

COMPLEX FEEDBACKS AMONG HUMAN AND NATURAL SYSTEMS AND  
PHEASANT HUNTING IN SOUTH DAKOTA, USA

by

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B.S., South Dakota State University, 2000  
M.S., South Dakota State University, 2003

AN ABSTRACT OF A DISSERTATION

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Department of Geography  
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## Abstract

Land-change science has become a foundational element of global environmental change. Understanding how complex coupled human and natural systems (CHANS) affect land change is part of understanding our planet and also helps us determine how to mitigate current and future problems. Upland birds such as the Ring-Necked Pheasant (*Phasianus colchicus*) have been widely studied. While myriad studies have been done that show relationships between land change driving forces and the pheasant, what are not found are long-term, comprehensive approaches that show the historical importance of how past land change drivers can be used to gain knowledge about what is happening today or what may happen in the future.

This research set out to better understand how human and natural driving forces have affected land change, pheasants, and pheasant hunting in South Dakota from the early 1900s to the present. A qualitative historical geography approach was used to assemble information from historic literature and South Dakota Game, Fish, and Parks Department annual reports to show the linkages between human and natural systems and how they affect pheasant populations. A quantitative approach was used to gather information from hunters who participated in the 2006 pheasant hunting season. Two-thousand surveys were mailed that gathered socioeconomic data, information on types of land hunted, thoughts on land accessibility issues, as well as spatial information on where hunters hunted in South Dakota.

Results from the hunter surveys provided some significant information. Non-resident and resident hunters tended to hunt in different parts of the state. Non-resident hunters were older, better educated, and had higher incomes than resident hunters.

Resident hunters, when asked about issues such as crowded public hunting grounds and accessibility to private lands had more negative responses, whereas non-resident hunters, especially those who hunt on privately-held lands, were more satisfied with their hunting experiences. Linkages were also seen between changes in human and natural systems and pheasant populations. Some of the most important contributors to population changes were large-scale conservation policies (Conservation Reserve Program) and agricultural incentives, as well as broader economic issues such as global energy production and national demands for increases in biofuel production (ethanol and biodiesel). Many of the changes in pheasant populations caused by changes in human systems have been exacerbated by changes in natural systems, such as severe winter weather and less-than-optimal springtime breeding conditions.

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Dr. Lisa M.B. Harrington

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## Dedication



*To Mom and Dad – for never pushing me too hard, nor holding me back from my dreams.  
I'll be forever grateful for everything you've given me and allowed me to do.*

## Preface

I am lucky enough to have found a discipline and a lifestyle that allows me to be inquisitive about the things in life I enjoy – the rural outdoors, my family’s history and my upbringing, and recreational activities such as pheasant hunting. Geography is a discipline that helps us to understand the world around us – both individually and how we fit into a larger community. I have often told my students “everything happens somewhere, thus most everything can be studied geographically” (and for those of you who have ever attended a national convention of the Association of American Geographers, you know that the word *everything* may be a conservative term to use). It was this basic idea that helped me come up with the idea for this research.

I have enjoyed pheasant hunting since the mid-1990s but was never serious about it until I decided to attend South Dakota State University, along with a lifelong friend from my hometown of Odin, Minnesota, Jeremy Berg. Folks in South Dakota are serious about pheasant hunting...all hunting. The dormitories at SDSU have game cleaning rooms in their basements, fully equipped with stainless steel tables to process the day’s quarry and freezers to store the meat after the game has been cleaned. It was during my time at SDSU that I was able to simultaneously become both a geographer and an outdoorsman; one more interested in the *quality* of the experience of hunting rather than the *quantity* of game I harvested. It was this timely combination of appreciating the natural landscape and things on it, and learning to appreciate and understand the processes that linked the people to the land and its resources, that led me to choose this topic for my dissertation research.

Since then, I have continued to be an avid outdoorsman and geographer, hunting and fishing whenever given the opportunity as well as working on research and presenting my work at numerous regional, national, and international locales. During my years in college I have been able to take family fishing trips to Canada, hunt pheasants on arguably some of the best pheasant hunting land in the world, fish in the Netherlands, and hunt pheasants, woodcock, and snipe in Ireland, all the while learning about these places and the people I have enjoyed these times with and the processes that make these people and places who and what they are.

Though this dissertation marks the end of my time as a student at K-State, I do not think of it as a culmination or an ending. My interests in how people and the land interact with one another will continue throughout my career as a geographer, and my research will always comprise topics that are of importance to me both professionally and personally. That is one of the wonderful things about our discipline – we can study what we love. Geography has given me many gifts in my life, and I hope that the work I accomplish in the future will help others to better understand their own wonderful and intriguing world that surrounds them.

## CHAPTER 1 - Introduction

### Setting the Stage

The proportion of Americans who actively participated in hunting declined 7 percent from 1960 to 2005 (U.S. Fish and Wildlife Service 2008a, b, c, d) (Figure 1.1). A number of factors have contributed to the national decline in hunting participation, the most noticeable being the loss of both public and private hunting lands and increases in the cost of hunting (both in license fees and equipment) (U.S. Fish and Wildlife Service 2008a, b, c, d). Some have argued that the increase in the number of single-parent families, as hunting has been a family-oriented tradition passed down to children by their parents and grandparents, has caused a decline in children being introduced to the sport (Eby and Kenyon 2008). However, other research suggests that children of single parents, whether that parent is a mother or father, hunt no more or no less than children with both a mother and father (Responsive Management 2003).

Even with the overall decline in hunting-related activities, participation in other outdoor-related activities, such as fishing and bird watching, has increased (U.S. Fish and Wildlife Service 2008d). Access to water and local, state, and national parks have remained relatively consistent from 1960 to 2005. During the same period of time, the number of pheasant hunters in South Dakota increased by over 34 percent (South Dakota Game, Fish, and Parks 2008b). Even during the fall of 2001, just one month after September 11, the number of out-of-state hunters who traveled to South Dakota increased from the previous year (Woster 2001a). Many changed their travel plans from flying to driving, but still made their October pilgrimage (Figure 1.2).

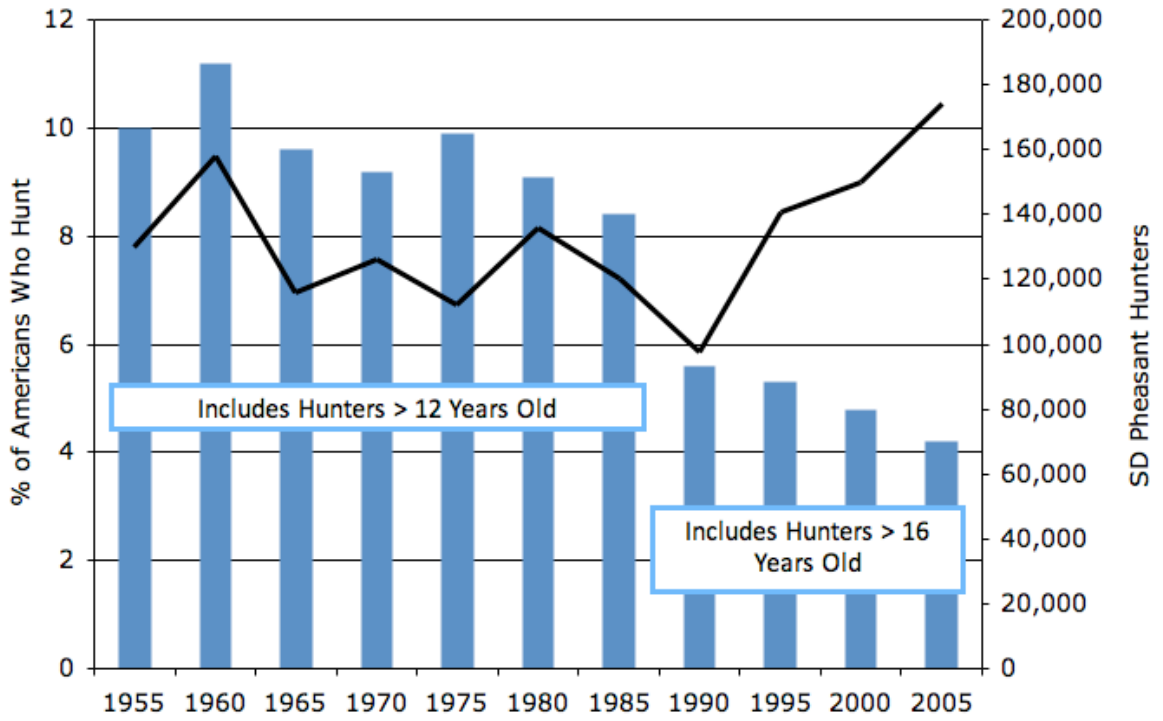


Figure 1.1. Decrease in American hunters and increase in South Dakota Pheasant Hunters, 1955 to 2005. Sources: South Dakota Game, Fish, and Parks 2008b; U.S Fish and Wildlife Service 2008a, b, c, d.



Figure 1.2. Out-of-state pheasant hunters arriving at the Sioux Falls Regional Airport on opening weekend of pheasant season. Photo used with permission of the Sioux Falls *Argus Leader*.

In 2002, for the first time since 1919, non-resident hunters outnumbered residents (Figure 1.3), and this gap continues to widen each year. In 2007, 103,231 non-South Dakotans (13 percent of the total state population) came to the state to hunt pheasants. Pheasant hunting is to South Dakota what golfing is to Scotland, with companies offering all-inclusive hunting trips to workers and clients (Shouse 2003). Business deals are struck in a field of switchgrass by men dressed in blaze orange as frequently as they are on a tee box (Merry 2003). South Dakota, along with surrounding states such as North Dakota and Minnesota, has reaped the economic benefits of its large pheasant population

(Bangsund, Hodur, and Leistritz 2004). Each year, the growing number of non-resident hunters contributes nearly \$219 million to the state’s economy (South Dakota Game, Fish, and Parks 2008a).<sup>1</sup>

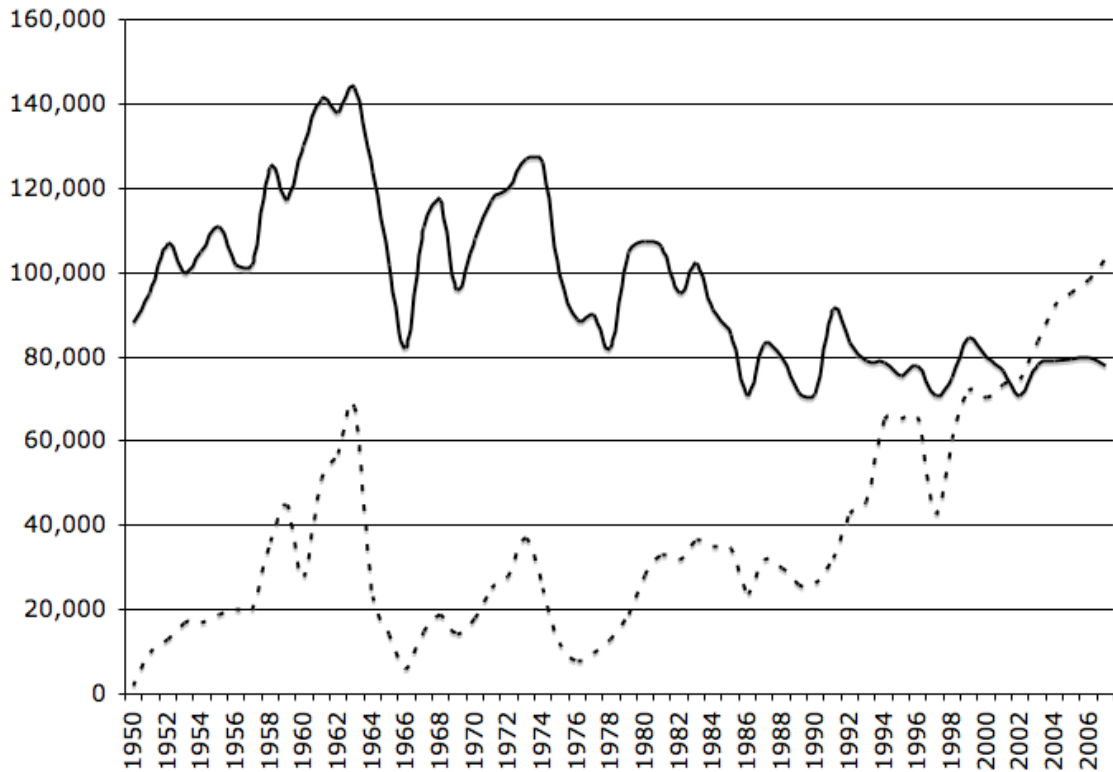


Figure 1.3. Residents (solid line) were overtaken by non-resident hunters (dashed line) in 2002 for the first time in the history of South Dakota pheasant hunting. Source: South Dakota Game, Fish, and Parks 2008b.

### The Pheasant in North America

The ring-necked pheasant (*Phasianus colchicus*) was first successfully introduced into the U.S. in the Willamette Valley of Oregon in 1881. It took hold in South Dakota in 1908 when three pairs brought from Oregon were released near Redfield, South Dakota,

<sup>1</sup> The gap between non-resident and resident hunters becomes even more impressive when one takes into account that non-residents can only hunt during two five-day periods during an eighty-day season (unless they are hunting on “preserves,” which are discussed later in the paper), whereas residents can hunt eighty days plus three days during an early resident-only season.



the self-proclaimed “Pheasant Capital of the World”. Today, pheasants can be found from California to Maine and from Texas to southern Canada. In 2007, South Dakota led the way in estimated harvested birds with over 2 million, a suitable proxy for bird abundance. Rounding out the top six states were North Dakota (907,000), Kansas (887,000), Minnesota (655,000), Iowa (632,000), and Nebraska (437,000) (Pheasants Forever 2008).

Thousands of hotels, motels, rented houses, and spare bedrooms are booked solid each year in anticipation of the opening weekend of pheasant hunting in some of the larger cities and towns of eastern South Dakota, especially in areas frequented by both resident and non-resident pheasant hunters (Figure 1.4). The differing patterns of where resident and non-resident hunters hunt is mostly a reflection of South Dakota’s population distribution. Many of South Dakota’s 781,000 residents do not stray far from home and hunt along the Interstate 29 corridor. While non-residents also hunt these areas, most frequent the east-central towns of Chamberlain, Pierre, Aberdeen, Redfield, Presho, and others. Pierre and Aberdeen have airports that service larger hubs such as Minneapolis and also have adequate hotel space and restaurants to serve the needs of the non-residents. Additionally, these areas are also home to many of the privately run pheasant hunting lodges that are used mostly by the non-resident hunters.

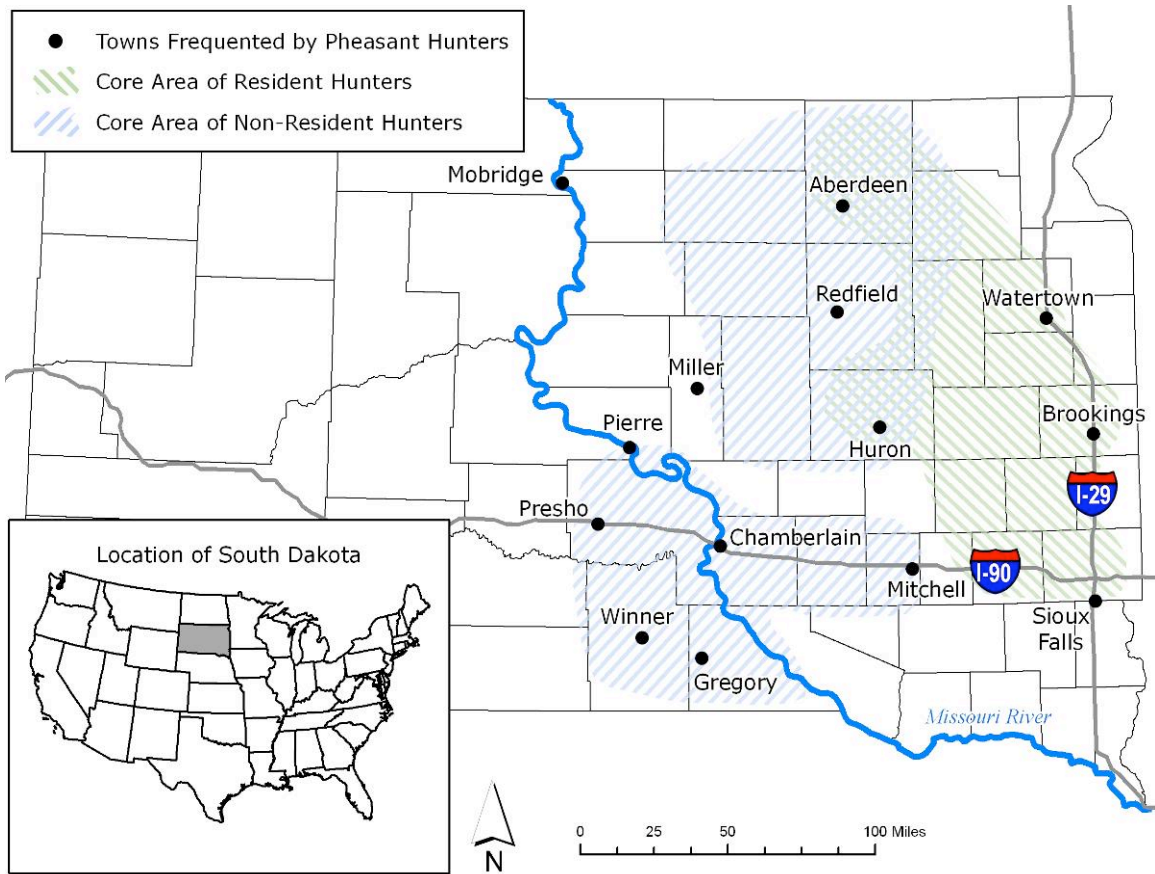


Figure 1.4. The difference of which South Dakota towns and areas were frequented by resident (green) and non-resident (blue) pheasant hunters during the 2006 season. Data based on survey responses which are discussed in Chapter 4. Map by Author.

Many of these towns have erected shrines to celebrate this coveted bird. The “world’s largest pheasant” (Figure 1.5) can be found perched atop the Dakota Inn Hotel in Huron, South Dakota. The world’s second largest pheasant (Figure 1.6) is found in the town of Gregory which at the beginning of the current pheasant boom in 1992, Fortune Magazine declared “The Ground Zero of Pheasantdom” (Farnham 1992).



Figure 1.5. Statue of pheasant in Huron. Photo by author.



Figure 1.6. A somewhat smaller, yet more animated pheasant statue in Gregory, South Dakota. Photo by author.

References to pheasants abound in South Dakota: giant birds on hotels, billboards along highways, advertisements in outdoor magazines, and even school mascots like the

fighting pheasant of Parker High (Figure 1.7). One image, however, epitomizes the importance of the pheasant to South Dakota more than any other. When residents were asked to vote among five designs for South Dakota's commemorative quarter, the one chosen not only portrayed Mt. Rushmore, an American icon, but also an Asian native - the ring-necked pheasant (Figure 1.8).



Figure 1.7. Parker High School mascot, the *Fighting Pheasant*. Source: Parker High School, <http://mb124.k12.sd.us/>



Figure 1.8. The 2006 State Quarter of South Dakota. Source: U.S. Mint, <http://www.usmint.gov>.

This dissertation reports on an investigation of pheasant hunting in South Dakota. Along with examining the hunting activity and its significance, the research delved into what has changed and what will change land use and land cover related to pheasant abundance. Land cover affects pheasant abundance, which in turn affects pheasant hunters, and in turn affects various socioeconomic issues and opinions about what pheasant hunting means to the state of South Dakota. Reporting on the situation and findings will be done using examples that illustrate concepts and ideas related to complex feedbacks of coupled human and natural systems; or, said another way, how changes in things such as weather, for example, positively or negatively interact with a change in agricultural policy that tempted farmers to take land out of conservation programs and put that same land back into agricultural production. How would all of that affect the pheasant population?

Land-change science has become a foundational element of global environmental change. Understanding how complex coupled human and natural systems (CHANS) affect land change is part of understanding our planet and also helps us determine how to mitigate current and future problems. Upland birds such as the ring-necked pheasant (*Phasianus colchicus*) have been widely studied. While myriad studies have been done that show relationships between land change driving forces and the pheasant, what are not found are long-term, comprehensive approaches that show the historical importance of how past land change drivers can be used to gain knowledge about what is happening today or what may happen in the future.

## **Purpose**

This research has been undertaken with the aim of increasing understanding of hunting-related interactions between human and natural systems by analyzing patterns, changes, and relationships--both spatially and temporally--of weather, land use/land cover, and the people involved in making land use/land cover decisions, along with those involved in hunting. Natural systems considerations include climate, pheasant biology, land cover, and agricultural regimes; human factors include land use, agricultural and land use policy, attitudes, and experiences. It is extremely difficult to model or gauge the impact of hunting land cover by simply looking at cover alone, but by comparing and contrasting data from both human and natural systems, patterns will appear, drivers will be found, and correlations will be made that indicate how the systems have interacted through time to change the influences that pheasant hunting has had on the State of South Dakota.

## **Research Questions**

Several research questions were developed in order to address change in pheasants, habitat, and land use in South Dakota. These question address not only tracking change, but also the linkages found in the relevant coupled systems:

- How have changes in coupled human and natural systems affected pheasants and the pheasant hunting community in South Dakota over the past century?
- How have more current changes in coupled human and natural systems affected pheasants and the pheasant hunting community in South Dakota in recent years?

- What changes are currently happening that could cause a dramatic shift in the way lands are managed with respect to pheasants, and how will that, in turn, affect hunters and those who rely on hunters for their livelihoods?
- What impact has land privatization and decreased land accessibility had on pheasant hunting?

This research can be considered under the broad umbrella of a coupled human and natural systems perspective, using a regional geography framework. Although regional geography receives less attention than at its height in the mid-1900s, in order to understand many of the complex processes involved in making a significant spatial area - in this case eastern South Dakota - different from adjacent regions. While it is realized that this research cannot definitively give an answer (or set of answers) that will answer all of the posed questions, it does give an example of a portfolio approach (Young et al. 2006) that uses multiple techniques and models to better understand issues related to coupled human and natural systems.

### **Study Area**

Regional (multi-state), state, and local scale examples will be used to describe the issues of this research. Although areas defined based on ecological or environmental boundaries (e.g., ecoregions or watersheds) generally are preferable for the study of natural systems, this is not always practical. This applies particularly to coupled human and natural systems. Due to the variations in management decisions as they relate to political policy and policy implementation, and data collection characteristics, political units have been used as the logical choice for most descriptions in this research.

The vast majority of this work is based in South Dakota. Nationally, the ring-necked pheasant is found from California to Maine, and from Texas to Minnesota; the various land covers and land uses of areas where pheasants are found are described in Chapter 3. Regionally, a portion of this study will focus on the Midwestern and Plains states of North and South Dakota, Nebraska, Kansas, Minnesota, and Iowa – the core of today’s U.S. pheasant habitat. Finally, most local-scale results will be based on information specific to eastern South Dakota (east of the Missouri River). Local-scale information also is used for multiple states in the explanation of today’s modern pheasant range.

### **Significance of Study**

This study adds new knowledge to the geographic literature by investigating a coupled human and natural system that has not yet been explored. While the research did not invent some new, sophisticated land change science or pheasant population model, it does bring together disparate knowledge from multiple disciplines, and using multiple data sources and methods, to help better explain the complex relationships between people and the environment, and how changes in those relationships impact an individual species, and those who most actively utilize and benefit from that species (pheasant hunters, farmers, and hunt facilitators).

As will be seen in Chapter 2, state, federal, and university biologists have done a masterful job of showing very specific (both spatially and temporally) examples of how coupled human and natural systems affect pheasants (Martinson and Grondahl 1966; Eggebo et al. 2003). What is missing from the literature, and what this research was meant to accomplish, is to show those variations at a larger temporal and spatial scale,



synthesizing disparate data into one story, and to compare and contrast the various driving forces, changes, and consequences that are involved.

In a paper written by Cutter, Golledge, and Graf (2002, 306), these three geographers identified “The Big Questions in Geography” with the hopes of “stimulating research that addressed these questions of importance to modern society.” None of these questions had simple answers, much like this research. However, two of their “big” questions fit the themes of this research: 1) What makes places and landscapes different from one another, and why is this important? and 2) How has the earth been transformed by human action? It is the goal of this research to not only answer the formal research questions discussed later, but to also add new knowledge to help everyone better understand this small yet complicated issue that affects both thousands of people and wide expanses of rural landscapes.

## **Methods**

This research is based on a portfolio approach (Young et al. 2006). One of the main goals was to demonstrate how complex coupled human and natural systems have shaped South Dakota’s pheasant hunting scene over the past few decades. In order to gain a better understanding of this, various tools from the portfolio toolkit were used: historical accounts, narratives, literature from a wide range of scientific disciplines, and visits and conversations with local, state, and federal wildlife officials were all used to piece together the history of how human and natural systems have affected pheasants and the pheasant hunting community. Much of this information served as the basis for the qualitative portion of this research.

Quantitative information was also obtained and analyzed. This involved mailing a two-page, 25-question survey to 1,000 residents of South Dakota and 1,000 non-residents. The goal of the survey was to allow the creation of a dataset that would show demographic information pertaining to the hunters, when and where they hunted, how they went about finding quality public and private hunting lands, the costs associated with land accessibility, information about the types and quality of the lands they hunted on, and their experiences hunting pheasants in South Dakota during 2006. Responses to the survey will not yield definitive answers but instead give an overview and tendencies with regard to the experiences and perceptions that the respondents reported for the 2006 South Dakota pheasant hunting season.

Land change science research can be complex because there are not many proven ways in which to associate and aggregate the various types of data used (satellite land cover data, surveys, interviews, literature reviews, and other types of qualitative and quantitative data) using one type of method (i.e., a regression model) to yield a set of answers. What is more common and accepted, however, is using a portfolio approach (Young et al. 2006). The goal of this research, along the lines of a true portfolio approach, is to develop a tool kit that is comprised of case studies, narratives, system analyses, interviews, and surveys for understanding the complex human-environment interactions that are in place with respect to South Dakota pheasant hunting and the land change associated with it. When the results of two or more techniques converge, confidence in the findings arises (Young et al. 2006). When contradictory results are found, more analysis is needed.

The structure of this dissertation is as follows: an introductory chapter that outlines the issues surrounding pheasants, pheasant hunting in South Dakota, and ideas of coupled human and natural systems. Chapter 2 includes review of land change science, hunting, rural geography, and human and natural systems literature. Chapters 3, 4, 5, and 6 will follow a progression of information, data, and analysis from the pheasant itself (Chapter 3) to the people who hunt them (Chapter 4), the land on which pheasant hunting is pursued (Chapter 5), and finally what the future may hold for the pheasant, the hunter, and the land (Chapter 6).

## **CHAPTER 2 - Literature Review**

On the surface it would appear that this dissertation deals simply with pheasant hunting in the western Corn Belt (Hart 1986), specifically in the state of South Dakota, and to a lesser extent, the neighboring states of Minnesota, Iowa, Nebraska, North Dakota, and--a little further afield--Kansas. While pheasants are the topic of interest, what this research really deals with are myriad topics under the umbrella of land change science (Moran 2003) (Figure 2.1). Very little literature, with the exception of specific research topics dealing mostly with biological issues (whether from geography or other disciplines), has been written on the relationship between land change science and upland birds. Currently, as far as this author knows, there is only one other geographer doing work with regard to game birds, hunting, and the land use/land cover changes involved. That work (Scallan 2008) deals little with land change science issues, but is more broadly focused on the economic and conservation impacts of game shooting in the Republic of Ireland.

### **Land Change Science**

There are a growing number of researchers who are trying to better understand the relationships between human and natural systems. This new field of study has been named land change science (Rindfuss et al. 2004). Understanding coupled human and natural systems requires the linking of land cover and land use, and an understanding of the human and natural driving forces that link them (Moran 2003). Land use occurs in local places, with real-world social and economic benefits, while potentially causing

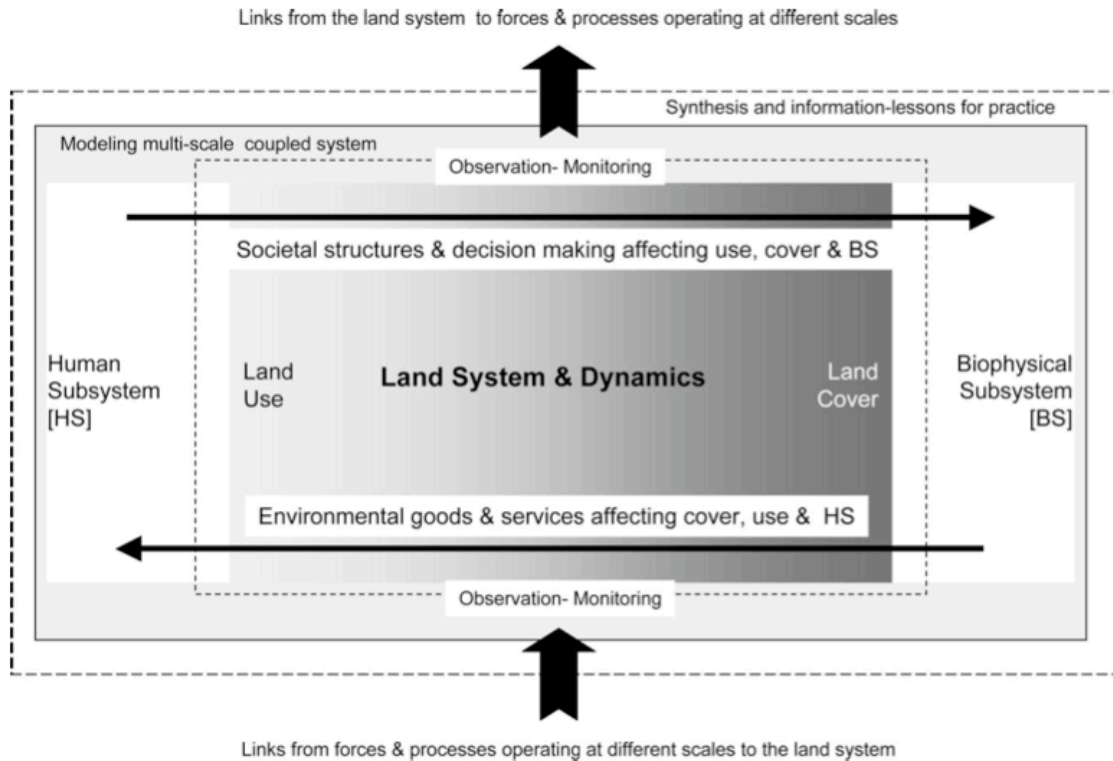


Figure 2.1. Model of Land Systems and Dynamics. Source: Figure 1 from Turner, Lambin, and Reenberg (2007).

ecological degradation across local, regional, and global scales (Turner and Meyer 1991; Foley et al. 2005). It is difficult to predict how socioeconomic factors affecting land use practices will be affected by the joint impact of land management decisions and environmental change (Ojima, Galvin, and Turner 1994). There is a need for multidisciplinary research, using both qualitative and quantitative methods, to improve our understanding of how human and natural systems affect one another.

The pace, magnitude, and spatial reach of human alterations of the Earth's land surface are unprecedented (Lambin et al. 2001). Changes in land cover and land use are among the most important to understand. Research that looks at both the actual land use and land cover changes, along with the driving forces that cause the change, are

becoming more common. Loveland et al. (2003) is using remotely sensed imagery to quantify the rates and trends of land use and land cover change in [give location] over the past thirty years. Qualitative data obtained from field visits, as well as socioeconomic data from population and agricultural censuses, help to develop driving force signatures that contribute to explanations of changes seen in imagery analyses. This coupling of quantitative and qualitative data is crucial to understanding the complete land use and land cover change story.

The interplay between the physical and human dimensions of hunting is not well studied. Some work has been done that considers only the socioeconomic components that are crucial to hunting in various regions around the world. Most of the recent research has been done on big-game animals (Zhang, Hussain, and Armstrong 2004). In Canada, province-wide surveys were administered and found that when hunting by tourists has a positive influence on the economy of a locale, residents see it as a positive endeavor and welcome it into their community (MacKay and Campbell 2004). In England, pheasant hunting is often regarded as a poetic pastime (Barnes 2001) or right-of-passage for a young boy into adulthood, as well as a family tradition that has been observed over many generations (Vincent 2006). Studies done in 'exotic' places like Africa have dealt with big game hunting and the lengths that people will take to obtain a prized trophy (Watson and El Fadl 2000). Money is no object and hunters are often willing to pay for guided hunts that take place on privately owned land (Frey et al. 2003a).

Many states have done studies that look at hunter satisfaction with publicly managed hunting (Adams et al. 1989; Butler et al. 2005). While the results provided by

these studies are important in understanding how hunting-related activities impact countries, states, or local communities, they lack insight into how land cover and land use are affected.

Recently, studies have begun to integrate changes in the physical environment (land cover change) and their socioeconomic driving forces. In a study by Bangsund, Hodur, and Leistriz (2004), increased Conservation Reserve Program (CRP) acres in North Dakota have been linked with positive agricultural and recreational economic benefits. An increase in CRP acres helped to increase the number of waterfowl, pheasants, and deer, thereby increasing the number of people coming to North Dakota to recreate. Farmers have also seen this economic benefit, not only from the government payments from their CRP enrollment, but also from the increased revenue they get from charging hunters to hunt on their CRP lands (Leistriz, Hodur, and Bangsund 2002).

The region's world-class upland game bird hunting has become a key draw for visitors from across the country (Hodur, Leistriz, and Wolfe 2006). Land cover changes, including taking cropland out of production and replacing it with grassland, has provided the habitat necessary for supporting bird populations (Eggebo et al. 2003). What is not well understood is which lands are being utilized for hunting, the amount of revenue taken in from allowing hunters to use those lands, and how local communities and their businesses are affected by the increased number of hunters coming to the region for recreation.

While little attention has been given to coupled human and natural systems with regard to pheasants and pheasant hunting, there have been studies about habitat requirements, pheasant biology and how birds relate to changes in land cover, and more

specific case studies looking at the impact of land change on pheasants and other wildlife. These studies will be highlighted in subsequent sections, as their examples are needed to highlight some of the fundamental arguments that this research makes.

## **General Hunting Research**

Much has been written about tourism hunting in the United States, as well as in other countries around the world, from England to Canada to Botswana (Butler 1998; Barnes 2001; Watson and El Fadl 2000; MacKay and Campbell 2004). In Canada, province-wide surveys were administered and found that when “tourist hunting” has a positive influence on the economy of a locale, residents see it as a positive endeavor and welcome it into their community (MacKay and Campbell 2004). In England, pheasant hunting is often looked at as a poetic pastime. To quote Barnes (2001), “There are quarry of such excellent nature, so keen in their dodges, so perfect in their cunning, so skillful of evasion...” Comparisons can also be made to sources found in the literature pertaining to pheasant hunting as a pastime, or right-of-passage for a young boy into adulthood, as well as a family tradition that has been observed over many generations (Vincent 2006). In this research it will also be important to understand the demographic trends of “who” is coming to South Dakota to hunt. Studies have been done in other states that have shown trends that are increasingly finding more women and younger children taking to the fields each fall in search of the wily pheasant (Zinn 2003; Pheasantcounty.com 2006.).

There have also been many similar studies that deal with big game hunting and the lengths that people will to go in order to obtain their prized mount (Watson and El Fadl 2000). Results from studies done on big game hunting in Botswana show social and economic trends similar to those of pheasant hunting in South Dakota and with other



parts of the U.S. People are willing to travel great distances for the hunt of a lifetime. Money is no object and they are often willing to pay for guided hunts that take place on privately owned land (Frey et al. 2003a). Many states, including Oregon, have done studies that look at hunter satisfaction of people who use publicly managed hunting lands (Adams et al. 1989; Butler et al. 2005), as well as another issue that will get a main focus of this paper, people's willingness to pay for hunting lands. Most of the recent research has been done on big-game animals (Zhang, Hussain, and Armstrong 2004). What they have found is that hunters are becoming more willing to pay to hunt if certain criteria are met. Top on the list is the factor of exclusivity (Adams et al. 1989). Hunters want not only a quality hunt with large numbers of birds, they also want to be able to hunt alone, without the distraction of other hunters using the same pieces of land. This [in my opinion] is why pheasant farms are becoming more popular in South Dakota. Those who have the time and money to do so are more willing to pay to have exclusive hunts of high quality and quantity.

The hunting sector of Botswana's economy is extremely cost-beneficial, leading the country's government to maximize their contributions to help the sector in any way it can (Watson and El Fadl 2000) much in the same way that the Department of Game Fish and Parks and other state and federal agencies contribute to the betterment of hunting in South Dakota and other states in the U.S. (South Dakota Game, Fish, and Parks 2008a). Safari hunting in Africa and pheasant hunting in South Dakota are more similar than one might think. Some hunters consider their trip as a once in a lifetime experience, whether it is to Botswana to hunt a water buffalo, or to South Dakota to hunt pheasants.

A few ideas from the existing literature from the United States can be used to get an introduction to some of the issues associated with pheasant hunting. Most studies found dealt with the biological or ecological issues pertaining to pheasants. Predation is a common theme (Riley and Shultz 2001; Frey et al. 2003b). Also common is research involving studies done on nesting cover and breeding success (Patterson and Best 1996; Leif 2005; Murray and Best 2003). While these papers do not address the issues I would like to research, they do discuss some of the basic information regarding pheasant hunting that any research should include, namely the history of the pheasant and pheasant hunting.

Increased leisure time and affluence (Millward 1996) also factor into this study. Over the past four decades, the amount of leisure time has increased by four to eight hours per week for the average working American (Aguiar and Hurst 2006). Disposable income also increased (Bureau of Economic Analysis 2006), allowing more people to hunt how and where they want, not just in proximity to where they live or have easy access. This means that not only do hunters have more time to spend in the field, they also have had the increased ability to choose to frequent establishments such as pheasant farms, where their every need can be catered to, allowing them to have to think of nothing but hunting and relaxing.

## **Rural Geographies and Sustainability**

Another segment of this research deals with multiple aspects of rural geography and rural sociology. Rural land use issues are at the heart of this research, spanning the gambit from those related to corporate agriculture as well as those regarding non-agricultural rural activities such as small and large game hunting activities. These forms

of land use have the potential to have both positive and negative impacts on the landscape depending on which side out the issue one is one. These impacts may leave nearby communities and rural residents who need those resources for survival looking for new avenues and new ways for the members of their community to survive (Brown and Swanson 2003).

Cutter, Golledge, and Graf (2002) said that one of the ten *Big Questions in Geography* (the ninth, to be exact) is “how and why do sustainability and vulnerability change from place to place and over time?” Humans are altering the agricultural landscape of the world in many ways. Impacts on soil and water resources in the U.S. have been great. Soil drainage, fertilization, and erosion, along with stream modification, irrigation, and surface and groundwater pollution are some of the major indicators on today’s landscape of the influences that human have had on the land (Goudie 2000).

Sustainability issues related to rural geography have also come to the forefront of recent research. Croplands and pastures have become one of the largest terrestrial biomes on the planet, rivaling forest cover in extent and occupying roughly 40 percent of the land surface (Foley et al. 2005). Changing land-use practices and technological advancements have allowed world grain harvests to double in the past four decades, and an increasing amount of research has been completed on such issues as “Green Revolution” technologies (Bell 2004), chemical fertilizers and pesticides (Moody 1990), and soil and water conservation programs (Bangsund, Hodur, and Leistriz 2004; Leathers and Harrington 2000). Natural inputs of energy, water, and nutrients have been modified by human activities such as wood extraction, irrigation, forest or grassland conversion to cropland or pasture, fertilizer additions, and livestock management (Ojima, Galvin, and

Turner II 1994) and can affect key ecosystem properties such as community composition or water and energy fluxes.

The patterns of where agricultural activities can occur dictate where humans are impacting water and soil resources. Early conversions of eastern forests and grasslands to agricultural uses stimulated the release of carbon from soils to the atmosphere (Waisanen and Bliss 2002; Ojima, Galvin, and Turner II 1994). Subsequent abandonment of that cropland back to grass or forests may have enhanced the sequestration of carbon in the soil. Wetland drainage, cropping practices, and use of chemicals to both fight infestation and to help fertilize crops have also added and taken away from the soil's inherent properties, transforming it forever.

From settlement until 1910, farming was the “great engine” that drove American life (Hart 1991). Even as late as 1940, one in four Americans still lived on a farm. Early farms were diverse (Hart 1991; Brigham and McFarland 1916). Farmers were not producing thousands of bushels of crops for export or trade. They were simply trying to get by, and while doing so created a landscape mosaic in most of the Midwest that was conducive to creating large populations of ring-necked pheasants. Most farms had some form of livestock (sheep, cattle, hogs, chickens, goats) and most farms raised a variety of crops to feed both themselves and their livestock. Since World War II a new cash-grain cropping system of corn and soybeans has replaced the traditional three-year rotation of corn, small grains, and hay in the Corn Belt (Hart 1991). Settlement and transportation changes have helped farmers make this transition (Borchert 1967). As horses and wagons gave way to automobile transportation, it made it much easier and affordable for farmers to harvest greater quantities of fewer types of crops, thereby altering the once

complex landscape mosaic, forcing pheasants to rely upon lands specifically set-aside for wildlife, or facing the challenges of trying to survive on the dwindling amount of cover.

Being able to understand the various ways in which the rural parts of the U.S. have been used since humans first moved westward across the landscape paints a complex picture of failed land uses and alterations to cropping practices to get as much from the land as possible, while at the same time trying to understand these changes and how they impacted a resource (the pheasant) that was not thought of as a resource until only recently.

Rural geography plays an important role in helping us understand the past in hopes of better predicting the future of rural patterns and processes. Multiple research traditions can be found within rural geography (Roche 2002; Roche 2005). Some research helps to explain land use patterns, while others focus on production and consumption, while yet others focus on sustainability issues. All of these traditions are needed to gain the best understanding possible about what makes up a rural landscape.

### **A Human and Natural Systems Framework with Respect to Pheasants**

What this research may best exemplify is how case studies can be used to help us understand complex systems and human impacts on natural systems. The central United States, specifically of the Upper Midwest and northern Great Plains, has been a region that has been undergoing transformation for centuries (Sylvester and Gutmann 2008) mostly driven by changes related to agriculture.

Human impacts and natural components within this region have been well documented. Some of the most important drivers of change that ebb and flow depending on the state of economies, land use policies, climate conditions, and individual decision

making processes, are seen in the figure below (Figure 2.2). This framework helped structure the ideas, data, and methods used to help guide the research reported here. The approach has been a regional case study of coupled human and natural systems, with specific focus on how they come together and/or work independently to change the population of the ring-necked pheasant of eastern South Dakota.

