of Nevada’s geographic features makes an analysis using geographic analysis tools extraordinarily applicable. Individually, the land features, distribution of residents, and location of preferred and selected hunting units describes hunter characteristics but the combination of these factors according to a spatial reference describes this interaction based on the physical world gives greater depth to the understanding of hunter characteristics (Figure 59).

Climate

Nevada can be roughly characterized by mountains and deserts. Nevada is one of the most mountainous states in the United States (Nevada Department of Transportation 2004). Nevada has 314 mountain ranges, at least 2100 mountain peaks and at least 50 of those peaks are over ten thousand feet (Mountain Zone 2009). McPhee (1981:18) described driving through Nevada in his book Basin and Range stating, “High, discrete, austere new ranges begin to come in waves, range after range after north-south range.”

Moreover, it is famous for arid areas such as Death Valley and Las Vegas. The type of desert that characterizes the area around Las Vegas accounts for only the southern third of the state. In contrast, the rest of the state, while by no means lush, has more vegetation than the Northern Sonora Desert covering the southern portion of the state. The Sierra Nevada Mountains have tall coniferous forests and the northeast features relatively dense stands of juniper and pinion pine.
Because Nevada is an arid, mountainous state, the climate can vary greatly. The weather can change rapidly and the climate can be vastly different from the base to the top of a mountain (Figure 60). The climate can also vary dramatically throughout the day in terms of temperature and precipitation. McPhee (1981:42) relayed a story from his friend who stated, “I was in a bar once in Austin Nevada and there was a sudden torrential downpour. The bartender began nailing plywood over the door. I wondered why he was doing that, until boulders came tumbling down the main street of the town.” Additionally, temperatures in Nevada are generally above average compared to the rest of the U.S. But contrary to the paradigm developed by individuals who characterize the whole of Nevada based on Las Vegas’ climate, temperatures have been known to reach -50 degrees below zero in the northern parts of the state (Young and Sparks 2002). Often the valley floors will remain relatively warm while the mountaintops maintain a sizable snow pack (McPhee 1981).

Residence

The combination of lack of water and building materials makes it difficult to sustain numerous rural communities. The lack of resources that support human populations have been a consistent factor in the development of Nevada. In one extreme case, several houses in Rhyolite Nevada were built with mortar and empty liquor bottles (Ghosttown.com, 2009). The lack of water has inhibited residential development and when mining ended, the town was soon vacated in Rhyolite and in many other ghost towns.
The main industries that exist outside of the major metropolitan areas of Reno and Las Vegas are mining, ranching and casinos/tourism (Starrs and Wright 1995). These industries have not stimulated dense population growth in many areas outside of Reno and Las Vegas. In the past mining camps provided temporary residence for miners while they were working, but today most miners maintain residences in larger towns with the mining company busing miners to the job site. Moreover, the creation of boomtowns like Goldfield in the early 1900s is unlikely because, with the advent of new mining technologies, fewer miners are needed.

Like mining, ranching is an important industry both economically and culturally. The settlement of Nevada is a result of mining and the cattle industry expanding into Nevada (Young and Sparks 2002). The climate dictates that settlements are scattered because the amount of land and water resources that are needed to maintain large ranches also inhibits dense population of rural areas through small farms.

The casino/tourism sector is generally small outside of areas such as Tahoe, Reno or Las Vegas. Several smaller communities along the state border are nearly fully dependent on the gaming industry. But again, these are not large communities compared to Reno or Las Vegas. The tourism sector is limited by the lack of lodging, relatively long distances to major population centers and the remoteness of sites of interest.

The combination of physical and economic restrictions results in Nevada being one of the most urban states in the United States (State Library and Archives 2008). Given the size of the state of Nevada, the urban nature of the population is unusual.
**Human characteristics**

The type of population that a person lives in affects each individual’s characteristics. The location of Nevada residents and in turn Nevada hunters tells us a great deal about hunters. Nevada’s unique population distribution results in a different distribution of hunters than other states.

The highly urbanized pattern of residents in general and the residences of hunters within the state have implications for hunter characteristics. In Nevada as well as nationally, most hunters come from the largest metropolitan areas (U.S. Department of the Interior, 2006). This seems counter-intuitive based on cultural perceptions about the importance and prominence of hunting in rural and urban areas. However, research confirms that rural hunters do hunt at a much greater percentage than urban hunters (U.S. Department of the Interior, 2006). But it is important to remember that rural communities account for a minimal percentage of the overall population. Therefore, the small percentage of urban residents who hunt represent a greater number of hunters than rural areas where the percentage is higher. The influence of urban hunters in Nevada on the characteristics of the average Nevada hunter is greater than that of rural hunters. If all residents outside metropolitan areas hunted, the total number of hunters would not increase much. By contrast, if Nevada’s urban residents hunted at the same rate as rural residents the overall number of hunters would be about twice as large as it is now (U.S. Department of the Interior, 2006).

It is important to note that the place of residence statistics for hunters are based on whether individuals live within or outside metropolitan areas as opposed to rural versus urban. A metropolitan area is defined as a central location of at least 50,000 residents.
Areas such as Winnemucca, with just over 7,000 residents, would not be a metropolitan area in this analysis. However, Winnemucca would be considered as an important urban area to residents of north central Nevada. Therefore, the contrast of urban versus rural residents can vary greatly depending on whether you consider those living outside MSA’s to be rural. If government definitions considered a rural individual to be anyone who did not live in a city, town or village of any kind then this effect would be much larger.

The proportional distribution of hunters between urban and rural areas in Nevada is dramatic because of the greater proportion of Nevadans who live in metropolitan areas compared to states with a much more diffuse population. In Nevada, about eighty percent of the population currently lives in urban areas (U.S. Department of the Interior 2006). This means that the hunter distribution is likely more concentrated in urban centers than in other states. Nationally more than 60% of hunters come from metropolitan areas while the other roughly 40% come from rural areas. The number of urban hunters is high because of the number of individuals who live in metropolitan areas are five times greater than rural populations. Around 33% of the hunters in Nevada reside outside of metropolitan areas. The distribution of hunters in Nevada is more extreme than national trends but the percentages of hunters by population of residence conforms to national distribution standards.

Demographics

Demographic characteristics of hunters tend to reflect the numerical dominance of urban hunters. For instance, hunters tend to have higher incomes than the average individual (U.S. Department of the Interior 2006). Hunters also tend to reside in larger
metropolitan areas, which tend to have higher incomes than rural areas (U.S. Department of the Interior 2006). The relative wealth of hunters allows them greater freedom to spend time and money when hunting. Also, typical demographic information such as gender, extended family size, age and race have strong influences on hunting patterns.

Hunters’ relative wealth allows them greater freedom to engage in hunting. Traveling long distances to hunting locations and acquiring hotel rooms in remote small towns can be prohibitively expensive. In addition, hunters need to purchase equipment, licenses, food, fuel and possibly off road vehicles.