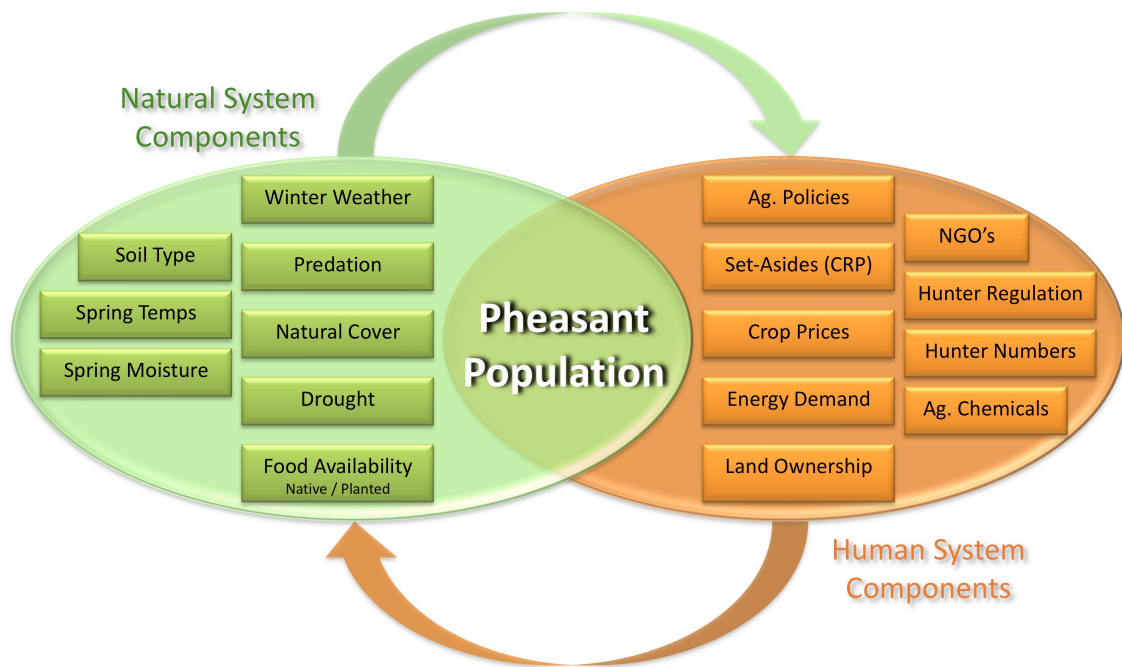


Figure 2.2. Natural and human components influencing pheasant populations in South Dakota.

And finally, this research fall along the lines of what Daniel Janzen (1998; 1999) refers to as the “gardenification” of wildlands. Janzen’s idea is that wildlands and their biodiversity (the South Dakota landscape and pheasants, in this case study) will survive in perpetuity only through their integration into human society. Looking at these lands as gardens will let us take stock of what these areas have to offer in terms of public goods and services. Pheasants can no doubt already be looked at as providers, not only for the

hunters in search of them, but also for local, regional, and state economic well being. Not only do pheasants and pheasant hunters bring in money to the state's economy, but the lands that are set aside also provide habitat, nesting cover, and food opportunities for a myriad of other creatures.

However, there are obstacles. As more lands are set aside for conservation purposes, the other players on this field, most notably in South Dakota, farmers, also vie for the use of these "agroscape" (Janzen 1999) lands. Hunters and those with vested interests in the hunting industry need to remember that maintaining wildland biodiversity and ecosystem survival in perpetuity through minimally damaging use is paramount (Janzen 1999), while in the agroscape, wild biodiversity and ecosystems are tools for a healthy and productive agroecosystem. These last two points succinctly sum up some of the major findings of this research: pheasant habitat and population are very much products of the ebb and flow of multiple parties (human drivers) and natural forces (weather, climate) involved.

## CHAPTER 3 - The Pheasant

It is important to understand some of the basics of the pheasant itself, because its life requires certain landscape conditions, changes that are both influenced by alterations land use/land cover and changes in weather/climate. The types of land cover found and the policy decisions that drive change can go a long way in determining the success of pheasants.

### Pheasant Range

Imported to America from Asia, no other game species introduced to this continent has been as successful at flourishing as the pheasant (Simberloff 1996). One of more than 40 species originating in Asia and Asia Minor, these birds are perhaps better known than any of the other 15 groups of pheasants in the world. All are related to the partridges, quails, grouse and guinea-fowls which make up the order *Galliformes* or chicken-like birds (Ultimate Pheasant Hunting 2008).

Archeological evidence suggests that large pheasants lived in southern France in the Miocene period, some 13 million years ago (Ultimate Pheasant Hunting 2008). The Greeks knew of the bird in the 10th Century B.C. and the name adopted for the species, *Phasianus ornis* (phasian bird), was derived from the Phasis River (now Rion) near the Caucasus Mountains (Ultimate Pheasant Hunting 2008). The Chinese knew the pheasant some 3,000 years ago, but the Romans are considered responsible for the spread of pheasants in western Europe. When Julius Caesar invaded England in the first century B.C., the pheasant followed and remains today. The pheasant of Europe, specifically of



the U.K. and the Republic of Ireland, does not thrive to the extent of their cousins in North America. Whereas pheasant populations in the U.S., as we will see later on in this dissertation, are affected positively by decreases in agriculture and increases in grasslands, Ireland's landscape lacks suitable amounts of croplands that would provide a more sustainable source of food (Figure 3.1). However, large-scale stocking programs in countries such as the Republic of Ireland work to help sustain populations (Scallan 2008), witnessed first-hand by this author in Ireland in December 2008, of mixes of pen-reared and wild pheasants.



Figure 3.1. Typical pheasant habitat in County Sligo, Ireland. Note the lack of cropland and/or grassland that could be used for cover and forage. Pen-reared pheasants who escaped the hunters' guns after release try to survive in the thick trees and shrubs of this river valley. Photo by author.

It wasn't until 1733 that the pheasant appeared in North America, when several pairs of the black-necked strain from Europe were introduced in New York. Other pheasant varieties were released in New Hampshire and New Jersey later in the 18th century, however no sustainable populations survived. Not until 1881, when Judge Owen Nickerson Denny, a U.S. diplomat to China, released 26 Chinese ring-necks in the agricultural Willamette Valley of Oregon, did the pheasant really gain a foothold in the United States (Adams et al. 1989; Diefenbach, Riegner, and Hardisky 2000; Pheasants Forever 2006). Eleven years later, Oregon opened a 75-day hunting season and 75,000 pheasants were harvested. Since then, pheasants have been propagated and released by government agencies, clubs, and individuals, and for all practical purposes are established everywhere on the continent that suitable habitat exists – approximately 40 of the 50 U.S. states (Pheasants Forever 2006).

In South Dakota, the state bird was first established near where the Split Rock Creek joins the Big Sioux River, near today's largest city, Sioux Falls, although there are conflicting stories that the first birds were stocked near Redfield in east-central South Dakota (Pheasant History 2006) (See Figure 1.4 for locations). Since then, the pheasant has established itself throughout much of the Great Plains, where land-use practices offer sufficient food and cover to successful populations (Ryan, Burger, and Kurzejeski 1998; Vincent 2006). Many other states where the pheasant is plentiful today went through similar scenarios – groups or individuals brought a few pairs of birds into those states, they were released, sometimes successfully, sometimes not, and based on landscape composition, climate and weather variables, and changes in landscape usage throughout

the decades has all worked together to help create the variations in range that is seen today.

Over the past fifty years, fluctuations in bird populations caused by land use and land cover change (human-related modifications) and climatic conditions (naturally-occurring change) also have caused the number of people hunting pheasants and the number of pheasants harvested in Iowa, Minnesota, Kansas, and North and South Dakota to shift (Figure 3.2). Not all of these states had reliable pre-season pheasant population data, so harvest data was used as a proxy to show pheasant abundance.

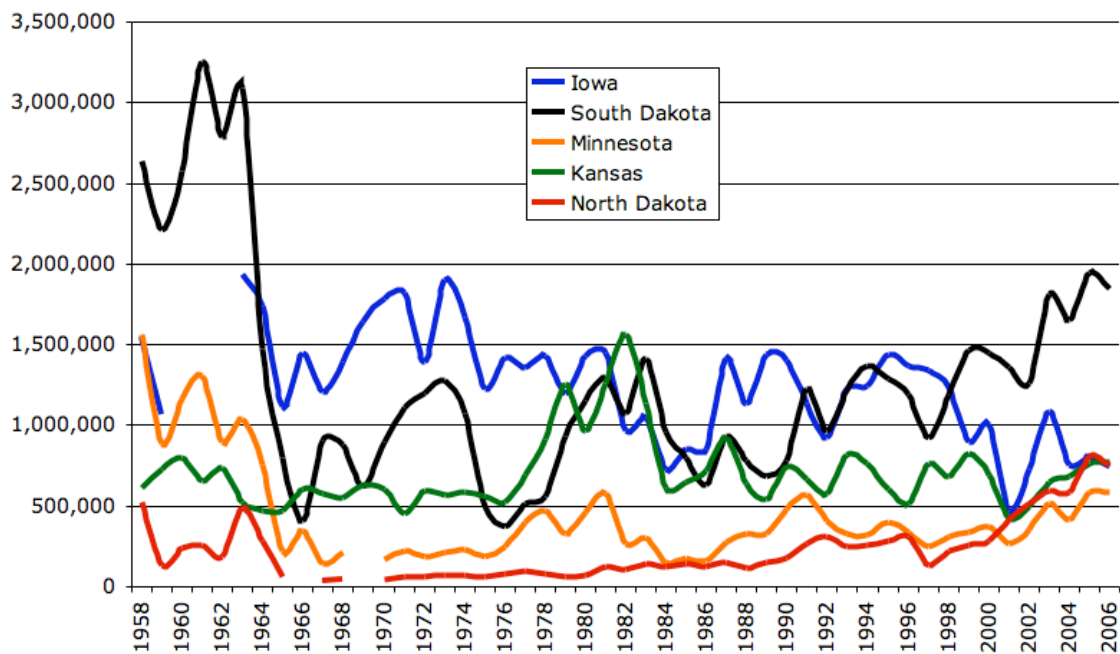


Figure 3.2. Pheasants harvested in Iowa, Minnesota, Kansas, North Dakota, and South Dakota from 1958 to 2006. Sources: South Dakota Game, Fish, and Parks 2008b, Kohn 2008, Rogers 2008, Haroldson 2008c, Bogenschutz 2008.

Along with seasonal variability (caused by factors that will be discussed later in this work), the U.S. Geological Survey also provides valuable information that shows the

overall abundance of the ring-necked pheasant in the North America (Figure 3.3). The bird is virtually gone from its original home in Oregon's Willamette Valley, although small, localized populations, aided through stocking programs, can still be found and hunted. The predominant range of today's pheasant generally follows the outline of what used to be the short- and tall-grass prairies of the Midwest and Great Plains and where complex mosaics of grasslands, croplands, idle lands prove to be the correct mix to sustain populations (Figure 3.4).

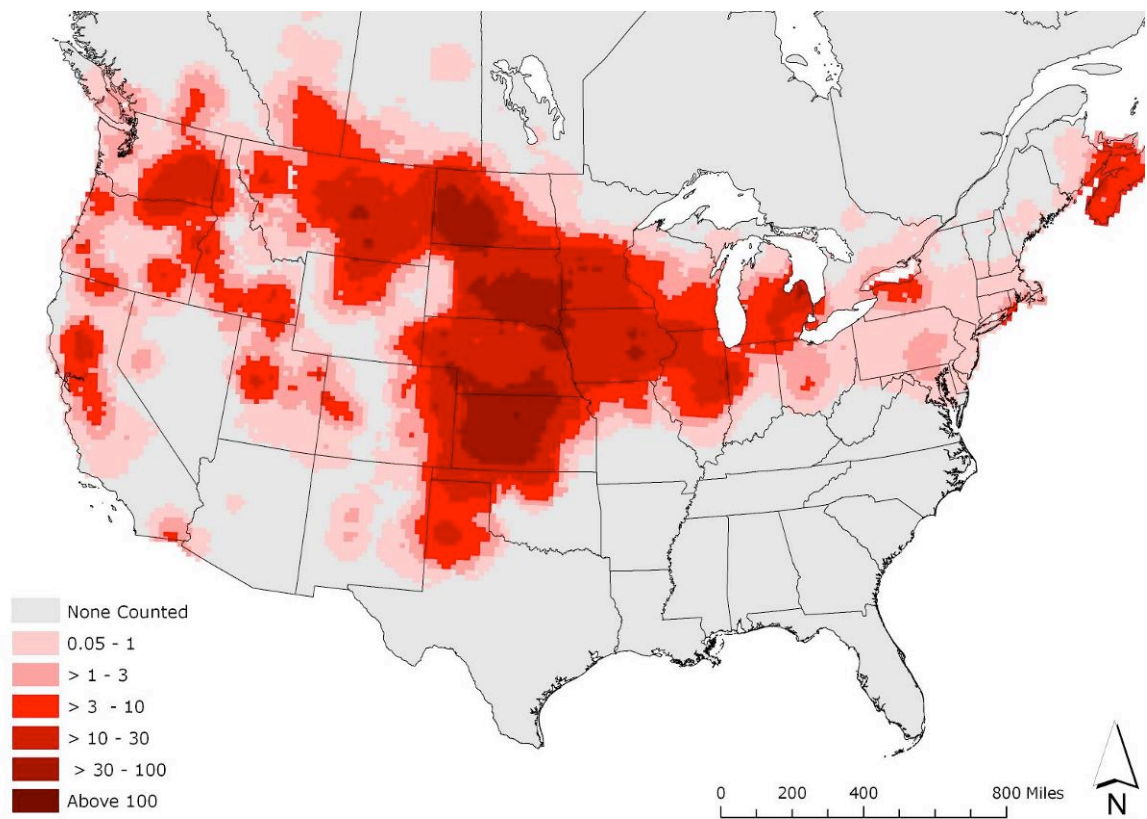


Figure 3.3. Abundance map of the Ring-Necked Pheasant. Map by author. Source: United States Geological Survey 2008.

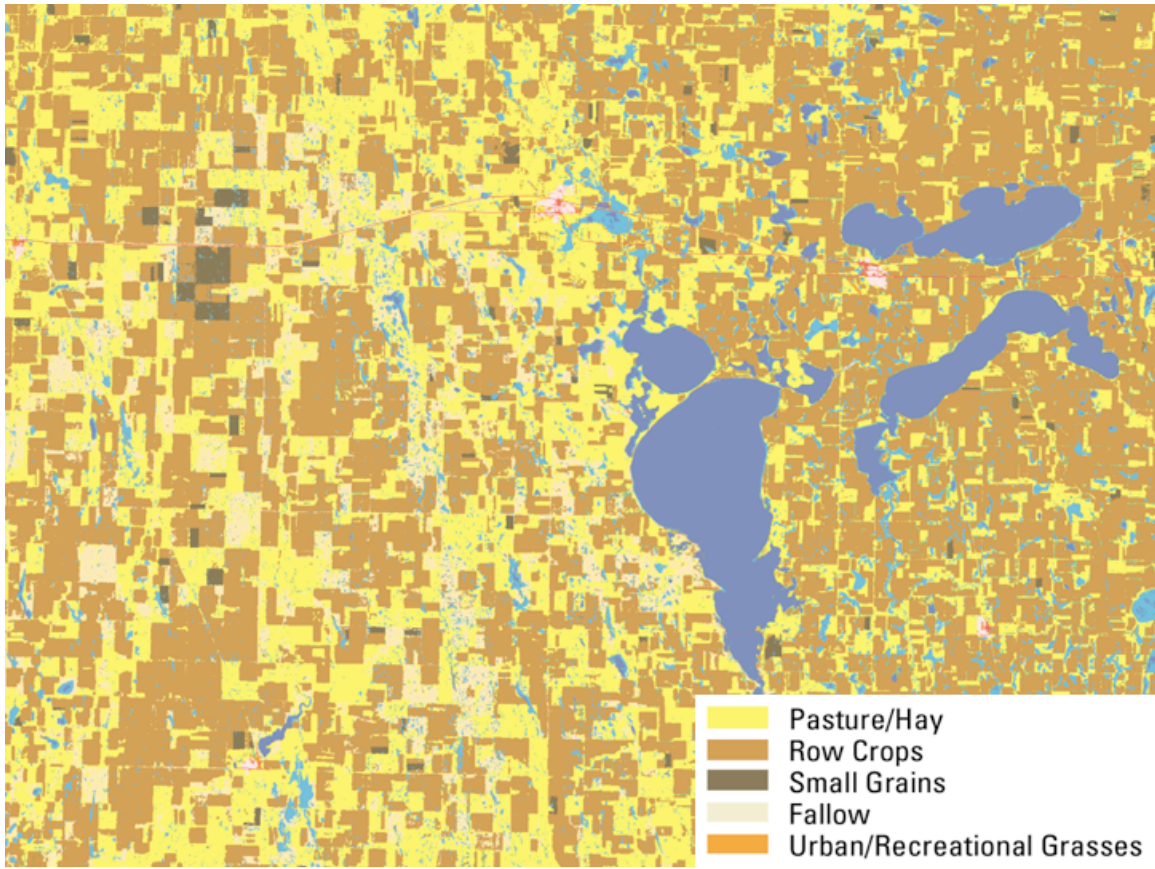


Figure 3.4. Example of South Dakota land cover near Lake Thompson, South Dakota (Kingsbury County). In Figure 1.4, Kingsbury County is the one between the towns of Brookings and Huron. Source: Map by author.

Much of this region of the upper Midwest (including eastern South Dakota) was once the domain of the Greater Prairie Chicken. Reports from near Fergus Falls, MN tell stories of hunters in the late 1880s harvesting more than 50 birds in a half-days time (Haroldson 2008b). As prairie chickens were forced off of their native prairie grasslands as agricultural intensification swept across the landscape, this opened the door for the ring-necked pheasant to take their place. Prairie chickens prefer the wide-open spaces of what once used to be the tall grass prairies of the western Minnesota and eastern South Dakota. Today, they are found further west and south in places such as south-central

South Dakota and north-central Nebraska, and stretching down through Kansas to the Texas panhandle.

### **Pheasant Biology and Population Factors Related to CHANS**

While one could look at supplemental stocking of pheasants as the reason they are so abundant in our country to begin with, it must be made clear that the birds first released in the United States were *wild* pheasants – not pen-reared birds. When it comes right down to it, the most important variable that drives pheasant populations today is whether or not pheasants have the proper habitat (or land cover) that ensures adequate nesting success that ensures a stable or growing population.

#### ***Lifespan and Breeding***

There are a few biological factors that point toward the importance of human land use decisions and general climate of an area being the key drivers of pheasant populations. In monitoring the overall health of a region or state's pheasant population, it is important to note that pheasants are polygamists. Studies have shown that in order to maintain genetic health of an area's population, a male pheasant can breed with up to as many as fifty hens (Haroldson 2008a). However, Haroldson (2008a) pointed out that in the Midwest those numbers usually do not reach higher than one male to ten females, whereas in states such as California or Wisconsin (where pheasants are not abundant) ratios may be as high as one male to twenty-nine females (Buss 1946; Harper, Hart, and Schaffer 1951).

### ***Predation***

Predation is another well-studied, naturally occurring driver that goes into determining whether an area has a sustainable pheasant population. Once again, it is a natural driver that is often enhanced by anthropogenic land change. The role of mammalian predators in Midwestern pheasant population declines is complex and unclear (Riley and Schulz 2001, 36). Four-legged predators such as fox or raccoons and avian predators such as the Red-Tailed Hawk (*Buteo jamaicensis*) can cause a significant decrease in pheasant survival during periods of severe weather and during the nesting season where inadequate cover is found.

### ***Weather Requirements***

Much has been written about the effects of weather on the ring-necked pheasant. Biologists in Midwestern and eastern zones of the pheasant's range have generally found that high precipitation and cool temperatures in the spring and summer have adverse effects on productivity (Martinson and Grondahl 1966). Examples of this will be seen later in this dissertation in greater detail in the section describing yearly examples of coupled human and natural systems in South Dakota in the late 1990s and early 2000s. While the high precipitation and cool temperature scenario is generally the norm, certain studies (Wandell 1949) found examples in Illinois and Montana where similar conditions did not trigger declined brood counts.

Pheasants are not directly affected during drought years (United States Department of Agriculture 1999) because they do not need standing sources of water for survival. What does affect pheasants during drought years are the indirect effects of the

altered habitat conditions. Examples will be given in Chapter 5's Brood Survey Reports that highlight the indirect impacts of drought on the pheasant.

Adverse winter weather conditions are some of the most lethal contributors to pheasant mortality (Nelson and Janson 1949). Winter conditions of below normal temperatures have been found to decrease pheasant populations in subsequent years (Kozicky, Hendrickson, and Homeyer 1955). In a study by Warner and David (1982) of severe winter weather conditions from December 1977 to March 1978, 70 to 90 percent mortality rates were seen after a winter of heavy snow, blizzards, ice storms, and frigid temperatures impacted central Illinois.

Wildlife biologists in South Dakota studied the impact of two disparate winters on radio-collared pheasants in eastern South Dakota's prime pheasant range (Gabbert et al. 1999). The winter of 1995-96 was typical, while the following winter of 1996-97 was one of the most severe South Dakota had during the past century (1892-1997). The severe winter began with a November ice storm and blizzard, had an average snow-depth during the 3-month winter study period of 48.7 cm, and was 100 percent snow covered during the entire period. Mortality rates due to overall weather did not change, however 31 of the 41 deaths occurred during blizzard conditions. Instead, mortality during the more severe winter was more closely tied to predation. Because snow filled grassland habitats where pheasants found winter cover, predators had a much easier time finding the pheasants that could not access hiding places from them in the grasslands.

One of the most important ideas to remember is that weather conditions where pheasants are normally found are typically not the direct, primary cause of pheasant population success or decline – hence the ideas of land change science and feedbacks



between the coupled human and natural systems approach used in this research. Rather, changes in weather or severe, sudden weather events often *combine with* or *exacerbate* changes in other important components that dictate pheasant population (e.g., predation, habitat, hunting) that cause population increases or declines.

### ***Habitat Requirements***

The habitat components and requirements shown in Table 3.1 are the types of landscapes where pheasants thrive. Organizations such as Pheasants Forever also have examples of “optimal” land cover distributions. Many of these are for areas that have become more specialized in terms of agriculture over the past decades. States such as Ohio, Indiana, Illinois, Iowa, and Minnesota, which 40 years ago had a more diverse landscape structure with smaller, more diverse agricultural fields, now have to be reconstructed using filter strips, core (hub) areas of CRP grasslands, and field borders (Figure 3.5).

Table 3.1. Ring-necked pheasant habitat requirements. After USDA 1999.

Habitat Component	Habitat Requirements
General	<ul style="list-style-type: none"> <li>• Crop fields of corn, sorghum, oats, wheat, barley, and other small grains.</li> <li>• Wild haylands, big and little bluestem, Indiangrass, sideoats grama, switchgrass, native forbs.</li> <li>• Dense vegetation growing along overgrown fencerows, windbreaks, shelterbelts, roadsides and field ditches, small woodlots, old fields, and grassy or shrubby odd areas and field corners.</li> </ul>
Food: Young	<ul style="list-style-type: none"> <li>• Insects: grasshoppers, crickets, potato beetles, caterpillars of gypsy moths and browntail moths, tent caterpillars, cutworms and others.</li> </ul>
Food: Adult	<ul style="list-style-type: none"> <li>• Forb seeds: legumes, ragweeds, smartweed, crotons, burdock, others</li> <li>• Cultivated crops: corn, milo, wheat, grain sorghum, barley, oats, buckwheat, sunflowers.</li> <li>• Mast: acorns, pine seeds, various berries</li> <li>• Insects: grasshoppers, crickets, potato beetles, caterpillars of gypsy moths and browntail moths, tent caterpillars, cutworms and others.</li> </ul>
Cover: Nesting	<ul style="list-style-type: none"> <li>• Wheat stubble, winter wheat, undisturbed grasslands and pastures, unmowed native and alfalfa haylands, grassy field corners and odd areas, overgrown hedgerows and fencerows.</li> <li>• Alfalfa, vetch, sweet clover, and cool season grasses and forbs providing residual cover and ground litter.</li> </ul>
Cover: Brood- Rearing	<ul style="list-style-type: none"> <li>• Mix of grass and forbs providing movement of foraging chicks along the ground with overhead cover.</li> <li>• Big and little bluestem, sideoats grama, switchgrass, tall and intermediate wheat grasses, smooth brome, wildrye, Indiangrass and mixed grasses and forbs</li> </ul>
Cover: Winter	<ul style="list-style-type: none"> <li>• Weedy fencerows, dense, undisturbed grasslands, old fields</li> <li>• Weedy playa lake bottoms, cattail marshes</li> <li>• Low-growing evergreen/hardwood windbreaks and shelterbelts, low-growing grassy and shrubby habitats</li> </ul>
Cover: Roosting And Escape	<ul style="list-style-type: none"> <li>• Trees, tall shrubs, hedges, weedy field borders, ditch banks, and fence corners</li> <li>• Cattail marshes, brush heaps, briar patches, small farmland woodlots and thickets.</li> </ul>
Water	<ul style="list-style-type: none"> <li>• Daily foods eaten provide an adequate amount of water</li> </ul>
Interspersion	<p>Complex of:</p> <ul style="list-style-type: none"> <li>• Cropfields of corn, sorghum, oats, wheat and barley stubble.</li> <li>• Wild haylands, big and little bluestem, Indiangrass, sideoats grama, switchgrass, tall and intermediate wheat grasses, smooth brome, wildrye, alfalfa, vetch, sweet clover.</li> <li>• Grassy roadsides, field borders, filter strips and ditch banks, cattail marches, abandoned farmsteads, grass/shrub-mixed odd areas and field corners</li> <li>• Brush heaps, briar patches, small farmland woodlots, and travel corridors consisting of hedgerows, overgrown fencerows, field borders, grassy waterways, windbreaks, and shelterbelts.</li> </ul>
Minimum Habitat Size	<ul style="list-style-type: none"> <li>• 15,000 acres; however, daily activities of ring-necked pheasants typically conducted on one square mile or less under optimal habitat conditions.</li> </ul>

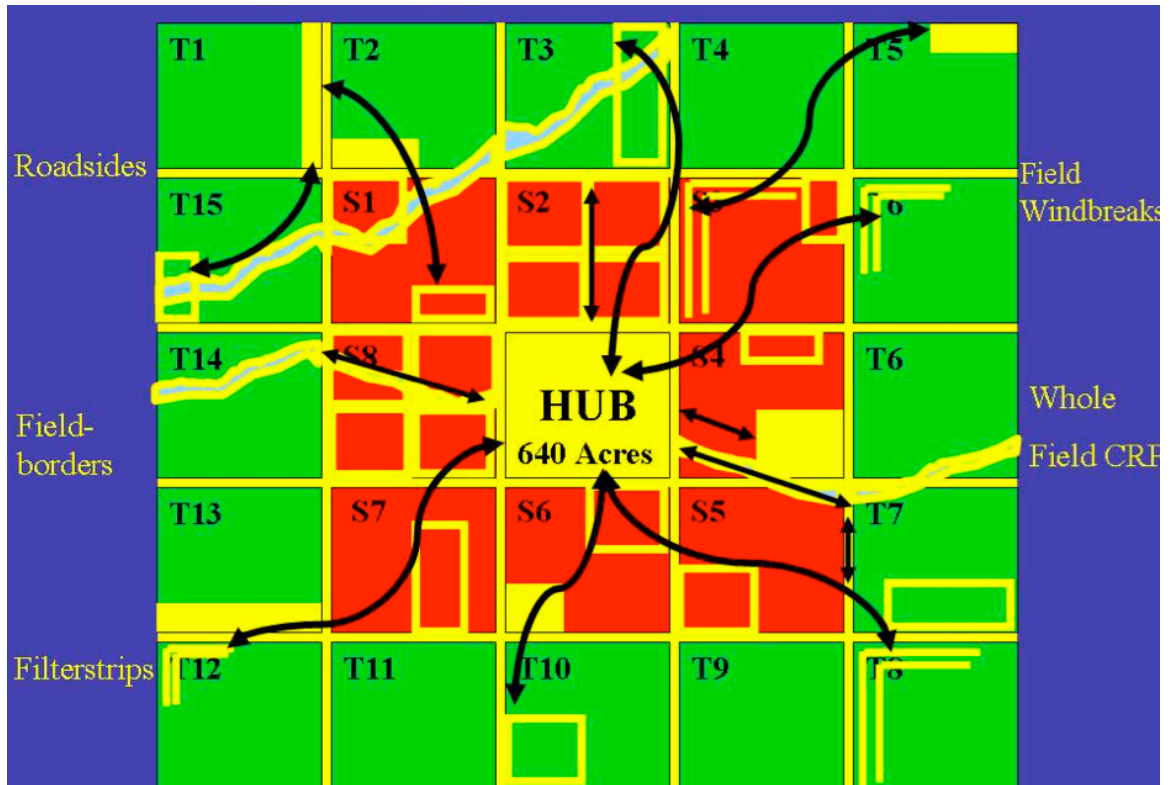


Figure 3.5. Example of a reconstructed landscape that would be suitable for sustaining pheasants. Source: Pheasants Forever.

Much work has been done on other species as well, such as Hungarian partridge and Northern bobwhite quail (Williams et al. 2004; Riddle et al. 2008). Many similar landscape and weather requirement issues affect species like bobwhite quail and various species of grouse that impact the ring-necked pheasant. Increases in landscape mosaic features such as ‘edge’ or ‘borders’ have been shown to be detrimental to many formerly large populations of bobwhite coveys in Kansas (Sandercock et al. 2008). Landscape scenarios that have been constructed (as in Figure 3.5) to show optimal “reclaimed” agricultural lands stress the importance of a balance between all types of landscape mosaic features: edges, core areas, strips, large and small patch sizes, and proximity to other food and shelter areas (to name a few). Changes driven by anthropogenic driving

forces, predominantly agriculturally-based land use decisions in eastern South Dakota, have constituted most of the changes in ‘natural’ settings and systems. These changes, in association with natural systems (weather, climate, drainage, and other systems) have been the focus of this research.

### ***Compensatory vs. Additive Mortality***

Another factor in determining of pheasant populations is compensatory and/or additive mortality rates. The compensatory mortality hypothesis entered the wildlife literature in the 1930s (Ellison 1991). With compensatory mortality, if enough pheasants are not harvested through legal bag limits, it is believed that the surplus birds would disappear through natural causes such as predation or disease. Additive mortality simply states that harvesting game birds lowers the population regardless of the number harvested (Ellison 1991). Pheasant and other upland bird biologists in South Dakota maintain that, given the current harvest rates and bag limits, pheasant populations will continue to, at the very least, remain steady and should, given normal weather conditions, even increase (Switzer 2008). Because male pheasants mate with upwards of a dozen or more hens, it is not likely that roosters would be over-harvested (Haroldson 2008b); if bag limits were dropped, it is likely that pheasants not killed through hunting would be lost through other, compensatory, mortality such as predation or exposure to the elements. As long as the major causes for mortality in hen pheasants are kept in check (i.e. predation, suitable and sufficient habitat), pheasant populations may be expected to remain stable or continue to increase.

### *Hunting Regulations and Effects on Populations*

Hunting pheasants with today's regulations generally has no impact on the next year's population. In a paper written by a group of wildlife biologists (George et al. 1980), the authors demonstrate this by comparing pheasant counts along the state border of Minnesota and Iowa. The winter of 1968-1969, the worst in thirty years, was devastating to pheasants in southern Minnesota and northern Iowa (Berner 1972). Because of the large numbers of pheasants lost, Minnesota decided to close its 1969 pheasant hunting season while Iowa did not. There was no statistical difference in annual pheasant populations between the two states in the years following 1969 that would show that closing the season helped the Minnesota birds to rebound better than the Iowa birds (George et al. 1980). There is no question that the winter of 1968-1969 killed thousands of birds in those two states. For the next two years (1970 and 1971), pheasant numbers rebounded, and in 1972 both states' populations began to see a precipitous decline, most likely due to dramatic changes in land use that included increased row-crop farming (Farris, Klonglan, and Nomsen 1977).

Residents may hunt any day during the Resident Only weekend, as well as any time during the regular pheasant season. Non-Residents may only hunt during two five-day periods (10 days total) during the regular pheasant season. When a non-resident purchases their license, they stipulate the first five-day period when they are purchasing their license, and are allotted one more 5-day period to hunt later in the season. If a non-resident only hunts for three days of their five-day period, they may not "make-up" the two days they did not hunt later in the season. There are three basic types of lands that both residents and non-residents may hunt on: Public Lands, Private Lands, and Preserves. These will be discussed in Chapter 5, but here are some general descriptions.

### ***Public Lands***

The three most prevalent types of public hunting lands are Game Production Areas, Walk-In Areas, and Waterfowl Production Areas. Game Production Areas owned by the State of South Dakota. South Dakota has over 696 of these areas totaling over 276,000 acres. Sportsmen's license fees pay property taxes for these lands. Walk-In Areas are a part of the Wildlife Partners Program designed to provide additional hunting opportunities. In this program, the state leases land at \$1 per acre from landowners on land that has a reasonable chance of supporting wildlife and hunting. If the land contains permanent wildlife habitat (such as a wetland or slough), the landowner is paid an additional \$5 per acre of that wetland. Waterfowl Production Areas are owned by the U.S. Fish and Wildlife Service. These lands are managed for the production of waterfowl, but other game species thrive on them as well. There are 1,000 WPAs in South Dakota, totaling nearly 150,000 acres.

Another type of public land is road right-of-ways (Road-Hunting). In South Dakota, public road right-of-ways are open for small game (pheasant hunting) except within 660 feet of schools, churches, occupied dwellings, and livestock. These public right-of-ways are found on the section lines of the Public Land Survey System (PLSS). These may be actual roads or simply section lines with wide-enough lanes to provide access for vehicular travel (common in South Dakota). For example, if a hunter is driving down a section line road and sees a cock pheasant within the right of way ahead, it is legal to drive up to where he or she thinks the bird was located, pull over, park the vehicle, and pursue the bird within the 66-foot right of way (33 feet in either direction from the centerline of the road). The hunter may shoot the bird from within the public

right-of-way if the bird itself takes flight from the right-of-way or flies over the right-of-way.

### ***Private Lands***

Private lands are simply that – private lands owned by private landowners. Permission is needed for access onto these lands. The only time it is permissible to be on private land (without prior permission) when hunting is when retrieving a downed/dead bird that was shot on adjacent public land or adjacent private land where permission to hunt was granted. It is legal to retrieve downed game from private land without permission if you retrieve the bird unarmed and on foot. In South Dakota, unless land is posted with a public hunting sign, it should be presumed the land is private.

### ***Preserves***

In 1963, the South Dakota Legislature enacted the Private Shooting Preserve Act authorizing the issuance of licenses to private shooting preserves. This permit can be issued to an individual (South Dakota residents only), co-partnership, association, or corporation owning, holding or controlling by lease or otherwise any contiguous tract of land (must touch at the corners or sides) of at least 160 and not to exceed 2,560 acres. According to state law, a shooting preserve may not be located within one mile of publicly owned land managed for hunting and wildlife without prior Commission approval. The private shooting preserve fee is \$100.00 for the preserve season plus 40 cents for each acre of land within the preserve. For example, the annual fee for a preserve of 640 acres would be \$356.00. The shooting preserve season runs from September 1 until March 31 of the following year. Shooting hours are restricted from sunrise until sunset. The game birds that can be licensed for South Dakota preserves include

pheasants, partridges, quail, and turkey. The bag limits will vary for each species. As pheasant hunting becomes more and more popular, all three of these types of lands are used differently and by different groups of hunters.

### *Summary*

In summary, it is important to understand some of the basics of the pheasant itself, because its life requires certain landscape conditions, changes that are both influenced by alterations land use/land cover and changes in weather/climate. As has been discussed, South Dakota's physical landscape and the processes that influence it are a large part of what makes South Dakota such a haven for pheasants. The pheasant will flourish when given the proper environmental requirements. Its polygamous nature aids in maintaining population size, and recovery after the population is reduced

Pheasants are aided by maintenance of landscape diversity, and a variety of land ownership and management types have contributed to creation of conditions that support not only the species, but also hunting activities (both commercially-lucrative hunting, and more traditional hunting). As described above, pheasant populations may respond to environmental shifts (land cover, weather). Such population-environment relationships, the effects of human decisions on environmental conditions, and the effects of environmental conditions (including land ownership and management) and pheasant populations on human experiences related to use of the game bird resources, are potentially complex in their connections, and serve as an area where human and natural systems are inextricably linked.



## CHAPTER 4 - Pheasant Hunters

### Hunter Survey

Pheasant hunters are a component of the driving force that has transformed South Dakota into the pheasant hunting Mecca that it has become. Without the hunters there would still be pheasants, but no incentives for the landowners to manage any portion of their lands for the pheasants (except for their own individual wants). So it is important to understand what the hunters are thinking with regard to how land is being used, how privatization of both farmland and conservation lands are affecting access to quality hunting grounds, as well as how differently residents and non-residents perceive the hunting “atmosphere” of South Dakota.

Hunting is a very personal endeavor that takes place on something that is also very personal to people – the land that they may own. As has already been mentioned, South Dakota is blessed with a variety and abundance of public hunting acreage. However, as the number of hunters continues to increase, the pressure put on those lands is also increasing, often putting pressure not only on the land, but also on the hunters who come together each fall to share that land. Perceptions are vast and varied both between and within the ranks of the residents and non-residents, as we will see in the results section of the survey.

In the spring of 2007, I obtained a comma-delimited text file from the State of South Dakota Department of Game, Fish, and Parks<sup>2</sup>. This file contained name and

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<sup>2</sup> Pheasant hunter data was obtained from Corey Huxoll (Game Harvest Survey Coordinator) of the South Dakota Department of Game, Fish, and Parks.

address information for all 78,122 South Dakota residents and 90,881 non-residents who purchased a small-game South Dakota hunting license for the 2006 hunting season. One caveat to this is that just because someone purchased a small-game license does not mean that they hunted pheasants exclusively, or at all. Small game in South Dakota consists of pheasants, prairie chickens, grouse, dove, partridge, waterfowl, prairie dogs, and coyotes. However, this is the only way to separate pheasant hunters from some other types (deer hunters, elk hunters, etc.). Mr. Huxoll also assured me that the “vast majority” of the people who purchase small game licenses in South Dakota are doing so to hunt pheasants. This is supported by the fact that I only received a total of seven surveys where the respondents explained that they did not hunt pheasant.

After obtaining the list of hunters, they were sorted in alphabetical order and numbered in ascending order; for non-residents, 1 through 90,881, and for residents, 1 through 78,122. A random number generator (<http://www.random.org>) was used to create two samples: one of 1,000 residents and the other of 1,000 non-residents. Once hunters were selected, surveys were mailed to the two groups of 1,000 hunters. The survey and cover letter can be found in Appendices A and B, and each individual question will be discussed in greater detail in the survey results section.

During the first two weeks of May 2007, surveys were mailed to the hunters selected from the resident and non-resident lists. Three weeks after the initial mailing, a reminder postcard was sent to those who had not yet returned the initial survey. Three weeks after that, if hunters had still not received a completed survey, a second survey was sent. Because of budget constraints, I was only able to afford two survey mailings and one reminder postcard.

The spatial distribution (mapped by zip code) of the residences of all South Dakota small game license holders in 2005 can be seen in Figure 4.1. The vast majority of hunters coming to South Dakota reside in neighboring states (including Minnesota, Wisconsin, Nebraska, and Iowa), as well as other states in the southern and southeastern U.S., such as Missouri, Texas, Arkansas, and Georgia. West of South Dakota, the pattern resembles a population map showing the cities of the Rocky Mountain front range, Salt Lake City, Phoenix, Los Angeles, Seattle, and Portland, to name a few. The map showing the locations of the recipients of my survey (again, using their zip codes) indicates a similar pattern (Figure 4.2), as does the map showing the pattern of survey respondents (Figure 4.3).

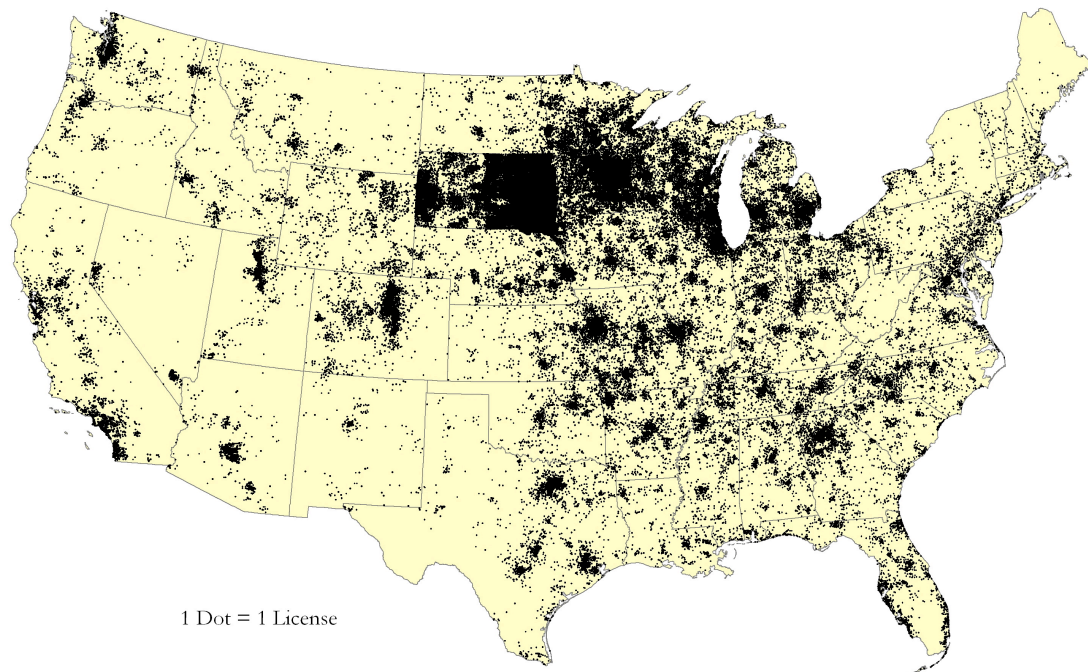


Figure 4.1. Nationwide distribution of people who purchased small-game hunting licenses in South Dakota in 2006. Map by author using data from the SD GF&P.

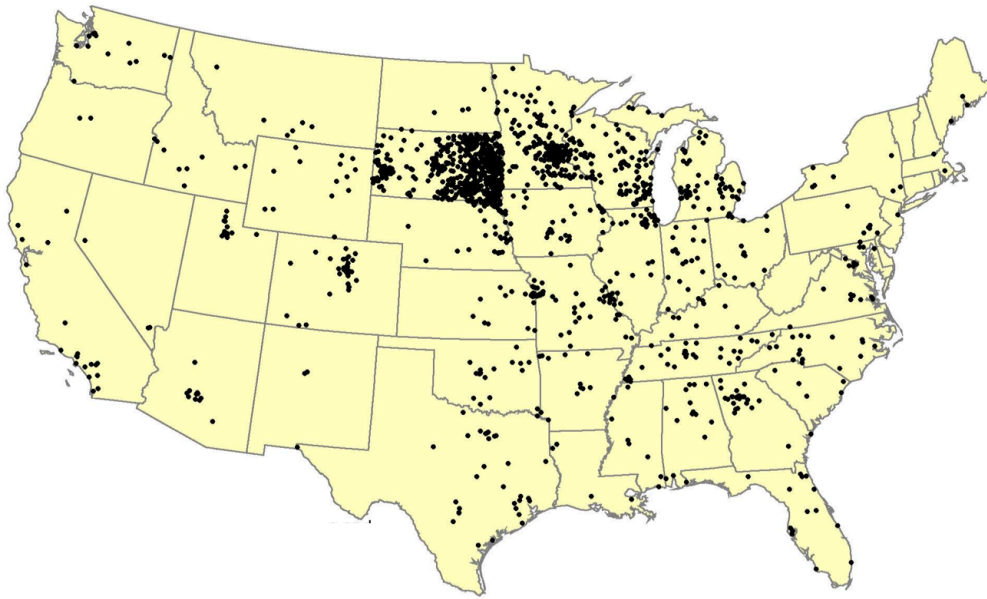


Figure 4.2: Survey Recipients. Map by author.

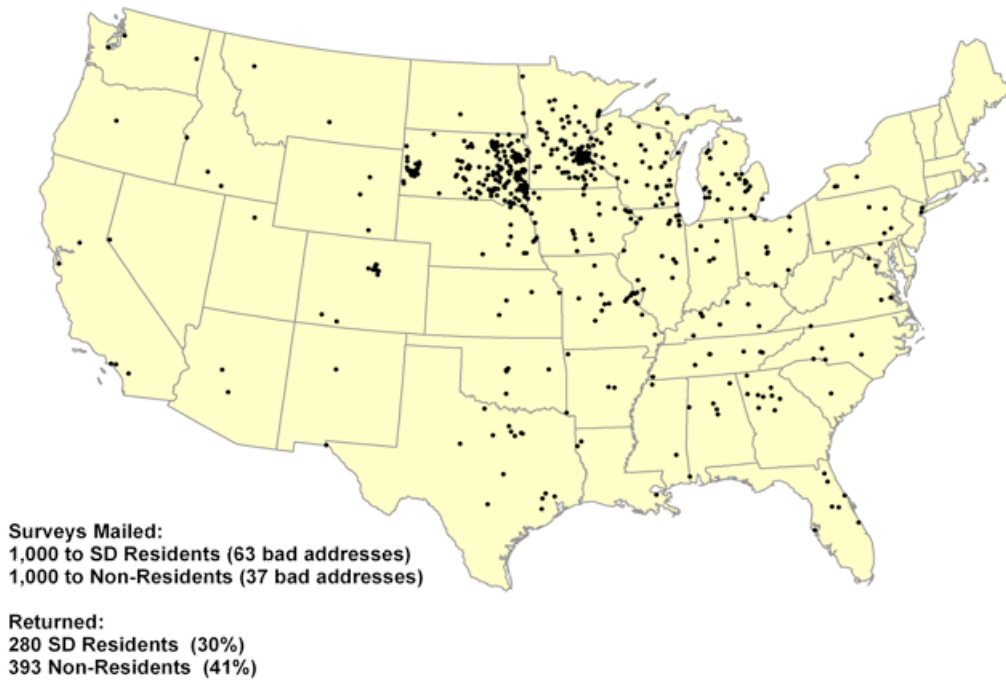


Figure 4.3: Survey Respondents. Map by author.

Of the 1,000 resident surveys that were mailed, 63 were returned as undeliverable (6.3 percent). With 280 usable surveys returned, a 30 percent response rate was achieved based on 937 delivered surveys. Of the 1,000 non-resident surveys that were mailed, 37 were returned as undeliverable (3.7 percent). With 393 usable surveys returned (of the 963 delivered), a response rate of 41 percent was achieved. Total response rate for both residents and non-residents was 34 percent.

### **Survey Questions and Results**

Respondents were asked to list (to the best of their memory) the county or counties they hunted in which South Dakota in 2006. If someone responded, “I’m not sure of the county, but we hunted near the town of Huron”, the county in which the town is located was recorded for analysis. Some people only hunted in one county, while others hunted in twelve counties through the season.

An interesting pattern occurs on the map of the results of this question (Figure 4.4). The core area of where residents hunted versus where non-residents hunted was further east (Figure 4.5). This can be explained by the fact that most the population centers of eastern South Dakota fall along the Interstate 29 corridor from Watertown down through Sioux Falls, the Interstate 90 corridor from Sioux Falls west to Chamberlain, and various other major highways that connect the interstates to other towns, such as Highway 14 connecting Brookings to Huron. Resident hunters tend to travel ‘commuting distances’ not requiring overnight stays.

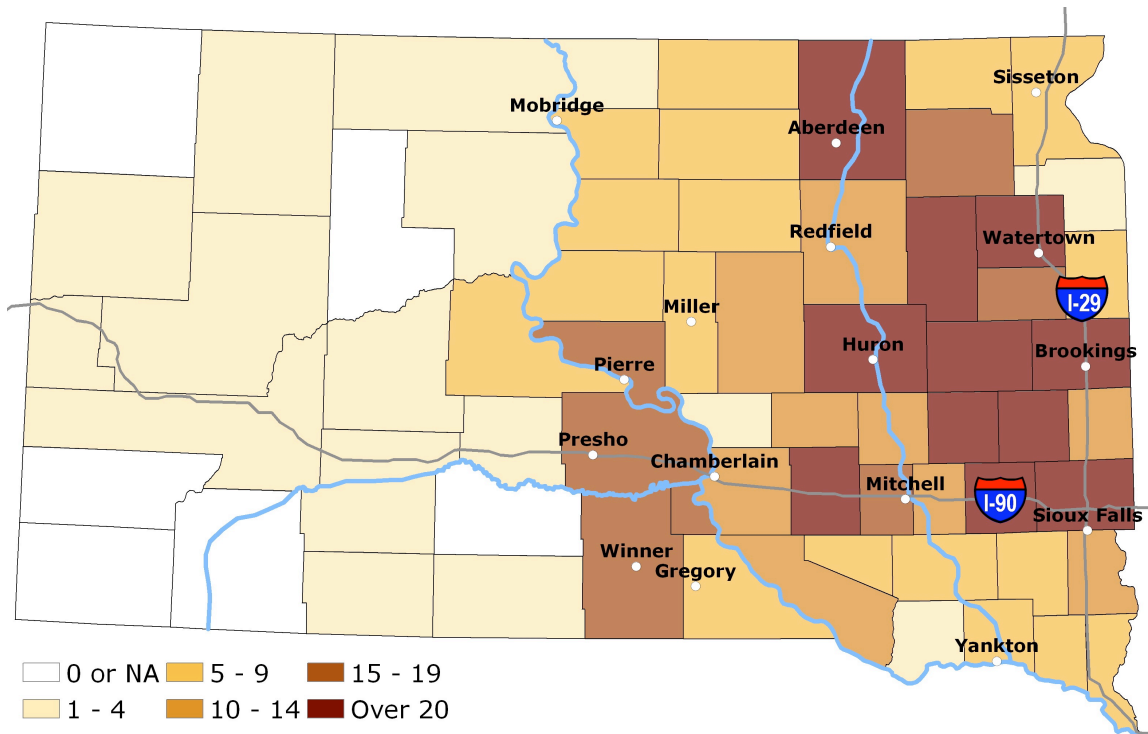


Figure 4.4. Number of hunters per county where residents hunted pheasants in 2006. Data from surveys. Map by author.

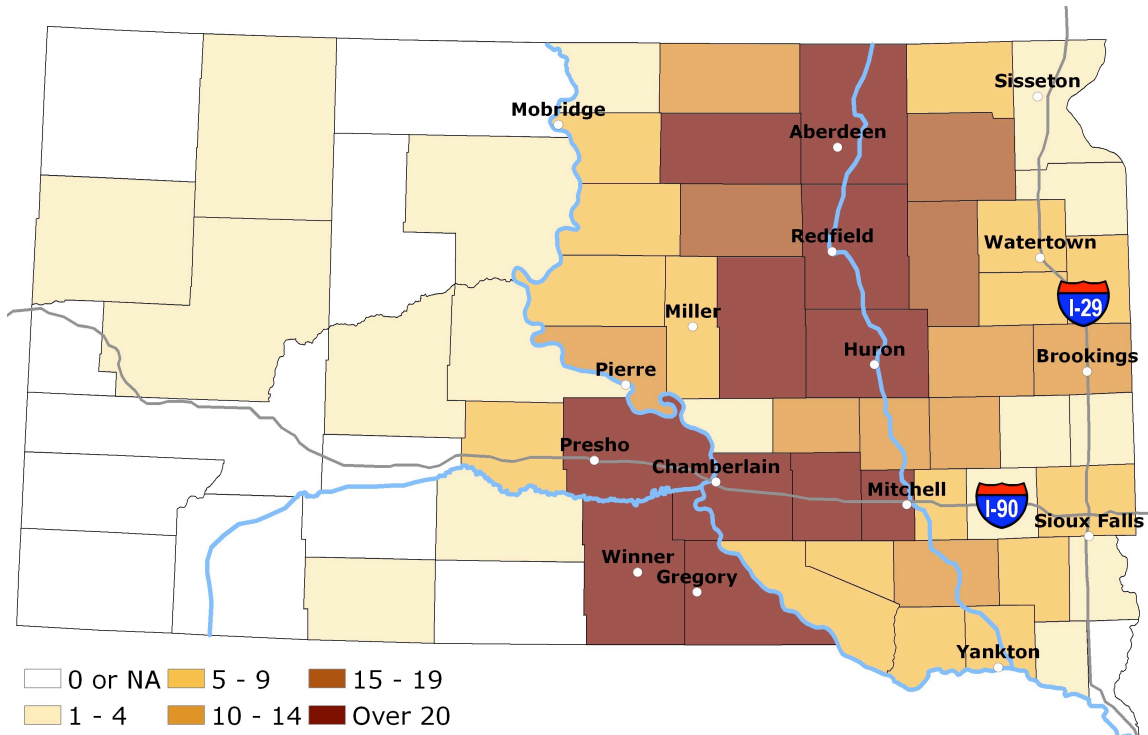


Figure 4.5: Number of hunters per county where non-residents hunted pheasants in 2006. Data from surveys. Map by author.

On the other hand, non-residents hunted the portion of the state between the James and Missouri Rivers, and even west of the Missouri River in the south-central portion of the state, much more frequently than did residents. This is because of two main reasons: 1) pheasants are found in higher numbers in these areas, and, more importantly, 2) this is where non-residents find the hunting lodges/resorts where they often stay.

Following up on the spatial basis of hunting in South Dakota, hunters were then asked how many days they hunted in the state in 2006. The number of days hunted ranged anywhere from one to one hundred, with the average being 12.5 days hunted for residents and 5.1 days hunted for non-residents. These numbers are typical given that non-residents may only hunt during the two five-day periods previously described, while residents can hunt for the entire duration of the regular October to January season, plus the “resident-only” weekend one week prior to opening day. Oftentimes, non-residents can only afford (because of time and/or economic constraints) to make one trip to South Dakota, so many simply lose out on their second five-day hunting period.

Also related to timing, the survey asked which months of years the respondent hunted in South Dakota in 2006. Pheasant hunting season in South Dakota typically begins the third weekend of the month and runs through the first weekend in January (e.g., the 2008 season runs from October 18, 2008, to January 4, 2009). A week prior to the opening day of the regular season, South Dakota residents are allowed to hunt for three days only on public lands, and a week prior to that is the five day youth pheasant season for children ages twelve to seventeen.

Survey results with respect to timing of hunting are not surprising (Figure 4.6). Opening weekends for sporting activities such as fishing or hunting are often the most popular times to participate. Weather conditions in South Dakota in October are generally milder than subsequent months so it makes sense for hunters traveling great distances to plan their trips earlier in the season, and pheasants are also perceived as being more abundant, though birds are simply getting “smarter” as they are shot at over and over again. The results show these trends.

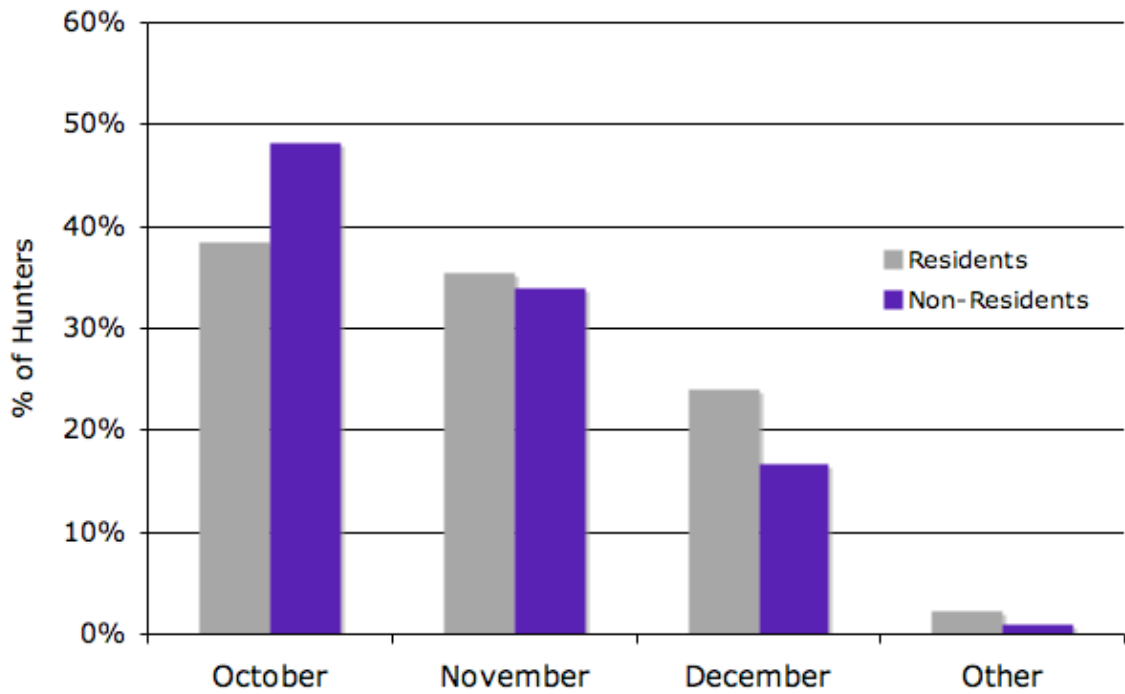


Figure 4.6. Months during the pheasant hunting season that residents and non-residents hunted. The majority of both groups hunted during the first two months of the season. Chi Square = 15.61, DF = 3, P = 0.0014.

Eighty-five percent of residents hunted in October, 79 percent hunted in November, 53 percent hunted in December, and five percent hunted in January or some other month (most likely at a game preserve). Sixty percent of non-residents hunted in



October, 42 percent hunted in November, and only 22 percent came back in December, January, or any remaining month.

To begin addressing the characteristics of lands used for hunting, the fourth survey item asked what percentage of the time a hunter hunted a certain type of land in 2006. The difference in what types of lands were hunted by residents and non-residents begins to tell the story of how these two groups of people may be impacted by land use change if the current scenario of cropland increase and grassland/habitat decrease continues in South Dakota.

Resident hunters were found most often, on average, to have hunted on no-charge private lands (70 percent), private fee-based lands (47 percent), public lands (33 percent), public right-of-ways (30 percent), and lastly preserves (29 percent). Non-resident hunters were found most often, on average, to have used private fee-based lands (85 percent), preserves (72 percent), no-charge private lands (70 percent), public lands (40 percent), and lastly public right-of-ways (23 percent) (Figure 4.7). The overall land resource use patterns vary significantly between resident and non-resident hunters, as indicated by probability less than 0.01. The percentages are averages of all respondents. The survey question asked for a percentage value for each type of land, with totals equaling 100 percent; for example, a typical resident hunter's response would be 80 percent no-charge private, 10 percent public, and 10 percent right-of-ways.

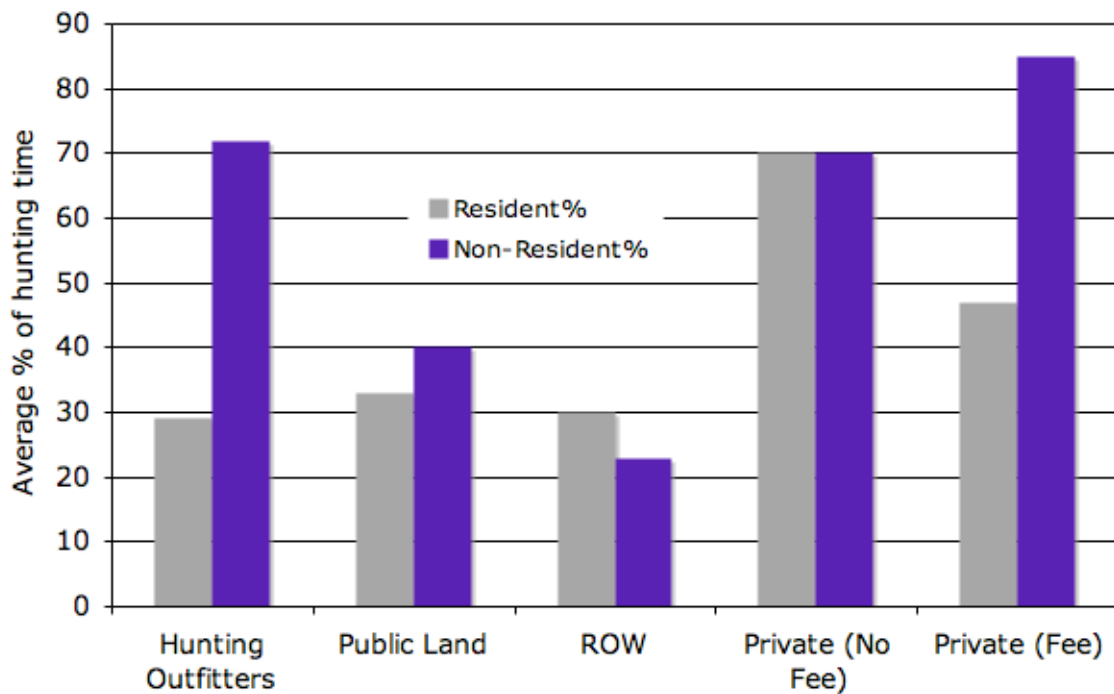


Figure 4.7. Types of land used for hunting. Chi-Square = 18.17, DF = 4, P = 0.0011.

Identification of land available to hunting activities is an important aspect of the entire hunting experience, particularly as some lands may be closed to hunting and hunting pressures on other lands may increase. Hunters were asked how they found land on which to hunt in 2006; response options included advertisements, hunting atlases, friends or family, previous knowledge, and ‘other’ (Figure 4.8). Accessibility to hunting lands, particularly *quality* hunting lands, is of paramount importance to most hunters. The availability of these lands is dwindling, especially in recent years as pheasant hunting has become more privatized and as habitat land uses and covers are being transformed. Good habitat does exist on many public hunting lands, but land that is best managed is found in private holdings, and the responses to the surveys show this.

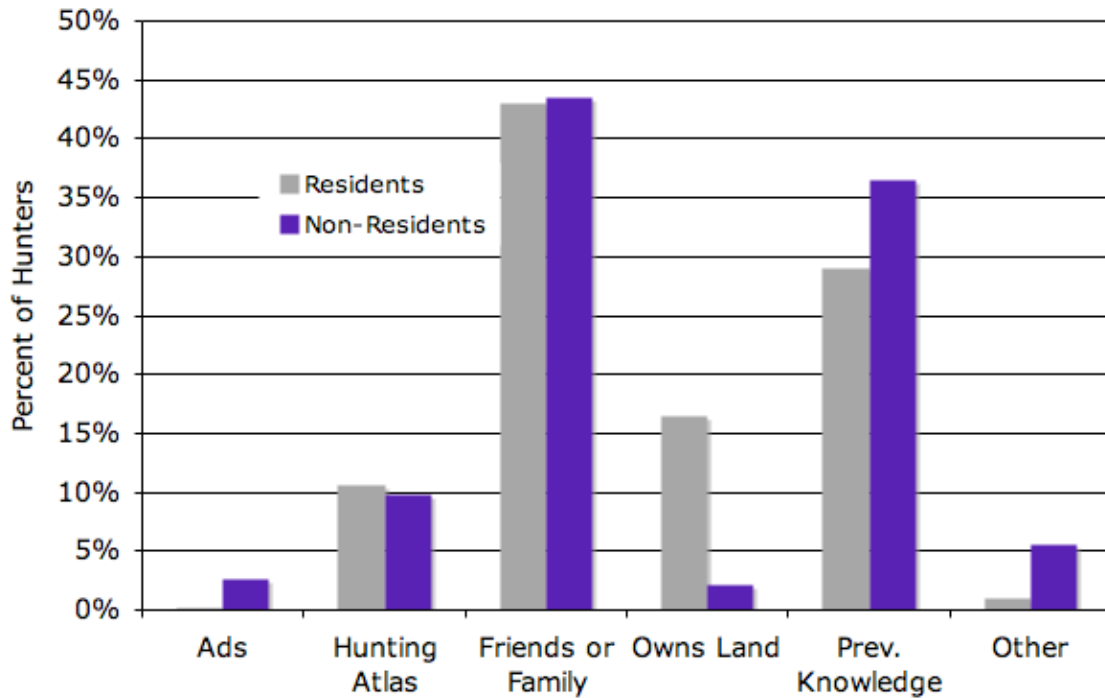


Figure 4.8. How hunters found land on which to hunt. Chi-Square = 82.61, DF = 4, P = < 0.0001. The categories of “Ads” and “Other” were grouped for P-value analysis.

Survey response options regarding how hunters found the land they hunted on included advertisements, hunting atlases, friends or family, respondent owns land, previous knowledge, and ‘other.’ Respondents could select more than one option. Of the 445 resident responses, 43 percent hunted lands owned by family or friends, 29 percent knew of land from previous hunts, 16 percent owned their own hunting lands, and 11 percent used a hunting atlas to find public lands. Of the 509 non-resident responses, 43 percent hunted lands owned by family for friends, 37 percent knew of land from previous hunts, 10 percent used a hunting atlas to find public lands, 3 percent found land through advertisements, and only 2 percent owned their own hunting lands.

Respondents were asked how much were they charged per-gun per-day to hunt, if they had hunted at a shooting/hunting preserve or hunting lodge in 2006. Lodge and

preserve users also were asked to rate their experiences (Figure 4.9). Non-residents are more likely to frequent preserves than residents, because many non-residents, especially those who are not familiar with South Dakota and its hunting opportunities, are willing to pay to have a catered hunt. More often than not, they often have great hunting success associated with these experiences.<sup>3</sup> There is a very wide range in daily charges for using commercial hunting facilities. For hunters who frequented preserves in 2006, the average cost per-gun per-day to hunt was \$258, with a range from \$75 to \$1,400.

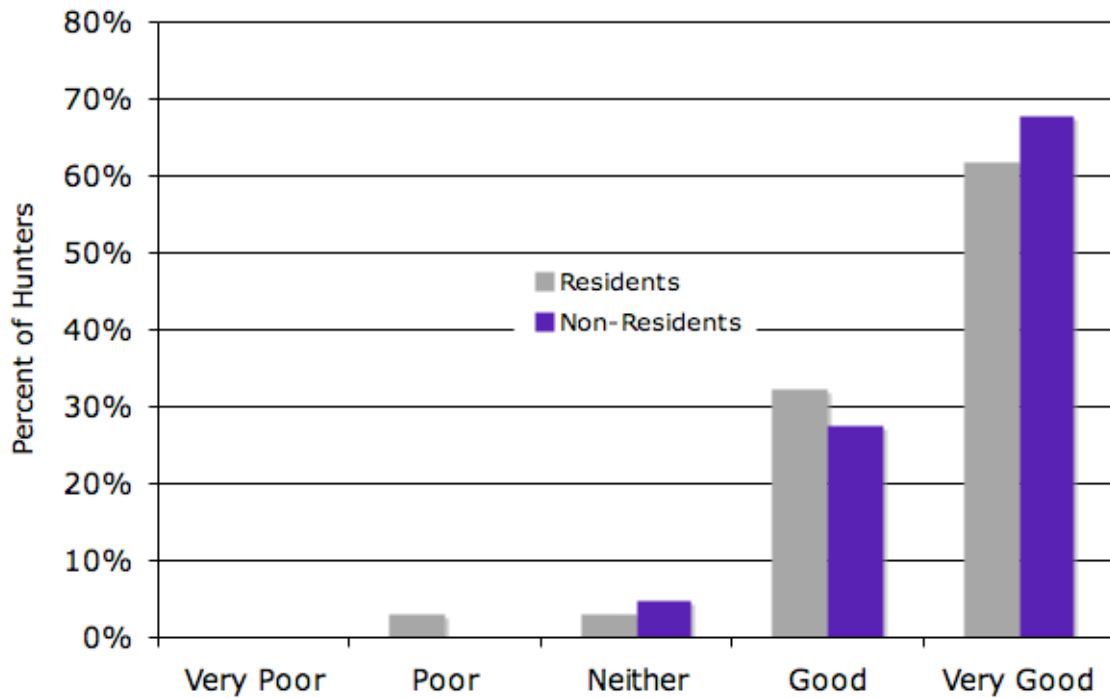


Figure 4.9. Experience appraisals of hunters on pay-to-hunt preserve land. Chi-Square = 2.02, df = 2, P = 0.3642.

Of the 34 residents who hunted preserves in 2006, 21 had “very good” experiences, 11 had “good” experiences, and two had “neither good nor bad” or “poor”

<sup>3</sup> Success can be measured in various ways. Many, who are simply fixated on quantity, or the number of birds they harvest, see preserves and paid hunts as successful. On the other hand, many, including myself, measure success based on the quality and overall experience of the hunt, which includes time spent in the field with family and friends.

experiences. Of the 62 non-residents who hunted preserves in 2006, 42 had “very good” experiences, 17 had “good” experiences, and 3 had a “neither good nor bad” experience.

Public lands present very different hunting experiences. Question 7 asked hunters who hunted on public lands whether or not they ever felt crowded, or if too many people were trying to use the same piece of public land at the same time (Figure 4.10) (often the case, especially early in the season) and to also rate their overall experience (Figure 4.11). As previously discussed, public hunting land, though more plentiful in South Dakota than most surrounding states, have become coveted as access to private lands becomes more difficult. Public hunting lands tend to be used more frequently in the earlier parts of the hunting season (mid-October to mid-November). Thus, those who hunt during the earlier season will perceive public hunting lands as more crowded and will have a more negative outlook on them versus those who find easier access in the later weeks of the hunting season.

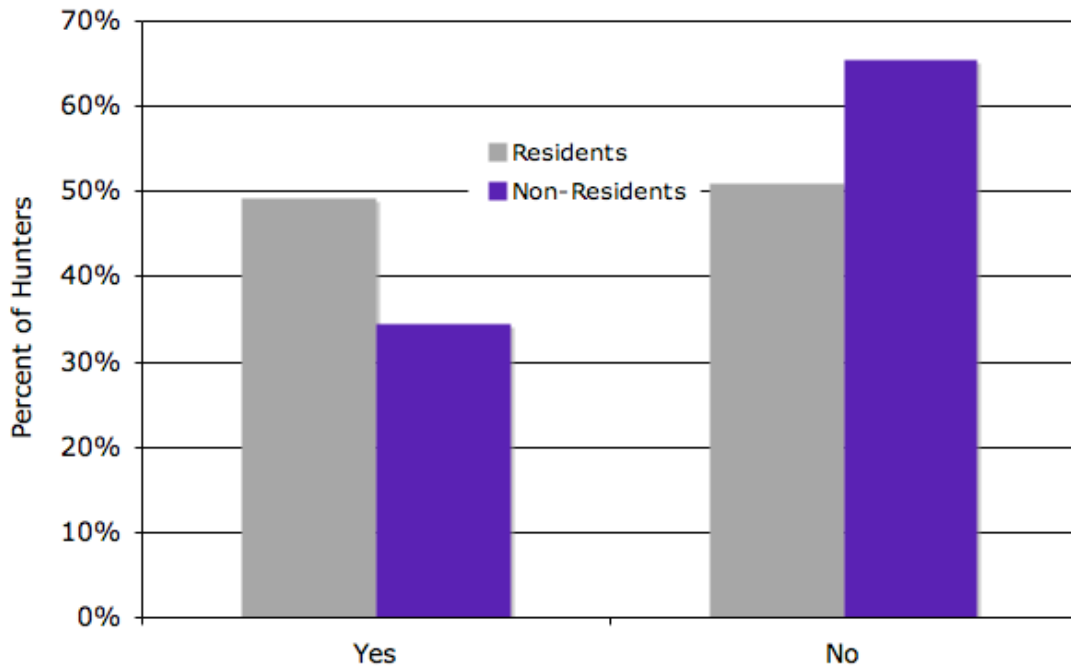


Figure 4.10, Hunter's perception of the level of crowdedness of public hunting lands. Chi-Square = 7.47, DF = 1, P = 0.0063.

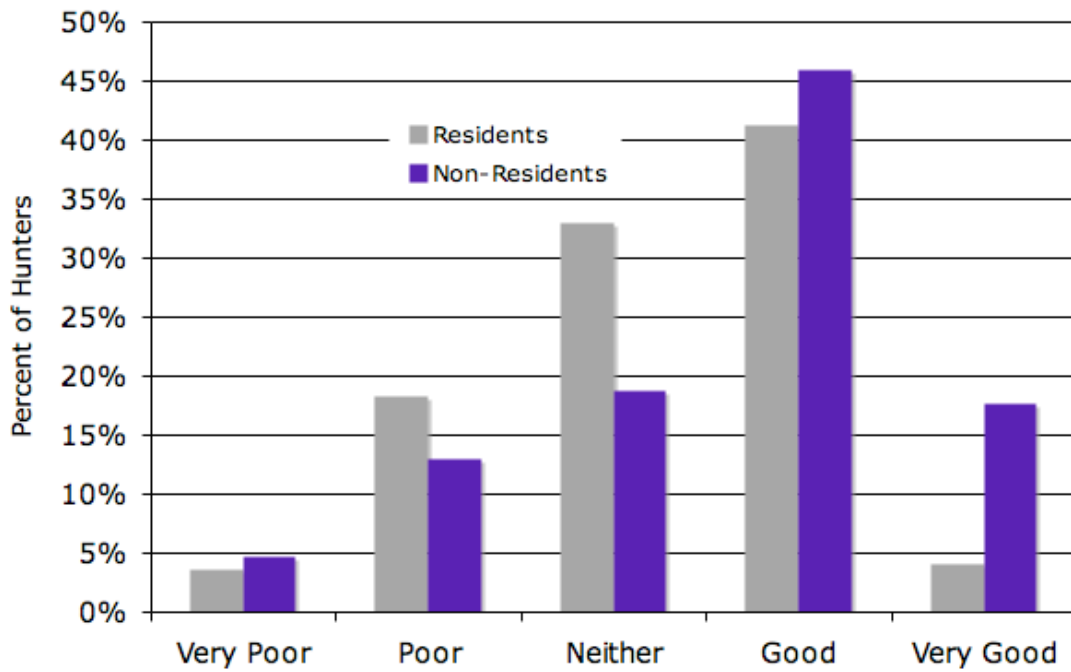


Figure 4.11. Experience appraisals of hunters on public land. Chi-Square = 23.09, DF = 4, P = 0.0001.

The results from the survey tell an interesting story. Of the 173 responses by resident hunters, almost half (49 percent) felt that the public lands they were trying to hunt were too crowded, while only 35 percent of the 168 non-resident respondents felt the same way. Statistical analysis indicates that these differences between residents and non-residents are significant ( $p < 0.01$ ). Many resident hunters may feel animosity towards non-residents for not only causing the decrease in access to private lands once hunted by residents, but also now the decrease in access (or perceived decrease in access through crowding) to public lands as more and more non-residents come to South Dakota each fall to hunt pheasants.

Feelings that there has been a loss of access are also evident in the way residents and non-residents rate their public land hunting experiences. Only 45 percent of resident hunters said they had a good or very good experience while 55 percent said they had a neither good nor bad, poor, or very poor experience. At the same time, 64 percent of non-residents said they had a good or very good experience, and only 36 percent had a neither good nor bad, poor, or very poor experience. Again, the differences are significant ( $p < 0.01$ )

Respondents who hunted on private land and were not charged a fee were asked whether their access to that land was granted because someone in their hunting party had an “in” with the landowner. Hunters who hunted on private lands who were not charged an access or per-bird fee tended to either know or to be with someone who knew the owner of the land on which they were hunting. This applied to resident hunters 96 percent of the time and non-resident hunters 91 percent of the time. This is not surprising: as seen above (Figures 4.7 and 4.8), respondents who had access to free

private lands normally gained access to them through previous knowledge (they had been hunting the land in past years and had set up an agreement with the landowners) or they gained access through family and/or friends.

The experience of hunters who used non-fee private land rated their experiences (Figure 4.12), as did the lodge and preserve users. Not surprisingly, the experience ratings for these lands were quite high for both residents and non-residents, with 91 percent of residents having a very good or good experience and 95 percent of non-residents having the same. There was no significant difference between resident and non-resident hunters. Again, these results are not surprising, and those who can gain access to those lands through prior arrangements or through family and/or friends oftentimes have good hunting success.

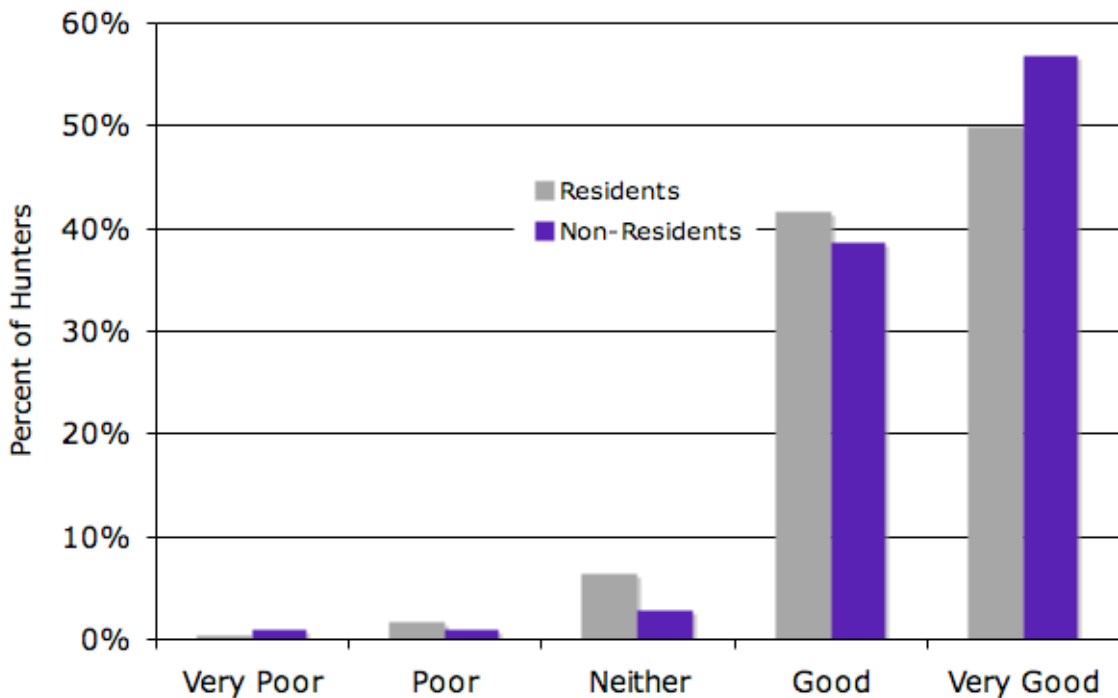


Figure 4.12. Experience appraisals of hunters on no-pay, private land. Chi-Square = 4.62, DF = 3, P = 0.101. Categories of “Very Poor” and “Poor” were grouped together for P-value analysis.



Question 9 first asked hunters who hunted on private land and were charged a fee the amount that they were charged. Secondly, they were asked to rate their experience hunting on that land (Figure 4.13). The average amount of money charged for access to private lands was \$189 per gun per day. Although the average amount paid by someone to hunt on private land was lower than the amount charged to hunt at a hunting preserve, the range was much greater, with some only charging \$25 and others charging \$2,500. Private landowners (not associated with any kind of hunting business) often are able to set up private hunts for hunters willing to pay premium prices for access to land that only they (or few others) will hunt throughout the season.

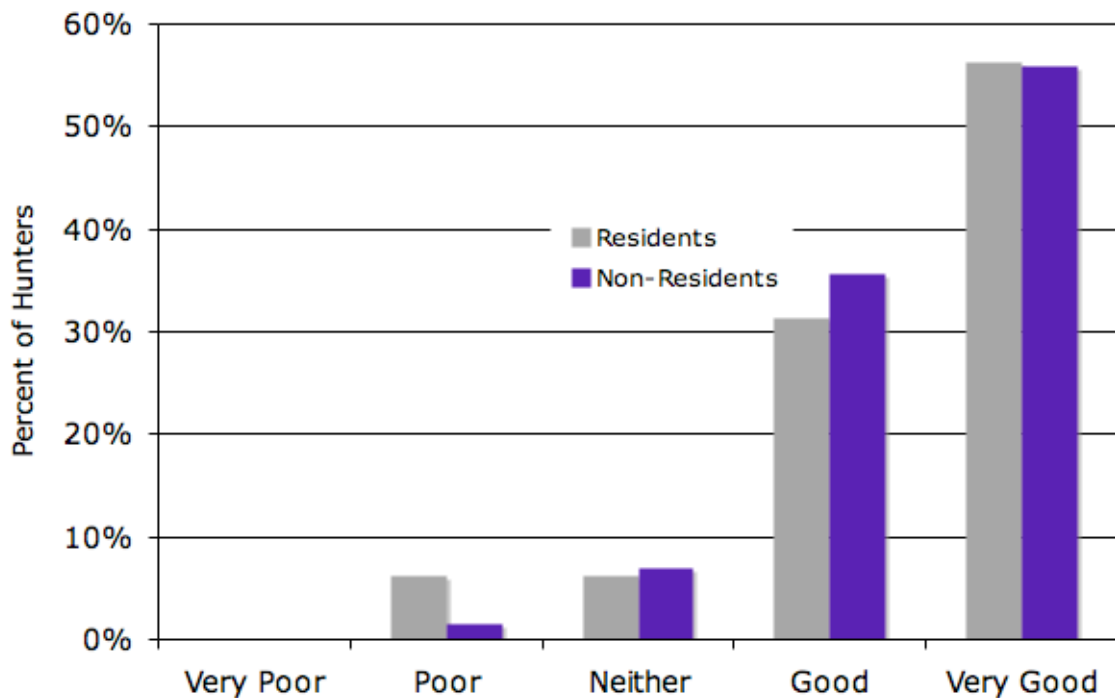


Figure 4.13. Experience appraisals of hunters on fee-based, private land. Chi-Square = 0.33, df = 2, P = 0.8479.

Because many residents who may have access to land of their own or a neighbor's land to hunt free of charge, only sixteen resident respondents took part in private fee-

based hunts, while 129 non-residents did participate. Overall, their experiences, like at hunting preserves, were all quite high because quality private hunting lands normally live up to their billing as having massive amounts of birds. Fourteen of the sixteen residents responded with good or very good experiences, and 118 out of the 129 non-residents said the same. Again, more often than not, private lands found within the core pheasant areas of South Dakota that do not see the same high hunting pressure as public lands are seen as offering hunters the best overall experiences when it comes to pheasant quantity and hunting quality, whether or not the lands are specifically managed for pheasants or are simply grasslands and crop fields owned by a local farmer.

Returning to the land cover/land use concerns relevant to both pheasant populations and hunting use, the survey asked respondents to identify the predominant type of land cover on the lands, both public and private, that they hunted on in 2006 (Figure 4.14). For these questions, respondents chose from the following list of cover types and were asked to check which type(s) of land they hunted for pheasants during the 2006 season: croplands, grasslands, trees, wetlands, a mix, or other. Respondents could identify any number of the cover types depending on their experiences.

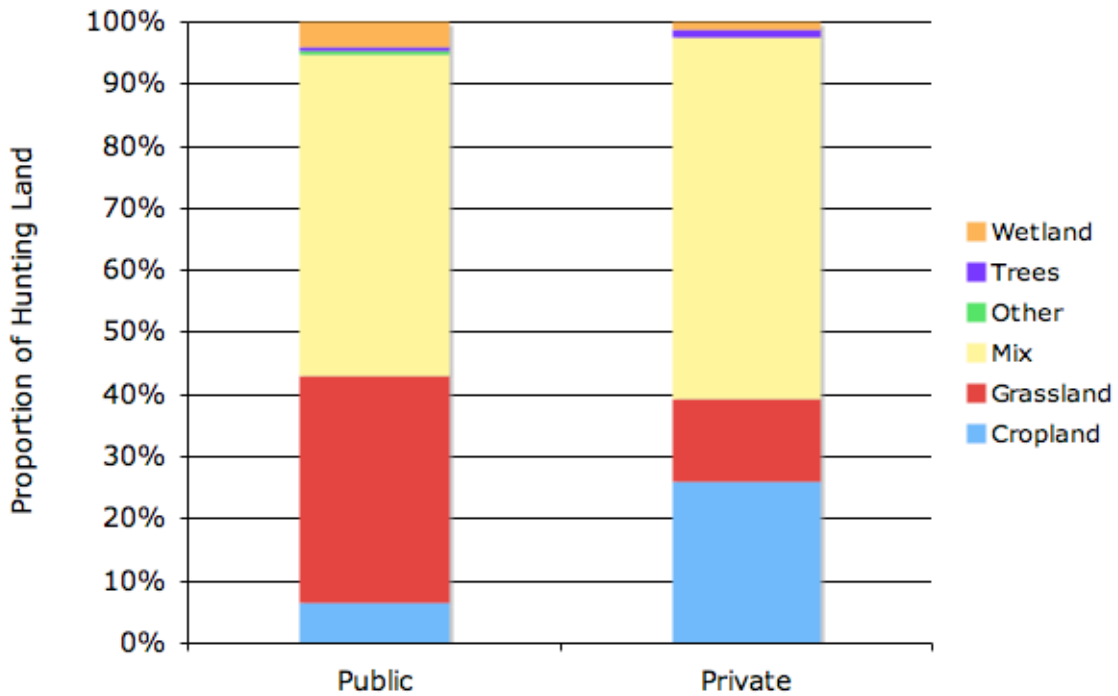


Figure 4.14. Predominant land cover differences between public and private lands.