On average, nationally hunters spend $1830 per hunter on hunting (U.S. Department of the Interior 2006). The average costs include $429 per hunter per year for equipment, which consists of guns, decoys, ammunition and camping equipment among other things (U.S. Department of the Interior 2006). Other outdoor recreational activities may be costly but are likely to cost less than hunting. For example, hunters must purchase a tag to hunt legally but rock climbers do not need to pay a fee to climb on public land. Additionally, hunters typically spend the night in a hotel room because the hunting seasons range over an extended period of time and the distances needed to travel are so far in Nevada while many other recreations do not necessitate hotel stays. Hunters may purchase a four-wheel drive vehicle in order to access more remote areas. By contrast, few other recreationists require special purpose vehicles. Moreover, hunting requires a more substantial time investment, which may be related to income. Nationally hunters hunt an average 18 days per year (U.S. Department of the Interior 2006). It is generally easier for urban residents who have better paying jobs to take time off work to hunt (Swanberg, Pitt-Catsoupghes and Drescher-Burke 2005). Wealthier individuals have
greater ability to schedule work on a more flexible basis and the costs associated with hunting represents a smaller percentage of income compared to lower income urban residents. Rural hunters’ ability to hunt is generally not as strongly affected by wealth because they are closer to hunting locations, reducing hunting costs. Rural societies are more willing to accommodate important cultural events.

Hunting is strongly differentiated by gender. In 1990, 16.4 percent of males indicated they were hunters compared to only 2.7 percent of females (Duda, Bissell and Young 1995). Among hunters, 90% are male and 10% female. This is likely a result of gender roles and peer influence. The effect of peer influence on hunting participation is illustrated by Stedman and Heberlein (2001). In this article, the authors study the influence of rural culture on hunting rates. They find that rural culture has an influence but only with males. If culture did not vary by gender, it would be expected that males and females would be affected equally. This influence seems likely to be the direct result of peer influence on adolescent males with the opposite influence for adolescent females. This effect occurs because social norms vary by age and sex within peer groups, which are the most influential reference groups during adolescence (Biddle, Bank, and Marlin 1980). The initiation to hunting is most likely to come from the father and be focused on his sons (Decker, Provencher and Brown 1984). The daughter is usually not socialized to hunt except under special conditions such as a hunting father having no sons (Schole, Glover, Sjorgen and Decker 1974). The number of men has a direct influence on the number of hunters because men tend to hunt at greater rates than women (U.S. Department of the Interior 2006).
The father/son influence is important but the support for hunting by the extended family matters as well. Extended families who hunt together tend to have greater bonding (Decker et al. 1984; Zinn 2003) and hunting may be part of family holiday rituals such as Thanksgiving. The normative behavior of extended families reinforcing immediate family values tends to maintain hunting norms (Decker et al. 1984). In addition, the extended family enables any individual member to have access to hunting locations and resources that could be more limiting for those without extended family hunters. Larger extended families and those with stronger ties may be the most beneficial for hunter initiation, but this cannot be measured without directly asking hunters. Also, individuals whose families support hunting tend to begin hunting earlier in life, which increases the likelihood they will continue hunting. The later in life a hunter begins hunting the more likely they will stop hunting (Decker et al. 1984).

A rough proxy for extended families may be average nuclear family size, which can be accessed through census data. Similarly to large extended families, large immediate families may facilitate hunting initiation by providing more hunting role models and if the family hunts together this may increase the probability that younger family members will choose to hunt (Decker et al. 1984; Bissell et al. 1998). The lack of family support as a deterrent to hunting is noted by Bissell et al. (1998) as one of the main reasons ex-hunters gave as to why they did not hunt anymore. It would seem that family would be less of a deterrent if all members of the family valued hunting. Hunting tends to be a family activity. For example, Zinn’s (2003) research revealed that only five percent of hunters were not married.
Age is a limiting factor for hunting. At one extreme, hunting is not allowed until an individual reaches a predefined age. This age depends on laws specific to the state and the type of hunt. In some cases this age can be determined by parents for hunting of specific game with lower powered weapons. Big game hunting is usually allowed during early adolescence. At the other extreme, when hunters enter their 50’s hunting desertion tends to increase for physical reasons (Schole et al. 1974). Hunters who are 45 years of age or older represent less than 50% of all hunters (U.S. Department of the Interior 2006). In comparison, the 35 to 44 age group accounts for approximately 25% of all hunters (Figure 61). Besides the physical limitations of hunting, social limitations begin to impact hunters as they age. Hunters may lose members of their hunting group due to relocation, desertion or death. Social interaction is very important to hunters and their attitude toward hunting (Decker et al. 1984; Zinn 2003). One of the most important losses might be the hunter’s father who is the primary influence on hunting initiation and continuation. In addition to the loss of hunting group members, older hunters likely have fewer opportunities to meet new individuals to replace group members. Younger hunters are more likely to meet other hunters through new jobs, college or marriage into a hunting family. As hunters age they may also be less likely to need the meat to supplement food sources for their family. Although acquiring meat may not be the most important motivation for hunting, because hunting for meat may or may not be an important factor for individual hunters, the loss of any satisfaction associated with hunting tends to increase desertion (Decker et al. 1984; Duda et al. 1995).

Race and ethnicity are becoming increasingly important in hunting literature. Many parts of the country are experiencing a decline in hunter numbers or at the very
least are experiencing hunter participation rates that are insufficient to attain wildlife management agencies harvest goals (U.S. Department of the Interior 2006; Stedman et al. 2008). Wildlife management agencies feared that the drop in hunting participation in the 90’s would affect state wildlife populations in turn this would effect state funding for wildlife management and the management of natural resources that animals on which wildlife depend. One of the solutions to this problem was promoting hunting among minorities.

Because of their low participation in hunting, the focus on hunting initiation for minorities seems logical. Hunter rates are dropping, while minority populations are increasing (U.S. Census Bureau 2009). In addition, the Black and Hispanic populations hunt at much lower rates, which indicates that they have the potential to increase. Approximately one percent of Blacks hunt and two percent of Hispanics hunt (U.S. Department of the Interior 2006). It seemed if the minority populations hunted at rates similar to whites this increasing number of hunters could offset the overall hunter decline.

The problem with this line of reasoning is that it fails to take into account demographic factors that influence hunting rates. Minority groups tend to be poorer (U.S. Census Bureau 2009). As stated above hunters tend to have higher incomes than the general public. In the case of the Hispanic population, lack of wealth is one reason why they have emigrated to this country en mass. Poorer individuals largely do not have the time or money to spend hunting. In Nevada, this barrier is larger since the cost of hunting does not make meat hunting attractive as a cheap, alternative food source (U.S. Department of the Interior 2006). We also discussed the importance of social ties to maintain hunting rates. The individuals who have moved here from another country have
likely lost a majority of their social network. These factors coupled with possible language barriers not only create barriers to increased social interaction but also for license applications. The tendency for Blacks and Hispanics to live in urban areas also reduces the odds they will hunt.

**Logistics of Access**

Spatial access to hunting in Nevada is a major issue. While Nevada has one of the highest percentages of urban residents, it is also the seventh largest state. The result is vast open unpopulated areas. In addition, the metropolitan areas tend to be near the state borders making those areas in the center of the state nearly uninhabited. Because the population in the center of the state is low, there are few well-maintained roads in this area. Often access to remote areas is only possible with four-wheel drive vehicles via unmaintained trails (Purser 1989). Weather can also be an issue in Nevada. While Nevada may not have a high rainfall or snow total, when storms do hit they tend to be dramatic and problematic for travel. For example, the Donner party was attempting to cross the Sierra Nevada Mountains along what is now Interstate 80 and was snowed in near the Nevada state line (McGlashan 1940). In addition to access, finding lodging close to these remote areas is difficult.