Wetlands and grasslands are found more often on public lands, as oftentimes this is what solely comprises public hunting areas and was the reason for their initial purchase by state or federal conservation departments. Private hunting lands are comprised more of croplands because landowners, especially the average farmer, seldom will maintain large tracts of wetlands or sloughs on their property. Grasslands that are found on private lands tend to be either in the form of pasturelands or CRP fields.

Many times a hunter arrives at a public hunting area (WPA, GPA, Walk-In Areas) only to find that someone else arrived earlier and is already hunting. Question 12 asked hunters how often this had happened to them. This question starts to get to the issue of access and competition for hunting lands, often contended between residents and non-residents. The days of walking up to someone's farm and gaining permission to hunt on

his or her lands are quickly going away. More and more landowners have found that they can make money by charging an access fee to those who are willing to pay the money for this privilege. Because of this, public lands in South Dakota have now become the lands that people rely upon for what they consider as “sure things” when it comes to finding free, accessible hunting lands. This has led to increased competitions between hunters during the busy early weeks of the hunting seasons on public hunting areas across South Dakota.

Seventy-one percent of residents have had experiences where they had wanted to hunt a specific public hunting area, only to arrive and have it already being used (Figure 4.15). On the other hand, non-residents experience this only 53 percent of the time. The non-resident experiences with this are significantly different from resident experiences ( $p < 0.01$ ), likely based on the type of land hunted: non-residents are more likely to be hunting private lands, and it may be expected that such areas are under less hunting pressure (have fewer hunters using them). As already discussed, there is also an aspect of hunting etiquette that must be followed when hunting public lands, and those who do not follow that etiquette can cause unpleasant conflicts or even confrontations between others who feel they are entitled to hunt on the same piece of land.

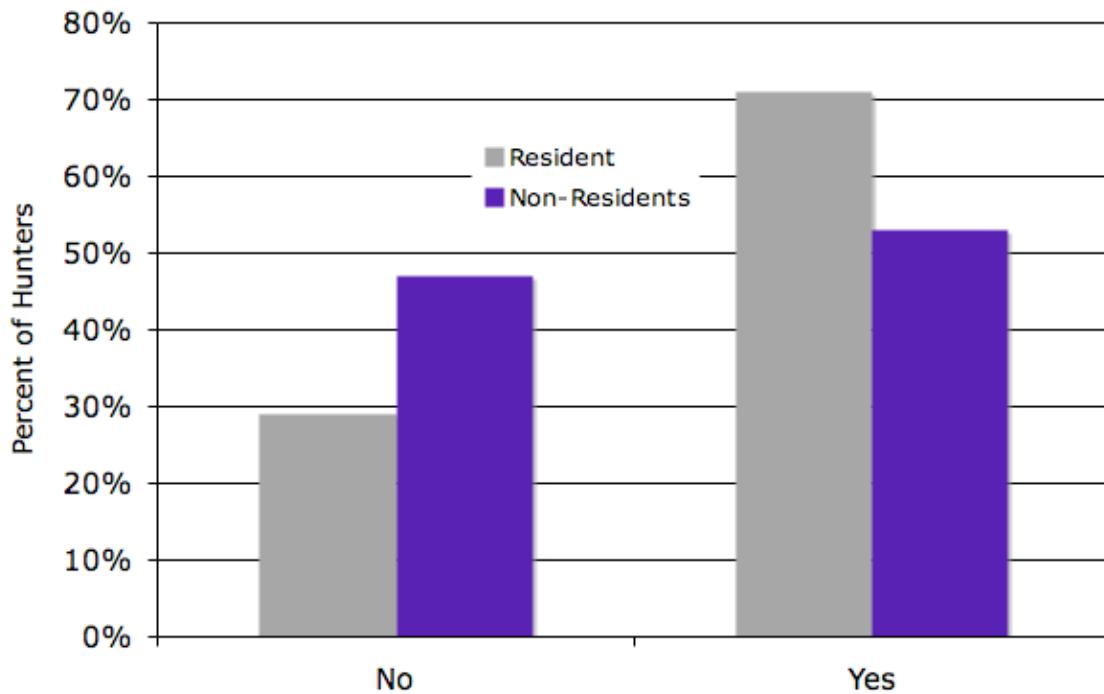


Figure 4.15. How often hunters found public lands they had hoped to hunt already being used upon their arrival. Chi-Square = 6.88, DF = 1, P = 0.0087.

Hunters' experiences of being denied access to land after asking permission of the landowner and being denied access to land on which they had hunted in previous years were addressed. Surprisingly, the ratios between residents and non-residents who were denied access in 2006 and who were denied access to land they had previously hunted were quite similar. There is no significant difference between South Dakotans and non-resident hunters: resident and non-resident difficulties with access are essentially the same. Only 30 percent of residents and 31 percent of non-residents experienced being denied access to private lands in 2006 (Figure 4.16), and only 17 percent of residents and 15 percent of non-residents experienced being denied access to land they had hunted in previous years (Figure 4.17). Continuing with the issue of accessibility, respondents were asked how difficult it was in 2006 to find free, quality pheasant hunting habitat on

which to hunt. Non-residents found it only slightly more difficult than residents to such areas in 2006 (Figure 4.18), but this apparent difference was not statistically significant.

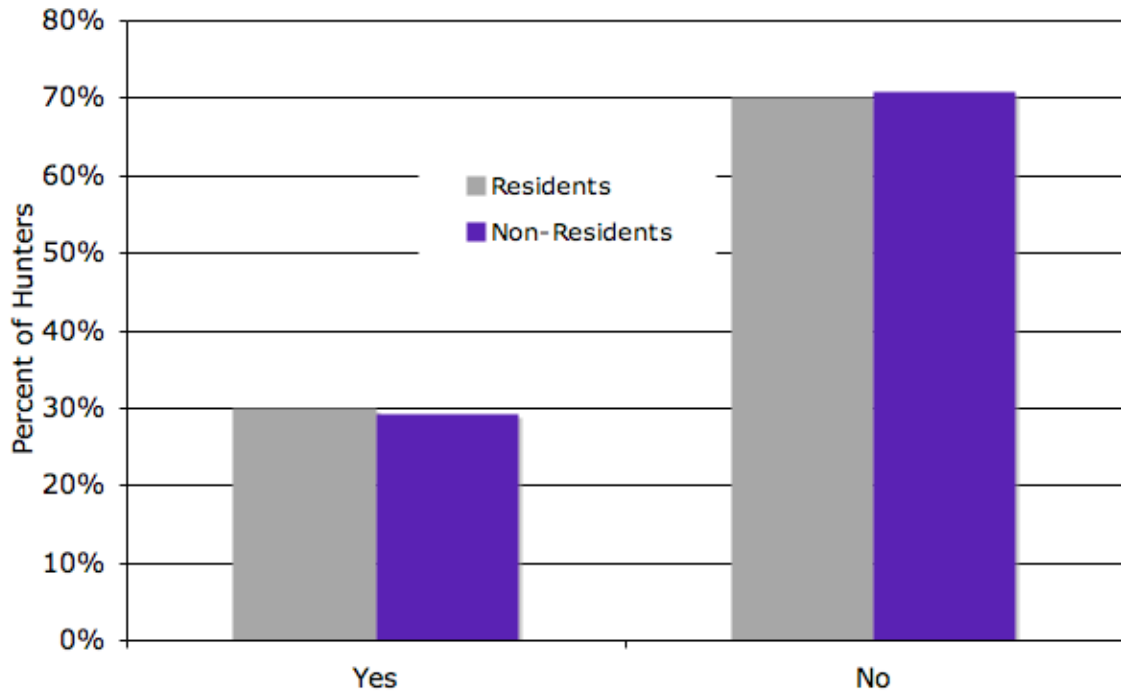
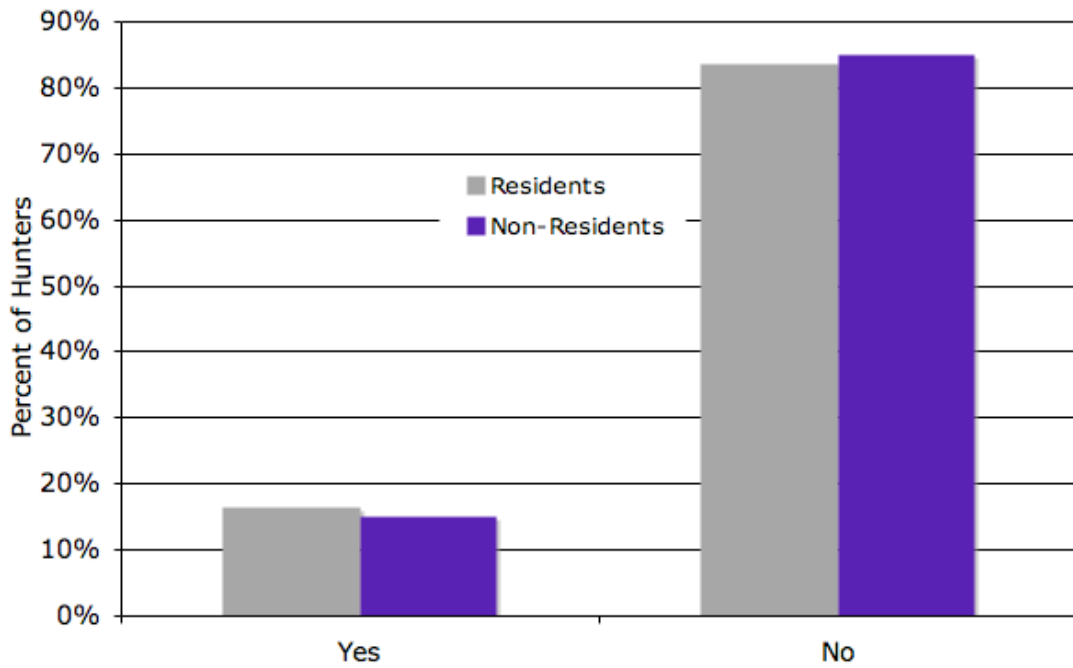
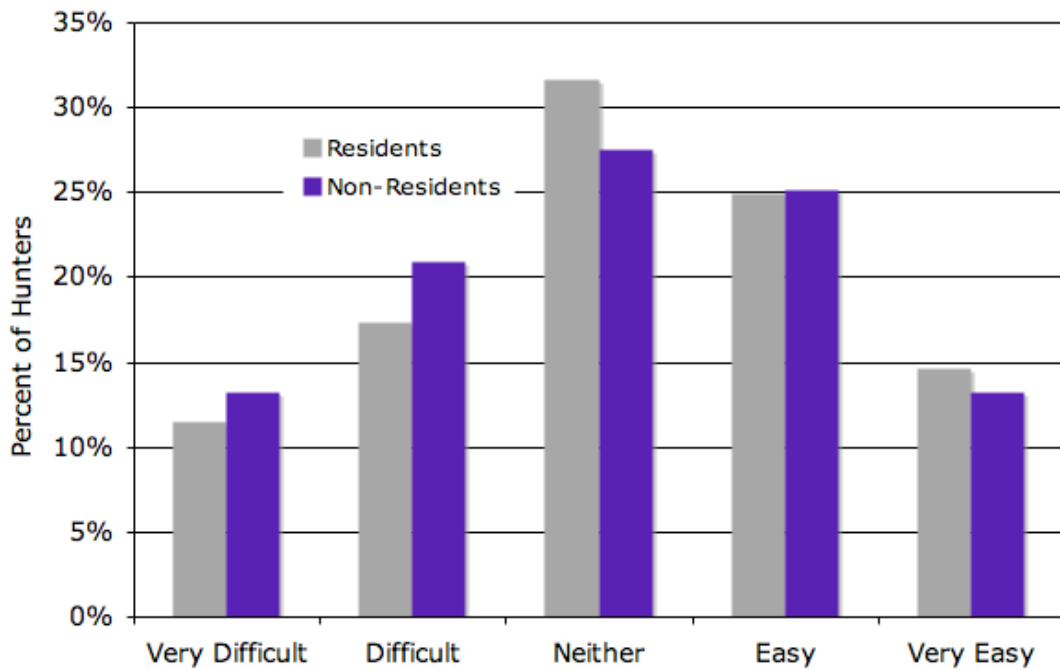


Figure 4.16. Number of hunters denied access to private lands in 2006 (after asking). Chi-Square = 0.02, DF = 1, P = 0.8875.



**Figure 4.17.** Number of hunters denied access to private lands in 2006 (after asking) that they had permission to hunt in previous years. Chi-Square = 0.23, DF = 1, P = 0.6315.



**Figure 4.18.** Difficulty hunters had finding free, quality pheasant hunting land to hunt. Chi-Square = 6.34, DF = 4, P = 0.1752.

The next set of questions was designed to determine how hunters ranked South Dakota in comparison with other states where pheasant hunting is popular (to varying degrees). Question 16 simply asked hunters which states they had previously hunted. Not surprisingly, more non-residents than residents have hunted in states other than South Dakota (Table 4.1). Most South Dakotans do not feel a need to go out-of-state, spending money on additional licenses, food, and lodging to participate in a sport that many can do in close proximity to their own homes. The vast majority of states listed by non-residents are their home state (Nevada, for example, was only listed once, and that respondent was from Nevada). When South Dakotans did venture outside of their state borders, they did not travel far. Only 7 of the 48 resident respondents traveled more than one state away from South Dakota. Most traveled to Minnesota, Nebraska, Iowa, or North Dakota.

Continuing with how other states compared to South Dakota, hunters were asked how South Dakota's pheasant habitat compared with other states. The responses to this question were not surprising. Survey respondents see South Dakota as having some of the world's best pheasant hunting habitat (Figure 4.19). The mosaic of land covers that are found across eastern South Dakota (discussed in previous chapters) make ideal habitat for pheasants, and the respondents recognized this.



Table 4.1. States in which non-residents and resident survey respondents had previously hunted pheasants.

<b>State</b>	<b>Non-Residents</b>	<b>Residents</b>
Minnesota	79	14
Iowa	77	7
North Dakota	40	8
Kansas	36	1
Nebraska	34	10
Michigan	23	1
Wisconsin	23	1
Illinois	10	3
Montana	8	2
Colorado	8	1
Indiana	7	
Missouri	7	
Ohio	6	
California	6	
Idaho	6	
Texas	5	1
Pennsylvania	5	
Oregon	4	
New York	4	
Wyoming	3	
Oklahoma	3	
Washington	2	
Nevada	1	
Massachusetts	1	
New Jersey	1	
New Mexico	1	
Utah	1	
South Carolina	1	
Florida	1	
Ontario, CA	1	

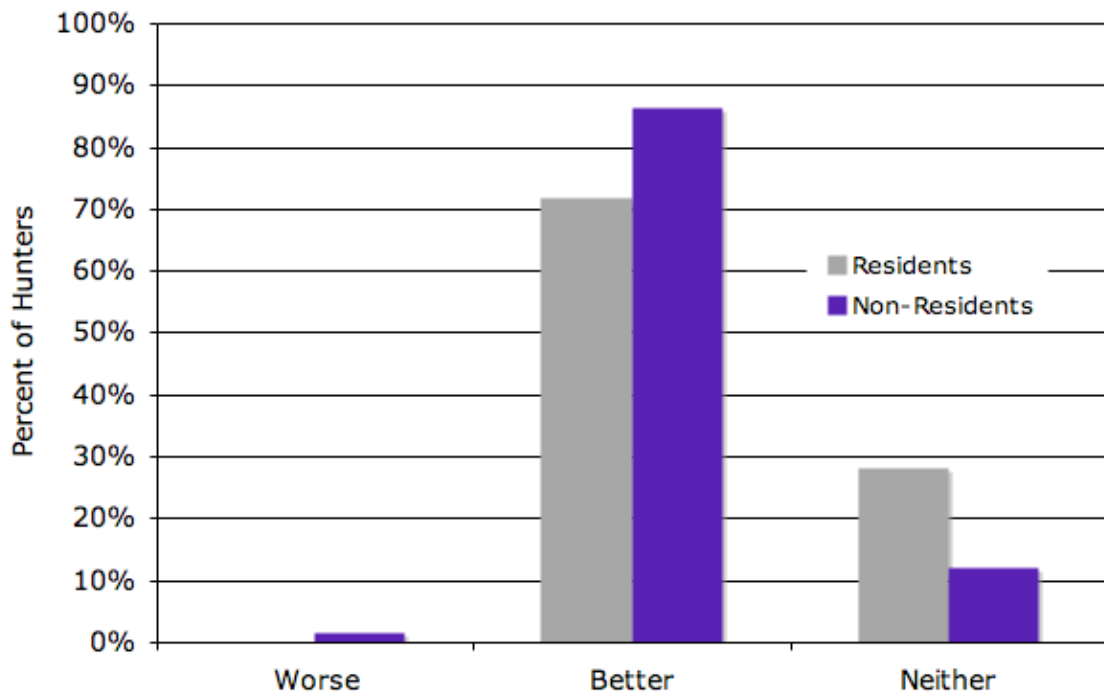


Figure 4.19. Hunter's opinions as to South Dakota's pheasant hunting as compared to other states in which they have hunted. Chi-Square = 15.02, DF = 1, P = 0.0001. The categories of "Worse" and "Neither" were grouped for P-value analysis.

Sometimes access to land does not vary much from state to state, and access often may be easier to obtain in other states. However, quality habitat that can support hunt-able quantities of pheasants actually can be what hunters look for. The survey addressed this by asking whether or not free, quality hunting land is easier to find in South Dakota than in other states. Free, quality hunting land could be either public or private lands. This question was asked in an attempt to find out whether or not there was a different perception between resident and non-resident hunters on accessibility to good hunting land in South Dakota versus other states (Figure 4.20). There may have been some interpretation of the question as representing the same concepts as illustrated in Figure 4.19, but the confirmation of overall positive impressions of pheasant hunting lands in

South Dakota are evident here, as well: 57 percent of the residents thought it was easier to find this land in South Dakota, whereas 51 percent of non-residents thought the same. This difference is not significant, however. Although not statistically significant, the apparent difference between resident and non-resident hunters likely is linked to the data which show that South Dakotans do not hunt in other states as much as non-South Dakotans. South Dakotans may have a bias toward the accessibility of land in their home state because they see this land every day, and perceive it as being better than what is be found in other states.

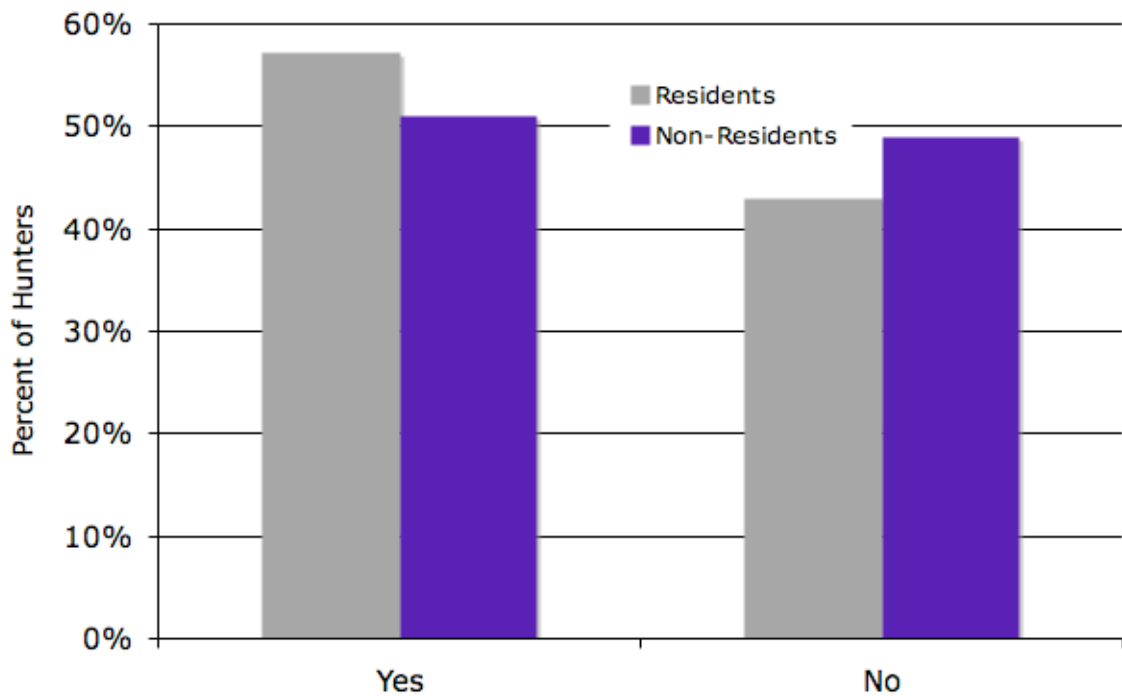


Figure 4.20. Number of hunters who said "yes" or "no" to the questions on whether or not free, quality hunting land is easier to find in South Dakota than in other states. Chi-Square = 1.2, DF = 1, P = 0.2733.

Question 19 dealt specifically with land accessibility in South Dakota and is directly linked to one of the more urgent issues surround South Dakota pheasant hunting:

the decline of access to free, quality pheasant habitat, especially on privately-held lands (Figure 4.21). Did pheasant hunters who hunted previously in South Dakota find access to free, quality pheasant habitat becoming harder to find? Ninety-nine percent of residents and 95 percent of non-residents see this type of land accessibility staying the same or becoming more difficult. There is statistical indication that residents and non-residents do, indeed have a difference here ( $p < 0.01$ ). A larger proportion of residents see this accessibility as becoming more problematic, possibly because of the amount of farmland in South Dakota being purchased by absentee landowners, some of whom are from out-of-state. Non-residents are only around for a few days each autumn, and likely based their responses solely on the difficulty of accessing hunting land for that period.

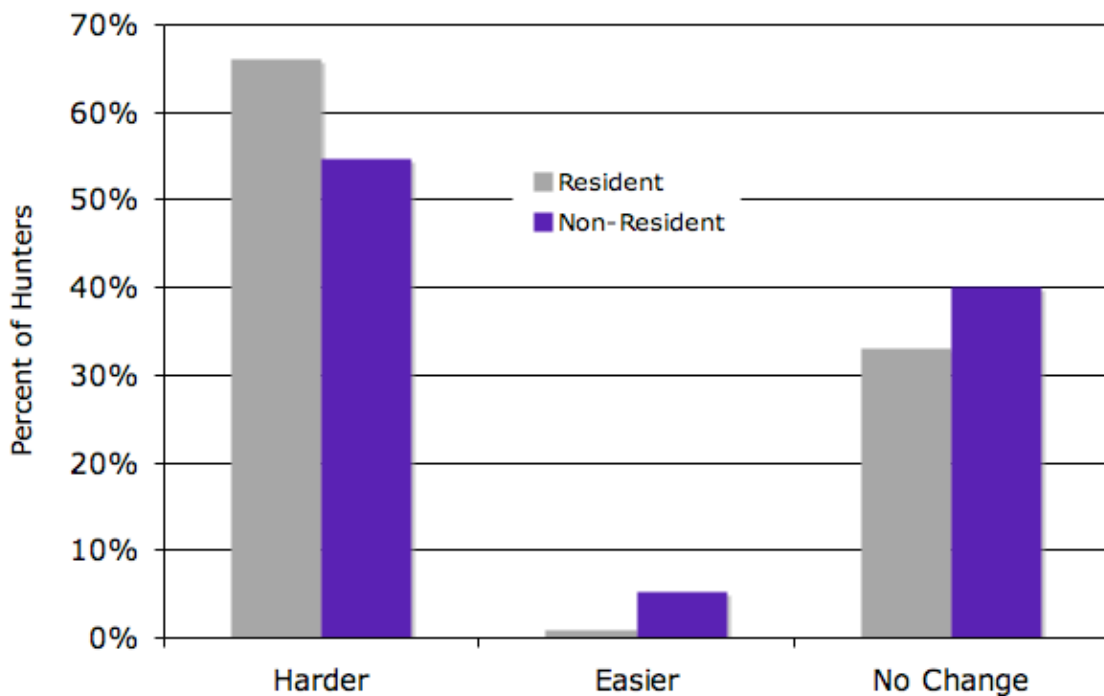


Figure 4.21. Difficulty of finding free, quality, hunting land relative to the past. Chi-Square = 12.78, DF = 2, P = 0.0017.

For most avid pheasant hunters, a trip to South Dakota is not a once in a lifetime opportunity. Hunters were asked if they expected to return to South Dakota in the future to hunt pheasants once again (Figure 4.22). Compared to most vacation destinations, South Dakota is quite inexpensive when it comes to lodging, transportation, and food. In the coming years, as today's economic crisis continues to affect many American families, the annual hunting trip to South Dakota may be put on hold, but more than likely not for good. (The difference between residents and non-residents is not significant at the 0.05 level, but p is less than 0.10).

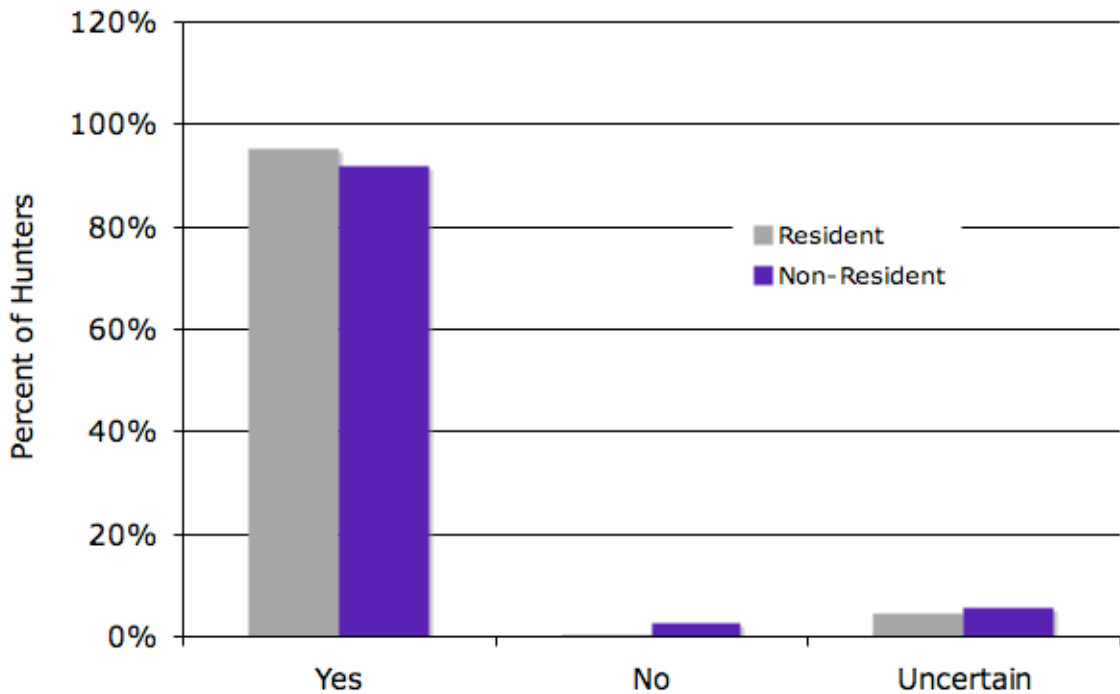


Figure 4.22. Do hunters expect to come back to South Dakota in the future to hunt pheasants? Chi-Square = 3.12, DF = 1, P = 0.0773.

While many outdoor sports such as hunting and fishing are becoming more popular with women, pheasant hunting in South Dakota is still a male-dominated activity.

Only 23 (3 percent) of the 668 respondents who provided their gender were females (Figure 4.23). A significantly larger proportion of resident hunters are female than are non-residents ( $p < 0.01$ ). National data (U.S. Fish and Wildlife Service 2008a, 2008b, 2008c, 2008d) show that the percentage of women participating in any kind of hunting has remained steady at 8-9 percent, or 1 percent of all women in the U.S., from 1991 to 2006. These numbers are up from the 1970s and 1980s, partly due to the efforts of hunting and conservation organizations, such as Pheasants Forever, that are hosting special women-only hunting events to try to increase the participation of women in outdoor hunting activities (Figure 4.24).



Figure 4.23: Gender of resident and non-resident hunters in South Dakota in 2006. Chi-Square = 13.29, DF = 1, P = 0.0003.



Figure 4.24: Women-only pheasant hunt in October 2008 sponsored by the Brown County, Minnesota, chapter of Pheasants Forever. Photo by Jeremy Berg.

On average, non-resident hunters tended to be older than resident hunters (Figure 4.25). This might be explained by a few hypotheses. First, it is possible that the cohort of hunters frequenting South Dakota from out of state is, on average, older than resident hunters. These people would need to have the money and the time to take hunting trips. The baby-boom generation, in 2006, would have been anywhere in age from 47 to 60 years old, comprising both of the largest groups of non-resident respondents. Alternatively, it is possible that older recipients had a greater tendency to return surveys than younger hunters.

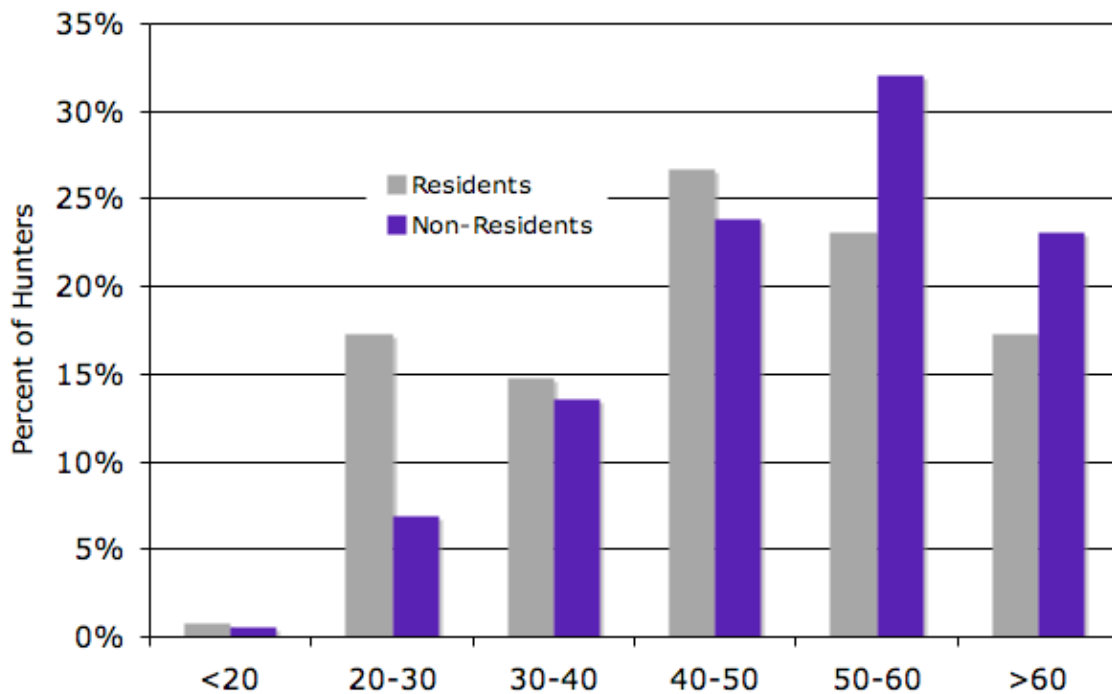


Figure 4.25: Age of resident and non-resident hunters in South Dakota in 2006. Chi-Square = 23.27, DF = 4, P = 0.0001. “<20” and “20-30” were grouped for P-value analysis.

Non-resident respondents have higher household incomes than resident hunters (Figure 4.26), with statistical significance ( $p < 0.01$ ). Again, these responses made sense. The median household income reported by the U.S. Census Bureau in 2001 for South Dakota was just over \$39,000. In contrast, Minnesota, the state that contributed the largest number of non-resident hunters to South Dakota in 2006, has a median household income of just over \$51,000. This does not take into account that many non-resident hunters live in urban areas and likely have even higher incomes.



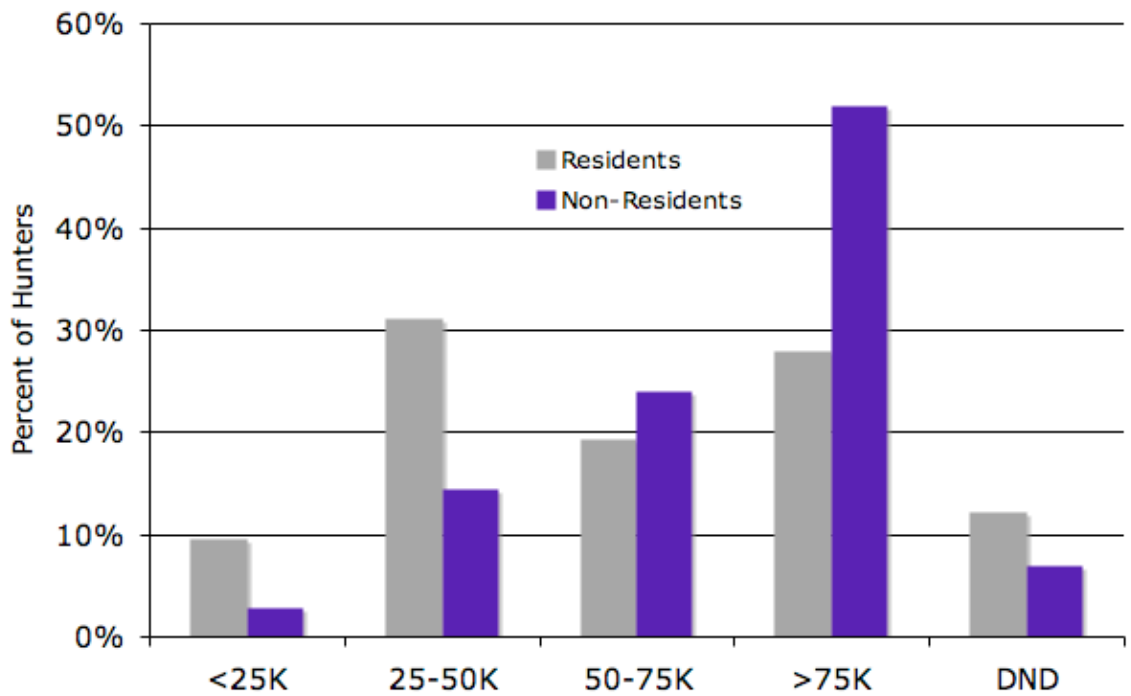


Figure 4.26: Estimate annual household income. DND = Did Not Disclose. Chi-Square = 63.72, DF = 4, P = <0.0001.

In education, the differences between South Dakota resident hunters and non-resident hunters were quite similar for most of the categories, except for those with 4-year college, masters, and PhD degrees (Figure 4.27). As with age differences, this likely is connected to the affluence of non-resident hunters.

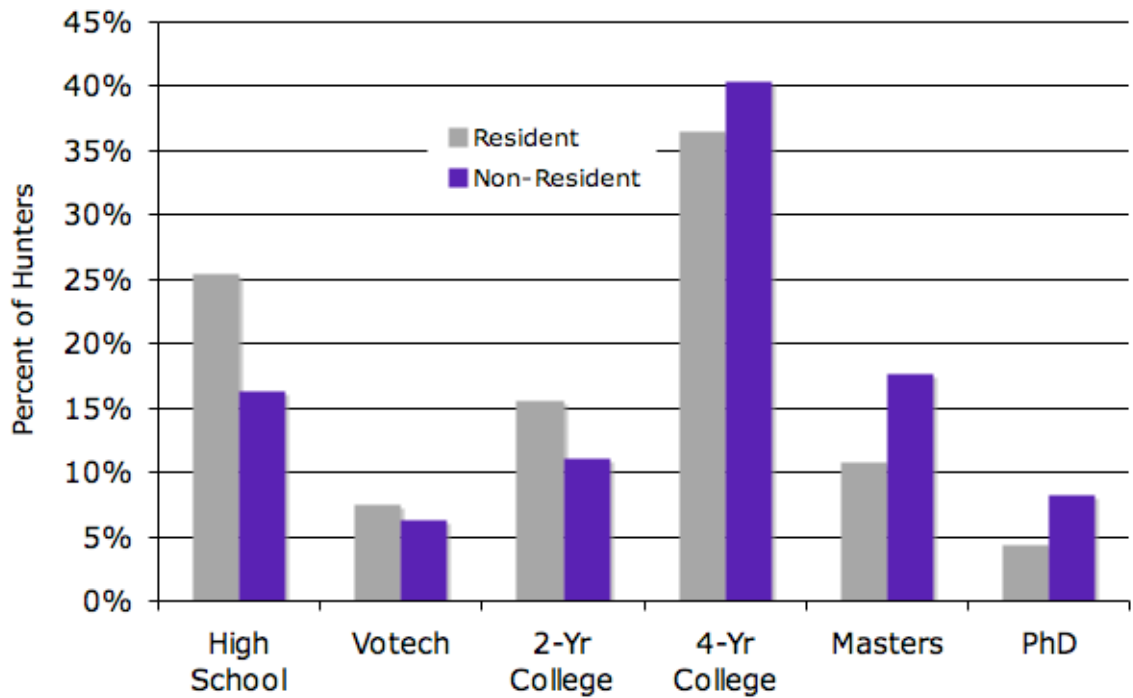


Figure 4.27: Highest level of education completed by resident and non-resident hunters in South Dakota in 2006. Chi-Square = 17.46, DF = 4, P = 0.0016. The categories of “Masters” and “PhD” were grouped for the statistical analysis.

## Respondent Comments

Accessibility seems to be one of the most important findings from this survey, and one that relates most closely to the research questions asked at the beginning. It was also one of the most prevalent themes in the responses to two open-ended questions on the hunter survey (Appendices C and D). Question 19 asked for a response to the question regarding the ease or difficulty in finding free, quality, pheasant habitat that they could hunt. The majority of both residents and non-residents proclaimed their dismay with the current trend of land privatization, although many non-residents stated that, unless the landowner were “a friend,” they would not have much access to private lands:

### *Resident Responses*

“If I did not own my own property, I would not have very good success at all.”

“Too many city people offer to pay farmers, therefore they don’t let us hunt even though I have known them for 50 years.”

“So much of the private land has become preserves and requires a large fee to hunt.”

“Landowners realize they can make a good profit by charging pheasant hunters to hunt their land.”

“Pay to hunt has become the norm and will ruin hunting in South Dakota. This trend is locking out the average SD hunter and young hunters. I don’t blame landowners since the money is too good to pass up, but it is counter-productive to the sport.”

“More and more hunting land is either being bought up by non-residents or residents that have paid non-residents (they know).”

### *Non-Resident Responses*

“Much, much harder. As a natural resource, it’s very frustrating to see farmers getting so greedy and charging ridiculous fees. We won’t pay them no matter what!”

“Not only free, but leased land was cut for hay. Our CRP land has been leased to crop growers now which means no hunting.”

“You can’t just knock on doors any longer. We purchased land to help get access to larger tracts of land.”

“My family has hunted in South Dakota for 30 years. The last 6-7 years we have lost access to over half of our hunting spots.”

“There is virtually no private land that is not pay-hunting or you must know somebody.”

“I have hunted South Dakota since the early 1980s, missing only a few years, but am nearing the end of my enthusiasm because of pay-per-gun, private commercial hunting, and having to wait for the 3<sup>rd</sup> weekend behind “take a kid” and “local hunters only”, then 3<sup>rd</sup> is non-residents. Public hunting by then get tougher each year.”

The last question of the survey asked respondents, if they'd like to leave any other related comments, concerns, or questions they had regarding the survey or South Dakota pheasant hunting. Many of the respondents did leave remarks in this open-ended format. Twenty percent of residents and 20 percent of non-residents left open-ended responses; some were short, simply saying "thank you for doing this survey," while others were quite lengthy and included extra paper that was needed for the respondents to make their point(s). Here are a few of the more interesting remarks that dealt with issues such as accessibility, loss of private land, and the overall experience of hunting pheasants in South Dakota:

### *Residents*

"It's becoming a rich-man's sport. All the farmers want money to shoot a bird that they didn't have to raise, feed, or have anything to do with. For the first couple weeks of the season the public land is overrun by out of state hunters. After that the birds are so gun shy you can't even get close to them. I know I only shoot pheasants if I see them. I rarely go hunting for them but I know lots of people that do. They go out to see their dogs work, and to spend time with their family and friends. If they get some birds, it's a bonus, that's not the problem, it's trying to find a place to hunt."

"Thank you for your study. I feel any CRP land that landowner is getting federal payments for should be accessible to the public. Right of way ditch hunting for 2-3 of us and a dog is all we have left and legislation is being introduced each session to try to end it. My boys don't hunt (19, 17, 13) because we have no relatives with land and I can't pay \$100, \$200, etc. to take 3 kids and myself out. It is a problem, but you can find the solution – best to you!"

"Many landowners seem to be prejudice to anyone that has the #1 (Sioux Falls license plate) on the license plate. They assume because we are from the "city" that we can afford to pay. This is not the case. I have on a couple occasions been turned down while using my vehicle only to return with a different person and vehicle and get let on. The only difference, the number on the license plate."

“I feel as though South Dakota’s hunting land and natural resources in general are being abused by affluent, spoiled out-of-state hunters. I am aware of the amount of money pumped into SD’s economy from them, however does not give them the right to abuse our resources. They are set loose to hunt in a field with “planted” pheasants, unload their guns on 1 bird, leaving it unrecognizable when it hits the ground. Then pay someone to clean it for them. I have feared for my own life in more than 1 case hunting public land with out of staters around. There are always exceptions to the rule...I’m off to fish the Missouri River, shoot...that’s being abused by the out of state populations too!”

“Hunting is turning into a rich-mans sport, the only way to hand it down to your children is to have your own land, but the “rich man” are buying that up too, so all that’s left in the future will be public land which will be overrun with hunters and what really upsets me is the “rich men” who own land next to public land use cattle/livestock laws to herd livestock and anything else (deer, pheasants, etc.) off public land into theirs, then deny wildlife from returning during the hunting season so we don’t have a chance at trophy hunts like years ago.”