The area where hunting most commonly takes place is in the northeast (Nevada Department of Wildlife 2008a). The main population centers are in the south and the west. It takes roughly four hours to get from Reno or Las Vegas to the nearest hunting area with any significant lodging accommodations. The route from Reno to Elko includes
a trip down the “Loneliest Highway in America.” This title speaks to the remoteness of the areas hunters need to pass through to get to a hunting location.

The roads that connect Reno and Las Vegas with hunting location in northeast Nevada include only one major highway (I-80). Few people travel even the major highways in Nevada compared with the level of traffic in other states while the road from Las Vegas to Ely is traveled less frequently. Many of the roads are indirect due to the mountains. This is mainly affects east west trips because the mountains in Nevada generally run north and south. This means that when traveling east and west the roads wind through and around mountain ranges. Traveling from south to north hunters are less affected by mountains but have to drive through some of the harshest deserts in the U.S.

While some routes are better than others, any drive from the major MSA’s to hunting locations will include few services along the way. For instance, the four hour drive between Reno and Elko includes only a few exits with services such as gas, food and restrooms. Running out of gas or having mechanical breakdowns in areas with poor cell phone reception and light traffic might result in being stranded for an extended period.

The variation in winter weather between valleys and mountain passes makes travel unpredictable and in some cases impossible. In a variable desert climate, the temperature can change rapidly. One day the high temperature might be in the 60’s and the next day it can snow up to two feet of snow on the valley floors. The amount of snow is generally much greater in the mountains. A major storm system can lengthen a four hour trip to 12 hours or quickly close down roads for days.
Beyond the issues of access to the general hunt location, access to areas where wildlife is located can be another challenge. In other states, agricultural activities create numerous roads and make access relatively easy (Purser 1989). This is currently not the case in Nevada. The state contains vast areas without access even by trails. The trails that are available often require four-wheel drive vehicles or off road vehicles. Wildlife, during hunting seasons, tends to avoid areas around roads more as human traffic increases (Milspaugh, Brundige, Gitzen and Raedeke 2000).

The terrain of Nevada makes hunting difficult. Nevada is one of the most mountainous states in the U.S. Because of the mountains, hunting areas tend to have more slope and are rockier. Mule deer can weight over three hundred pounds (Desert USA 2009). This makes access to and removal of game from remote hunting locations relatively difficult. Also, the ground is generally rough and rocky. Most of Nevada can be characterized as desert. The land is generally open with mainly short trees and low bushes. These two factors can combine to make Nevada a dry and rugged state. As a result, hunting in remote areas is more difficult than in the eastern U.S. In an environment that has less slope and terrain that makes hauling a deer easier, hunters still prefer to hunt near the road (Stedman, Dieffenbach, Swope, Finley, Luloff, Zinn, San Julian and Wang 2004). How much more is this true when conditions are harsher?

Lodging is a limiting factor in hunting territories. There are few cities with a sizable number of rooms for rent to hunters. The seasonal nature of hunting means that hotel businesses do not have enough steady income to operate large hotels. The lack of lodging near hunting locations can mean long distances to travel from where you sleep to where you hunt. A long trip from the hotel to the hunt sight can make hunting less
attractive to potential hunters. The hotels have some advantages over other states. The presence of gaming in hotels can be a draw for out of state hunters. Also, hunters during hunting season are bound to encounter other hunters during their stay, which creates opportunities for socialization, which is a key factor in hunter satisfaction (Decker et al. 1984).

Difficulties associated with food and water availability can also make hunting in Nevada difficult. A hunter in more populated states could return home or to a nearby town for lunch in other states. In Nevada, the distance traveled between town and hunt location makes it more sensible to pack food to the hunt location for all day or multiple day hunts making hunting less convenient.

Satisfactions

Hunting demand is high in Nevada. Up to this point, many factors have been listed that restrict participation in hunting. So it would seem that hunting in Nevada should have low demand. Some states have difficulties selling enough tags to manage the deer herds (Stedman et al. 2008). This in not the case in Nevada primarily because of the limited number of animals and high number of residents. In 2007, 15,873 tags were distributed among 49,747 first choice applications (Nevada Department of Wildlife 2008a). Despite the ratio of deer to the population, several factors increase the demand for hunting in Nevada. For example, Nevada has many unique game species. This state also has a distinctive environment because of its mountains and open landscape. The diversity of hunting satisfactions that are available in Nevada allows hunters to fulfill many satisfactions at once, which is key to maintaining high hunting demand (Hendee
A wide variety of big game species live in Nevada. These animals include mule deer, elk, big horn sheep, antelope and mountain goats. These animals are highly valued trophy animals and are rare which increases hunting demand (Gasset 1943). Mountain goat licenses can only be obtained once in a hunter’s lifetime. These species of game are found only in a limited number of states. The antlers and horns on these animals can be very large and highly attractive to hunters for mounting in their homes. Hunters will often display racks from their first animal harvested or for unique racks either due to the quality and size or because of the unusual nature of the rack.

Another factor that influences hunting demand in Nevada is the hunting environment. The mountainous nature of the state may make traveling more difficult but the view when you get to your destination will include mountains on the horizon. The mountains often create special weather formations, which make the view variable and interesting.

Nevada is characterized by mountains and open terrain allows viewing of long distances and large areas possible. This gives the individual a good sense of the remoteness of the area. The ratio between number of hunters and the available land for hunting means that a hunter could hunt the entire season and never see another hunter while hunting. This contributes to the perception that hunter and animal are matching wits in a primal activity. The perception of remoteness allows the hunter feel relieved of social burdens, which is another satisfaction for hunters (Gasset 1943; Decker et al. 1984).
Tag distribution and Harvest

One of the traditional measures of hunter satisfactions is harvest. The potential to harvest a trophy animal or to harvest any animal is important to hunters. One way of determining interest in hunting in general and interest in specific types of harvests is to look at tag demand and harvest rates by hunt unit to determine which factors are most closely associated.

Tag distribution tends to be highly variable between hunt units and these units tend to be very large (Figure 66) (Wasley 2004). The hunt units for mule deer are divided so that specific herds reside completely within a one hunting area, which may consist of several smaller units (personal interview Mike Cox NDOW 2008). In 2007, the Nevada Department of Wildlife (NDOW) made a total of 15,873 tags available for all mule deer hunts in Nevada. The number of tags per hunt area varies depending on herd size, carrying capacity and food availability. The number of tags per hunt area can range from less than 10 to more than 2,000 for bucks and less than 10 to over 250 for does (NDOW 2008a). Based on the number of tags applied for and received the average hunter who applies to hunt in Nevada receive one tag every three years. In contrast, a portion of the tags generally go unused, but unused tags are generally associated with special hunts such as a depredation hunt following a fire (Nevada Department of Wildlife. 2008a).

Harvest rates vary as well. Those units with few tags available can have 100% or 0% harvests, which make a report on the range of harvest success misleading. For those units with at least fifty tags available the harvest percent ranged from 11% to 84% in 2007 (Nevada Department of Wildlife 2008a). For all antlerless hunts, the harvest percentage is 50% to 80%.
The fact that there is such a high demand for antlered licenses while antlerless tags go unfilled indicates that hunting for meat may not be as important as other hunt satisfactions. The lesser demand for antlerless tags can have several explanations. First, the number and location of tags can be highly variable. Second, when the overall cost of hunting is divided by the pounds of meat obtained, deer meat can be very expensive. The average mule deer produces about one hundred and sixty pounds of meat. The average hunter in Nevada spent 1,922 dollars on hunting related costs resulting in an average cost of over $12 / pound. When the amount spent by big game hunters is used, the costs are greater than $14 per pound. This does not take into account the harvest rate, which is around 50% (Nevada Department of Wildlife 2008b). The high cost of this activity can make it unattractive as a recreation option.

The low supply of tags also is an important barrier to hunting in Nevada. Nevada implemented a tag lottery to deal with the high demand for hunting tags. This system issues tags to those selected and gives points to those not selected. The idea is that those who did not receive tags in previous years will be more likely to receive a tag in future years. If you divide the number of tags by the number of hunters in 2007, a hunter should receive a tag every three years and harvest a deer every other year that they have a tag (Nevada Department of Wildlife 2008a). This breaks up the continuity of hunting and can have a negative effect on hunter retention (Decker et al. 1984).

**RESEARCH QUESTIONS**

This chapter asks two main questions. The first is what is the spatial distribution of hunters’ residences in Nevada. The distribution of hunters matters for several reasons.
The distribution between urban and rural areas is an important factor in the hunting analysis. We know that rural and urban hunters have different characteristics due to demographics and place influences (Zinn 2003; Steadman 2001). For example, urban hunters are on average wealthier and hunting for rural hunters tends to be more important culturally. The proportion of hunters between rural and urban tells us about culture, access, familiarity with surrounding environment and probability of hunting participation.

Also, how do demographic factors affect hunting participation? We know that hunters have above average income and that factors such as race, age, sex and family integration influence hunting participation. Do hunters reside in expected areas according to past literature or is there something unique about Nevada’s hunter distribution? For example, you would not expect to find a tract with a high percentage of minorities to have a high population of hunters. The results will be analyzed to determine whether the results indicate a difference between Nevada and the U.S.

The second research question is where do hunters choose to hunt. Although many factors influence the decision of where to hunt, only the most prominent factors will be reviewed in an attempt to determine where hunters hunt. Physical and social factors represent a significant proportion of the influence on where hunters hunt. The physical factors used in this analysis were the same as Stedman’s et al. (2004) premise of the interaction of distance and slope to determine the preferred hunt geography. His original premise will be altered slightly in respect to slope to account for the difference in terrain between Pennsylvania and Nevada.

While Hendee’s (1974) work on multiple satisfactions points out that hunting is more than just harvesting, whether or not an animal was harvested and the point class of
the animal are important factors (Duda et al. 1995; Decker et al. 1984). The point class of the harvest and the demand for specific units groups will be analyzed to determine the extent to which hunting motivations best explain hunt unit selection.

DATA

The data was processed using ArcGIS 9.2. This program allows the user to spatially analyze and layer multiple data sets on one another to combine geographic and social data. The ability to combine data sets allows the user to represent data visually and concisely. The ability to join multiple pieces of data and perform calculations on the resulting dataset enables analyses that would be nearly impossible without GIS software.

The data used in this analysis come from government records, ESRI data files and addresses from 1657 Nevadans who responded to the Nevada Big Game Hunting Survey (conducted by Kimberly Rollins, Department of Resource Economics, University of Nevada, Reno). The government data sets were readily available on the internet. These data sets include the 2000 census, Nevada road and boundary maps, and NDOW harvest report for 2007. The census data provided tract boundaries and demographic data divided by tracks. The track boundaries were used to visually represent data units but also group data by geographic location using the join function. Demographic data was collected on income, sex (percent or gross), mean family size, median age, and race. A file containing all Nevada roads was used to calculate road density. The NDOW data consisted of hunt unit boundaries and harvest reports for 2007. Seventy-meter digital elevation model (DEM) data was used to determine slope in the analysis of road density.
MEASURES

The location of the residence from the Nevada Rangeland Vegetation Survey was used to determine the residences of Nevada hunters. The demographic data describing income, age, sex, family size and race were used to explore possible links between demographic characteristics and hunter participation. A combination of slope and distance measures physical access to hunt locations. The NDOW harvest data will be used to determine the extent to which harvest factors influence unit selection.

PROCEDURES

The Tag Applicants residence location map used addresses from the Nevada Big Game Hunting survey. The addresses were located on a map of the state of Nevada and were represented with a purple dot. A composite address locator was created to allow the computer to place the addresses using two levels of address sensitivity. First, the address locator matched addresses that contained zip code, state, city, street name and house number. The second address locator matched addresses using zip code, state and city data. The remaining unmatched addresses were reviewed manually to place the address; if the place names were misspelled, they were corrected and matched to a known address.

Once the addresses were located on the map the points were spatially joined to the tract boundary data file. The spatial join allowed the data to be classified by tract. The density of tag applicants was calculated using the field calculator by dividing the number of applicants by acres in that tract. One of the problems with the composite address locator was that addresses matched by zip code or city were located in the same spot. This means that one dot could represent any number of addresses. In addition, address
locations in cities tended to overlap concealing the total number of locations. In order to compensate for these problems, the tag applicants by census tract map was created.

Figure 63 displays the data according to number of locations within each tract. The previously joined data was symbolized by unique values by tract. Five categories were automatically generated by ranking number of tag applicants per tract. The total number of tracts was divided by five. The category values are 0-3, 4-10, 11-21, 22-50 and 51-109. Different colors were used to represent the number of addresses per tract. This representation revealed that White Pine County, which originally appears to contain five locations, in fact contained over 50. Tract size varies throughout the state. The areas of Reno and Las Vegas are blown up to show the small tract units within cities.

The Figure 64 was derived in a similar manner to Figure 63. The average income by census tract was ranked and the total number of tracts was divided by five. The income range in each group was based on the high and low average income within each group and symbolized by unique values (colors). The income groups were $15,731 - $32,306, $32,306 - $43,200, $43,200 – $55,949, $55,949 - $72,578 and $72,578 - $156,042. Tracts without data were represented by white.

The Demographic Factors map is a collection of six maps. The process for creating each of the six maps is the same except for the specific data category used to create the map. The unit of analysis was sorted in descending order in the attributes table. The number of tracts was divided by 10. The highest 10% of tracts by each unit were selected and the data exported. The three categories positively associated with hunting rates were symbolized in shades of green. The three categories negatively associated with
hunting are symbolized in shades of red. Reno and Las Vegas are shown in exploded views to show the smaller tracts within cities.

Figure 66 analyses roads that are located on a slope of less than 2%. All areas of the state that had an average of less than 2% by raster unit were selected using the select by attribute tool. The intersect tool was used to find all roads within areas of less than two percent slope. The erase tool was used to remove metropolitan area roads from this analysis. Because Nevada is rapidly expanding in population the metropolitan area borders used to remove metropolitan roads from the analysis could not accurately define urban areas. It seems that areas such as Reno or Las Vegas have true metropolitan boundaries somewhere between the currently reported boundaries and the boundaries associated with the ten-year projection. The top 10% of tracts were reviewed and tracts were added to and removed from the list to account for highly urbanized areas not within metropolitan boundaries. This data was then spatially joined to the hunt unit boundary data. In the attributes table a field calculation divided length of road within each unit by acres per unit. This column was sorted in descending order and the top ten percent were selected. The top 10% of tracts were then exported and symbolized in blue.