### *Non-Residents*

“I bird hunt all over the world; Argentina, Uruguay, and Paraguay during the last 24 months. Have hunted out of Winner for 15 years. The first nine or ten were free. Some of my closest friends live in SD, and I would pay \$100 / day to be there if I didn’t fire a shot. For me (and the 10 or so I bring each year) South Dakota is more than just shooting. It is the people and lifestyle.”

“I live 30 miles south of Boston and areas I rabbit and pheasant hunted as a youth have been swallowed up by suburban sprawl. My trip to Winner, SD was an extremely enjoyable trip. The people in Winner were very friendly to outsiders who came to hunt. It’s beautiful country, and I can’t wait to go back. It was nice to see hunting and hunters viewed in a positive way, as in Massachusetts, that is not the case.”

“I have hunted pheasants in 6 states. Every year South Dakota is best. I wish it were not so far, and I would go every weekend. S. Dakota needs to increase walk in access like Kansas. But population #'s keep me coming back. South Dakota in a bad year is better than most in a good year.”

“We have a group of 12 guys that have hunted at the same farm for 21 years. The farmers have let us build a pheasant shack on their property as it has become an event for them and their families along with us that is looked forward to each year. We help work cattle (about 600 head) while we are there. Their hospitality is classic South Dakotan. We use their

trucks to hunt and they always strip corn for us. We are and never will be charged a fee. They farm about 6,000 acres. Hopefully this sport doesn't turn into a sport for the wealthy only. Thanks for the study."

"I personally know friends that have been threatened at gunpoint for hunting land they thought was public. I also have no problem paying for good quality wild bird hunting. However, there should be a cost break for kids under 18 – the landowner I hunt with does just that."

"My family started hunting in South Dakota in 1963. My grandfather met a man from South Dakota at a cattleman's association meeting in Houston, TX. They became friends and started hunting together. It is now 3 generations later and we are still coming to South Dakota every opening day of pheasant season. My son has now been for the past two years. He is sixteen. I think it's a great tradition to pass on. Just like my dad did and his dad to him. All because two guys bumped into each other at a meeting in TX."

Comments made by non-residents on the last question of the survey seem to be much more optimistic about South Dakota pheasant hunting than residents (See Appendices C and D for all responses), aside from the party who was apparently held at gunpoint when trespassing. In the open-ended answers the affluence of the non-resident hunters comes through. The vast majority who pay to hunt do not complain about having to do so, while those who hunt on public ground feel that they are being unfairly treated because of the resident-only seasons that preclude non-resident opening day.

## **Survey Discussion**

The results of this survey, by and large, were not terribly surprising, although they did yield some data that were useful in identifying issues regarding what kinds of lands were hunted on, accessibility issues, as well as some interesting socioeconomic issues. However, most of the results garnered from the survey would be better used, and will be better used, in studies other than ones associated with land change science.

Some of the more interesting findings were that non-residents tended to be older in age, better (more highly) educated, and had higher average incomes than South Dakota residents. This seems to indicate that pheasant hunting trips to South Dakota, at least for the non-resident hunters, is somewhat of a luxury that, on average, the better educated, wealthier class of non-residents can participate in, while the residents hunters of South Dakota are generally younger, less educated, and not as wealthy.

Other interesting results that are more related to land use are that resident and non-resident hunters are using different parts of the state on which to hunt pheasants. Non-residents are traveling further west, to the less densely populated areas west of the James River, where there are large expanses of private lands (both simply private farmlands or private hunting lodges). Residents, on the other hand, tend to stay east of the James River and in counties along the I-29 and I-90 highway corridors, or where most of the population of eastern South Dakota lives.

Questions related to hunter's experiences on public and private lands were fairly consistent between the two groups. However, in the open-ended questions, themes pertaining to land privatization and agricultural land changes were evident. As long as agriculture dominates the rural landscape of South Dakota, accessibility and land ownership will continue to be key issues that drive the pheasant hunting industry. Many of the respondents who fear for the future of the sport may be correct: free, quality, hunting lands are becoming scarcer as fewer landowners own more land, especially as land prices and commodity prices continue to rise.

## CHAPTER 5 - The Land

### Hunting and Land Use

Hunting is a recreational sport (land use) that takes place in various types of settings or land cover. Waterfowl hunters are usually found on cold autumn mornings near a wetland, in flooded timber, flooded crop fields (usually corn or rice), or on larger lakes or rivers. Big game such as deer may be hunted on virtually any type of rural land cover, from forests to agricultural lands and prairies. Pheasants and many other upland game species, including partridge, quail, chukar, and grouse may also be found on quite a wide variety of land cover, including agricultural settings such as corn fields, plots of sorghum, wheat and other small grains; vegetation surrounding lakes and wetlands; grasslands; and relatively small patches of trees.

With respect to the land resource base, however, hunting is very seldom the primary land use of a particular area. Of the roughly 25 million acres that comprise eastern South Dakota's pheasant range, only one to two percent is managed specifically for wildlife, with only a fraction of that being managed solely for pheasants (Coughlin 2008). Most land used for pheasant hunting has or had a primary agricultural use such as cropland or pastureland, as well as former agricultural lands that have been converted to some type of conservation land. This said, determining changes in the amount of habitat or hunting land for the pheasant or any other game species is quite difficult.

In South Dakota it is not uncommon to see large groups of hunters walking down the rows of an unharvested cornfield. Corn is a staple of the pheasants food supply.



However, the decision to use the cornfield as hunting land was a decision made by the landowner. In addition, his decision to plant corn in the first place was driven most likely by the fact that soil and climate in eastern South Dakota are suited to the crop, and the market for corn is profitable. An identical cornfield on the other side of the road, planted for the same reasons, may contain the same number of pheasants and offer the same quality of hunt, but that landowner may choose not to let anyone hunt on his land.

Complex feedbacks among human and natural systems help drive pheasant hunting in this country. For example, on the natural side, soils and climate have to be appropriate to grow the types of food pheasants eat. Climate has to be such that pheasants have successful hatches in the spring and ample insects for the chicks to eat and water to drink. On the human side, the decisions made with respect to land use and land cover (the percentage of land in crops, grasslands, wetlands, etc.) determines the success and abundance of pheasants in any given area. It becomes complex when one begins to understand how tightly these two systems are woven together. The human decision to plant certain types of crops is dictated by climate and soil (natural drivers), but also by what the agricultural market (human driver) tells the farmer he will make the most money by planting. Landowner decisions regarding special management actions to encourage gamebirds or to open land to hunting play a role, and the potential hunting experience, including environment, hunt success, economic and time costs, and camaraderie among hunters play a role on the other side of human decision making with respect to hunting.

Boom and bust cycles in pheasant populations have been common in South Dakota. During the mid-1900s good weather and abundant habitat brought populations

to record highs (Trautman 1982). Early cropland retirement programs of the 1930s and 1950s-60s have also influenced population cycles (Edwards 1994). These programs, coupled with favorable weather, were responsible for record numbers of pheasants in the 1940s – years that may never be eclipsed. More recently, the impact of the Conservation Reserve Program (CRP), which also coincided with milder weather and habitat-friendly land use practices, has created another boom in pheasant population and hunting in South Dakota (Ryan, Burger, and Kurzejeski 1998). Historically, when populations suffered severe declines, it was likely a response to changes in both land use and weather (Labisky 1976; Trautman 1982).

The relationships and feedbacks among pheasants, land use, policy, and climate/weather in South Dakota are the focus of this chapter. This begins with a consideration of the characteristics that make South Dakota special when it comes to pheasants and pheasant hunting. Three periods of time are then identified and examined, with each corresponding to a combination of both human and natural driving forces that together helped to change land use and land cover, along with pheasant habitat, populations, and hunting. Finally, the chapter concludes with analysis of current issues surrounding the CRP and comparison of past changes in government land retirement programs to what is happening today.

## **Weather and Habitat**

Pheasant numbers fluctuate in the extremely dynamic continental climate of South Dakota (Winter and Rosenberry 1998). Precipitation deficits coupled with environmentally unstable land use put South Dakota on the northern edge of the 1930s Dust Bowl. Conversely, precipitation surpluses in the 1990s caused extreme flooding in

eastern South Dakota, creating Lake Thompson, a former wetland complex that is today the state's largest lake (Winter and Rosenberry 1998). Recent increases in temperature and growing degree days (Graesser 2008) have allowed crops such as corn to become viable and profitable options for farmers in northeastern South Dakota. Long-term climate changes affect and often drive land use change, and thus strongly influence the size of the state's overall pheasant population. Short-term, annual variations such as severe winters or cool, wet springs are also important and can cause dramatic local decreases in pheasant numbers (Trautman 1982).

What really sets South Dakota apart is what wildlife biologists facetiously term the 3-H's: *Habitat, Habitat, and Habitat* (South Dakota Game, Fish, and Parks 2008c). Historically, eastern South Dakota has had a near perfect blend of row crops, small grains, fallow land, pasturelands, grasslands and abandoned farmland (Figure 5.1). Climate and soil dictated what grew well in this region, and what was grown created prime conditions for pheasant nesting, feeding, and cover from predators and weather. Periodic changes in landowner decisions based on agricultural markets and policy brought about habitat changes and created boom and bust cycles in pheasant populations.



Figure 5.1. Some of the diversity of the eastern South Dakota landscape is depicted in this painting by Maynard Reese, entitled “Weedy Draw.” Reese captured common landscape elements, including row crops, grasslands, idle acres, and an abandoned farm site. *Source:* [www.maynardreecegallery.com](http://www.maynardreecegallery.com). Used with permission from the Maynard Reece Gallery, Des Moines, Iowa.

Agriculturally, this region is close to the western fringe of the Corn Belt that stretches from Illinois westward through Iowa and Minnesota. Eastern South Dakota has a more diversified crop composition than the core Corn Belt states, where agricultural land cover is predominantly corn or soybeans. This diversity is reflected in a comparison between one of Minnesota’s best pheasant counties (in terms of pheasant harvest), Jackson, with one of South Dakota’s best (in terms of pheasant harvest), Gregory, 250 miles farther west (Figure 5.2). Virtually all agricultural lands in Jackson County are planted to corn or soybeans, whereas Gregory County has a diversified mix of corn, soybeans, forage, and small grains. Landscape diversity is key to pheasant survival, both

for food and cover (Vandel and Linder 1981). Even idle, unmowed patches of grasslands around abandoned farmsteads, field corners, and section lines are extremely beneficial to pheasants.

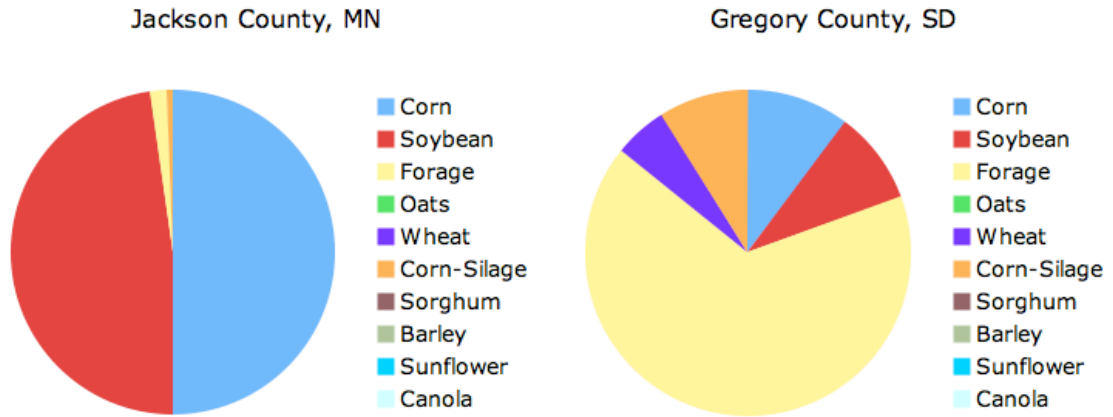


Figure 5.2. Agricultural land use composition of Jackson County, Minnesota, and Gregory County, South Dakota. *Source:* United States Department of Agriculture NASS 2008a and 2008b.

### Public and Private Hunting Lands

A crucial component of the pheasant-friendly land use mosaic is South Dakota’s public land. The creation of the state-owned public hunting and game habitat lands can be attributed to the dedication and monetary support from hunters themselves. Hunters were more than three times as likely as non-hunters to participate in organized wildlife conservation efforts (Responsive Management 2008). Only 15 percent of non-hunters said they were a member of, or donated to, any organization dedicated to the protection or conservation of wildlife such as Pheasants Forever or Ducks Unlimited, whereas 51 percent of hunters said they belonged or donated to such an organization.

South Dakota’s land ownership is generally divided into three categories: 80 percent is privately owned, 10 percent is part of Native American Reservations, and 10

percent is part of publicly-held lands (Coughlin 2008). Much of the publicly held 10 percent is in the western part of the state, where pheasants are less abundant (for example, the large tracts of U.S. Forest Service lands in the Black Hills and the expanses of BLM lands), but significant public land is found in eastern South Dakota pheasant country as well. Both state and federal lands are vital components to the public land systems of South Dakota.

The acquisition of public lands and the addition of them to the hunting landscape of South Dakota can largely be attributed to federal and state agencies, including the U.S. Fish and Wildlife Service and the South Dakota Department of Game, Fish, and Parks, which created programs to help fund the purchasing of lands suitable for wildlife. The federal Duck Stamp Act of 1935 authorized acquisitions of wetlands as Waterfowl Production Areas (WPA). Nearly 95 percent of these are located in the Dakotas, Montana, and Minnesota (U.S. Fish and Wildlife Service 2008e). To date, over 150,000 acres of wetlands and grasslands have been purchased in South Dakota using money from the sale of federal duck stamps (Coughlin 2008). While the purpose of these lands initially was to help waterfowl populations, wildlife in general—including pheasants—benefited from the lands acquired and set aside by conservation-minded organizations and landowners (Figure 5.3).



Figure 5.3. Hunting in a federally owned Waterfowl Production Area. Photo by Wade Harkema.

In addition to the federally owned lands, the state also has set aside conservation land. Game Production Areas (GPAs) are managed for the production and maintenance of all wildlife species, although emphasis varies from site to site (Figure 5.4). South Dakota has 696 GPAs totaling more than 250,000 acres. Money to purchase these lands comes from state hunting license fees (Smith 2008). The land cover of these varies, but is usually a mix of grasslands, wetlands, and - in some cases - plots of food crops (corn, sorghum, or some other field crop).



Figure 5.4. A state-owned Game Production Area. Photo by author.

Walk-In Areas (WIA) are created by another state program (Figure 5.5). These lands are rented by the state from landowners at a rate of \$1 per acre, and an additional \$5 per acre for land that is in a permanent cover beneficial for wildlife, such as wetlands or native grasses (Smith 2008). The quality of habitat in WIA varies greatly, and it is rarely of the quality that one finds in WPAs or GPAs. For example, two farmers may enroll two 40-acre plots in a WIA contract. One of them may be a 40-acre grassland that can be hunted in its entirety, whereas the second farmer may have enrolled a 40-acre plot with a two-acre wetland surrounded by 38 acres of soybean stubble. It is still considered a 40 acre WIA, but the only beneficial habitat is the two-acre wetland.





Figure 5.5. An example of a state leased Walk-In Area. Photo by author.

The last, and most interesting, type of public lands available for hunting is the public right-of-way (ROW). ROWs range from paved roads to unkempt minimum maintenance roads found along the old Public Land Survey System section lines. In South Dakota it is legal to walk along these and, if one stays within the legally defined 66-foot-wide ROW, to hunt pheasants on them. It is also legal to hunt while driving a vehicle on any public ROW except state and federal highways, in what is known as “road hunting.” When a pheasant is spotted or heard<sup>4</sup> scurrying into the ditch, hunters park

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<sup>4</sup> When road hunting, one of the tricks-of-the-trade is to roll down the window and listen for pheasants. If the roadside grass is dry, the sound a startled pheasant makes while trying to scurry away

their vehicle, get out, and shoot the bird if it takes flight (Figure 5.6). Although many purists find this method unappealing and lazy, it draws many hunters as both public and private lands become more crowded.



Figure 5.6. Road hunting in South Dakota. Photo by Laura Neel used with permission of *Sioux Falls Argus Leader*.

Not surprisingly, road hunting is a contested practice, especially when land adjacent to the ROW is part of a private hunting business. The South Dakota Supreme Court has heard cases in recent years from landowners wanting to ban road hunting because birds *they* raised and released for *their* paying hunters wandered off private property and into the public ROW, becoming fair game for all hunters (Berg 2006). The question arose, whose bird was it? The private landowner may have purchased the bird as a chick and later released it, so he feels entitled to it and the money it is worth, but someone road hunting has no way of knowing the origins of the bird (Figure 5.7).

Another issue involved with this debate is whether or not a hunter can shoot a bird flying over private property if the hunter is within the 66-foot ROW. If the bird takes flight

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unseen (a “swishing” sound) is often audible to the driver. As a first line of defense a pheasant will run; it will generally only take flight as a last resort if it feels cornered.

from the ROW, it is legal. If the bird takes flight from private land, it is not. Each county has only one conservation officer, so many “border” issues such as these are often impossible to enforce, which can lead to greater controversy. The courts have always ruled in favor of road hunting, but quarrels over private versus public land accessibility are far from over (Shouse 2004b).



Figure 5.7. Pheasants found at the edge of the private/public property boundaries have sparked debate over the ownership of the birds. Photo by Terry Sohl, [www.sdakotabirds.com](http://www.sdakotabirds.com).

Private land is also available for hunting. Some landowners have enrolled their land in “preserves” (South Dakota Game, Fish, and Parks 2008d), paying fees to the state and releasing pen-raised pheasants to help replace the birds harvested, whether they were pen-raised or wild. The establishment of a preserve entitles these operations to a longer hunting season and a higher bag limit. Instead of an autumn season lasting three-and-a-half months, preserves can be hunted from September to March.

Pheasant farms, businesses set up by landowners or businessmen that cater to hunters, are another way private land becomes available (Figure 5.8). They are actually more common than preserves (Woster 1999). These establishments may consist of only a spare bedroom in the house of a landowner who allows hunting on his/her land, or be an all-inclusive resort, offering clients dining, lodging, transportation, game cleaning, and equipment. The latter outfitters tend to appeal mostly to non-resident hunters, or to those who have the financial means to spend hundreds or thousands of dollars for five days of vacation pheasant hunting.



**Figure 5.8.** The Rooster Roost Ranch, an example of a private pheasant “lodge” just south of Mitchell, South Dakota. Photo by author.

The majority of private-land hunters, however, simply frequent the croplands, wetlands, pastures, or grasslands owned and operated by rural residents. Hunters from around the world make the annual pilgrimage each year. Some access the land of family

or friends, and some may be private landowners themselves. In the past it was not uncommon to drive up to someone's residence, ask permission for access to their land, and enjoy a full day of hunting. As pheasant hunting becomes more profitable for landowners—who charge hundreds or even thousands of dollars per person for private land access—less free access land than in the past is available for the ever-increasing number of hunters. Today, with more private landowners charging hunters for access, more complaints of hunter trespass, and more quarrels between landowners and hunters over access rights, residents who have hunted their adjacent neighbor's land for years are being turned away (Figure 5.9). In turn, many have purchased their own land just for pheasant hunting (Woster 2006).



Figure 5.9. Old tires often have a second life as signs warning hunters that unless they have permission to hunt in a particular area, their presence is not welcome. Photo by author.

From 2000 to 2007, the percentage of people purchasing land for hunting or recreation in eastern South Dakota has increased from 16 to 23 percent (Janssen, Pflueger, and Ahrendt 2007). In 2003 alone, 34 hunters bought 9,848 acres, or more than 15 square miles of land (Shouse 2004a). As the population of rural South Dakota continues to decline, farmstead auctions are commonly attended not only by local farmers bidding on farmland, but also by people on cell phones, calling out bids from as far away as Florida in hopes of securing their own piece of hunting land on the South Dakota countryside (Shouse 2004a).

### **Booms and Busts**

Since 1920, pheasant populations have experienced four boom periods and three bust periods (Figure 5.10). These booms and busts were driven by changes in policy, land use, and climate/weather. The first boom period began in the “Dirty Thirties” (1930-36). Crop failure caused by long-term drought and a major economic depression led to “slip-shod farming practices” (Trautman 1982, 59). With bank failures and landowner bankruptcy, farmland was abandoned and it reverted to weeds and grasses. At the same time, the first major government land retirement program was enacted in 1936: the Agricultural Conservation Program (ACP). In the new landscape of abandoned farmlands and increased expanses of grassland, pheasant numbers quickly reached 12 million.

A short-lived bust followed this boom. Climate conditions improved following the Dust Bowl years, and farmers were again able to till more acres. Pheasant habitat was lost. Pressures on the pheasant population were compounded by the most severe period of starvation among the birds in history. Eighty percent of the population was lost during

the winter of 1937, when more than 70 inches of snow fell on eastern South Dakota, accompanied by prolonged sub-zero temperatures (Trautman 1982, 63). Nonetheless, even with the loss of natural habitat, the diversified farming of this period helped populations recover quickly. They continued to increase into the second boom period, which occurred during the years of World War II.

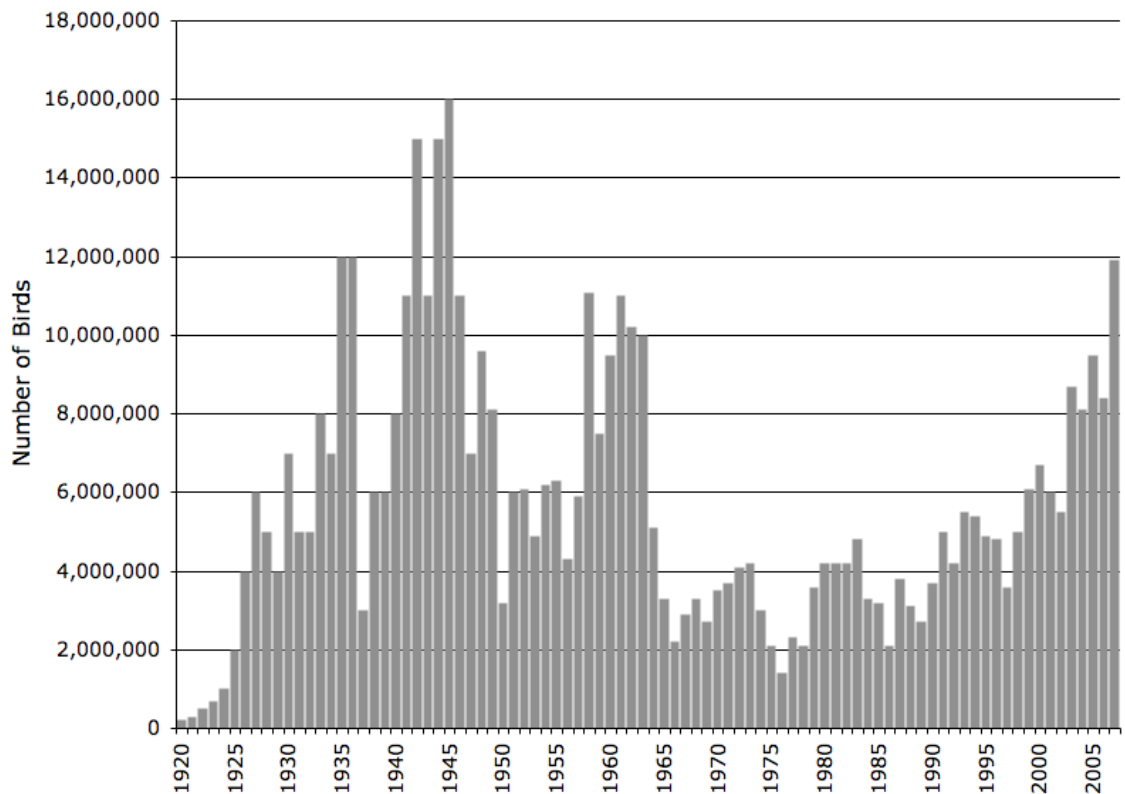


Figure 5.10. South Dakota pre-season pheasant population, illustrating the booms and busts of the South Dakota pheasant population, 1920–2007. *Source:* South Dakota Game, Fish, and Parks 2008b.

During the war, tractor fuel was rationed and farm laborers were scarce (Trautman 1982, 59). Agriculture declined, creating large acreages of partially used croplands and expanding grasslands—both prime habitat for pheasants. The climate of those years was also pheasant friendly. Above normal rainfall filled the numerous

“prairie potholes” of eastern South Dakota and supported sturdy and dense stands of vegetation that became much needed protective winter cover for pheasants. Populations reached an estimated 16 million birds in 1946, the highest ever recorded and most likely the highest that will ever be seen (South Dakota Game, Fish, and Parks 2008b).

The second bust period began when World War II ended. Soldiers came home to their farms and began working the land again, removing vital nesting and winter habitat. Exacerbating this second decline in habitat were changes in the weather: warmer than normal spring temperatures spoiled hatches in 1946, another severe winter struck in 1947-48, and a second abnormal spring hatch occurred in 1950 (Trautman 1982). These factors, as well as increased bag limits,<sup>5</sup> led to another major decline.

Pheasant population dynamics changed dramatically during the 1950s. Agriculture became more intensive and less diversified, with the result that populations were much slower to rebound after catastrophic losses. Severe weather events such as blizzards had much more lasting impacts on pheasant populations. In earlier bust periods that had followed habitat losses or severe weather events, populations had recovered relatively quickly, normally in five to ten years.

The third boom period began in 1956, lasted for about eight years, and corresponded to the establishment of the precursor of today’s CRP, the Soil Bank (Edwards 1994). Agricultural lands were taken out of production and seeded into

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<sup>5</sup> In the 1944, hunters could harvest ten birds, five of which could be hens. This had a large impact on subsequent populations, as there were fewer hens to lay eggs. Hunting males (cocks) under current bag limit conditions has no impact on the next year’s population as one male will breed with upwards of ten females (Haroldson 2008a). The last year that it was legal to harvest hens was in 1947. During the late 1950s and early 1960s, bag limits again went up to five birds during the pheasant friendly Soil Bank years, but since then bag limits have been either two or three cock pheasants per day, with the limit today being three.



perennial legumes and grasses. Pheasant populations increased to an estimated 11 million birds.

The Soil Bank boom was short-lived. Emergency haying programs were authorized by the government in the early 1960s to offset forage losses caused by drought (Trautman 1982). Deep snows in the winter of 1964-65 and cold spring temperatures in 1965 caused hatch success to decline significantly. In 1966 a severe blizzard struck eastern South Dakota. Wildlife biologists estimated an 86 percent mortality rate for pheasants (Trautman 1982). Luckily, because of some remaining cropland diversity and stands of cattails in wetlands that had not yet been drained and farmed, some pheasants did find winter cover.

This third bust period lasted from the mid-1960s to the mid-1980s. Decreases in the pheasant population were linked to the aforementioned weather impacts, but also to changes in agricultural markets and policy (Erickson and Wiebe 1973). Following the years of land enrollment in Soil Bank, which at its peak removed 1.8 million acres in South Dakota (Edwards 1994), the U.S. government turned its agricultural policy from conservation to production as new markets for surplus agricultural commodities opened in the USSR and China (Hart 1991). With increased corn prices, land in conservation acres, along with pastureland and other idle acres, was converted back to production-based uses (Figure 5.11). The result was the loss of suitable habitat both for nesting and winter cover, to the detriment of pheasants.

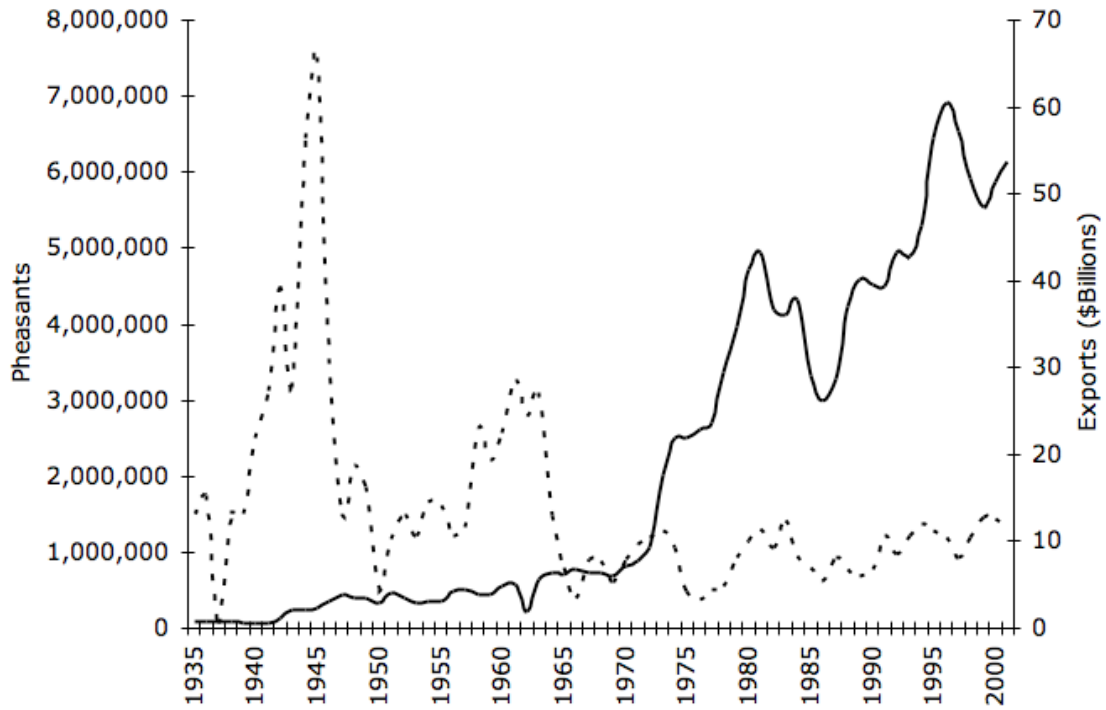


Figure 5.11. Pheasants harvested during hunting season (dashed line) and U.S. agricultural exports (solid line) from 1935 to 2001. Source: South Dakota Game, Fish, and Parks 2008b; United States Department of Agriculture 2009.

A trend from diversified to monoculture (fence row to fence row) farming also removed pheasant-friendly habitat. In 1975, another severe blizzard struck, taking away any gains that pheasants had made in their population recovery. By 1976, numbers had dropped to record lows, lows not seen since the introduction of the bird in the early 1900s (Trautman 1982).

The last boom period began in 1986 with the start of the CRP and efforts by wildlife conservation organizations such as Pheasants Forever (established in 1982) to help manage lands specifically for pheasants (Figure 5.12). The CRP was created in 1985 as a federal program to retire highly erodible and environmentally sensitive cropland and pasture, and is generally set aside in 10 to 15 year contracts (Leathers and

Harrington 2000). Initially designed as a supply control program, in more recent years it has evolved into a land retirement program designed to meet many environmental objectives (Klein et al. 2008). Currently, South Dakota has 1.3 million acres of land in CRP, or 6.5 percent of the state's cropland acres.

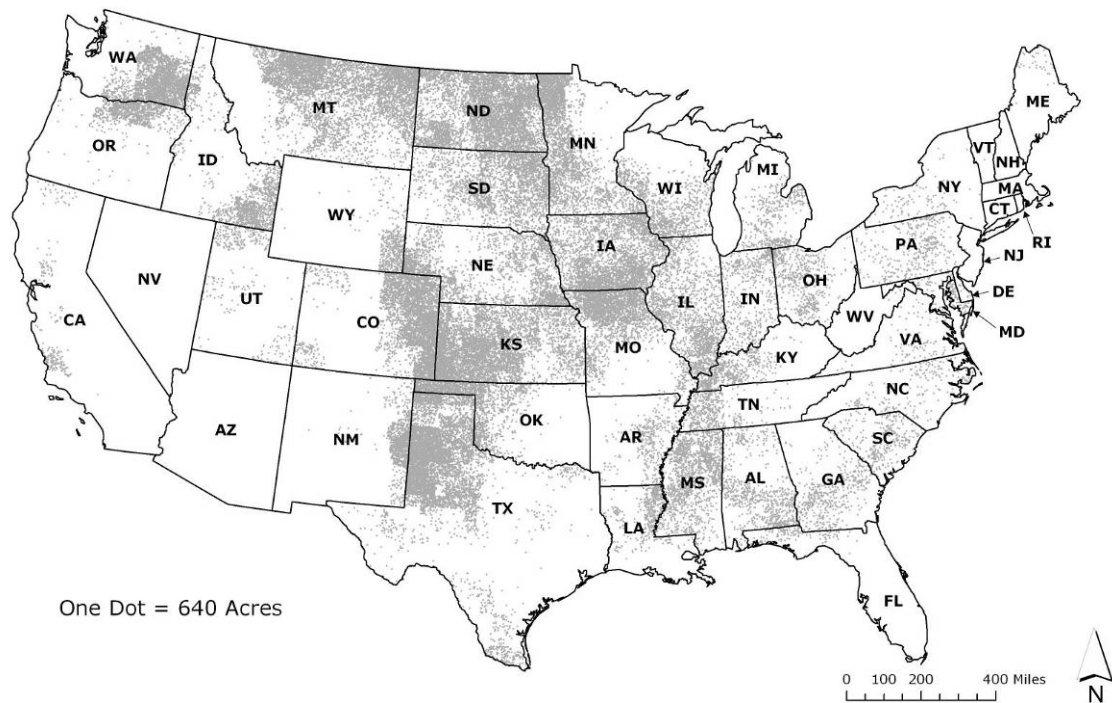


Figure 5.12. Acres in the Conservation Reserve Program, 2007. Map by author. Source: United States Department of Agriculture 2008a.

As under the Soil Bank program, a positive correlation has been seen between the CRP acreage and pheasant numbers (Eggebo et al. 2003). The only noticeable mini-bust periods occurred during two severe winters in 1997 and again in 2001. Just as in the years of the Soil Bank, when secondary winter cover was available on idle lands, pheasants of the 1990s had grasslands for refuge from severe winter weather. Contemporary farming practices such as no-till left wheat and corn stubble on the surface. This provided a beneficial food resource and, by trapping blowing snow, limited

snow accumulations in the grasslands and wetlands that pheasants used for cover (Figure 5.13).



Figure 5.13: Pheasants in wheat stubble near Presho, SD. Photo by Terry Sohl.

Wildlife conservation innovations directly aimed at helping pheasants (such as no-till), along with the CRP, saved countless birds' lives (Ristau 2007). In addition, many landowners had planted windbreaks or shelterbelts that trapped blowing snow in the windward rows, leaving leeward rows almost devoid of snow (Woster 2001b). Rows of trees planted as windbreaks in areas near grasslands and food sources are an example of a local scale land use change that helps pheasants survive the sometimes brutal winter weather of the upper-Midwest (Ristau 2007)

## South Dakota Brood Surveys

The South Dakota Game, Fish and Parks Department conducts pheasant brood surveys each summer to evaluate the status of pheasant populations and predict pheasant population levels relative to previous years. This information, when combined with other factors such as status of the agricultural harvest and historical hunting pressure, can be used to predict hunter success and satisfaction for geographical areas of the state. Densities of pheasants alone do not infer high or low hunter success and satisfaction. Access to hunting opportunities is equally, if not more, important to densities of pheasants in evaluating potential hunter success and ultimately, hunter satisfaction.

Survey indices are derived from 110 30-mile pheasant brood routes that are distributed across South Dakota where pheasants are found in sufficient numbers for surveying (Figure 5.14, Table 5.1). Routes are surveyed from 25 July through 15 August each year using standardized methods. The surveys are conducted on mornings when weather conditions are optimal for observing pheasants (see Appendices E and F). Also, pheasant brood members are opportunistically counted throughout the survey period to estimate an average number of young per brood. Pheasants per mile (PPM) estimates are calculated by summing the product of mean brood sizes and broods observed with numbers of cocks and hens observed on each route. PPM estimates for 2007 and the average of the previous 10 years are compared with the 2008 survey results. Results are compared within local areas with Wilcoxon signed-rank tests which take into account the direction (up or down) and magnitude of change for each route. Since PPM estimates are *relative* density estimates, comparisons are valid only between years within each local area.

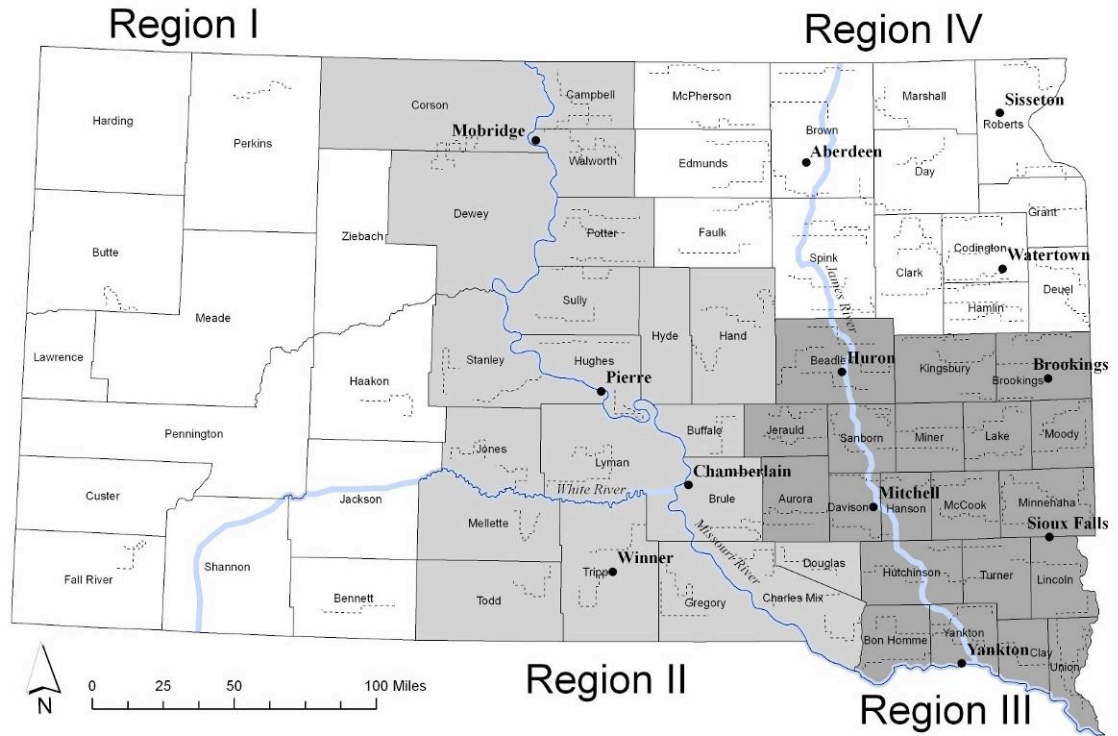


Figure 5.14: South GF&P Regions, Brood Survey Routes, and counties, towns, and rivers that are referenced in the following survey descriptions. Map by author.

Table 5.1. Brood survey regions and the routes they that comprise them.

Region	Routes
Chamberlain	Brule, Buffalo, Charles Mix (north), Gregory (north), Lyman, Tripp (north), Aurora
Winner	Tripp, Gregory, Lyman (south), Jones (south), Mellette, Todd
Pierre	Hughes, Jones, Lyman, Potter (south) Stanley, Hand/Hyde (south), Sully
Mobridge	Campbell, Corson, Dewey, Potter (north & central), Walworth
Aberdeen	Brown, Marshall, Day (south), Edmunds, Faulk, Spink (north & central), McPherson
Huron	Hand (north & central), Beadle, Jerauld, Kingsbury, Sanborn, Miner, Clark (south), Spink (south & central)
Mitchell	Davison, Hanson, Charles Mix (central), Douglas, Aurora, Hutchinson (north & west), Jerauld, McCook, Miner, Sanborn
Yankton	Yankton, Charles Mix (south), Bon Homme, Clay, Turner/Hutchinson (west & south), Union
Sioux Falls	Minnehaha, Turner/Hutchinson (north), Lake, Lincoln, McCook, Moody
Brookings	Brookings, Deuel (south), Hamlin (south & central), Kingsbury, Lake (north), Moody
Watertown	Codington, Clark, Deuel, Grant, Hamlin
Sisseton	Grant, Day (north), Marshall, Roberts
Western SD	Bennett, Haakon, Perkins, Butte, Fall River

These reports serve as sources of data and anecdotal information from state wildlife biologists regarding the effects of complex coupled human and natural systems and how they impact that year's cohort of birds. Brood survey data and summaries of weather conditions and land use changes from 1997 to 2008<sup>6</sup> can be found in Appendix H, and an example of the changes in pheasant populations can be seen in the examples given in Chapter 6 (Figures 6.4 and 6.5 and Table 6.1) for the Pierre and Brookings survey routes. Using the anecdotal information given by the state wildlife biologists along with the quantitative pheasant population data can provide a detailed spatial and temporal analysis of yearly fluctuations in population. Figure 5.15 shows an example of two very different datasets (pheasant survey data and winter precipitation) to illustrate how severe winter weather and high snow amounts (in 1997 and 2001) can impact pheasant populations, causing decreased population counts.

Other information can then be brought in that further emphasizes and supports the pheasant brood survey data along with the observed mortality (in the case of a severe winter). Field workers or game biologists often go out in the field after severe winter weather to observe and document pheasant fatalities (Figure 5.16). Mitigation efforts can then be put in place, such as state and federal programs that encourage landowners to plant windbreaks--coniferous trees (cedars, most often) in rows--near pheasant habitat and food sources (Figure 5.17). The rows of trees act as a snow fence, trapping snow in the windward rows, and leaving open space in subsequent rows.

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<sup>6</sup> Chad Switzer, South Dakota Game, Fish, and Parks Senior Biologist, provided brood survey reports. The most recent annual brood survey can be found on the state's Game, Fish and Parks website at: <http://www.sdgame.com/Wildlife/hunting/Pheasant/BroodReport.pdf>.