Figure 69 is a compilation of four separate maps. The process was similar to the Demographic factors map process. Because the hunt units for mule deer often combined several hunt units this data could not be joined to the hunt unit boundaries. The data were saved in an excel spreadsheet and calculations for best odds of harvesting a trophy animal, best odd of harvesting any animal, best tag draw odds and worst tag draw odds were calculated in the excel format. The top 10% in each category were selected and the units were then manually selected in arc map. The selected units were then exported and
symbolized with horizontal and vertical lines, dots and the color green. The four maps were then layered onto one map.

**ANALYSIS**

The spatial and physical conditions of populations of interest rarely receive consideration in social research. When the physical attributes of a unit of analysis are given, often they are only described through text with supplement images that give only the briefest glimpse of the visual data. For instance, a description of an ancient tribe may include a sketch of what the town likely looked like, how its inhabitants dressed or tools of the period. If maps are included, they generally are very simple, giving only a directional relationship between units. For example, tribe A is north of its trading partner tribe B by fifty miles.

Until the 1990s this was the most that could be done to aid visual analysis of land units. Since the 1990s, the creation of geographic information systems (GIS) computer software for the analysis of landforms has been developed and has become a useful and sophisticated tool to understand physical as well as social phenomenon. With this software calculations, that would include extensive time investments, are performed on a scale that would have been impossible in the past. The following analysis takes advantage of GIS software to analyze the spatial and physical components of Nevada hunters.

A three dimensional analysis of the land will include the examination of spatial distribution, elevation and attribution of social influences by geographic unit. The analysis of hunting in Nevada can be explained effectively with using spatial
representations of the data. It gives those who have not lived in Nevada a better understanding of the factors affecting social attitudes and structures.

RESULTS

Distribution

Hunters’ residences (Blue dots) were densely clustered around urban areas (Figure 62). The major clusters are Las Vegas, Reno, Carson City, Fernley, Fallon, Winnemucca and Elko. These areas are the largest populated areas in the state. Of these areas, the largest concentrations are in the Las Vegas and Reno metropolitan areas. The highest ratios of hunters per acre (represented by red dots) were mostly in these two large metropolitan areas (figure 62). The Elko and Carson City areas also showed high concentrations but not to the same extent as Reno and Las Vegas. Elko and Carson City have relatively large populations for the state of Nevada but the cities are not as densely populated. While Reno and Las Vegas exhibit the skyscrapers, strip malls and large apartment complexes of metropolitan areas, aside from the casinos, Carson City and Elko are typical of many moderate sized cities across the country. Conversely, the number of hunters from rural areas was much smaller compared to other states. As previously stated, Nevada is one of the most urban states in the U.S. (State Library and Archives 2008). Very few hunters reside outside of urban areas. This is an effect of the physical and economic features of the state that were discussed previously in this chapter. These factors include the relative lack of agriculture, harsh landscape and lack of economic opportunities.
Comparisons between rural and urban areas would be beneficial but it is extremely difficult to make an exact count of these residences. The boundaries of urban areas in Nevada have expanded so rapidly that accurate urban boundaries do not exist.

Generally, the center of the state has very few residents and in turn few hunters. The distribution of hunters by population size of residence is roughly similar between Nevada and the U.S. as a whole (U.S. Department of the Interior 2006). The percentage of residents that hunt by population size is also similar (U.S. Department of the Interior 2006). The Nevada numbers should only be used for rough estimates due to the small sample sizes collected by the Department of the Interior. The addresses of tag applicants are a random sample of Nevada hunters so it can be assumed that the Nevada’s unique population variations affect rural/urban hunter distribution but the composition of hunters within specific cities correspond to national data. For example, Nevada is more urban so the hunter residences will be more concentrated in urban areas than in less urban states. Within these urban areas the proportion of that community that hunts are similar to other communities in the U.S. of similar characteristics (See chapter one).

Demographics

Because the individual tracts show variation in the association between factors and participation, a more general trend will be analyzed. This is not to say that when examined closely that individual tracts tend to show contradicting influences. Rather the individual units are numerous and can be described according to multiple factors. Also, these factors did not overlap because only the top 10% of those factors representing the
most intense concentration of negative and positive factors were displayed. If each factor were represented for each tract, the display would be unintelligible.

**Income**

Figure 64 displays a distribution of hunters similar to other studies and national data. The highest median income areas in the state center around Las Vegas, Reno, Carson City and Elko. Median income generally increases as population increases. The number of hunters increases as population increases. This indicates that while income may be associated with hunting participation it does not cause increased hunting. If income was a cause of hunting participation areas such as Pahrump should show decreased hunting rates. This is not the case. It is likely that higher income makes hunting possible. We see from the map that hunters tend to cluster around areas with high income potential but not all clusters are near high income areas.

**Race, Age, Ethnicity and Sex**

Other demographic factors show an arrangement of hunter residences as expected (Figure 65). In general, hunters live in areas that are white and male and not in areas that are older or highly Hispanic or Black. This information corresponds to published data on these topics (U.S. Department of the Interior 2006; Decker et al. 1984; Filion 1978). Not all tracts with factors that increase hunting participation have high hunting rates and vise versa. This lends more support to the argument that demographic factors are not causational but correlational. Also all factors are clustered around urban areas. This is
partially because the tracts with the highest populations are located in urban areas.
Because some of the rural areas of the state are not represented in the sample, it is more likely that urban areas include high proportions of various demographic factors.

Family Size

The factor family size was meant to approximate size of extended family because the Census bureau does not record extended family size (Figure 65). The closest variable to extended family size was immediate family size. It appears that immediate family size is confounded by other factors such as the family size associated with poor or minority families who are less likely to hunt. Because of this confound there seems to be a dual representation of this variable. In one environment, large family size may be related to agricultural activities and to high hunting participation. This is likely in rural areas. In another environment, large family size may be related to low income families and a possible decrease in hunting. This is likely in urban areas. Because of this relationship more specific data is needed than this representation can contribute.

HUNTING SATISFACTIONS

Spatial Access

The access to hunting areas was clustered mainly in northeastern Nevada (Figure 66). Two units are separated from the main cluster. One is located towards the northwest and one to southeast. The unit to the northwest and the cluster to the northeast are likely
the result of ranching. The ranching industry has promoted road construction to access crops and livestock. It is unclear why the southwest unit has greater access but may be attributable to mining activities. The main cluster does correspond to most of the hunting activity in the state. It is not likely that hunting created a demand for greater access. Rather greater agricultural activity corresponds to environmental conditions that support greater herd numbers (Figures 67 and 68). The access that is created by agricultural activities allows better hunting conditions.

**Harvest and Trophy Rates**

The factors such as harvest rate and trophy rate indicate areas that should be targeted by hunters based on traditional motivations for hunting (Hendee 1974). The highest overall harvest rates are located in the west central, central and east central regions (Figure 68). The west central area likely experiences higher harvest rates due to the proximity to Reno. This allows hunters to travel less and make more hunting trips to harvest a deer. The central location has some of the largest deer populations in the state (Nevada Department of Wildlife 2008c). Hunters hunting in this area have a better chance of seeing deer, which increases the harvest odds. Also, this area has a close proximity to denser populations of rural hunters. The same can be said for the southeast area.

Trophy harvest units are clustered in the southeast, north central and west central regions. The west central region again likely has a high trophy harvest rate due to the proximity to Reno, which allows hunters to take more trips hunting and increase trophy harvest odds. The high trophy harvest rate in the southeast region may be due to
proximity and access to Las Vegas hunters. These hunters are more likely to hunt for a
 trophy animal possibly as a result of meat becoming less important for hunters and
 limited ability to process and store meat. Additionally this area represents the closest
 areas to mule deer habitat. The north central region is close to smaller population cities
 and does not give any indication as to why it has high trophy harvest rates.

Draw Odds

Draw odds for tags represent demand for hunting opportunities. Tag draw odds
 are the best approximation of demand because tag allocations vary by unit according to
 herd population. Therefore if gross tag applications were used the demand would appear
disproportionately greater in areas with higher deer populations.

The lowest draw odds (best chance to get a tag) are located in the northeast
(Figure 69). This area has the largest herds but is farthest from the main population areas
of Reno and Las Vegas. This means that most tags are allocated to areas were hunters
have to travel the longest distance. Of this area, roughly a quarter of the area intersects
high harvest areas. Another quarter intersects high trophy harvest areas. The important
factor here is that half of the area intersects factors associated with hunt satisfaction. If
this area is characterized as having low draw odds, why does it contain factors that should
increase demand? Also, the area that corresponds to the best access, which should
increase demand, is nearly completely within the low demand area. It might be expected
that areas that have better chances to achieve hunter satisfactions and better access would
have a greater demand. In this analysis, the inclusion of positive hunting factors with low
draw odds is an important clue in determining hunter motivations.
The greatest demand areas are in the west central, northwestern, east central and southeastern areas of the state. It is not clear why the demand is high in the northwest. The west central region is again close to Reno. The east central and southeastern areas are not close to Las Vegas but they are the closest suitable hunting areas. Also, the highway access to the North runs through this area, which explains why high demand is experienced in this long, narrow region. Roughly a third of this area intersects with trophy harvest units. This intersection is closest to Las Vegas. Again, this indicates that Las Vegas hunters may be more likely to hunt for trophy animals than for meat. The unit near Reno has a high trophy harvest percentage and overall harvest unit. The high demand region shows no overlap with high harvest areas except the single unit near Reno. This pattern of intersection is interesting for similar reasons to the low odds area. It would be expected that the high demand areas would intersect high harvest and high trophy harvest areas.

CONCLUSION

The cluster of hunters around Metropolitan areas is expected but more pronounced due to unique population distributions in Nevada. The demographic factors correspond roughly to theories about hunting promoted by human dimensions research. Access is greatest in areas that have agricultural activity. But this area is not highly correlated to high demand areas. The demand does not seem to systematically follow traditional hunt satisfactions as much as it does convenience factors.

The intersection of satisfaction and access with demand is not what would be expected if traditional hunt motivations best described hunters. This analysis underscores
Hendee’s (1974) theory that no one factor explains hunting demand. In addition, this analysis supports Decker et al. (1984) claim that hunters do not hunt to fulfill harvest motivations to the same extent as in the past. However, the fact that a small proportion of the high demand area and large proportion of the low demand areas intersect areas characterized by traditional satisfactions tells use that these are not the most prominent motivations for hunting in Nevada.

Further research should account for the effects of the environmental conditions on hunter constraints. Hunter constraints vary by area and are often omitted from discussions on hunting other than hunting area conditions. Also, the detail of the data should be increased. The main data sources for this research are the FHWAR survey and NDOW. Very little research has been performed on the Great Basin region but with the variety of game and the scenic quality of the state, an increase in hunting interest beyond what has already been experienced could be developed.
CHAPTER 5: CONCLUSION

This thesis has described Nevada hunters’ demographic and economic characteristics and provided nationwide comparisons where possible. It has also assessed the range of outdoor recreations they engage in to determine the degree to which hunting is a specialize activity and to what degree it is part of an outdoor recreational lifestyle. Lastly, it has examined the social spatial characteristics of hunters and hunting. In this concluding section, I will first summarize the principal findings and then explore their implications for policy. Finally, I will reflect on the implications of the findings for sociological theory and will point the way towards some avenues these findings open for future research.

Summary

The data in this thesis were analyzed using frequencies, factor analysis and GIS programs to show that hunters in Nevada have similar characteristics and perform similar behaviors as U.S. hunters. In addition, factor analysis shows that outdoor recreationalists tend to be generalists. Hunters in Nevada are similar to hunters in the U.S. Most of the demographic factors have similar distributions and represent similar proportions of the whole population. For example, the percentage of minority hunters in the U.S. does not vary greatly from the percentage of minority hunters in Nevada. While the demographics are similar, variation is present in the behaviors of the two groups of hunters. For example, hunters in the U.S. tend to hunt much more in their state of residence than other states. In Nevada, roughly equal numbers of hunters live in Nevada as there are hunters in
Nevada. These differences in most cases are not drastic but to apply the characteristics of Nevada hunters to future research a basic understanding of Nevada is needed. For example, Nevada’s population is very urban. If policy regarding hunting in Nevada is altered, a paradigm developed out of research from the eastern U.S. needs to be altered to reflect the desires of hunters in urban areas.

The debate over whether hunters are specialists or generalists has tended to focus on whether outdoor recreationists are generalist or specialist. While prior research indicates that outdoor recreationists are generalists in relation to progression within outdoor recreations, little research has been performed to determine if outdoor recreationists are generalists in relation to the number of recreations that recreationists perform. Data from the Nevada Rangeland Vegetation Survey and FHWAR survey were analyzed using frequencies and factor analysis to propose that hunters are recreational generalists in that they tend to perform multiple outdoor recreations. For example, someone who hunts may also fish and camp. The tendency to engage in multiple recreations is a positive sign for the longevity of hunting in a state where hunting opportunities are limited.

The analysis of hunting locations that hunters select indicates that hunters in Nevada do not conform to traditional hunting motivation paradigms. Using GIS software to visually represent spatial and geographical data, the locations where hunting is in high demand does not systematically overlap areas with attractive hunt locations based on traditional hunter motivation paradigms. The extent that this is true indicates that managing herds for quality and quantity may not be the most effective means of improving hunter satisfaction in the state. For example, the act of hunting may give
legitimacy to an opportunity to bond with other hunters or experience rural settings. In this case hunting in a prime location may take a backseat to finding a convenient location where like-minded hunters congregate or simply finding the nearest open space. This may be the case of in southern Nevada where hunting is not optimal for harvest but may be convenient. Also, improving herds based on where hunters prefer to hunt rather than where increasing a herd may be most efficient could be more effective to increase hunter satisfaction. This is not to say that herds should be developed in areas that they are not suited, but if there is a choice between two areas where increasing the herd in advisable the location that provides more convenient access for hunters should be targeted.