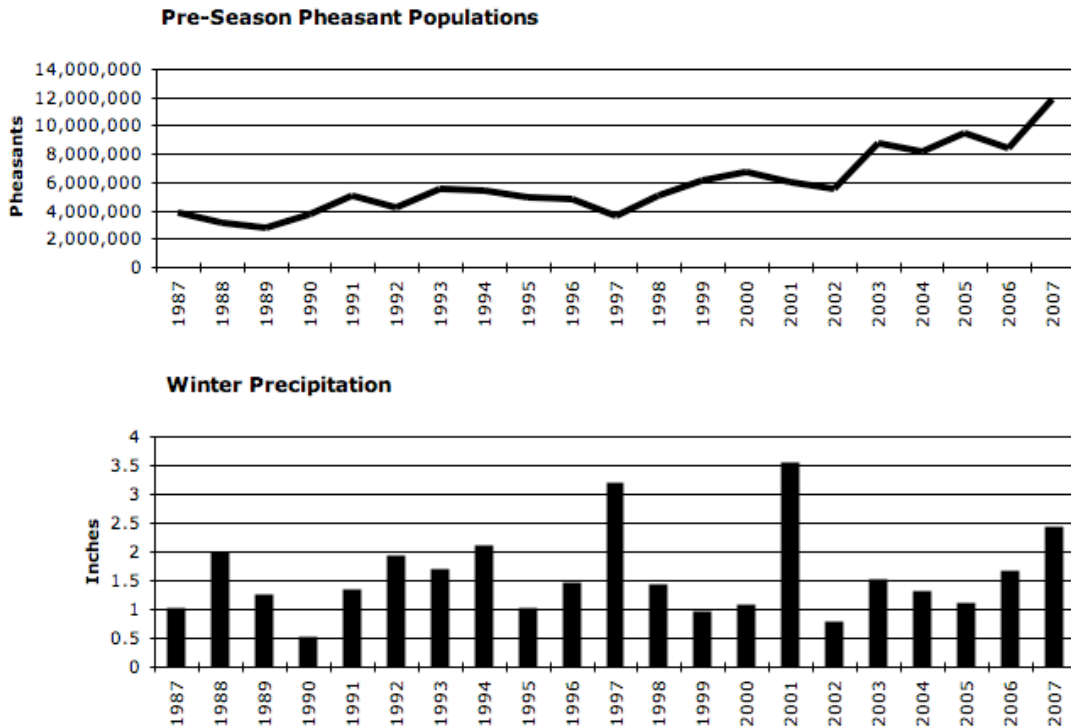


Figure 5.15. Pre-season pheasant population and average winter precipitation from east-central South Dakota from 1987 to 2007. Note the two severe winters of 1997 and 2001 have corresponding declines in pheasant population because of the large amounts of snow that fell, along with sub-zero temperatures. Sources: South Dakota Game, Fish, and Parks 2008; South Dakota State University Climate and Weather 2008.





Figure 5.16. A pheasant that did not survive the severe winter of 2005-06. Photo by Pheasants Forever (<http://www.pheasantsforever.org>).



Figure 5.17. Rows of trees planted as windbreaks near other pheasant-friendly habitat. Photo by Pheasants Forever (<http://www.pheasantsforever.org>).

Over the past 10 years, pheasant numbers in South Dakota have continued to climb, with rebounds from the harsh winter of 1996-97 and the severe drought of 2002. South Dakota's pheasant population has reached new 40-year highs, with 2007 climbing to a level almost inconceivable after the winter of 1996-97. The combination of high pheasant numbers, good nesting habitat (none more important than the 1.4 million acres of CRP), low winter mortality, high pheasant carry over, and favorable nesting and brood-rearing conditions have brought the state's pheasant population near to the remarkable numbers experienced during the Soil Bank years.

All necessary components needed to substantially increase South Dakota's pheasant population came together, creating a scenario to surpass the most recent high statewide index of 2005. The result was the highest statewide index since 1963. Only during the Soil Bank years of the late 1950s and early 1960s did this index exceed the 2007 value of 7.85.

### **Summary**

Pheasant habitat, and lands available for hunting activities, are affected by federal policy, including land acquisitions and farmland policies, state acquisitions and conservation programs, and individual land owner decisions. Additionally, hunter decisions and economic conditions play a role in where and how hunters pursue their use of land and game resources. These social factors, as well as natural variability in weather and climate, cause changes in pheasant populations. These changes can differ spatially, depending on natural environmental conditions, land management and policy decisions, and hunter behavior.

Brood survey reports indicate that there is often varied change in pheasant population depending on the effects of local scale weather events (cool spring temperatures, severe snow events) and that change is often exacerbated by local changes in land use and land cover. Including these local-scale examples of coupled human and natural systems impacts was needed to show that pheasant populations, though sizable in places like South Dakota, are comprised of smaller, regional populations that all endure various changes based on where they are located. Populations in the eastern part of the state (east of the James River) are more susceptible to the detrimental effects of loss of habitat as CRP contracts are not renewed (highlighted in the next chapter) where populations nearer the central part of the state (Pierre, the Missouri River, Gregory) deal mostly with the effects of drought (which leads to land use change) and severe winter storms.

The final chapter of this dissertation looks to the future. How will the ring-necked pheasant adjust (or not) with future, yet likely, losses of CRP lands? With expected losses of hundreds of thousands of acres in the next two to three years across the Upper Midwest and northern Great Plains, the outlook for pheasants appears to be bleak.

## CHAPTER 6 - The Future

### The 2008 Farm Bill, Agriculture, and CRP

One of the largest drivers of what the future will hold for pheasants in South Dakota, and across America for that matter, are some of the new guidelines that were signed into law as part of the new 2008 Farm Bill. The U.S. farm bill is the primary agricultural and food policy tool of the Federal government of the United States. A comprehensive 'farm bill' is passed every several years by Congress, dealing with agriculture and other affairs under the guidance of the United States Department of Agriculture.

The current farm bill, known as the Food, Conservation, and Energy Act of 2008, replaces the last farm bill, which expired in September 2007. Farm bills can be highly controversial and can impact international trade, environmental preservation, food safety, and the well-being of rural communities. The new bill focused heavily on support for renewable fuels such as ethanol, which in many places meant that farmland previously placed in conservation programs would be taken out and put back into energy (ethanol) crops, predominantly corn

Previous Farm Bill legislation had capped the number of acres that could be enrolled in the CRP at 39.2 million (United States Department of Agriculture 2009a). As of April 2008, enrollment had already declined to 34.7 million acres, and the 2008 Farm Bill reduces that cap to 32 million acres nationally, starting on 1 October 2009. In the summer of 2008, conservationists convinced the USDA to not initiate a program that would take more CRP land out of conservation than the amount set to expire annually.

Such “early-outs” would have given landowners the opportunity to make more money farming their land than they were getting by leaving it in the CRP, but the potential environmental effects of early CRP withdrawals had enraged many conservation organizations, such as Pheasants Forever and Ducks Unlimited. In late July 2008, the USDA announced that it would offer no early-outs.

Today, the major concern is what will happen now that existing CRP contracts are set to expire (Figure 6.1) and no new general signups are being offered. General signups are those that enroll large tracts (i.e., 160 acres or more) of land into 10-15 year retirement contracts. These large “general” enrollments (as opposed to “continuous” enrollments that only enroll small strips of land or buffers) have the biggest impact on pheasant populations because they do the most to protect the pheasants from predators and the weather. The top five pheasant hunting states in the Midwest stand to lose hundreds of thousands of acres of prime pheasant habitat, mostly due to the loss of lands taken out of the “general” enrollments.

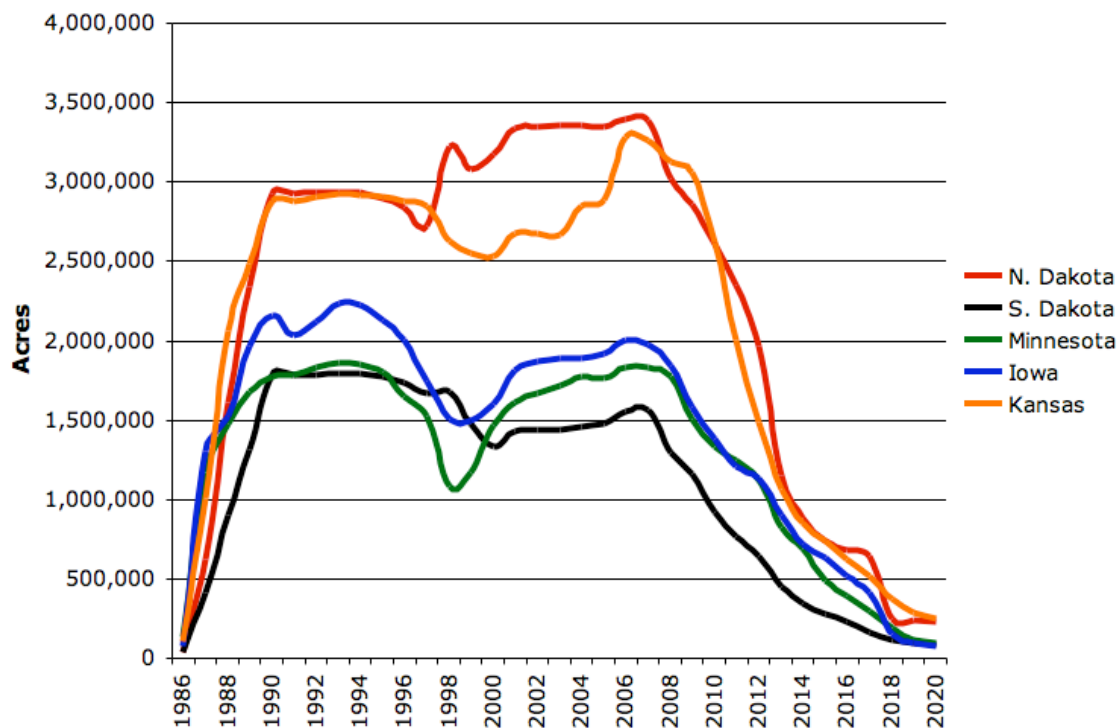


Figure 6.1. Projected drop in CRP acreage due to enrollment expirations in five Midwest states. No new general signups are scheduled. *Source:* United States Department of Agriculture 2008a.

In a study recently completed for the USDA (Nielsen et al. 2007), results showed that with every four percent increase in large-tract CRP acreage, pheasant populations rose by 22 percent. Losses of this magnitude can be expected with the withdrawal of land from the Conservation Reserve Program and will be detrimental to pheasant populations, especially in states like Minnesota and Iowa where CRP acres provide virtually all the pheasant habitat. Changes in a new farm bill may rejuvenate the CRP, but new signups (if there are any) are not anticipated until at least 2010 (Forman 2008), and will not happen at all unless CRP soil rental rates are updated to become more competitive with cropland rental prices (Hauck and Nomsen 2008).

South Dakota lost 214,000 acres, or 14 percent, of its total CRP acreage in 2007 and 2008 (Ducks Unlimited 2008). Contracts set to expire between 2008 and 2010 will add another 530,000 acres to that total (Figure 6.3a and 6.2b). This could cause a more significant pheasant loss than the 1960s post-Soil Bank decline because today's agricultural landscape is much less diverse.



Figure 6.2a. A former CRP field west of Brookings, South Dakota, on state Highway 14, October 2008. The grass had been cut, the land had been tilled, and field tile was waiting nearby.



Figure 6.3b. During a return trip in April 2009, the field had been returned to corn production. Photos by author.

### **Evidence of Change from the 2008 Brood Survey**

The 2008 Brood Survey shows evidence of what has begun to happen to pheasant populations because of changes in agricultural land use policy (Figure 6.4). Favorable weather conditions and a solid habitat foundation, most importantly via the Conservation Reserve Program (CRP), are the key ingredients to the success of ring-necked pheasants in South Dakota. As in recent years, the winter conditions of 2007-8 were mild from a pheasant survival perspective. While much of South Dakota experienced heavy snow cover and blizzard conditions during late March and early April, these events were short-lived and little mortality was reported. As experienced in 2007, significant rainfall events and below normal temperatures occurred across much of the state during the months of May and early June. However, this precipitation was timely and helped set the stage for



widespread habitat conditions that were beneficial for nesting, in particular the central portion of the state where pheasant production was extraordinarily high. Though above average precipitation and below average temperatures were observed over much of the state through the early nesting period, much drier and warmer conditions were experienced during the critical brood-rearing season.

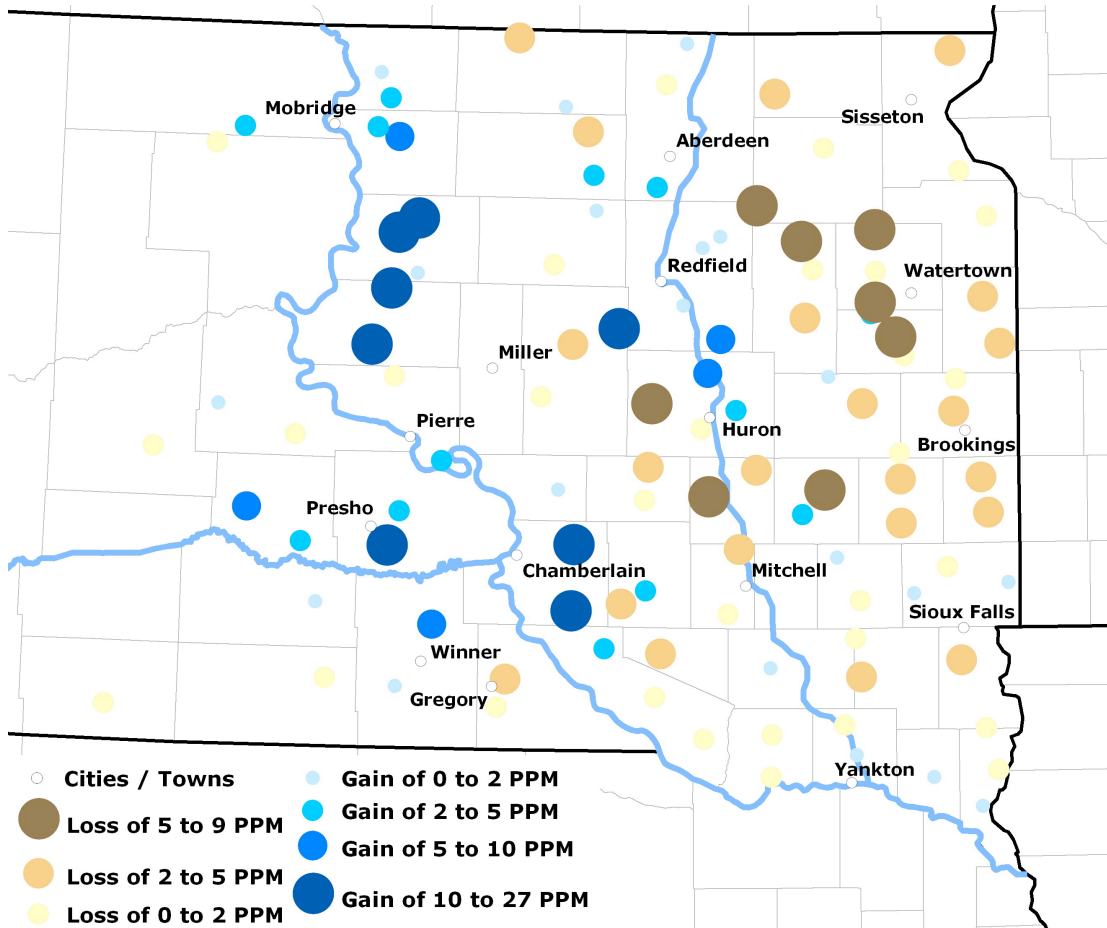


Figure 6.4. Change in Pheasants per Mile (PPM) from August 2007 to August 2008. Source: South Dakota Department of Game Fish and Parks 2008e.

Pheasant numbers in South Dakota have continued to rise over the past 10 years, demonstrating their reproductive capabilities with nesting cover as provided by current CRP acreage and with moderately good weather during the nesting season, to overcome localized harsh winter conditions and severe drought conditions experienced statewide in

2002 and 2006. The high carryover of birds into the 2008 breeding population, 1.3 million acres of CRP, nesting cover provided by rangeland interspersed throughout central South Dakota, and acceptable weather conditions during the nesting and brood-rearing season, set the stage for a very high fall population of nearly 10 million.

The recent and near future loss of thousands of CRP acres is on the mind of wildlife managers, in general terms and specifically for ring-necked pheasants. Comparing July 2008 to July 2007 at a statewide level, South Dakota lost 259,909 acres, or 17 percent (1,560,969 vs. 1,301,060 acres), of nesting cover provided by CRP. To put it into perspective, this loss is equivalent to a one-mile-wide strip of nesting habitat positioned from Sioux Falls to the Black Hills.

Enhanced grassland conditions across the state provided a buffer against this CRP loss in 2008, although documented declines in local areas, particularly eastern South Dakota, were likely the effect of associated reduction in nesting cover. Steady increases in pheasant numbers, or substantial gains in some cases, were seen in central South Dakota near Pierre, where little CRP land had disappeared (Figure 6.5). Observers conducting surveys on many of the eastern South Dakota routes noted that bird numbers were down substantially along routes where CRP lands had been reduced from 2007 acreage (Figure 6.6). When critical nesting habitat is lost in local areas, it can have an immediate, negative impact on the pheasant numbers in that area (Table 6.1). While it's hard to imagine a statewide forecast capable of surpassing that of 2007, the 2008 pheasants per mile index of 8.56 is the highest since the 1963 index of 11.24 and the fourth highest ever recorded since the survey began back in 1949.

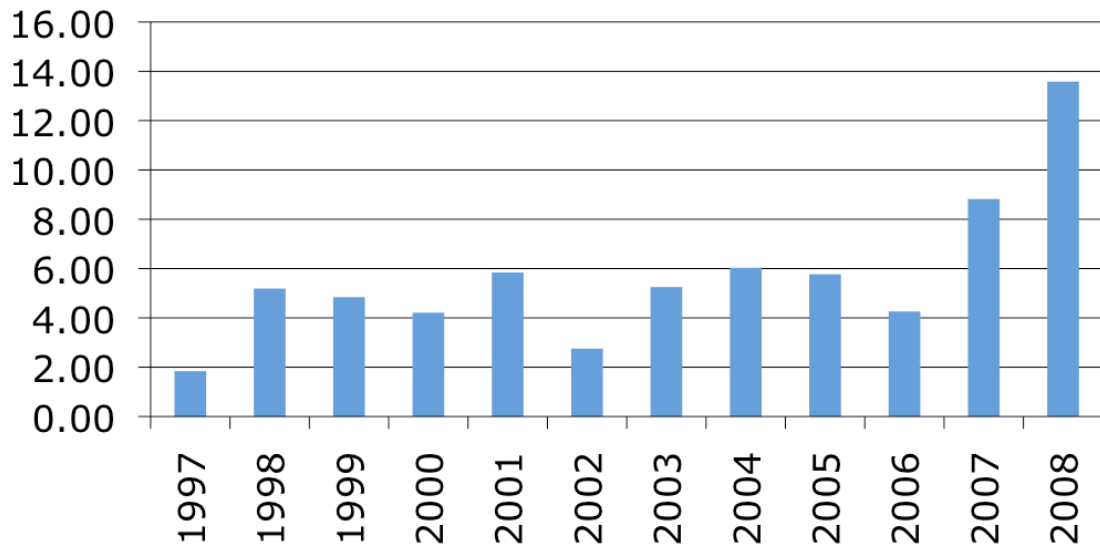


Figure 6.5. Pheasants per mile in the Pierre, SD area in 2008. Source: South Dakota Game, Fish, and Parks 2008e.

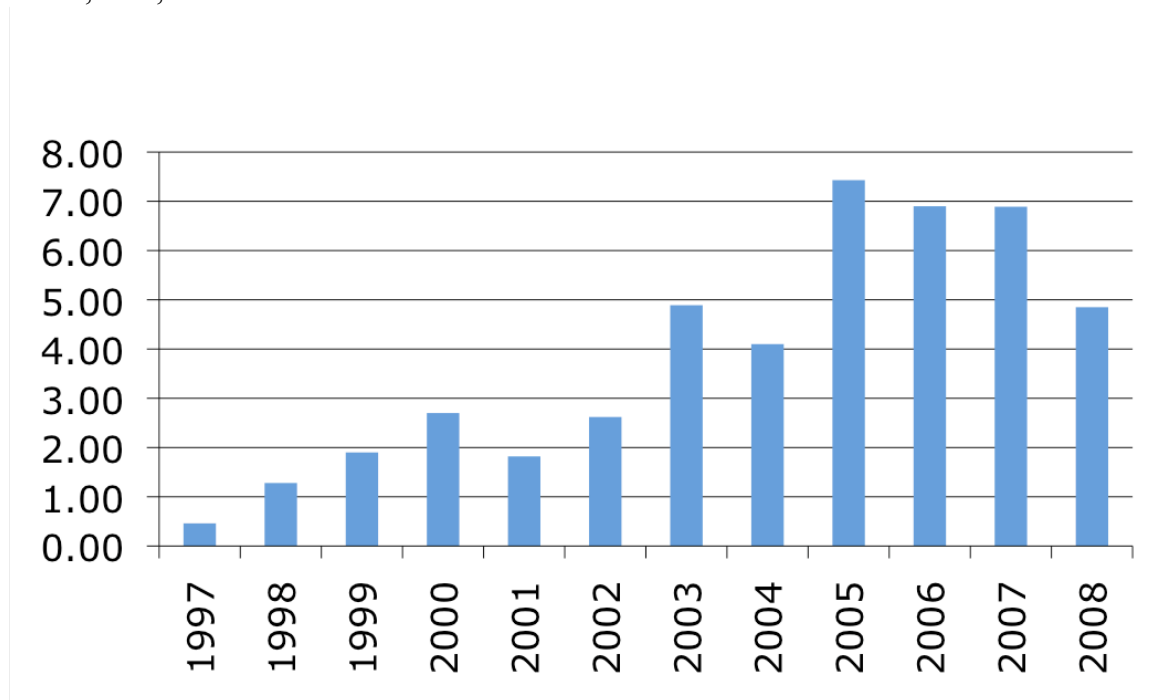


Figure 6.6. Pheasants per mile, Brookings, South Dakota area. Source: South Dakota Game, Fish, and Parks 2008e.

Table 6.1. 2008 Pheasant Brood Survey data by city areas. Source: Chad Switzer, South Dakota Game, Fish, and Parks Senior Biologist, personal communication.

Local Area	Routes	Pheasants per mile (PPM)			Difference of 2008 PPM with	
		2008	2007	10-yr ave	2007	10-year ave
Chamberlain	10	22.56	16.64	14.11	36%*	60%*
Winner	8	10.61	7.76	6.43	37% <sup>ns</sup>	65% <sup>ns</sup>
Pierre	13	13.58	8.82	5.27	54%*	158%*
Mobridge	8	12.29	7.61	4.37	61%*	181%*
Aberdeen	14	8.84	9.38	5.50	-6% <sup>ns</sup>	61%*
Huron	17	11.39	10.61	7.78	7% <sup>ns</sup>	46%*
Mitchell	16	7.61	9.22	7.23	-17%*	5% <sup>ns</sup>
Yankton	10	1.78	2.31	1.64	-23% <sup>ns</sup>	9% <sup>ns</sup>
Sioux Falls	13	2.55	3.99	2.33	-36%*	9% <sup>ns</sup>
Brookings	11	4.85	6.89	4.16	-30%*	17% <sup>ns</sup>
Watertown	12	5.93	8.84	4.00	-33%*	48%*
Sisseton	5	1.90	3.61	1.59	-47%*	19% <sup>ns</sup>
Western SD	5	1.96	2.37	2.67	-17% <sup>ns</sup>	-27% <sup>ns</sup>
STATEWIDE	110	8.56	7.85	5.22	9% <sup>ns</sup>	64%*

<sup>ns</sup> Results of Wilcoxon signed-rank test not significant ( $P > 0.10$ )

\* Results of Wilcoxon signed-rank test significant ( $P < 0.10$ )

If the push toward ethanol (Hallinan 2006) continues to increase across the Midwest, and if the worldwide demand for crops such as corn and wheat continues to increase and drive up commodity prices, payments on CRP contracts cannot compete with cash rental payments. In 2008, late spring floods and crop loss in the Corn Belt states of Iowa, Illinois, and Indiana increased the pressure on marginal states such as South Dakota to produce even more corn. During the last 18 years, cash rental rates have steadily increased in eastern South Dakota, while CRP payments have risen only slightly (Figure 6.7). Increased crop yields, shifts to higher valued crops of corn and soybeans,

and declining input costs left farmers with more money to bid into land rental payments, which helped increase the amount of money per acre a landowner could get by renting out his land versus putting it into a 10 or 15 year CRP contract (Janssen 2008). In eastern South Dakota, landowners can earn \$90 per acre by renting the land to a neighboring farmer, as opposed to receiving a \$65 per acre CRP payment.

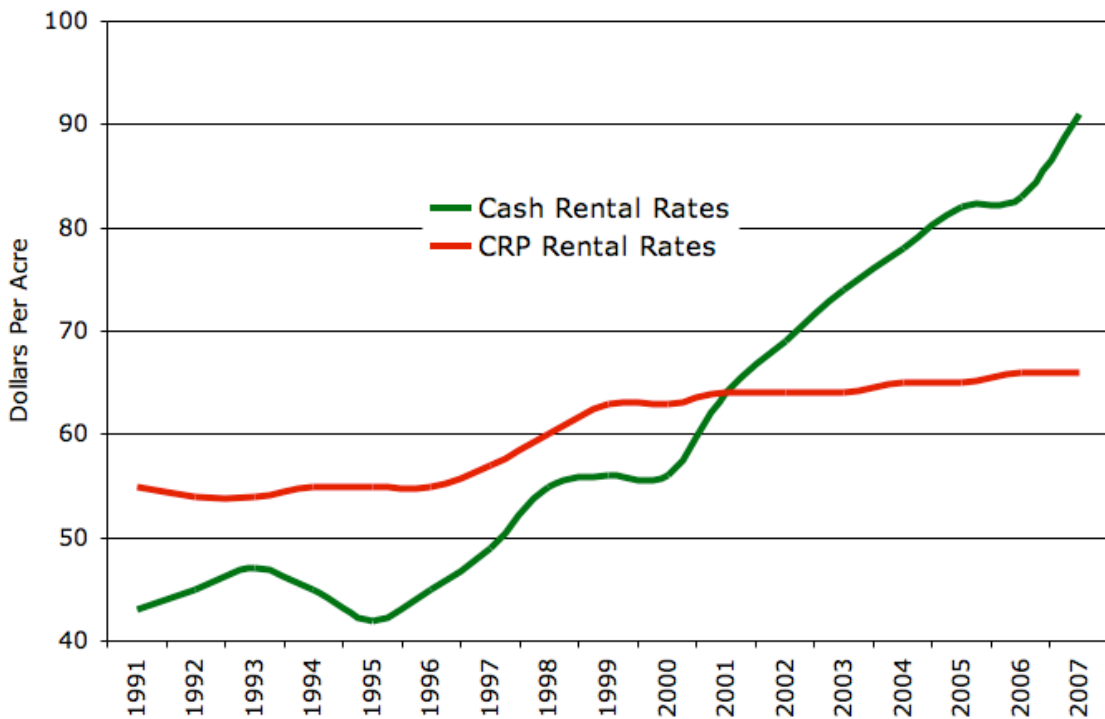


Figure 6.7: Cash rental rates and CRP rental rates. Source: Janssen 2008 and USDA (<http://content.fsa.usda.gov/crpstorpt/r1sumyr/sd.htm>).

What will be the future of pheasants and pheasant hunting in South Dakota, and for that matter, the rest of the Midwest where pheasants thrive? Will agriculture out-compete conservation? Early indicators say yes. What cannot be accurately predicted are weather events such as blizzards and abnormal spring temperatures or rainfall. There is, however, no question that declines in habitat like those presently occurring based on

policy and land use decisions (Figure 6.8) will only serve to amplify any negative impacts caused by natural factors. The future of pheasant populations (and, concomitantly, pheasant hunting) may be decided by federal agricultural policy and international energy prices as much as by climate.

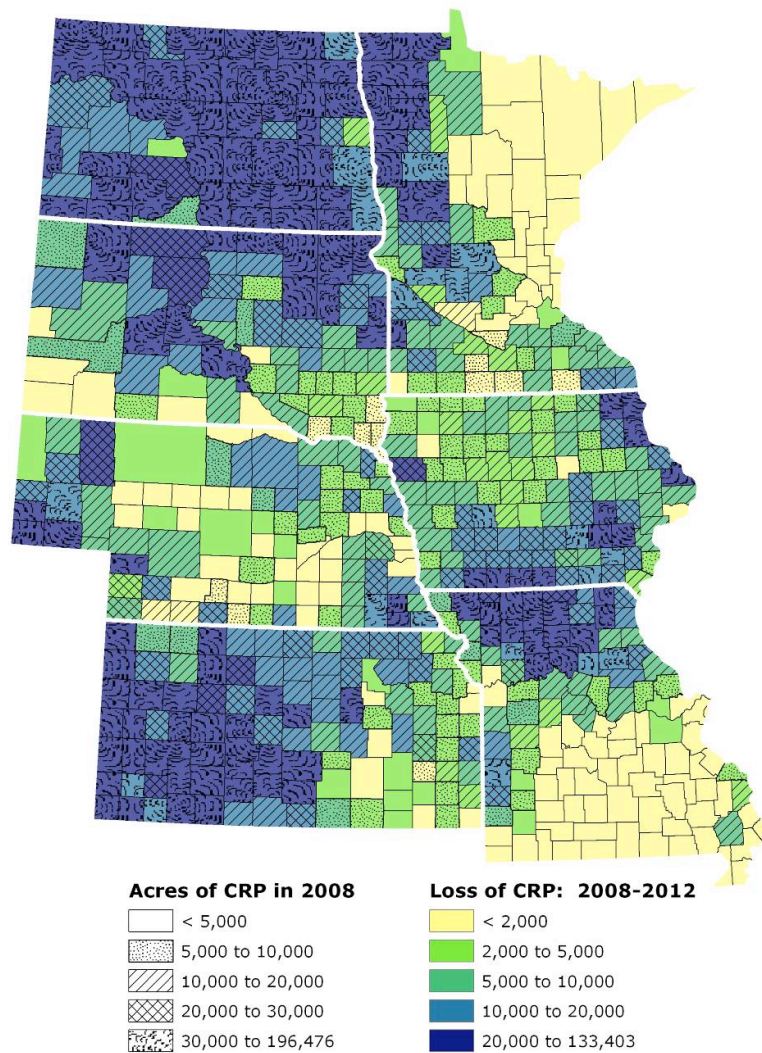


Figure 6.8: Acres of CRP in selected Midwestern states in 2008 and the potential loss of CRP acres by 2012 if no new general CRP signups are administered. Data from United States Department of Agriculture 2009b. Map by author.

## Research Questions Answered

Several key research questions were proposed at the outset of this dissertation. While it is not possible to say that each was completely answered, this research was a productive and fruitful example of a regional-scale geographic study that provided an example of a portfolio-style approach (Young et al. 2006) to better understanding the complex feedbacks and connections between human and natural systems, using the case study of pheasants and pheasant hunting in South Dakota.

The following research questions were identified at the outset, addressed by several data collection and analysis methods, and described in the earlier chapters of this dissertation. The questions and relevant conclusions based on available data are as follows:

- **How have changes in coupled human and natural systems affected pheasants and the pheasant hunting community in South Dakota over the past century?**

It is evident from the increase in the South Dakota pheasant population that the conversion/abandonment of agricultural lands to idle lands helped pheasant populations dramatically increase in the years following the Dust Bowl. Because the winter and spring temperatures were above normal and few if any severe winter storms occurred, pheasants flourished. The relative importance of each factor is not discernible from the data and analyses here.

- **How have more current changes in coupled human and natural systems affected pheasants and the pheasant hunting community in South Dakota in recent years?**

This period of time (1986 to 2008) indicates that even in today's more specialized agricultural systems (fewer farmers, larger farms, less land diversity), as long as weather does not have an adverse affect on populations, and as long as large areas of grassland habitats that pheasant populations rely upon are available, large populations of birds are likely to be found. *If* the current CRP acreages are depleted, and *if* pheasants experience a year or more of winter and spring weather that is not conducive to breeding or survival, we may see a decline in pheasant populations similar to that of the early 1960s, when declines in Soil Bank acres teamed up with severe winter weather to decimate populations.

- **What changes that could cause a dramatic shift in the way lands are managed with respect to pheasants are occurring, and how will they, in turn, affect hunters and those who rely on hunters for their livelihoods?**

Changes to the 2008 Farm Bill have set into motion changes that are likely to have dramatic effects on land use, land cover, and the ring-necked pheasant in South Dakota. With increased corn prices, farmers are more likely to replace fields in the CRP with crops in coming years as U.S. energy legislation demands larger proportions of ethanol-based fuels. Corn prices have recently come down, however, and it can be difficult to forecast price shifts in either direction, which may have land cover/habitat effects and associated pheasant population effects. If the trend of CRP loss continues, the reduction in pheasant numbers observed in agricultural areas of eastern South Dakota will also be seen further west. Large numbers of birds may remain mostly unaffected in some parts of the state if CRP



losses continue; however, there would likely be more hunter competition for the remaining birds.

- **What impact has land privatization and decreased land accessibility had on pheasant hunting?**

Based on survey results both from this study and from surveys conducted by the Department of Economics at South Dakota State University (Janssen, Pflueger, and Ahrendt 2007), decreased accessibility of private and public lands has driven some residents and non-residents alike to purchase land so they know they will have access to land on which to hunt. Absentee ownership is not new to the rural Midwest. However, as more and more land becomes privately held by fewer and fewer local residents, rates of accessibility will dramatically decrease. Not only is land being sold, it is being sold to people who are not from local areas. As mentioned above, the continued loss of CRP is likely to increase competition for access to quality hunting lands. The issue then may not be whether or not a severe winter will decimate the population; rather it will simply increase demand for hunting lands that now are in the few remaining areas of the state that support birds.

### **Future Research**

This research represents a start toward understanding upland game bird populations, habitat, natural fluctuations (climate conditions), and human policy and individual decisions. This set of relationships constitutes coupling of natural and human systems. Further research addressing these linked systems is needed, and should build on the work reported here:

- Statistical and spatial analyses of data pertaining to pheasant populations, hunter numbers, economic conditions, weather/climate, and CRP acreage in order to more clearly identify relationships.
- Investigation of localized changes in land cover and pheasant populations, with integration of remotely sensed data, to see at what scale changes in regional populations begin to appear. Giudice and Haroldson (2007) showed that even though brood survey data indicated positive correlations post-CRP, there were certain cases where pheasant numbers actually dropped, showing that there are many more complexities involved in pheasant sustainability than simply acres of CRP. Rundquist (2000) used landscape metrics analysis in Kansas to quantify the effects of land cover change and grassland bird population changes (including the pheasant). Incorporating these types of statistical, quantifiable land cover changes will augment information from brood surveys and regional land cover change observations, either to support inferential interpretations or to lead to other understandings.
- Additional factors (e.g., those shown as natural and social system components in Figures 2.2 above and 6.8 below) should be explored for their relationships with other factors (as either proximate or ultimate forces) in the human-pheasant system(s) in the Midwestern U.S.
- Investigation of spatially variable perspectives on land use and on hunting activities. There may be various perspectives east and west of the James River in eastern South Dakota. Residents of South Dakota are often grouped into two categories – East River residents and West River residents. The “river” in

question is usually perceived to be the Missouri River, as it is the largest and most visible river, and it essentially cuts the state in half. However, a more telling “divide” may be the James River. East of the James River, land use and occupations tend to focus more on row-crop agriculture; west of the James River small-grain crops and ranching become the predominant land uses.

- Additional content analysis of responses to open-ended questions on the hunter survey. Some important themes and opinions are evident, including: 1) differences in how land accessibility is seen and interpreted, 2) the commodification of the pheasant by rich, out-of-state hunters (as seen by South Dakota residents), 3) unfair hunting privileges given to resident hunters (as seen by non-residents), and 4) hunters seeing themselves as the driving forces of change (although in most cases agriculture and agricultural policy are more important drivers of how landowners manage their land).

### **Final Thoughts**

This research has added valuable insights from the perspective of a regional geographical approach to the complex issues of understanding the interactions between human and natural systems. While there is yet no perfect assembly of research methods, models, or theories with regard to understanding complex human and natural systems, this research used a portfolio approach (Young et al. 2006) to gain a better understanding of the data and other information that was available.

While no component of either the human or natural systems side of this issue is often singularly responsible for major fluctuations in pheasant habitat and populations, various combinations working in similar temporal and spatial scales and working in

concert have been known throughout the years to have moderate to severe impacts (Figure 6.9) which caused populations to decline substantially.

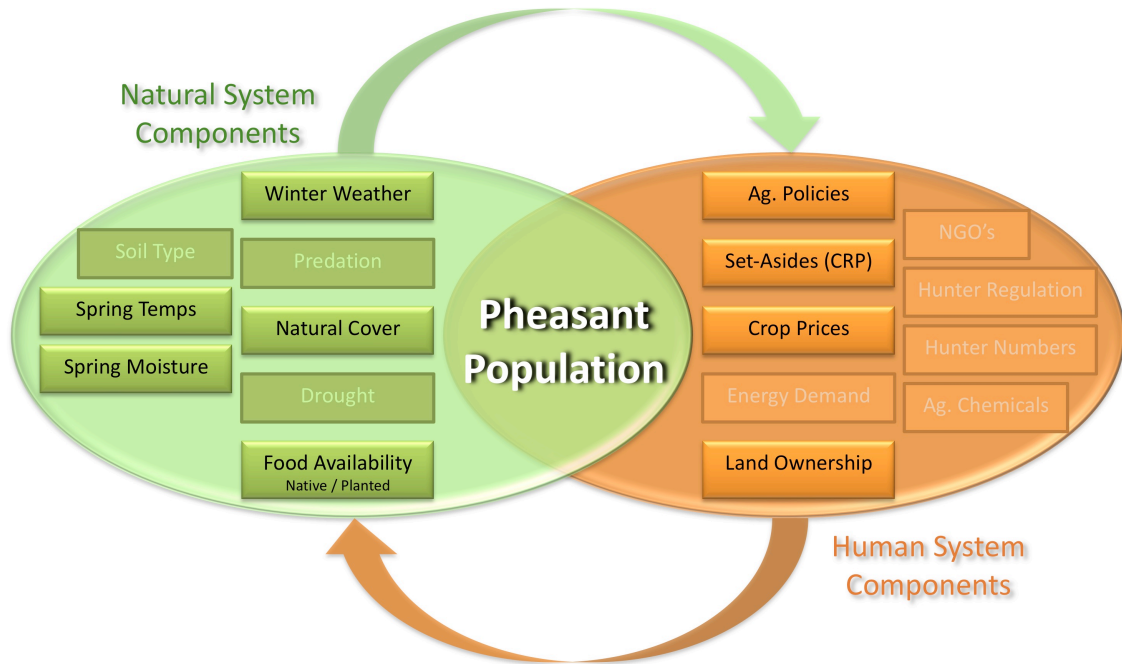


Figure 6.9. Important natural and human components that have been linked to pheasant population status in South Dakota.

It is my belief that if the current situation of habitat loss and increased competition for quality hunting access continues, pheasant hunting in South Dakota as it is known today will slowly disappear. The 1940s and 1960s were both known, during their respective times, as glory days of pheasant hunting. But situations were different then. Small communities and landowners did not rely on money coming from hunters (for either goods or access). It was simply a common autumn activity. But just as both of those “glorious” periods ended, brought on by a combination of changes in land use and adverse weather conditions, so too can the current period of high pheasant numbers.

Thus far, the winter of 2008-09 in South Dakota has not been one that would cause a dramatic downturn in populations (with everything else – particularly proper

habitat – being equal). Although the pheasant population and habitat in South Dakota availability are currently at high points, there may be dramatic reductions ahead. The fate of pheasants in South Dakota is at the mercy of two important factors: 1) the U.S. Farm Bill and the need to balance lands used for fuel, foods, energy with those set aside for conservation, and 2) changing climate conditions, which may drive seasonal weather conditions and variability in as-yet unknown directions. Climate change was not discussed in this research because at the moment it is not known to what extent (if any) climate change has impacted or will impact pheasants. However, if climate change does cause shifts in vegetation patterns and areas where certain agricultural crops such as corn and wheat are grown, then there's no doubt that climate change can be added to the long list of indirect forces that cause changes in pheasant populations (driving, as it may, the more direct annual weather forces).

Governmental mandates for ethanol production have led many in and on the fringes of the Corn Belt to make decisions that do not include renewals of CRP contracts. Record high crop prices in 2008, which have influenced many landowners to not re-enroll acres into the CRP (Babcock and Hart, 2009), have declined somewhat (Figure 6.10). Even as global markets for agricultural commodities for food and fiber have lowered the prices of farm commodities, the demand for renewable fuel sources and promises from world leaders to champion such programs have kept prices for crops such as corn and soybeans higher than they would be if ethanol and/or biodiesel demand were lower.

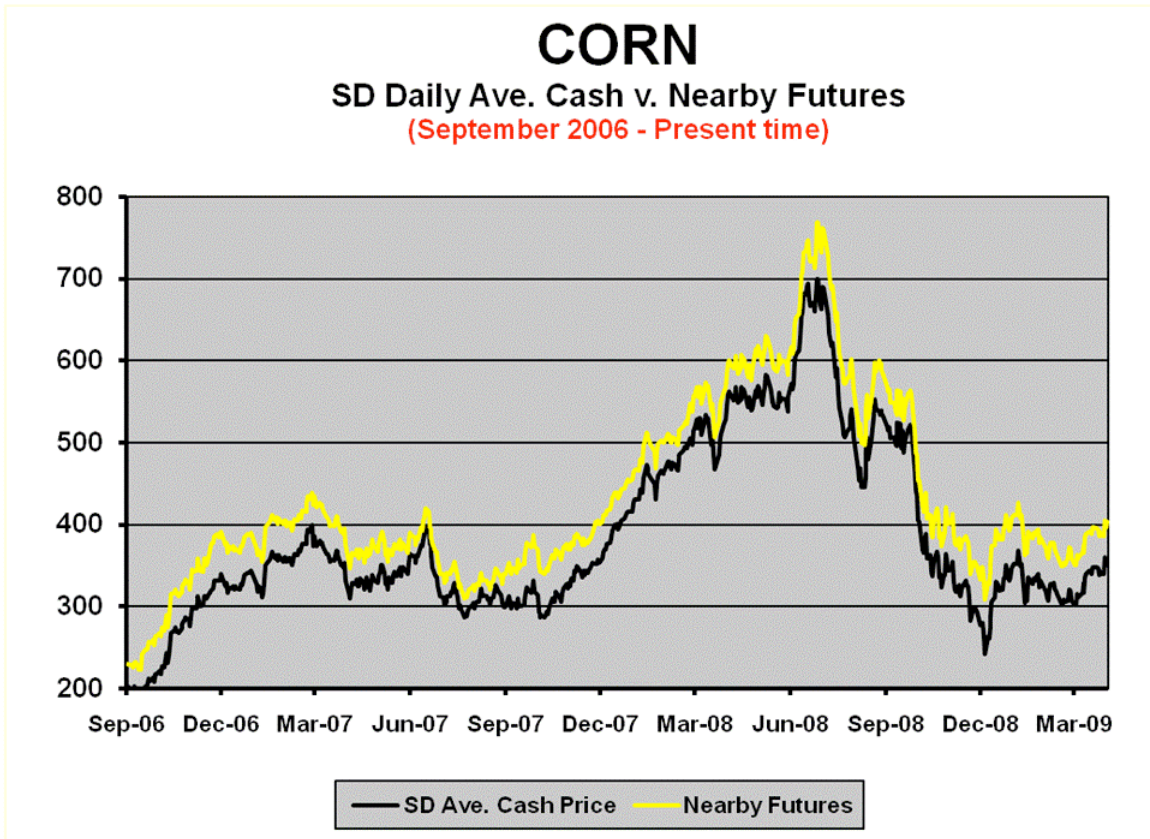


Figure 6.10: Corn prices exceeding \$7.00 per bushel in 2008 and the subsequent decline in price in early 2009. Source: <http://econ.sdstate.edu/Extension/corn.htm>

The largest single sign up year for CRP was 1987, which coincided with the most current pheasant boom. Although there have been spatial changes in CRP lands through the life of the program, much of the land enrolled in 1987 was ending its second 10-year contract in 2007. By 2007, certain land eligibility had changed and uncertainty about maintaining the program caused the USDA not to renew the long-term 10-year contracts but instead to issue extensions, usually 2-3 years in length, for those farmers who either wanted to stay in CRP or hadn't made the firm decision to get their set-aside acres back into crop production. Most of these extensions will expire in the fall of 2009 or 2010. The CRP has been renewed in the new farm bill but at a reduced national total (32

million acres rather than the formerly authorized 39 million acres) and for more targeted goals (e.g., regional water quality, critical wildlife habitat). A farmer who wants to maintain his or her CRP land will potentially face more competition to keep his or her land enrolled and also will potentially have to meet the new goals. Thus, with the CRP extensions mostly ending in 2009 and 2010, these lands will be returned to cultivation and producing crops in 2010 and 2011. These years may well turn out to be the years of greatest pheasant declines since the post-Soil Bank decline if unfavorable and unseasonable weather events occur.