**Theoretical implications**

Stage theories propose that societies progress from less technologically advanced and structurally complex existences to ones that are more technologically advanced and structurally complex, and that the means of subsistence follow these technological innovations. This model would predict that hunting would not continue to be widely practiced in agricultural societies. In general, this progression holds true if all societies in the world are analyzed. But, individual societies do not always follow a simple linear progression. For example, hunting continues to be widely practiced in spite of highly developed methods to produce and distribute agricultural commodities. While most hunters engage in hunting as a recreation, there continue to be economic benefits to hunting for some. It is this conflict between the prevalence of hunting and the agricultural means of production available that call into question whether societies progress in a linear fashion.
Max Weber saw specialization as a pervasive tendency of modern societies. For example, Weber’s understanding of the role of specialization within bureaucracy discussed a similar progression promoted in stage theories in that bureaucracies progressed from low levels of specialization to high levels (Weber 2008). Weber believed that rationality would lead societies to implement more efficient and specialized bureaucracies over time. Nevertheless, Weber understood that because specialization was a component of social structure and social structure is made by humans then specialization can be altered (Hamilton 1991). This indicates that stage theories and Weber’s iron cage are not as rigid as they are sometimes interpreted. The idea that progression is not inevitable enables hunting to be understood as widespread practice within modern culture.

Both stage theories and Weber’s bureaucratic iron cage theory point to this linear progression but societies do not seem to follow such a linear path. One example of societies exhibiting continuity of behaviors with changed meanings over time is hunting in America. This thesis has shown that while hunting may be on the decline, it is still widely practiced. According to general stage theories, this practice should have been abandoned in favor of agriculture. According to Weber, one might say that hunting is inefficient and in many cases expensive but hunting continues. Weber’s discussion of recreation as a component of the Protestant ethic might help to understand why hunting has remained popular. Weber discussed recreation as a rational means of allowing the body to relax (Hamilton 1991). Recreation for Protestants was not a time of frivolity. On the contrary, it was a time when the body could relax and the mind could prepare for the week ahead. It was a way for the individual to position himself or herself in the larger
social world outside of work. This is likely what hunting has become (Kuentzel 2000). Hunters do not hunt mainly for economic reasons today as they did in the past rather, hunters want to engage in an activity that is defines the individual and locates that person among in relation to like-minded individuals. This activity allows the participants to relax while challenging themselves in a way that they cannot in the course of daily activities.

While hunting is not rational from an economic viewpoint for many hunters and hunters in Nevada in particular, a rational structure can be observed in the types of hunting that various classes perform. This research has indicated that lower class hunters engage in forms of hunting that have a greater economic benefit and train the hunter to be disciplined. Conversely, upper class hunters tend to hunt types of game that include a greater amount of socialization during the hunt and minimize the physical exertion associated with big game hunting such as transporting a large animal over rugged terrain.

**Policy implications**

There is useful information in this thesis for NDOW. While they are doing an excellent job of managing wildlife in Nevada, they are not experts on the social factors of hunting. In addition, with the lack of research on hunting in Nevada leaves game managers in the state to rely on anecdotal evidence. Understanding that Nevada hunters are comparable to hunters in other states and being provided scientific research on hunting in Nevada, game managers can apply research that is geared specifically towards Nevada to hunting regulations and management practices. In addition, understanding this differentiation in hunting motivations will help game managers to create hunting opportunities that are varied and well suited to multiple types of hunters.
In the mean time, hunting should remain viable in the near future because of outdoor recreationists’ tendency to engage in multiple recreations. This means that even though hunters may not be able to get a tag every year, they may be satisfied to substitute other activities in their place and hunt when the opportunity arises. Additionally Ditton and Sutton (2004) found that hunters who are more educated were more willing to substitute recreations than less educated hunters. In Nevada, hunters tend to be more educated compared to U.S. hunters. This may also allow game managers to divert hunting demand into outdoor recreations that can also create local business and while maintaining a reserve pool of hunters.

An issue that should be central to Nevada is revenue. Nevada has few renewable natural resources. In other states livestock production, grain production and forestry provide sizeable revenues for the state’s government and residents. Nevada, due to the harsh terrain and dry climate, has few renewable industries. If Nevada wants to provide more business opportunities in rural areas, hunting may be a good place to start. Nevada hunters tend to hunt more often out of state than out of state hunters hunt in Nevada. Most hunters prefer to hunt in areas they are familiar with which should result in hunters preferring to hunt in Nevada. One of the reasons for this deficit is the limited game populations in the state. If more hunting opportunities could be created through increasing wildlife populations or altering regulations on hunting, local supporting industries such as hotels would experience an increase in business.

Local businesses can also use the more accurate understanding of hunters presented in this thesis to promote their services. Many local businesses are experts neither in wildlife management nor in sociology, but given this information on what
motivates hunters in Nevada, they can make their marketing more effective. For example, a guide service may advertise pictures of trophy animals that were harvested due to the skill of the guide. But, a more effective advertisement might be the same trophy animal with a group of hunters socializing in the foreground and a rugged mountain range in the background. With a basic understanding of hunters, a business owner can improve the way they market their service with little or no additional cost.

**Future research**

We have seen that hunting is part of a generalized outdoor recreational life style, but regression analysis is needed to evaluate the separate impact of different social forces such as education and income on hunting. Chapter 1 shows a number of social differences, but regression analysis is needed to assess their independent contributions. Future analysis will determine what factors influence hunters to choose consumptive outdoor recreations versus non-consumptive recreation. Several of the independent variables of interest include demographic variables such as age, income and education as well as variables such as the presence of children of hunting age, length of residency in Nevada, marital status and metropolitan versus non-metropolitan residency. This analysis will indicate which factors are most influential in determining type of recreation. A similar analysis will be performed using the Nevada Big Game Hunting Survey to determine the factors that influence hunters to hunt.

It is not certain why hunters are leaving the state to hunt. It has been proposed in this research that the cause is limited hunting opportunities, but a number of other factors may be influencing the decision. For instance, because the state has experienced a rapid
increase in population through individuals moving from other states, it may be that
hunters enjoy traveling to familiar locations to hunt where they lived previously. They
could also hunt out of state because they gather with family that lives out of state, around
holidays such as Thanksgiving. Future research should identify the specific motivations
for hunting out of state more often than instate.

It has also been proposed in this research that altering hunting regulations in the
state to accommodate hunting in groups would increase revenue and hunting
participation. This theory has not been tested, but if correct, this new hunting system
could improve hunter satisfaction in the state greatly. Also, Nevada’s game managers are
unlikely to implement a new hunting structure without research that indicates hunters
support this system and that this system would increase hunting opportunities, hunt
quality or revenue from hunting.

The application of the new hunting paradigm in advertising could increase the
attractiveness of hunting in Nevada but the extent of this benefit is unknown. Previous
research has indicated that hunters find social and environmental factors to be a greater
motivating factor than harvest factors (Decker et al. 2004). Through personal experience,
the majority of marketing continues to focus on harvest motivations. Future research
needs to indicate how great an influence marketing these other factors can have on
attracting hunters.

The factors that motivate hunters to hunt are becoming clearer but the beliefs that
separate these groups are not clear. Previous research indicates that family support for
hunting increases the odds that individuals initiate hunting (Decker et al. 1984). Rural
residence influences young men to hunt (Stedman and Heberlein 2001). However,
hunters are not so easily categorized on whether they hunt to consume meat, experience the outdoors or to engage in physical activity. It is not that these factors do not influence hunters to hunt; rather these are motivating factors for most outdoor recreationists. Is it the case that an individual enjoys outdoor recreation and the family supports hunting or is there a more direct influence on hunters?