Although the above is the most likely outcome, conflicting and changing driving forces influence individual landowner decisions. A prolonged economic downturn and slower recovery that reduces commodity prices may impact land conversion decisions, especially if there is an alternative like commercial pheasant hunting. Currently, the price of a bag of premium hybrid seed corn is approaching what a typical landowner in pheasant-rich land is charging per hunter per day (both about \$200). Whereas the bag of seed corn has greater potential financial return, it also has greater potential financial loss. Rising inflation, caused by large federal deficit spending, may increase interest rates that heighten the already high cost of crop inputs, especially for corn. On the other hand, a new federal law requiring 36 billion gallons of biofuels by 2022 and 15 billion gallons of ethanol by 2015 (Environmental Protection Agency 2009), along with continued farm subsidies of counter-cyclic crop deficiency payments and ethanol subsidies may ease the uncertainty and high costs of commodity production. Although the overall general trend will be less CRP land and more crop production, the complexity of U.S. agricultural land

use and the decision-making processes of those using that land will continue to keep researchers busy.



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## Appendix A - Hunter Survey Cover Letter

June 29, 2007

Dear Small-Game Hunter:

I am a graduate student in the Geography Department at Kansas State University, studying pheasant hunting and land use. As both a hunter and a past resident of South Dakota, I understand the importance of pheasant hunting, both to hunters and to the local economy.

In 2005, the South Dakota Department of Game, Fish, and Parks reported that over \$153 million was spent by over 174,000 pheasant hunters. Some of that money is used for access to hunting lands. Landowners have discovered that this added income can be beneficial, thus leading to changes in land use. I am trying to learn more about hunter experiences and land-owner decisions related to hunting and land use.

Your name and address was selected in a random sample of South Dakota small-game hunters from the 2006 hunting season. I am asking for information related to pheasant hunting experiences: where you have hunted, what types of land you hunted on, and your access to certain types of hunting lands.

Filling out and returning this questionnaire is completely voluntary; you may be assured of complete confidentiality. Also, if you are under the age of 18, please do not complete the survey. The return envelope has an identification number for mailing purposes only: I will check your name off when the questionnaire is returned so that you do not receive further mailings. Your name will not be placed on the questionnaire.

I hope you will participate in this effort by completing and returning your questionnaire in the enclosed stamped and addresses envelope as soon as possible. If you have any questions, please feel free to contact me by email at [claingen@ksu.edu](mailto:claingen@ksu.edu) or 419-733-9274, or my advisor, Dr. Lisa Harrington ([lbutlerh@ksu.edu](mailto:lbutlerh@ksu.edu) or 785-532-3410). Also, please let me know if you would like to receive information regarding the findings of this study. Thank you very much for your participation.

Sincerely,

Christopher R. Laingen  
PhD Candidate, Department of Geography  
Kansas State University

## Appendix B - Hunter Survey

Please answer the following questions to the best of your knowledge. If you do not know the answer or questions do not pertain to you, please leave them blank. The survey is completely voluntary, and all responses are confidential. Thank you for your cooperation.

1. Which South Dakota county(ies) did you pheasant hunt in 2006?  
\_\_\_\_\_
2. Approximately how many days did you pheasant hunt in South Dakota in 2006?  
\_\_\_\_\_
3. Which months did you pheasant hunt in South Dakota in 2006? (Check all that apply)  
 October       November       December       Other  
\_\_\_\_\_
4. What percentage of time did you hunt each of the following types of land in 2006? (**total should equal 100%**)  
Hunting/shooting preserves or lodges \_\_\_\_\_ %      Private land (no fees charged) \_\_\_\_\_ %  
Public lands \_\_\_\_\_ %      Private land (fees charged) \_\_\_\_\_ %  
Road Right-of-Ways \_\_\_\_\_ %
5. How did you find land on which to hunt in 2006? (Check all that apply)  
 Previous knowledge       Advertisement       You own hunting land  
 From family member or friend       Hunting atlas       Other: \_\_\_\_\_
6. If you hunted at a shooting/hunting preserve or hunting lodge in 2006, how much were you charged per-gun per-day to hunt? \$ \_\_\_\_\_  
Please rate your hunting experience (check):  
 *very poor*       *poor*       *neither poor nor good*       *good*       *very good*
7. If you hunted on public lands, did you ever feel crowded or that there were too many other hunters trying to use the same piece of land?       YES       NO  
Please rate your hunting experience:  
 *very poor*       *poor*       *neither poor nor good*       *good*       *very good*
8. If you hunted private land and **WERE NOT** charged a fee, was it because you or someone in your hunting party knew the landowner before you asked to hunt their land?       YES       NO  
Please rate your hunting experience:  
 *very poor*       *poor*       *neither poor nor good*       *good*       *very good*

9. If you hunted on private land and **WERE** charged a fee, and it **WAS NOT** land owned by a hunting lodge, how much money were you charged (either for a one-time fee or a per-gun per-day fee) to hunt? \$ \_\_\_\_\_

Please rate your hunting experience (check):

*very poor*       *poor*       *neither poor nor good*    *good*       *very good*

10. What was the predominant land cover of the public land you hunted (Check)

Grassland    Cropland    Wetland    Trees    A mix    Other \_\_\_\_\_

11. What was the predominant land cover of the private land you hunted (Circle)

Grassland    Cropland    Wetland    Trees    A mix    Other \_\_\_\_\_

12. Did you ever arrive at a public hunting area, only to find it already being used and having to find another area to hunt?

YES    NO

13. In 2006, were you ever denied access to private land after asking permission?    YES    NO

14. In 2006, were you ever denied access to private land you had hunted on in previous years?

YES    NO

15. How difficult was it in 2006 to find free, quality pheasant hunting habitat to hunt?

Very Difficult    Difficult    Neither difficult nor easy    Easy    Very easy

16. In 2006, or in previous years, in what other states have you hunted pheasants? (Please give year(s), as well as state(s).)

\_\_\_\_\_  
\_\_\_\_\_

17. How does South Dakota pheasant habitat for hunting compare to other states?

WORSE    BETTER    NEITHER BETTER NOR WORSE

18. Is free, quality hunting land easier to find in South Dakota than in other states?    YES    NO

19. If you have hunted pheasants in South Dakota in previous years, is it becoming harder or easier to find free, quality pheasant habitat that you can hunt?    HARDER    EASIER    NO CHANGE

Comments \_\_\_\_\_  
\_\_\_\_\_

20. Do you expect to hunt pheasant in South Dakota in future years?    YES    NO    UNCERTAIN

21. What is your home state? \_\_\_\_\_ county? \_\_\_\_\_ zip code? \_\_\_\_\_

22. What is your gender?    MALE    FEMALE

23. What is your age?  Under 20  20 to 30  30 to 40  40 to 50  50 to 60  Over 60

24. What is your estimated annual household income?  < \$25,000  \$25K to \$50K  \$50K to \$75K  >\$75K

25. What is your highest level of education? \_\_\_\_\_

**THANK YOU VERY MUCH FOR YOUR PARTICIPATION.**

Please feel free to any other thoughts, concerns, or statements with regard to this survey or pheasant hunting in general. I would appreciate and look forward to any stories or discussions dealing with land use or pheasant hunting that you would like to share.

## Appendix C - Responses to Question 19 on Hunter Survey

19. If you hunted pheasants in South Dakota in previous years, is it becoming harder or easier to find free, quality pheasant habitat that you can hunt?

\_\_\_\_\_ Harder                      \_\_\_\_\_ Easier                      \_\_\_\_\_ No Change

Comments \_\_\_\_\_  
\_\_\_\_\_

### **Resident Responses**

More pay to hunt farms.

\$\$\$\$\$\$\$\$ Money – out-of-staters leased land.

I hunt private land owned by friends. If you don't know landowners it's difficult to find a place to hunt without paying a fee!!

Public lands are easy to find with an atlas, however private land is getting a little harder due to the popularity of pheasant hunting.

Too many city people offer to pay farmers, therefore they don't let us hunt even though I have known them for 50 years.

If I did not own my property, I would not have very good success at all.

We need laws protecting landowners against lawsuits so they can feel more free to have people on their land to hunt.

Some farmers are starting to charge visiting out-of-state hunters.

Doing something for the landowner in the off season could make it much easier to be welcomed back. Also, pick up after selves.

I've almost always been turned down – even in “poor” hunting areas which should have less hunting pressure when I was hunting by myself 8-10 years ago. I suspect even worse today with all the game farms / more hunters. This situation was very foreign to me as I had very good luck asking in MN and ND. ND rule was you could hunt anything that wasn't standing crops unless it WAS posted – it was awesome!!!

Until my hunting partner's uncle sells his land or passes away, we will be able to hunt his land.

Landowners think wildlife is theirs though they can't contain them. Yet they still feel okay to prohibit the hunt or charging per bird.

In my 30+ years of hunting, our approach and attitude towards private landowners has never changed. Towards the 2<sup>nd</sup> half of the season, we are still given permission regularly.

Hunting in South Dakota is all about money – I have been hunting since 1960. It's becoming too commercialized. Out of state hunters are increasingly buying land for their personal hunting use.

Public land is becoming harder to find.

So much of the private land has become preserves and requires a large fee to hunt.

It is getting real hard to find any free land – everything you have to pay for anymore. But I am a farmer, so I don't have to look for land. That's why a lot of the questions I did not answer, I have never hunted any other lands.

My family owns and rents land that has above average pheasant habitat, so I have no need to hunt elsewhere (public lands).

Some farmers cut the grass or graze cattle in area.

Too much commercial hunting operations.

MUCH HARDER!

Much harder – pay to hunt is the norm now, not the exception.

I would rather buy a chicken than pay to shoot a pheasant...

In the last 5 years a lot of the land is being leased.

There are more people hunting on public land and private land has mostly been leased.

Most farmers say NO!

Landowners realize that they can make a good profit by charging pheasant hunters to hunt their land.

Harder to find birds, perhaps due to over-hunting.

I have a friend I can hunt on, but late season.

I am a farmer and hunt on my own land and my neighbor's.

More land in my county is being converted into pay-operations.



I am from South Dakota, born and raised, and have hunted in this state for approximately 50 years.

That's what I am told by many. I predominantly hunt land we own.

My in-laws are landowners – very easy to get hunting areas.

Fee hunting has become big business and the automatic no trespassing law passed years ago has really hindered our hunting opportunities.

Unless you are willing to pay the market price it has become very difficult to find access.

Some landowners are getting fussy.

Too many landowners are charging fees.

I hunt the same spots every year.

Everybody wants to charge a fee to hunt on their land due to the hunting lodges.

One man in Codington County owns over half of the hunting land and does not allow hunters.

More out of state hunters and private land being leased for pay hunts.

More and more and owners are charging to hunt their land.

Always hunt on family lands.

In my local area several new hunting lodge / preserves have started up.

Over-crowded in the early season.

Most is now commercial and tailored to out-of-state groups.

County-wise there is somewhat of a difference for example around Kimble, Mitchell, Plankinton, pheasant hunting is excellent.

Pay to hunt has become the norm and will ruin hunting in South Dakota. This trend is locking out the average SD hunter and young hunters. I don't blame landowners since the money is too good to pass up, but is counter-productive to the sport.

In previous years I hunted on 12 different farms. Now I have maybe 2 farms I can hunt on.

Don't know I only hunt my own land.

Easy for me because I have lived on a farm all my life. Some farms are leasing their land to hunting resorts.

Farmers are not saving pheasant habitat.

A lot of farmers find they can charge and make money. I do not have a problem with this until they say they are “their” pheasants. Because they are not. I will not pay to hunt anything I will see my guns before I pay to hunt.

Almost impossible.

Some land hunted in the past is now not available until hunting parties (fee based) are finished.

Lots of walk in is very poor quality habitat.

More pay hunting.

Land owners don't seem to be as accepting to hunters if you don't know them, or they have too many others hunting to allow you to hunt.

Too many private hunting businesses are buying up all the land.

People are trying to make money off of their and as secondary income for ranching/farming.

They charge way too much!

I own farmland and relatives also farm, making life good for me.

Much harder.

More and more hunting land is either being bought up by non-residents or residents that have paid non-residents.

### **Non-Resident Responses**

Much, much harder. As a natural resource it's very frustrating to see farmers getting so greedy and charging ridiculous fees. We won't pay them no matter what!

More land is posted “No Hunting” each year. More “pay to hunt” land each year.

Public land was mowed for hay, many farmers mowed highway ditches to keep out hunters.

Always need more public grounds.

Very nice people and landowners. Very few nasty ones.

Wife's grandfather owns over 1,000 acres.

More landowners leasing to "pay only" outfitters.

Landowners are leasing out land thus free hunting privileges are dwindling.

Bigger hog farms buying up farmer's land.

Only because of my contacts there so I have access to quality hunting ground.

Not only free but leased land was cut for hay. Our CRP land has been leased to crop growers now which means no hunting.

You just can't knock on doors any longer. We purchased land to help get access to larger tracts for hunting.

Private land very scarce except for large fees. Public land – hard to find birds in November.

Same amount of public land and many, many more hunters than in previous years.

Some people lease out hunting rights so they don't have to tell some "yes" and some "no".

I've only hunted for 2 years and both times it was at the same place.

1<sup>st</sup> year hunting South Dakota – was hard to find quality hunting without having to pay lease fees.

We used to hunt for free in many places. For the last 10 years we hunt the same farm but pay since everything is leased now. Some years the farmer takes us to other properties.

You cannot find free, quality pheasant hunting in SD unless you are a realtor or landowner.

Farmers are more in need of supplemental income, so have had to start charging.

Some quality walk-ins are no longer available to the public.

I've hunted in South Dakota since 1994, but only twice on public land in December.

2006 was our first time. I hope it was not harder in previous years...

Less CRP land in '06 than in '04/'05 in our area.

More and more landowners are asking for money, our party will mostly likely hunt elsewhere if it becomes a major issue in the future.

Loved the book (atlas) locating the walk-in areas.

Only harder because of drought – would have been “no change” otherwise.  
Amount of birds seems to continue to improve.

Good numbers of birds. Public land plentiful and hunting good. However, private land (no fee) is getting more and more difficult to find. I find this concerning, but farmers have to earn a living, too.

Even though we do not seek free land, my perception is that it is harder – from talking to folks.

Weather patterns make the habitat harder.

More hunters sometime lessen the overall experience.

In the areas I am used to hunting, this year I will be looking at new counties.

A lot of pressure. Need to get there early to mark a spot.

Free is easy – Quality is harder.

Always hunt public lands.

Harder because of the paid hunting.

My family has hunted SD for 30 years. The last 6-7 years we have lost over half of our hunting spots.

Minnesota residents are not welcome sometimes in South Dakota.

Everybody has their hand out.

More birds in recent years = more hunters = more landowners knowing they can charge more and still get a hunter.

Don't hunt early in the season because it is next to impossible to find uncrowded land.

Very hard to access private land and public areas are very poor hunting at best.

I have always gone to the same people/farm.

Always had a place.

Relatives are all off of the farms or dead.

Only hunt at per-gun per-fee farm – have for 12 years.

Too many pay-to-hunt clubs – they think they own the roads and ditches!

With the Walk-In program and the Hunting Atlas, it is easy to find places to hunt plus road hunting is good.

I know more people who own land they have purchased for hunting.

Every year it seems that the number of hunters increases making the competition on public land a little greater.

Most is leased out to guides or over-hunted.

There is virtually no private land that is not pay-hunting or you must know somebody.

We hunt the same farm, +/- 600 acres.

We always hunt with the same friends that farm in South Dakota.

Yes, there is a change. The ditches are being mowed. Does the state charge a fee for the hay?

Lost of birds, hunting late in season was hard to hunt – spooky birds even with good dogs.

Great guide service.

Too many people lease land to hunters. I used to be able to ask but now rejected most of the time. Now like California (very bad thing).

We hunt family land and farms.

It is disappointing to go to an area and find it harvested while the private land beside it is not. Nor has it been planted.

We have never tried to find free private land.

Everybody wants to make money – out-of-state hunters aren't treated very well.

Don't know – been going to same private land for five years.

Very familiar with WMA's, so I keep abreast of info about them.

Pheasants seem to be concentrated close to preserves or pay-to-hunt land. They have resources to give them proper habitat.

Later in the year is sometimes easier.

I have hunted South Dakota since 1980s (early) missing only a few years, but am nearing the end of my enthusiasm because of pay per gun, private commercial hunting, and having to wait for 3<sup>rd</sup> weekend behind the “take a kid” and “local hunters only”, then 3<sup>rd</sup> is non-residents. Public hunting by then gets tougher each year.

Always hunt on the same preserve for 20 years.

Looks like farmers are leasing land to clubs of rich only.

Lots of land is available but seems to have a lot of hunting pressure.

Don't know as I've always hunted through a guide service.

Some areas disappear, other emerge.

Too much paid hunting – lodges, etc.

We will stay with the same venue.

Grassland is harvested and there is no cover for the birds to hide or roost.

I have noticed a lot of out-of-state people buying land just to hunt pheasants on.

I hunt on a family farm.

Only hunted one other time at the same lodge.

I have access through a friend, without that I think it would be impossible.

## **Appendix D - Responses to Last Question on Hunter Survey**

Responses to last section of survey asking the participants to write any other thoughts, concerns, or statements with regard to this survey or pheasant hunting in general.

### **Resident Responses**

The quality of hunting has went down significantly – all the good habitat is being leased out – it is becoming a rich-man’s sport! Too many out-of-staters...

It’s becoming a rich-man’s sport. All the farmers want money to shoot a bird that they didn’t have to raise, feed, or have anything to do with. For the first couple weeks of the season the public land is overrun by out of state hunters. After that the birds are so gun shy you can’t even get close to them. I know I only shoot pheasants if I see them. I rarely go hunting for them but I know lots of people that do. They go out to see their dogs work, and to spend time with their family and friends. If they get some birds, it’s a bonus, that’s not the problem, it’s trying to find a place to hunt.

Thank you for your study. I feel any CRP land that landowner is getting federal payments for should be accessible to the public. Right of way ditch hunting for 2-3 of us and a dog is all we have left and legislation is being introduced each session to try to end it. My boys don’t hunt (19, 17, 13) because we have no relatives with land and I can’t pay \$100, \$200, etc. to take 3 kids and myself out. It is a problem, but you can find the solution – best to you!

It has become a rich man sport. I grew up hunting with my brothers/uncles/dad. Great memories which I will not be able to continue or be able to experience with my children.

My landowners seem to be prejudice to anyone that has the #1 (Sioux Falls license plate) on the license plate. They assume because we are from the “city” that we can afford to pay. This is not the case. I have on a couple occasions been turned down while using my vehicle only to return with a different person and vehicle and get let on. The only difference, the number on the license plate.

Having a good hunting dog helps – German Wire[hair] are the best! Plus a good gun safety first before hunting. All ages!!!

I am fortunate to be able to hunt for free on our family farmland. However it is becoming more fee-based in our area for others. I personally do not find this practice acceptable unless the landowner raises pheasants and just want to be reimbursed for his/her investment and time. Good luck with your responses!

Pheasant hunting in South Dakota is a huge thing anymore. You cannot just find land easy anymore, like I said before you have to pay to hunt. I know a lot of people around where I live that they charge to hunt.

The South Dakota Game, Fish, and Parks has created so much confusion with the youth, resident, and everyone seasons. I believe some don't know when they can hunt. Also, confused where you have to use steel shot and where you can use lead. For these reasons I only hunt on relative's land. Whether or not road hunting is OK from year to year is also confusing.

To gain access to private land it is a must to know the landowner. A Minnehaha County license plate is enough for denial to use land!

I feel as though South Dakota's hunting land and natural resources in general are being abused by affluent, spoiled out-of-state hunters. I am aware of the amount of money pumped into SD's economy from them, however does not give them the right to abuse our resources. They are set loose to hunt in a field with "planted" pheasants, unload their guns on 1 bird, leaving it unrecognizable when it hits the ground. Then pay someone to clean it for them. I have feared for my own life in more than 1 case hunting public land with out of staters around. There are always exceptions to the rule...I'm off to fish the Missouri River, shoot...that's being abused by the out of state populations too!

I don't hunt myself by I plant food plots on my land for pheasants. I don't allow hunting on my land because everyone around me does allow it. I can see the pheasants migrate to my land when the hunting pressure is high and disperse back to their original habitat when the pressure is low. I don't know if any of this is helpful to know.

I don't hunt anywhere but my OWN land. I am a farmer and work hard so I have my own ground to hunt.

Just for info: not big on pheasants, but waterfowl hunting in SD is the best kept secret.

I hope you were able to quiz my sons – they hunt like I used to – 3 to 4 times a week. Maybe road hunting after work, and weekends in the field. They have farmer friends and after October, they are welcome on the private sectors. If you don't know somebody, it is tough. Getting to be "Big Money" hunting.

Game farms are open 9/1 to 3/31 each year. A license is \$35/yr – 15 birds per day. Residents hunt from Oct (3<sup>rd</sup> Saturday) to Dec. 31<sup>st</sup>. Don't bother to ask to hunt for free – it's a waste of time. Game farms are taxed as agriculture – not as a business.

I do not own my own land so I rely on road hunting. Due to the commercialization of pheasant hunting the landowners want to get rid of road hunting because they fell they own all the birds on or near their land. They have already succeeded in making laws that make road hunting success extremely difficult. A lot of local hunters that do not own land are giving it up because of these reasons.



In my opinion, our wetlands and the shelter and protection they provide for all wildlife is critical for the continuation of our excellent population of pheasant. Our winter can start in early November some years. Once the crops are out in winter begins these areas become home to all our wildlife.

Hunting is turning into a rich-man's sport, the only way to hand it down to your children is to have your own land, but the "rich man" are buying that up too, so all that's left in the future will be public land which will be overrun with hunters and what really upsets me is the "rich men" who own land next to public land use cattle/livestock laws to herd livestock and anything else (deer, pheasants, etc.) off public land into theirs, then deny wildlife from returning during the hunting season so we don't have a chance at trophy hunts like years ago.

I'm also an archer deer hunter. So the pheasant hunting season runs at almost the same time, as archery deer which is my first love. I enjoy eating pheasants, which is not true with all pheasant hunters. I try to bag 15 to 20 birds a year for the table.

Keep the CRP program in place. That is the reason we have the pheasants we do.

The pheasant population in Eastern South Dakota has really improved the last few years. Milder winters are much of that reason. Good luck with your research.

Because of the high cost of land – taxes and farming pheasant hunting has simply become an additional form of income. People have capitalized on the fact that the rich from other areas have money to spend for pleasure, and are taking advantage – which then causes difficulty for those here in SD who simply want to hunt for sport and meat. Also the general public takes for granted that they should be allowed to hunt when they neither contribute nor reward the landowner for the use of his resources. It has become a sore sport for many and as always those with money will have the advantage. SD needs to find more ground for public hunting.

It's getting harder to find hunting ground. So all the public access areas are always full. Road hunting has always been the best option and I hope they don't make it any harder to do then it is now.

I have lived in the 57075 area all my life and as time goes on the old landowners, of which we use to hunt their land every year, have either rented out their land or have died and the "estate" turns the land over to a Management Co. because they live in another state. When we ask the management Co. for permission they tell us to either pay rent plus 1 to 2 million \$ liability insurance, because they are scared of being sued by the hunter in case of an accident. Don't other states have laws protecting landowners against this?

It would be interesting to know what % of pheasants harvested are natural or raised on a pheasant farm.

I think that if we didn't have our own land, it might be getting more difficult to find free land to hunt.

Enjoys hunting but does not have time to search for free private hunting land, so uses game reserves and/or private land with fees.

Practically all landowners are going to FEE hunting, even for local residents.

I have hunted road right-of-ways ever since I could hunt. If the state does away with it, I think it would hurt the state greatly. Thank you for the opportunity to do your survey.

Hunting has always been a rich man's sport, however I have to manage to spend many years hunting both small game and big game animals with a minimum investment in the past. I really believe with hunting lodges and the number of people and business in the guide and outfitters increase rates. The average income people will be priced out of the outdoor experience.

I am a farmer who hunts my own land. Pheasant hunting is going to be very good here this year.

I have noticed in the past few years more and more landowners are trying to capitalize on the commercial aspect of pheasant hunting since there is such a demand for it in SD. It has not affected my hunting, but I have seen more game lodges open every year.

I'm not impressed with hunting lodges. There is one in my area. They think they own everything. They have no preserve, but they have access to one. They will just go on people's property and hunt and when they get caught they just tiddy it over with money. I heard they got kicked out of Arkansas for doing stupid stuff like this. I know of several instances that this happened in my area. I wish they would leave.

I am a landowner and we only hunt on our own land. Lots of birds around here.

I think that SD sets a very high standard to access public land.

I am curious how you are going to compare the geography within the state. There are pheasants in east river and west river, but geographically the habitat is different, so they quality of the hunt is very different! Also, landowner mentality is very different east river vs. west river. These are very complex issues.

I think your survey will have some interesting results. I don't have hard feelings towards landowners who deny access or charge a fee to hunt. Because there a small number of hunters who make bad decisions and do stupid things, lack of respect to land, landowners, etc. And this makes it hard for good sportsmen to obtain land to hunt. Good luck with your survey!

I have seen non-residents shooting in farm driveways by houses and misc. litter, trespass – drive where they are not allowed to. Leave gates open. Licenses are too cheap for them. They are buying our land up! And old houses to fix up.

I feel Game-n-fish should be investing in more land – also what about land that gets gov't payments like CRP land? This would be great if it were open to hunting.

I become very frustrated with public land hunting. Several days were spent walking with an excellent dog and not ever seeing a hen. I am planning on hunting Minnesota this year due to increased private land that owners will let you hunt free and excellent numbers of birds on public lands (in MN). Good luck with your study and don't let them take away SD ditches/right-of-ways.

More and more out of staters are buying land in SD. Hunting brings revenue to SD. We own land. Everyone in the family hunts. It is a very popular sport. If you do not own land it is getting very difficult to find "premium" hunting land.

It's been easy for me to find land to hunt because my family members hunt and own land. Also, my dad will refuse to let people hunt his land. He saves it for friends and family to hunt.

It is my honor to do this survey. It is my experience that small game hunting land that is free is growing harder to find.

I would love to talk to sometime. I played basketball at K-State 1 year and 3 years at KU – graduated from KU. Each year for 50 years 15 high school classmates gather at Doland, SD, 50 miles west of Watertown to hunt. We are now up to 40 people with grandkids and great grandkids. I am now a retired air force general and live in San Antonio, TX.

I think that the pay hunting is getting out of hand. The average person will soon not have quality places to hunt. However, I do not hold it against landowners for making the extra money. Lord knows they can use the extra income. I think that the Walk In Area program should be expanded.

Concerned about loss of CRP land. We expect to see increased land use for corn because of ethanol production growth.

Have 660 acres (cropland 522 acres, 20 wetland acres, balance trees, grasslands and waste). Adjoins a lot of state and federal game land and a large shallow lake. Twenty miles NW of Watertown. Giving thought to selling it as I am 73 years old. Has been a wonderful place to hunt pheasants, ducks and deer.

## **Non-residents**

I would pay to hunt private land if it was cheaper. \$150 per gun/day is steep. That's \$50 per bird. I would rather get one less bird than pay through the nose.

My land use is strictly private in South Dakota due to good fortune. When hunting North Dakota, my hunting is primarily late season use of plots. Access to private land is extremely limited other than by fee. I'd rather stay home and hunt grouse than pay \$100 to kill a rooster.

I bird hunt all over the world; Argentina, Uruguay, and Paraguay during the last 24 months. Have hunted out of Winner for 15 years. The first nine or ten were free. Some of my closest friends live in SD, and I would pay \$100 / day to be there if I didn't fire a shot. For me (and the 10 or so I bring each year) South Dakota is more than just shooting. It is the people and lifestyle.

I live 30 miles south of Boston and areas I rabbit and pheasant hunted as a youth have been swallowed up by suburban sprawl. My trip to Winner, SD was an extremely enjoyable trip. The people in Winner were very friendly to outsiders who came to hunt. It's beautiful country, and I can't wait to go back. It was nice to see hunting and hunters viewed in a positive way, as in Massachusetts, that is not the case.

Hunted on private land for a fee! With the exception of bad weather the bird population/hunting and shooting was excellent!

I am concerned that hunting is quickly becoming a business, driving out cheap hunters like myself. I am in the military and have seen hunting in Texas, Europe (which the average citizen cannot afford to hunt) and Virginia. South Dakota is by far the "most friendly" to hunting, but in the 7 years I have lived there access to private (no fee) land has significantly diminished.

I have hunted pheasants in 6 states. Every year South Dakota is best. I wish it were not so far, and I would go every weekend. S. Dakota needs to increase walk in access like Kansas. But population #'s keep me coming back. South Dakota in a bad year is better than most in a good year.

Hunting with a local guide service for an all inclusive fee for a 3-day hunt - \$1,300 including meals and lodging.

Left KS middle of week long trip because drought had greatly reduced pheasant numbers. This was 1<sup>st</sup> week of KS season. Found that some KS CRP field, that had been prime in prior years had been hayed and were totally devoid of ANY cover (or pheasants). Last 4 days of trip spent in SD. This was about 3<sup>rd</sup> week of SD season. Number of pheasant on public land was about same as observed on KS public land that had cover (although SD field had seen significantly greater harvesting prior to our arrival due to being later in SD season. Saw same or more pheasant hunters in SD than in KS which has more public

walk in land. I would come more frequently to SD if it had equivalent land area per hunter as KS because it seems to produce more birds/acre. If SD had a program where \$50 to \$100 above the license cost would make a large amount of walk in area available to those who paid the fee (both resident & non-resident) I would be much more likely to hunt in SD annually.

Easy to find land. Very open and marked off so it was easy to find. Finding the birds was tough, though.

I have been hunting Ringnecks in South Dakota for the past 25 years. All landowners have been very helpful and cooperative and want you to have a successful hunt.

As you can tell from my answers, drought greatly affected our hunting this year. I would have answered the survey much differently the previous year. Nearly all of the walk-in areas near Eureka where we stayed were mowed for hay. The one area that did hold birds was cattails with corn adjacent. Every hunter in the county was there also. Since we couldn't hunt the crops it was tough. This was our 4<sup>th</sup> straight year in Eureka but we are going to Webster, SD this year because of the conditions around Eureka.

Having a hunting dog is a must. We would have lost over 50% of our birds if we would have not had a dog. Hunting was great and we had plenty of shooting. My shooting needs some work. Filled our limit each day!

We have a group of 12 guys that have hunted at the same farm for 21 years. The farmers have let us build a pheasant shack on their property as it has become an event for them and their families along with us that is looked forward to each year. We help work cattle (about 600 head) while we are there. Their hospitality is classic South Dakotan. We use their trucks to hunt and they always strip corn for us. We are and never will be charged a fee. They farm about 6,000 acres. Hopefully this sport doesn't turn into a sport for the wealthy only. Thanks for the study.

It is clear that quality hunting land will soon be a luxury that only the wealthy will be able to afford. The commercialization and restricted access to private cropland is one of many reasons that hunters are a dying breed. \$50 to \$100/day/gun is outrageous.

While we don't actually pay to hunt, we pay for the farmer to buy "pheasant food", which he plants for cover. We pay for a mobile home, in which we live, we paid \$1,200 to take the farmer fishing in Ontario land year, we take them out to dinner while we stay there. So my indirect costs for my "free hunting" are around \$600 to \$700 a year. We've been doing this for 20 years, and we're sort of like family now. Our first pass on opening day last year, we flushed maybe 500 pheasants. You'd have to see it to believe it.

Housing accommodations very hard – used to rent Mina Lake Lodge – now can't get in – several motels booked.

Years back we could go to SD and just ask for permission to hunt and be able to hunt the farms and ranches. Now it is so commercialized it's tough to get on the land. Public land gets too crowded. It downgrades the quality of the hunt. For the last three years I've hunted because of a business perk. The bad part of that is that it feeds the commercialization of it. But I love to hunt and SD is great.

I shall try the South Dakota experience again – probably will try a “family fee farm” as this worked well in North Dakota. Public land in western South Dakota is abundant, but has been heavily stressed by overgrazing and haying in the fall. The sharptails were abundant and couple with pheasants is the reason to travel to South Dakota!

While hunting the ditches in Gregory County, encountered a hunting preserve owner that was very rude and a complete ass. His name was \_\_\_\_\_. He tried to strong-arm my party into hunting on his place for a fee which was against my principle as an avid hunter. I will not return to South Dakota and will tell all others of the treatment we received! We met 4 gents from New Jersey that felt as we did, the public land is being neglected, while private and hunt club lands get more to capitalize on the money.

I have limited experience with public land in South Dakota. I have returned in December twice and some of that was public. Railroad grades were productive but most public land was small parcels and scattered. By looking in the guides while we are there in October each fall, I think the Walk In Areas on private land seem to be a good idea, but again I haven't done any myself so I can't make much of a comment about public lands.

I've hunted in SD for the last 6 years and the only thing that really hacks me off and the other 4 people in my hunting party is that SD allows a youth and resident only hunt about 1-2 weeks before the general season opens. The part about it that upsets us is that these hunts are only open to public hunting areas....so when we arrive they've already been stomped out pretty good.

We hunted land owned by my grandfather, uncle, and cousins in McCook and Lake County. The family land is a mix of CRP and row crops, corn, beans. The first weekend of pheasant season usually bring a group of 15 to 20 pheasant hunters and family to the farm for mini reunion and hunt.

Kansas has a Walk-In-Hunting program which you might be familiar with, where the state pays a trespass fee for 40+ acre patches to allow public access. It has been very successful.

I've quit trying to find free land to hunt on. It's not like it used to be.

I personally know friends that have been threatened at gunpoint for hunting land they thought was public. I also have no problem paying for good quality wild bird hunting. However, there should be a cost break for kids under 18 – the landowner I hunt with does just that.

Most of the pheasant hunting we do in Michigan is on preserves. South Dakota hunts on private are going up and up and everything seems to be getting leased. We used to go all over for free 10 to 15 years ago. The public land has a lot of hunters early in the season.

I would like to try hunting free, quality, public land but for one trip per year with no opportunity to scout the paid private hunting land is a safer bet. I come for the camaraderie anyway. It is too far to drive for 3 pheasant a day regardless of the cost.

I was very disappointed to find the CRP lands our group intended to hunt had either been cut or grazed.

All public lands were stripped of cover, either grazed or mowed for hay – all private land we encountered were leased to outfitters. Very poor hunting for anyone who wants to hunt pheasant and not have to pay high lease fees. I can stay home and shoot as many birds for the money at local game farms. Minnesota and Iowa are far better to hunt pheasants.

I hunt on land owned by relatives which is why I did not answer the questions about difficulty in finding free, quality hunting land or the ones about access to private land.

I have been hunting in SD for 30 years. I enjoy the hunting – find it gets harder every year to find a good place to hunt without having to pay.

I feel that as more and more land becomes pay to hunt I feel that people with limited funds get shut out. I know in North Dakota if you find land that isn't posted you can hunt on it. From what I hear it's not too hard to find. My fear is that hunting will only be for the people who can pay the most money.

The crux of the issue, I believe, is economics. Many landowners as ag producers work on very thin margins. When given the opportunity many choose substantial revenues from hunting. As more land goes to pay hunting others maybe driven to lease because of added pressure from displaced hunters.

I am originally from South Dakota. I have lived in Wisconsin for 7 years. The land I hunt in SD is family and friends of family. I didn't hunt public land in 2006, but have in the past. It is getting harder to find land and public land is busier than it used to be.

I was a bit concerned to find some of my favorite bullrush sloughs on Waterfowl Production Areas had been burned and planted by farmers in the last few dry years. Specifically the one in New Holland, SD.

I pheasant hunt with one friend from MN in SD. We primarily hunt private land in which is owned by homestead residents. Our secret is knocking on doors and offering to do chores or jobs around the farm in return for hunting. It has worked great and we have formed many relationships with farmers.

We (my sons and grandson) make a trip for a 3 day hunt at the end of October each year. We hunt on a private farm. It's a lot of fun and a get-away. There is always plenty of birds.

I think the need for gasoline (ethanol) will change pheasant hunting forever. I don't blame the landowner for switching from CRP to crop fields because who can afford \$50-\$60 an acre to lease?

More and more private landowners are leasing land to hunting lodges. Hunters tend to spend all of their time at the Lodges and this will be detrimental to the economy of the local communities as time passes.

I have hunted South Dakota for the last 3 years. I use B&B guide service in Pierre. They provide lodging and all meals and transportation. The fee is \$1,295 per person for 3 days hunting (included license). Our group is 10-15 hunters and we never fail to limit out.

Because of the popularity of pheasant hunting, it is becoming much harder to find quality hunting land in SD due to the high hunting pressure, unless you have a lot of \$\$\$, or as in my case, grew up in the area and have longstanding connections there.

We had a good hunt in 2006. Birds were much wilder than ever before. We were lucky if we killed 10 out of 2-300 birds that go up – almost all out of range. Coldest time hunting that I can remember in last 30 years.

South Dakota was a great experience. Look forward to going each year.

I believe hunting is a shared privilege, whether you are a landowner or a hunter with hunter ethics wanting to hunt private land which holds wildlife for hunting. It should be shared.

We have been going to the same guiding service in Gregory SD for approximately 10 years. Our party of 6-7 hunters per year are all from SE Ohio and have no experience on public lands in SD. My guess is that finding access to quality private hunting without a fee is difficult. Likewise, good public hunting, I would imagine, is difficult to find and is probably crowded.

In 2004 I located land to hunt in SD owned by a friend's in-laws. We usually hunt 4-5 days. This land provides 2.5-3 days of hunting. To fill out the trip we hunt public lands. Last year (2006) we did not see a rooster in 1.5 days spent on various public lands we successfully hunted in previous years.

I have been hunting public land in South Dakota since 2000. After having extreme difficulty getting any access to private property (without fee) I have hunted public land exclusively. In 2001 after getting landowner permission to hunt we were chased off by angry employees! Although public lands can sometimes be crowded it has provided good action in the past. This last year was extremely frustration trying to find birds.



Although it was predicted to be a good year, it was the worst I've experienced. To top it off we were verbally harassed by a resident group on our December hunt.

We hunt private land. The farmer does a good job with the pheasants. He has no pen-raised birds. He plants man feed plots. He has plenty of grass for cover.

The package was where you hunting on private land and lodged there. So the \$200/day cost included lodging for 4 nights and hunting for 3 days.

Being from the east coast where the wild pheasant population is virtually zero, I have to travel to the Midwest to hunt pheasants. Not having the time or local knowledge to scout public areas, I hunt with the same outfitter every year that provides an excellent hunting experience.

The area we hunted, although not a lodge, was controlled by a family who on a charge basis provided guided trips on lands they farmed and ran cattle on. They had parts of the cropland in CRP and hunted these as well as grass waterways and timber edges. I saw and shot at more pheasants in the first day than all of the previous years combined.

I have a special situation that allows me to hunt very high quality private land, free. But SD is basically one big pay-to-hunt area now, and will only get worse. Good, free hunting in SD will soon be all over but the shooting.

This experience I had at the "Horseshoe" was one of my most memorable hunts of any kind in over 40 years of hunting.

The loss of CRP habitat for hunting has been very notable over the past 15 years in these areas. There are not very many places to walk.

South Dakota has provided some great hunting experiences over the years. It is like my second home. People are friendly and hospitable. Have been going since 1974.

I refuse to pay to hunt and I don't know where to go hunt in SD so I drive 45 miles to Jasper, MN where I have land. Hunting for pheasants was great there last year even though I hate paying \$90 for an out of state license.

I am originally from Aberdeen, SD. Have hunted birds since the 1960s. Hunting quality has improved in the past 10 years.

I've been doing this since 1967. I've seen a lot of changes. I hope the state and people of SD don't allow greed to ruin it. The hunting lodges, the higher fees, and the way the farmers use their land is a threat to what I have always loved. With an eye to the future I have taken my 16 year old grandson with me the past two years and have plans for Fall of 2007. Happy hunting!

My wife's grandfather has put some land in a game/fish/parks for public use for so many years at a time. I and my family find it very hard to hunt the public land because it is over populated with out of state hunters who leave tons of garbage when they leaves. Because of this when the current agreements expire with game, fish, and parks, they will not be renewed! Game, Fish, and Parks needs to patrol more often.

Having to be able to hunt road right-of-ways is a very nice and enjoyable way to hunt.

My family started hunting in South Dakota in 1963. My grandfather met a man from South Dakota at a cattleman's association meeting in Houston, TX. They became friends and started hunting together. It is now 3 generations later and we are still coming to South Dakota every opening day of pheasant season. My son has now been for the past two years. He is sixteen. I think it's a great tradition to pass on. Just like my dad did and his dad to him. All because two guys bumped into each other at a meeting in TX.