**Indications for Hunting in Nevada**

Due to the current populations of game species and humans in Nevada it appears that hunting will maintain high demand in the near future. In addition, because hunters are recreational generalists, the lack of consistent hunting opportunities in the state do not appear to be a major concern in the near future. However, given the nature of Nevada’s development since its time as a territory to this point in time, change should be expected. It is incumbent on social scientists and game managers to monitor trends in hunting and apply current understandings of hunters to hunting regulations. With all parties working together hunting in Nevada will continue to be known for the quality of hunting and hunters’ satisfaction will remain high.
References


Appendix

Figure 1. U.S. Hunters by Population Size

Figure 2. Nevada Hunters by Population Size
Figure 3. Distribution of Hunters by Region and Hunt Type

![Distribution of Hunters by Region and Hunt Type](image)

Number of Hunters by Geographic Region (Department of the Interior 2006 tbl 10) in thousands.

Figure 4. U.S. Census Regions (Department of the Interior 2006)

![U.S. Census Regions](image)
Figure 5. U.S. Hunters by Age and Hunt Type

![U.S. Hunters by Age and Hunt Type](image)

- **Legend:**
  - #us population
  - #total all hunting
  - #big game
  - #small game
  - #migratory bird
  - #other

Figure 6. Nevada Hunters by Age

![Nevada Hunters by Age](image)

- **Legend:**
  - All Nevadans
  - Nevada Hunters
Figure 7. U.S. Hunters by Sex and Hunt Type

U.S. Hunters by Sex and Hunt Type

Male Versus Female Hunters by Game Type
(Department of the Interior 2006 tbl 10)

Number of Hunters (Numbers in 1,000s)

sex male
sex female

Figure 8. Nevada Hunters by Sex

Nevada Hunters by Sex

Male Versus Female Hunters (U.S. Department of the Interior 2006b)
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![U.S. Hunters by Ethnicity and Hunt Type](chart1.png)

(Figure 9. U.S. Hunters by Ethnicity and Hunt Type)

Figure 10. Nevada Hunters by Ethnicity

![Nevada Hunters by Ethnicity](chart2.png)

(Figure 10. Nevada Hunters by Ethnicity)
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Figure 12. Nevada Hunters by Race
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![U.S. Hunters by Income and Hunt Type graph]

Figure 14. Nevada Hunters by Income

![Nevada Hunters by Income graph]
Figure 15. U.S. Hunters by Education and Hunt Type

U.S. Hunters by Education and Hunt Type

Individuals by Education

(Department of the Interior 2006 tbl 10)

Figure 16. Nevada Hunters by Education

Nevada Hunters by Education

Individuals by Education

(Department of the Interior 2006b)
Figure 17. U.S. Hunting Participation Trends (Department of the Interior 2006 tbl c2, c5)

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![Bar chart showing Instate Versus Out of State Hunting in Nevada from 1991 to 2006.](image)

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![Chart showing U.S. Hunting Participation by Hunters, Trips and Days Hunting 2006]

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![Chart showing U.S. Hunting Participation by Hunters, Trips and Days Hunting 2001]
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Figure 23. U.S. Hunting Participation by Hunters, Trips and Days Hunting 1991
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Figure 26. Big Game by Hunters and Days Hunting in the U.S. 1996

![Graph of Big Game by Hunters and Days Hunting in the U.S. 1996](image)

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![Graph of Big Game by Hunters and Days Hunting in the U.S. 1991](image)
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Figure 29. Small Game by Hunters and Days Hunting in the U.S. 2001
Figure 30. Small Game by Hunters and Days Hunting in the U.S. 1996

Small Game by Hunters and Days Hunting in the U.S. 1996

Hunters by Type of Game (Department of the Interior 1996 tbl 7)

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Small Game by Hunters and Days Hunting in the U.S. 1991

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![Graph showing migratory game by hunters and days hunting in the U.S. 2006.]

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![Graph showing migratory game by hunters and days hunting in the U.S. 2001.]

Figure 34. Migratory Game by Hunters and Days Hunting in the U.S. 1996

Figure 35. Migratory Game by Hunters and Days Hunting in the U.S. 1991
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![Hunting by Game Type in Nevada](image)

Hunters by Type of Game (Department of the Interior 2006, 2001 tbl 56 1996 52 1991 61) migratory and other sample size too small to report

Figure 37. Big Game Expenditures in the U.S. 2006

![Big Game Expenditures in the U.S. 2006](image)

Hunting Expenses (Department of the Interior 2006 table 18) special equi($3045663) not included
Figure 38. Big Game Expenditures in the U.S. 2001

Big Game Expenditures in the U.S. 2001

Figure 39. Big Game Expenditures in the U.S. 1996

Big Game Expenditures in the U.S. 1996
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Figure 46. Migratory Game Expenditures in the U.S. 2001

Migratory Game Expenditures in the U.S. 2001

Figure 47. Migratory Game Expenditures in the U.S. 1996

Migratory Game Expenditures in the U.S. 1996
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Migratory Game Expenditures in the U.S. 1991

Figure 49. Instate Versus Out of State Expenditures in Nevada 2006

Instate Versus Out of State Expenditures in Nevada 2006
Figure 50. Instate Versus Out of State Expenditures in Nevada 2001

Figure 51. Instate Versus Out of State Expenditures in Nevada 1996
Figure 52. Instate Versus Out of State Expenditures in Nevada 1991

![Instate Versus Out of State Expenditures in Nevada 1991](image)

Figure 53. Equipment Expenditure Trends in Nevada

![Equipment Expenditure Trends in Nevada](image)
Figure 54. Trip Expenditure Trends in Nevada

Table 1. Participation in and Intensity of Outdoor Recreation among Nevadans. Question wording: “Please check the boxes that best indicate your use of Nevada rangelands for the listed activities in the last 12 months...”

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Figure 55. Mean Number of Outdoor Recreation Trips by Activity

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Figure 56. Mean Number of Activities per Year per Outdoor Recreationist

Average Number of Activities per Individual per Year (Nevada Rangeland Vegetation Survey 2005)
Table 2. Inter Item Correlations of Outdoor Recreations and Criterion Variables

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Figure 57. Inter Item Correlations of Outdoor Recreations

Figure 58. Factor Loadings for Factor One
Figure 59. DEM (Digital Elevation Model) of Nevada
Figure 60. Nevada Average Annual Precipitation
Figure 61. Age Comparison of all U.S. Citizens to all U.S. Hunters
Figure 62. Location of Nevada Hunters’ Residences and Hunter Density

Legend
- **Greatest Number of Tags per acre**
- Geocoded Location of Tag Applicants
- Tract Boundary
Figure 63. Nevada Hunters by Census Tract
Figure 64. Nevada Residents Median Income by Census Tract
Figure 65. Nevada Demographics by Census Tract
Figure 66. Road Density by Hunt Unit in Nevada
Figure 67. Mule Deer Population by Hunt Units
Figure 68. Mule Deer Habitat in Nevada
Figure 69. Harvest Results and Draw Odds in Nevada by Hunt Unit