I really enjoy pheasant hunting in South Dakota. I have had a lot of fun. I look forward to coming to South Dakota and hunting as much as I can.

Always need more land to hunt!

I generally find most property owners in South Dakota very pleasant and easy to work with. I think they realize the benefit of having folks visit and spend \$\$ in their state. Great people!

Farmer walk on land was very marginal in NE South Dakota in 2006. Most was very short grass not able to hold birds. Possible due to drought condition or having to graze herds on land.

I primarily hunt on family land. Very rarely do I hunt on public land.

South Dakota farmers do not want out of state hunters to hunt public areas or road ditches – we had no place to hunt – I will never come back to South Dakota – what a disaster.

If CRP, WMA, or WPA are allowed to be hayed off when there is a hay shortage, it should be managed to allow only a percentage that can legally be hayed. It doesn't make sense to promote a lot of good winter cover and food sources, and then allow the destruction of the nesting cover.

In all states that I have hunted, I find it much easier to make prior arrangements with landowners to hunt. If you lease land for the purpose of hunting you are guaranteed an exclusive area. Real hunters don't hunt "tame" birds on hunting preserves.

# Appendix E - South Dakota Game, Fish, and Parks Department *Summer* Pheasant Management Survey Instructions<sup>7</sup>

**Study Title:** Pheasant Management Surveys

**Job Title:** Pheasant Brood Survey

**Job Objectives:** To annually determine pheasant reproductive success, population trend, and relative densities of populations throughout the pheasant range.

**Procedures:**

A. For collecting the Data: The statewide pheasant brood survey begins July 25th and continues through August 15. Survey data will be obtained by observation of pheasants on roads and roadsides, generally on secondary county roads, selected as permanent brood survey routes. The routes are distributed throughout the major pheasant range in portions of 51 South Dakota counties.

Survey instructions are:

1. Begin the route survey at sunrise.
2. Make every effort to obtain one primary run on each route during the survey period. Continue survey attempts until a primary run is achieved.
3. All routes should be 30 miles long and must be at least 1/2 mile from other routes if crossing is necessary.
4. All birds observed within 1/8th of a mile of roadway will be recorded. Binoculars may be used to identify birds, but may not be used to locate birds.
5. Brood size data may also be obtained (see specific instructions for gathering brood size data).

A count is considered of primary significance when obtained under the following dew and weather conditions.

1. Vegetation is thoroughly saturated from heavy or moderately heavy dew, or from rain.
2. Sunshine is continuous or only occasionally briefly interrupted.

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<sup>7</sup>Instructions emailed to author on October 6, 2008 by Chad Switzer, Senior Upland Game Biologist, South Dakota Department of Game, Fish, and Parks.

3. Wind velocities are in the calm to 8 M.P.H. range.

To help in predicting if one can expect primary conditions, the observer should watch the weather forecast during the evening prior to the run paying particular attention to dew-point information as well as predicted temperature, wind speed and nebulosity (clouds).

A count is considered of secondary significance when only light to no dew is present, sunshine occurs infrequently or is totally absent, and wind velocity range between 8 to 12 m.p.h. Counts obtained under primary conditions generally have fewer variables than when made under secondary conditions, but primary conditions are often erratic during the survey period. Therefore, the observer should utilize every primary-run opportunity until all routes are completed. If a primary run is not achieved, a secondary run will still be necessary. **However, counts should not be obtained when the sky is heavily overcast with rain threatening or falling, and/or when wind velocities are in excess of 12 m.p.h.** Unseasonably cold temperatures will often produce primary dew conditions, but the cold temperatures appear to lessen pheasant movements resulting in reduced numbers in the count.

Any portion of a route undergoing construction or being used as a thorough-fare for gravel trucks or used as a detour for a highway should be temporarily abandoned and a new portion should be substituted and noted. Descriptions of permanent changes in old routes and/or the locations of the new routes must be recorded on the field sheet. Counts must not be obtained with the aid of an assistant unless the assistant's activity is limited to recording data only.

Routes should be established in areas that have a high probability of producing at least one brood over the course of the route in most years in order to avoid zeros. Zeros create statistical problems and can not be included in certain aspects of the analysis. The distribution of routes is shown in the attached "Pheasant Brood Survey Routes."

Adult bird and brood observations will be recorded on a "Pheasant Brood Survey Field Sheet." One adult hen is recorded each time a brood is recorded, even if no hen is visible. Observation of even a single chick is recorded as a brood. The "other" column on the Field Sheet is to record grouse, prairie chicken, gray partridge and quail that are observed on the route. County boundaries should also be indicated on the field sheet. If observational conditions change while a route is being run, the nature of the change should be noted on the field sheet. Classification of data is primary (P) or secondary (S) should be made on the marginal of field sheet.

Brood size data must also be collected, summarized and submitted promptly to the Regional Program Manager at the close of each workweek. A recommended minimum sample for brood size is 25 broods per county. More is, of course, better. Twenty-five will not be a reasonable sample in all counties. All Regional Program managers will have to arrange for such help as may be needed to get the job done. It is preferable that

each Wildlife Conservation Officer in the pheasant area conducts at least one survey. It is imperative that all observations are recorded according to instructions.

**Instructions for gathering pheasant brood size:**

1. Attempt to get a count of the number of chicks (brood-size) in broods seen at places where the vegetation is light or short enough to make the chances of getting a complete count fairly good. By “bare places” is meant mowed ground, etc.-places where the chicks can be seen running or flying away as you are walking towards them. Places where not to attempt to get such counts are along the edges of heavy stands of unmowed vegetation, cornfields, etc.,-places where you may be able to flush some chicks but the other in the brood can easily hide in the vegetation without being seen.
2. Do not record chick numbers for brood-size information unless the entire brood is flushed and the surveyor is reasonably certain that all the chicks of the brood are seen.
3. The above information may be gathered while driving a census route, and while returning from a completed census route. Also, take advantage of as many favorable situations as time allows while running the route – but not beyond the point that it will prevent completing the census route within the 2-hour period following sunrise. Late afternoon counts can be productive for this type of data.
4. Special field forms are furnished for recording brood-size information. A new sheet is not necessary for each day.

Each Regional Wildlife Manager will collect data sheets from those personnel in their region. They will then submit all data and summary sheets for that region to Scott Lindgren, 400 West Kemp, Watertown, SD 57201.

B. For Analyzing the Data: The survey results are summarized according to average number of adults, average number of broods, and the average of total birds per mile. These figures are then compared with figures from the previous year to indicate amount of population change. Brood size data indicates success of reproduction. The values received from a given route are only relative to other measurements over that 30-mile length of road. It is not until values from many routes are pooled together that the values begin to mean something from the perspective of a larger area. For this reason, comparison of data from individual routes should not be made—such comparisons mean very little if anything.

**Appendix F - South Dakota Game, Fish, and Parks**  
**Department *Winter* Pheasant Management Survey**  
**Instructions<sup>8</sup>**

**Study Title:** Pheasant Management Surveys

**Job Title:** Pheasant Winter Sex Ratio Survey

**Job Objectives:** To annually determine winter sex ratios of pheasant populations throughout the range.

**Procedures:**

- A. For Collecting the Data: Since the accuracy of sex ratio counts is primarily influenced by snow conditions, personnel are urged to fully utilize all satisfactory days between December 20 and March 31 to complete their respective assignments. Two standardized methods, the Road Count Method and the Flushing Count Method, will be employed (Trautman 1982).

Principal features of each method are as follows; use the “Pheasant Winter Sex Ratio Field-sheet” to record data:

1. Road Counts. With satisfactory snow coverage, this method is used in fair weather throughout the morning, early afternoon, late afternoon and until pheasants have moved to roosting cover in early evening. Road counts are conducted as follows:
  - (a) Birds are observed by cruising along roads at slow speeds of between 10 and 20 m.p.h.
  - (b) Counts are made after the vehicle has stopped.
  - (c) Counts consist of recording all cocks and hens observed either individually, groups or in concentrations within or outside of the road right-of-way. Sex identification is facilitated by use of binoculars.
  - (d) An attempted count of concentrations or of a portion of a concentration should be discarded if the count cannot be or was not completed prior to the disappearance of an appreciable number of the originally exposed birds.

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<sup>8</sup> Instructions emailed to author on October 6, 2008 by Chad Switzer, Senior Upland Game Biologist, South Dakota Department of Game, Fish, and Parks.

- (e) Counts should not be restricted to large concentrations in any county. All parts of a county should be sampled. All sizes of groups of pheasants should be sampled. Sampling only large concentrations may distort the sex ratio.

2. Flushing Counts. This survey method is used in the following conditions:

- Stormy weather-when the storm is of sufficient intensity to concentrate and hold birds in, or closely adjacent to, heavy cover.
- Fair weather-in late morning or early afternoon when birds have temporarily returned to areas of concentrated cover between feeding periods. These counts are conducted as follows:
  - (a) On Stormy days, the flushing activity is primarily directed towards the sampling of the best loafing areas. As the surveyors flush pheasants, the numbers of each sex are counted and recorded. Birds observed within one-eighth mile of the road also should be flushed and recorded according to sex.
  - (b) In fair weather, flushing counts are conducted in all densities of cover deemed capable of concealing birds. In addition to the flushing of cover areas, birds observed in fields, feedlots, or incidental cover will also be flushed and recorded according to sex.
  - (c) Flushing counts are generally facilitated with the help of an assistant to flush or drive the birds past the experienced observer. Conducting flushing counts with or without an assistant is left to the discretion of the Wildlife Conservation Officer.

3. Weather and Snow Conditions.

*For Road Count Method:*

- (a) Need a minimum of 75 percent of the ground surface covered with snow. No road counts are permissible with snow coverage less than 75 percent.
- (b) Ideal conditions would have all except the heaviest cover inundated by snow; counts are permissible, however, in light snow depth and with relatively little cover inundated.
- (c) Wind velocity preferably calm to light; not to exceed 15 m.p.h.
- (d) Cloudiness and snowfall are not detrimental if wind remains light.

*For Flushing Method in Stormy Weather:*

- (a) Wind velocities sufficiently strong to maintain blizzard intensities.
- (b) Continuous or intermittent snowfall.
- (c) Temperature is not a critical factor.

*For Flushing in Fair Weather:*

(a) Snow and weather conditions similar to those in Road Count Method.

#### 4. Sample Size

Sample size will vary with pheasant density and size of individual counties. Minimum samples of 500 (low density counties) to 1,500 (high density counties) per county will be taken. If time permits, twice as many would be desirable.

Sex ratio data will be summarized at the close of January, February, and March and copies mailed to the Regional Program Manager-Game for data assemblage. Summaries will show sample size and sex ratio for each count. Regional Program Managers will submit data summaries to Will Morlock, 400 West Kemp, Watertown, SD 57201.

- B. For Analyzing the Data: The winter sex ratio will indicate the degree of cock harvest attained during the previous hunting season by comparing it with the pre-hunting season sex ratio of about 90 cocks per 100 hens. Generally, a winter sex ratio of a minimum of 15 cocks per 100 hens is necessary for successful reproduction in the spring. Any males in excess of this ideal winter ratio indicate an under-harvest of cocks and thus incomplete utilization of surplus birds the previous hunting season.

**Annual Work Schedule:** December 20 – March 31: Conduct Survey  
April 1 – 15: Summarize and analyze data  
April 16 – 30: Write annual report



## Appendix G - Raw data and responses from hunter survey

Total responses and responses by state.

State	Total Hunters in Database	Mailed Surveys	Returned Surveys	Percent of State's Hunters Surveyed	Percent of Surveys Returned
AK	626	7	3	1.12%	42.86%
AL	1,312	15	6	1.14%	40.00%
AR	1,855	13	4	0.70%	30.77%
AZ	989	12	3	1.21%	25.00%
CA	2,092	22	6	1.05%	27.27%
CO	4,348	40	14	0.92%	35.00%
CT	133	0	0	0.00%	0.00%
DC	33	0	0	0.00%	0.00%
DE	56	0	0	0.00%	0.00%
FL	1,784	17	8	0.95%	47.06%
GA	2,330	28	9	1.20%	32.14%
HI	35	0	0	0.00%	0.00%
IA	2,964	35	20	1.18%	57.14%
ID	496	8	2	1.61%	25.00%
IL	2,780	28	14	1.01%	50.00%
IN	1,690	20	7	1.18%	35.00%
KS	2,105	23	6	1.09%	26.09%
KY	999	10	7	1.00%	70.00%
LA	575	4	3	0.70%	75.00%
MA	111	1	1	0.90%	100.00%
MD	404	5	1	1.24%	20.00%
ME	88	4	0	4.55%	0.00%
MI	4,416	57	28	1.29%	49.12%
MN	22,405	253	106	1.13%	41.90%
MO	4,366	48	17	1.10%	35.42%
MS	877	8	2	0.91%	25.00%
MT	643	7	2	1.09%	28.57%
NC	1,375	17	5	1.24%	29.41%
ND	1,041	7	2	0.67%	28.57%
NE	2,876	27	10	0.94%	37.04%
NH	64	1	0	1.56%	0.00%
NJ	222	1	0	0.45%	0.00%
NM	214	2	1	0.93%	50.00%
NV	394	3	2	0.76%	66.67%
NY	399	8	5	2.01%	62.50%
OH	1,660	13	10	0.78%	76.92%
OK	1,036	20	5	1.93%	25.00%

OR	463	3	2	0.65%	66.67%
PA	722	6	5	0.83%	83.33%
RI	20	0	0	0.00%	0.00%
SC	717	5	1	0.70%	20.00%
TN	2,187	34	9	1.55%	26.47%
TX	3,425	32	15	0.93%	46.88%
UT	1,379	13	1	0.94%	7.69%
VA	899	14	6	1.56%	42.86%
VT	46	0	0	0.00%	0.00%
WA	1,146	13	3	1.13%	23.08%
WI	8,690	101	39	1.16%	38.61%
WV	126	0	0	0.00%	0.00%
WY	1,178	15	3	1.27%	20.00%
<b>Non-Res</b>					
<b>Total<sup>a</sup></b>	90,791	1,000			
Bad Address		37			
Total		<b>963</b>	<b>393</b>	<b>1.06%</b>	<b>40.81%</b>
<b>Resident</b>					
<b>Total<sup>b</sup></b>	77,315	1,000			
Bad address		63			
Total		<b>937</b>	<b>280</b>	<b>1.21%</b>	<b>29.88%</b>

a - There were 90,881 non-resident hunters, although only 90,791 addresses were usable

b - There were 78,122 resident hunters, although only 77,315 addresses were usable

Responses by survey question.

<b>Question 1:</b>			
Results are shown in Figures 4.4 and 4.5			
<b>Question 2:</b>			
		Residents	Non-Residents
Total Days		3495	1983
Average		8.26	8.15
Range		1 to 100	1 to 20
<b>Question 3:</b>			
		Residents	Non-Residents
October		239	236
November		221	166
December		149	82
Other		14	5

<b>Question 4:</b>	Resident%	Non-Resident%
Hunting		
Outfitters	29	72
Public Land	33	40
ROW	30	23
Private (No Fee)	70	70
Private (Fee)	47	85

<b>Question 5:</b>	Residents	Non-Residents
Ads	1	13
Hunting Atlas	47	50
Friends or Family	191	221
Owns Land	73	11
Prev. Knowledge	129	186
Other	4	28

<b>Question 6:</b>	Residents	Non-Residents
Very Poor	0	0
Poor	1	0
Neither	1	3
Good	11	17
Very Good	21	42
Average Cost	\$210	\$258

<b>Question 7:</b>	Residents	Non-Residents
Yes	85	58
No	88	110

	Residents	Non-Residents
Very Poor	6	8
Poor	31	22
Neither	56	32
Good	70	78
Very Good	7	30

<b>Question 8:</b>	Residents	Non-Residents
Very Poor	1	2
Poor	4	2
Neither	15	6
Good	98	84
Very Good	117	124

<b>Question 9:</b>	Residents	Non-Residents
Very Poor	0	0
Poor	1	2
Neither	1	9
Good	5	46

	Very Good	9	72
	Average Cost	\$253	\$176
<b>Question 10 and 11:</b>		Public	Private
	Cropland	25	161
	Grassland	141	81
	Mix	201	358
	Other	2	1
	Trees	3	7
	Wetland	15	8
<b>Question 12:</b>		Resident	Non-Resident
	No	29	47
	Yes	71	53
<b>Question 13:</b>		Residents	Non-Residents
	Yes	69	76
	No	162	184
<b>Question 14:</b>		Residents	Non-Residents
	Yes	38	39
	No	192	222
<b>Question 15:</b>		Residents	Non-Residents
	Very Difficult	29	38
	Difficult	44	60
	Neither	80	79
	Easy	63	72
	Very Easy	37	38
<b>Question 16:</b>	Results shown in Table 4.1		
<b>Question 17:</b>		Residents	Non-Residents
	Worse	0	5
	Better	99	282
	Neither	39	39
<b>Question 18:</b>		Residents	Non-Residents
	Yes	68	124
	No	51	119
<b>Question 19:</b>		Resident	Non-Resident
	Harder	168	149
	Easier	2	14
	No Change	84	109
<b>Question 20:</b>		Resident	Non-Resident
	Yes	262	357

	No	1	10
	Uncertain	12	22
<b>Question 21:</b> Responses shown in Figure 4.1			
<b>Question 22:</b>		Residents	Non-Residents
	Male	259	386
	Female	18	5
<b>Question 23:</b>		Residents	Non-Residents
	<20	2	2
	20-30	48	27
	30-40	41	53
	40-50	74	93
	50-60	64	125
	>60	48	90
<b>Question 24:</b>		Residents	Non-Residents
	<25K	27	11
	25-50K	87	57
	50-75K	54	94
	>75K	78	204
	DND	34	27
<b>Question 25:</b>		Resident	Non-Resident
	High School	64	59
	Votech	19	23
	2-Yr College	39	40
	4-Yr College	92	146
	Masters	27	64
	PhD	11	30

## **Appendix H - Yearly Brood Survey Results**

### ***Brood Survey - 1998***

The northeastern part of the state was still behind in terms of rebounding from the severe weather of the 1996-97 winter, but the rest of the state saw some of the best conditions in recent history. Survey results indicated that the 1998 pheasant population was almost double that of 1997 – the largest number of pheasants in South Dakota since the early 1960s. While the natural toll of the severe winter weather during 1996-97 did kill hundreds of thousands of birds, the individual landowner and policy decisions that implemented the CRP in the mid-1980s helped the surviving population rebound very quickly by providing suitable winter and breeding habitat. The mild winter of 1997-98, an early spring, and a warm summer with timely precipitation worked together with prime habitat conditions to help numbers increase more than they would have if, for example, no CRP land were available.

RESULTS OF 1998 PHEASANT BROOD SURVEYS BY CITY AREAS						
CITY AREA	ROUTES	PHEASANTS PER MILE			COMPARISON OF 1998 ESTIMATES WITH:	
		5-year mean	1997 survey	1998 survey	5-year mean	1997
Chamberlain	14	8.08	8.11	14.55	+80%*	+79%*
Winner						
Pierre	11	2.86	1.84	5.19	+74%*	+183%*
Mobridge	9	2.14	1.91	5.01	+122%*	+163%*
Aberdeen	11	1.50	0.92	2.66	+77% <sup>ns</sup>	+189%*
Huron	13	3.74	4.17	6.12	+64%*	+46%*
Mitchell	14	6.39	6.74	10.15	+59%*	+51%*
Yankton	7	1.43	1.09	2.30	+61%*	+112%*
Sioux Falls	11	1.02	0.60	2.05	+101%*	+240%*
Brookings	11	0.85	0.46	1.28	+52%*	+177%*
Watertown	14	1.18	0.19	0.79	-32% <sup>ns</sup>	+323%*
Sisseton	8	0.56	0.09	0.20	-61% <sup>ns</sup>	+114% <sup>ns</sup>

<sup>ns</sup> Results of Wilcoxon signed-rank test not significant ( $P > 0.05$ )

\* Results of Wilcoxon signed-rank test significant ( $P < 0.05$ )

### ***Brood Survey - 1999***

The winter of 1998-99 was again mild, and the state was once again poised to see gains similar to those in 1998, but less than ideal spring breeding conditions (cool weather) stopped that from happening. Statewide, populations were still 30 percent above the five-year average. At a more local scale, some areas south of Interstate 90 in eastern South Dakota, and in places south of the White River, 24 of 30 survey routes saw significant declines. This was likely due to severe thunderstorms that occurred in June--a critical stage when many young pheasants are hatching.

RESULTS OF 1999 PHEASANT BROOD SURVEYS BY CITY AREAS						
CITY AREA	ROUTES	PHEASANTS PER MILE			COMPARISON OF 1999 ESTIMATES WITH:	
		5-year mean	1998 survey	1999 survey	5-year mean	1998
Chamberlain	10	11.81	17.99	15.10	+28% <sup>ns</sup>	-16%*
Winner	8	5.71	8.58	5.17	-9% <sup>ns</sup>	-40%*
Pierre	11	3.37	5.24	4.84	-8% <sup>ns</sup>	+44% <sup>ns</sup>
Mobridge	8	2.86	5.01	2.92	+2% <sup>ns</sup>	-42%*
Aberdeen	12	1.70	2.51	3.08	+81%*	+23%*
Huron	12	4.61	6.43	7.29	+58%*	+13%*
Mitchell	15	7.52	10.13	9.31	+24%*	-8% <sup>ns</sup>
Yankton	8	1.51	2.30	2.33	+54% <sup>ns</sup>	+1% <sup>ns</sup>
Sioux Falls	10	1.25	2.01	1.34	+7% <sup>ns</sup>	-33%*
Brookings	10	0.99	1.35	1.90	+92%*	+41% <sup>ns</sup>
Watertown	12	0.88	0.78	1.01	+15% <sup>ns</sup>	+28% <sup>ns</sup>
Sisseton	5	0.13	0.12	0.28	+107% <sup>ns</sup>	+138% <sup>ns</sup>

<sup>ns</sup> Results of Wilcoxon signed-rank test not significant ( $P > 0.10$ )

\* Results of Wilcoxon signed-rank test significant ( $P < 0.10$ )

### ***Brood Survey - 2000***

The total pheasant population was unchanged from 1999 to 2000 and was still 18 percent higher than the average of the previous five years. However, the distribution of the pheasants changed considerably. Areas near Mobridge, Winner, Sioux Falls, Brookings, Watertown, Aberdeen, and Sisseton all posted significant increases in pheasant numbers, while areas of decline were found in southern South Dakota where the average brood size declined significantly for a second year. However, following a steady population decline through the mid-1990s that culminated with the severe winter of 1996-97, the pheasant population of eastern South Dakota made a full recovery, with only



localized areas of declines due to changes in habitat or impacts from severe weather. The rebound in pheasant population from 1997 to 2000 illustrated the positive impact of having a solid habitat base and favorable weather conditions (particularly three mild winters), especially in northeastern South Dakota. Areas near Watertown, Brookings, Aberdeen, and Sisseton, saw a six-fold increase in pheasant density during this time: in 1997 routes averaged 15 birds, but in 2000 they averaged over 85.

RESULTS OF PHEASANT BROOD SURVEYS BY CITY AREAS						
CITY AREA	ROUTES	PHEASANTS PER MILE			COMPARISON OF 2000 ESTIMATES WITH:	
		5-year mean	1999 survey	2000 survey	5-year mean	1999
Chamberlain	10	12.26	15.10	9.80	- 20%*	- 35%*
Winner	8	5.05	5.17	6.91	+ 37% <sup>ns</sup>	+ 34%*
Pierre	11	3.51	4.84	4.21	+ 20% <sup>ns</sup>	- 13% <sup>ns</sup>
Mobridge	8	2.79	2.92	3.94	+ 41% <sup>ns</sup>	+ 35%*
Aberdeen	12	1.94	3.08	4.36	+ 125%*	+ 42%*
Huron	12	4.98	7.29	6.80	+ 37%*	- 7% <sup>ns</sup>
Mitchell	15	7.54	9.01	5.93	- 21%*	- 34%*
Yankton	8	1.66	2.63	1.44	- 14%*	- 45%*
Sioux Falls	10	1.19	1.34	2.23	+ 88%*	+ 66%*
Brookings	10	1.13	1.90	2.70	+ 138%*	+ 42%*
Watertown	12	0.76	1.01	1.72	+ 125%*	+ 71%*
Sisseton	5	0.14	0.28	1.09	+ 702%*	+ 294%*
STATEWIDE	96	3.53	4.51	4.16	+ 18%*	- 8% <sup>ns</sup>

<sup>ns</sup> Results of Wilcoxon signed-rank test not significant ( $P > 0.10$ )

\* Results of Wilcoxon signed-rank test significant ( $P < 0.10$ )

### ***Brood Survey - 2001***

In 2001 there was a 19 percent decline in statewide pheasant population, with survey areas near Huron, Mitchell, and Yankton significantly below their five-year averages. The factor that deserves the greatest amount of attention in explaining this decline is the status of the USDA's Conservation Reserve Program (CRP). In the fall of 1999, a significant amount of land enrolled in CRP came out of the program. Some of the largest losses were in Edmunds (-60%), Faulk (-54%), Spink (-39%), Jerauld (-36%), and Beadle (-32%) counties. Biologists believe that the milder than average winter of 1999-00 postponed the inevitable population decline due to loss of habitat provided by CRP until the severe winter of 2000-01. This abnormally long winter began the first week of November with above average and in some cases, all-time record snowfalls. Heavy snowpack extended winter-like conditions well into March, shortening the breeding season, and snowmelt runoff filled most low areas that normally would provide nesting habitat. The bulk of the pheasant population decline can be directly linked to pheasant mortality caused by exposure, lack of food, and lack of habitat created by the severe winter weather and loss of CRP lands. Biologists found 31 percent fewer adult pheasants on survey routes in eastern South Dakota; in areas that were less severely affected, adult populations dropped only 3 percent.

RESULTS OF PHEASANT BROOD SURVEYS BY CITY AREAS						
CITY AREA	ROUTES	PHEASANTS PER MILE			COMPARISON OF 2001 ESTIMATES WITH:	
		5-year mean	2000 survey	2001 survey	2000	5-year mean
Chamberlain	10	12.44	9.83	12.34	+ 25%*	- 1% <sup>ns</sup>
Winner	8	5.50	6.94	6.00	- 14% <sup>ns</sup>	+ 9% <sup>ns</sup>
Pierre	11	3.81	4.23	5.84	+ 38%*	+ 53%*
Mobridge	8	3.28	3.96	3.03	- 24% <sup>ns</sup>	- 8% <sup>ns</sup>
Aberdeen	12	2.49	4.36	3.22	- 26%*	+ 29%*
Huron	12	5.63	6.80	3.85	- 43%*	- 32%*
Mitchell	15	7.52	5.93	4.89	- 18% <sup>ns</sup>	- 35%*
Yankton	8	1.73	1.44	0.64	- 56% <sup>ns</sup>	- 63%*
Sioux Falls	10	1.50	2.23	1.07	- 52%*	- 29% <sup>ns</sup>
Brookings	10	1.49	2.70	1.82	- 32%*	+ 22% <sup>ns</sup>
Watertown	12	0.88	1.72	1.02	- 41%*	+ 16% <sup>ns</sup>
Sisseton	5	0.35	1.09	0.27	- 75%*	- 22% <sup>ns</sup>
STATEWIDE	96	3.82	4.16	3.38	- 19%*	- 12%*

<sup>ns</sup> Results of Wilcoxon signed-rank test not significant ( $P > 0.10$ )

\* Results of Wilcoxon signed-rank test significant ( $P < 0.10$ )

### ***Brood Survey - 2002***

After a 19 percent decline in 2001, 2002 saw an 18 percent decline. It appears that higher than average temperatures and below average precipitation during the summer of 2002 negatively impacted pheasant numbers west of the James River valley (central South Dakota). Pheasant numbers declined most significantly where the drought conditions were most severe. When precipitation in central and eastern South Dakota is above average, populations flourish. After the mild winter of 2001-02, this area of the state had a higher than average breeding population, yet pheasant numbers dropped. While few would debate that the ultimate cause of the decline was the drought,

pinpointing the direct effect on populations is more difficult. Most likely, the drought impacted pheasant densities on two levels. First, the direct impact was a reduction of herbaceous growth. These plants provide habitat for nesting and for invertebrates, an essential food source for young pheasants. Secondly, because of the impact of the drought on herbaceous cover, much of the remaining potential cover was put up for hay or grazed. CRP land was released by the government for emergency haying and grazing. This occurred late enough in the summer so that many young were able to survive, but those that hatched late in the spring would not have been able to avoid hay mowing equipment.

RESULTS OF PHEASANT BROOD SURVEYS BY CITY AREAS						
CITY AREA	ROUTES	PHEASANTS PER MILE			COMPARISON OF 2002 ESTIMATES WITH:	
		5-year mean	2001 survey	2002 survey	2001	5-year mean
Chamberlain	10	13.16	12.34	7.65	-38%*	-42%*
Winner	8	6.06	6.00	4.21	-30%*	-31%*
Pierre	11	4.20	5.51	2.75	-50%*	-35%*
Mobridge	8	3.36	3.03	1.82	-40%*	-46%*
Aberdeen	14	2.63	3.00	2.21	-26% <sup>ns</sup>	-16% <sup>ns</sup>
Huron	17	4.93	3.58	4.08	+14% <sup>ns</sup>	-17% <sup>ns</sup>
Mitchell	16	6.94	4.78	3.14	-34%*	-55%*
Yankton	9	1.63	0.69	0.59	-14% <sup>ns</sup>	-64%*
Sioux Falls	13	1.40	1.11	1.21	+9% <sup>ns</sup>	-14% <sup>ns</sup>
Brookings	11	1.66	1.82	2.62	+44%*	+ 58%*
Watertown	12	0.94	1.02	2.01	+97%*	+114%*
Sisseton	4	0.44	0.26	0.72	+177%*	+64% <sup>ns</sup>
STATEWIDE	105	3.82	3.29	2.69	-18% <sup>ns</sup>	-30%*

<sup>ns</sup> Results of Wilcoxon signed-rank test not significant ( $P > 0.10$ )

\* Results of Wilcoxon signed-rank test significant ( $P < 0.10$ )

### ***Brood Survey - 2003***

Following two years of 19 percent and 18 percent declines, the results of the 2003 survey indicated that pheasant abundance in the state had increased by 121 percent. This is the highest documented abundance since 1963, and is an important indicator of the complexity of the human and natural systems that regulate pheasant populations. The prior four years saw ups and downs in pheasant population, but because of the overall health of habitat statewide, when weather conditions were right, pheasant populations could quickly rebound from dramatic losses. For a second year in a row, the state experienced a relatively warm, dry winter, and timely rains and near-average temperatures occurred in the eastern part of the state, helping pheasants during their reproductive period. The traditional “pheasant belt” of south-central South Dakota responded well from the 2002 drought.

RESULTS OF PHEASANT BROOD SURVEYS BY CITY AREAS						
CITY AREA	ROUTES	PHEASANTS PER MILE			COMPARISON OF 2003 ESTIMATES WITH:	
		10-year mean	2002 survey	2003 survey	2002	10-year mean
Chamberlain	10	11.33	7.65	16.23	+112%*	+43%*
Winner	8	5.64	4.21	6.37	+51%*	+13% <sup>ns</sup>
Pierre	11	3.71	2.75	5.25	+91%*	+42% <sup>ns</sup>
Mobridge	8	2.82	1.82	4.14	+127%*	+47% <sup>ns</sup>
Aberdeen	14	2.17	2.21	7.58	+243%*	+249%*
Huron	17	4.40	4.08	8.18	+100%*	+86%*
Mitchell	16	6.12	3.14	8.15	+160%*	+33% <sup>ns</sup>
Yankton	9	1.49	0.59	1.68	+185%*	+13% <sup>ns</sup>
Sioux Falls	13	1.29	1.21	2.72	+125%*	+111%*
Brookings	11	1.56	2.62	4.89	+87%*	+213%*
Watertown	12	1.19	2.01	4.47	+122%*	+276%*
Sisseton	5	0.42	0.68	1.58	+132%*	+276%*
STATEWIDE	105	3.38	2.66	5.87	+121%*	+74%*

<sup>ns</sup> Results of Wilcoxon signed-rank test not significant ( $P > 0.10$ )

\* Results of Wilcoxon signed-rank test significant ( $P < 0.10$ )

### ***Brood Survey - 2004***

Habitat and weather conditions resulted in another year of high pheasant numbers in 2004. Small declines in population counts during the annual roadside survey were evident in the eastern part of the state because excessive rainfall events in late May and early June reduced reproductive success. Cool, wet weather across the state in June caused higher than average chick mortality and a decline in the average size of broods. The hens can protect some of their chicks, but not all of them, by covering the chicks with their own bodies. Also, extended wet periods make it difficult for newly hatched chicks to spend sufficient time foraging. As in the preceding years, numbers may have increased in some areas and decreased in others.

Local Area	Routes	Pheasants per mile (PPM)			Difference of 2004 PPM with	
		2004	2003	10-yr ave	2003	10-year ave
Chamberlain	10	17.14	18.18	12.21	-6% <sup>ns</sup>	+40% <sup>ns</sup>
Winner	8	7.00	7.11	5.79	-2% <sup>ns</sup>	+21% <sup>ns</sup>
Pierre	13	6.03	5.26	3.79	+15% <sup>ns</sup>	+59%*
Mobridge	8	5.52	4.43	3.03	+25% <sup>ns</sup>	+82%*
Aberdeen	14	5.94	8.18	2.84	-27% <sup>ns</sup>	+109%*
Huron	17	7.92	9.05	5.34	-12% <sup>ns</sup>	+48%*
Mitchell	16	6.91	8.97	6.66	-23% <sup>ns</sup>	+4% <sup>ns</sup>
Yankton	10	1.28	1.82	1.69	-30% <sup>ns</sup>	-24% <sup>ns</sup>
Sioux Falls	13	2.72	2.89	1.53	-6% <sup>ns</sup>	+78%*
Brookings	11	4.10	5.15	2.05	-20%*	+100%*
Watertown	12	3.89	4.62	1.48	-16% <sup>ns</sup>	+163%*
Sisseton	5	1.38	1.50	0.59	-8% <sup>ns</sup>	+134%*
Western SD	5	2.37	2.19	2.54	+9% <sup>ns</sup>	-7% <sup>ns</sup>
STATEWIDE	110	5.66	6.20	3.72	-9% <sup>ns</sup>	+52%*

<sup>ns</sup> Results of Wilcoxon signed-rank test not significant ( $P > 0.10$ )

\* Results of Wilcoxon signed-rank test significant ( $P < 0.10$ )

### ***Brood Survey - 2005***

For 2005 on the survey count averaged 6.63 pheasants per mile, the highest recorded in South Dakota in nearly 40 years. Overall, the year saw a 21 percent increase in total pheasant population from 2004. Similar to the previous two years, the winter of 2004-5 was for the most part mild and open (little to no long-term snow cover), resulting in minimal winter mortality and good carry-over of birds into the next season. Timely rainfall in the spring provided the moisture necessary for good overall habitat conditions for nesting and brood-rearing. State game biologists referenced the importance of the CRP (Switzer 2008), although pastureland, hay-land, winter wheat, idle areas, and roadside ditches also played an important role in achieving the 2005 pheasant count.

The only Region III, in the southeastern part of the state, experienced a decrease. Several heavy rainfall events and some isolated severe weather and cool temperatures in May could have reduced initial nesting success. If so, hens would have re-nested and produced smaller broods; hatched chicks may not have been able to survive the May weather. Similar events also occurred in the northern part of the state, but greater CRP acreage there may have afforded nests and chicks better protection there.

In the early 1960s, South Dakota's pheasant population reached one of the highest levels on record, mainly due to habitat provided by Soil Bank set-aside acres. CRP and state Walk-In Areas, along with ideal weather conditions, likely provided for 2005's new 40 year high in pheasant numbers. An additional benchmark was surpassed, with over 1-million acres enrolled in the South Dakota Walk-In Area program.



Local Area	Routes	Pheasants per mile (PPM)			Difference of 2005 PPM with	
		2005	2004	10-yr ave	2004	10-year ave
Chamberlain	9	13.63	16.42	12.47	-17% <sup>ns</sup>	9% <sup>ns</sup>
Winner	8	5.68	7.00	5.65	-19% <sup>ns</sup>	1% <sup>ns</sup>
Pierre	12	5.77	4.57	3.07	26%*	88%*
Mobridge	8	5.59	5.52	3.28	1% <sup>ns</sup>	70%*
Aberdeen	14	8.73	5.94	3.29	47%*	165%*
Huron	17	9.85	7.92	5.74	24%*	72%*
Mitchell	16	7.19	6.91	6.57	4% <sup>ns</sup>	9% <sup>ns</sup>
Yankton	10	1.45	1.28	1.52	13% <sup>ns</sup>	-4% <sup>ns</sup>
Sioux Falls	13	2.97	2.72	1.64	9% <sup>ns</sup>	81%*
Brookings	11	7.43	4.10	2.32	81%*	220%*
Watertown	12	8.16	3.89	1.71	110%*	377%*
Sisseton	5	3.01	1.38	0.72	118% <sup>ns</sup>	318%*
Western SD	5	2.75	2.37	2.57	16% <sup>ns</sup>	7% <sup>ns</sup>
STATEWIDE	109	6.63	5.50	3.81	21%*	74%*

<sup>ns</sup> Results of Wilcoxon signed-rank test not significant ( $P > 0.10$ )

\* Results of Wilcoxon signed-rank test significant ( $P < 0.10$ )

### ***Brood Survey - 2006***

The winter of 2005-06 began in late November with one of the state's worst ice storms in its history. Pheasant numbers for 2006 declined by 6 percent overall.

Fortunately, these conditions were short-lived, and although game biologists heard accounts of localized pheasant mortality, pheasants by and large fared quite well. In addition to habitat created by CRP and other state and federal land set-aside programs, pheasant habitat was increased/improved through techniques that have become widely adopted, such as leaving rows of unharvested corn, which acts as a natural snow fence, and planting rows of trees near food sources and other grassland habitats, which also act

as a natural snow fences. Such windbreaks both block snow and shelter the birds from ice storm and blizzard events.

After the early winter storms, the rest of the winter returned to conditions seen in the previous few years – moderate temperatures and limited snow cover. Spring nesting conditions were favorable statewide and weather conditions were ideal during the normal peak hatch (2<sup>nd</sup> week in June). However, dry, hot temperatures persisted throughout the summer, resulting in severe drought conditions. Overall, pheasant population across the state did not change much – only a 6 percent loss from the record setting year of 2005. Many hunters remarked on the survey that they found habitat conditions in this year worse than normal (in localized situations) and that some grassland they had wanted to hunt had been hayed or grazed because of the drought. Some also thought populations had declined. Many CRP acres did fall under the USDA’s emergency haying/grazing rules, but because haying could not begin until July 15, minimal impacts on pheasant populations should be attributed to this.

Local Area	Routes	Pheasants per mile (PPM)			Difference of 2006 PPM with	
		2006	2005	10-yr ave	2005	10-year ave
Chamberlain	9	12.88	13.55	13.15	-5% <sup>ns</sup>	-2% <sup>ns</sup>
Winner	8	5.87	5.64	5.75	4% <sup>ns</sup>	2% <sup>ns</sup>
Pierre	12	4.26	5.73	4.26	-25% <sup>ns</sup>	0% <sup>ns</sup>
Mobridge	8	3.89	5.55	3.68	-30%*	6% <sup>ns</sup>
Aberdeen	14	7.99	8.73	4.00	-9% <sup>ns</sup>	100%*
Huron	17	10.27	9.84	6.47	4% <sup>ns</sup>	59%*
Mitchell	16	7.58	7.19	6.74	5% <sup>ns</sup>	12% <sup>ns</sup>
Yankton	10	1.65	1.45	1.52	14% <sup>ns</sup>	9% <sup>ns</sup>
Sioux Falls	13	2.97	2.97	1.84	0% <sup>ns</sup>	61%*
Brookings	11	6.90	7.43	2.98	-7% <sup>ns</sup>	132%*
Watertown	12	7.93	8.16	2.41	-3% <sup>ns</sup>	229%*
Sisseton	5	2.74	3.01	1.01	-9% <sup>ns</sup>	171%*
Western SD	5	2.46	2.75	2.68	-11% <sup>ns</sup>	-8% <sup>ns</sup>
STATEWIDE	109	6.22	6.62	4.33	-6% <sup>ns</sup>	44%*

<sup>ns</sup> Results of Wilcoxon signed-rank test not significant ( $P > 0.10$ )

\* Results of Wilcoxon signed-rank test significant ( $P < 0.10$ )

### ***Brood Survey - 2007***

In 2007 statewide pheasant counts were up 23 percent from the previous year.

Although survey staff counted fewer roosters on their survey routes, the number of broods and brood size both increased. The winter of 2006-07 provided favorable conditions for pheasant survival. Significant snow events and blizzard conditions occurred in late February and early March; however, snow cover was short-lived and little mortality was reported. Significant rainfall events occurred in several areas of the state during the month of May, especially in the James River Valley and north-central South Dakota. The James River Valley experienced flooding, but most of the wide-

spread spring precipitation helped create excellent habitat conditions for both nesting and brood-rearing. Even with hot and dry conditions through most of the summer, the high spring rainfall helped keep habitat conditions in good condition.

Local Area	Routes	Pheasants per mile (PPM)			Difference of 2007 PPM with	
		2007	2006	10-yr ave	2006	10-year ave
Chamberlain	10	16.64	13.15	13.50	27%*	23%*
Winner	8	7.76	5.87	6.02	32% <sup>ns</sup>	29% <sup>ns</sup>
Pierre	13	8.82	5.63	4.57	57%*	93%*
Mobridge	8	7.61	3.89	3.80	96%*	100%*
Aberdeen	14	9.38	7.99	4.65	17% <sup>ns</sup>	102%*
Huron	17	10.61	10.27	7.20	3% <sup>ns</sup>	47%*
Mitchell	16	9.22	7.58	6.96	22%*	32%*
Yankton	10	2.31	1.65	1.53	40%*	51%*
Sioux Falls	13	3.99	2.97	2.01	34%*	99%*
Brookings	11	6.89	6.90	3.56	0% <sup>ns</sup>	93%*
Watertown	12	8.84	7.93	3.13	11% <sup>ns</sup>	182%*
Sisseton	5	3.61	2.74	1.26	32% <sup>ns</sup>	187%*
Western SD	5	2.37	2.46	2.71	-4% <sup>ns</sup>	-13% <sup>ns</sup>
STATEWIDE	110	7.85	6.36	4.71	23%*	66%*

<sup>ns</sup> Results of Wilcoxon signed-rank test not significant ( $P > 0.10$ )

\* Results of Wilcoxon signed-rank test significant ( $P < 0.10$ )