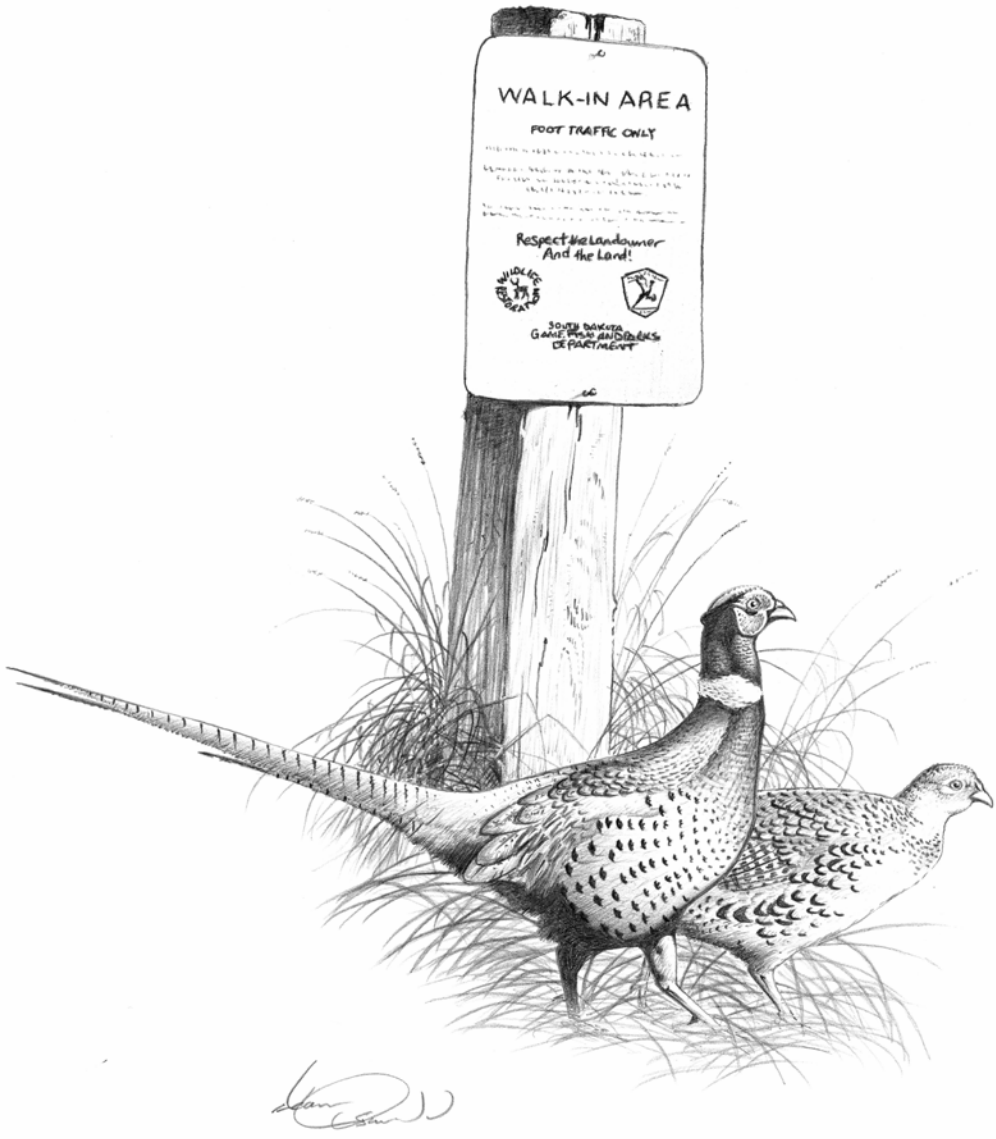
RING-NECKED PHEASANT MANAGEMENT PLAN FOR SOUTH DAKOTA 2009-2014



SOUTH DAKOTA DEPARTMENT OF GAME, FISH & PARKS

Division of Wildlife Mission

The Division of Wildlife will manage South Dakota's wildlife and fisheries resources and their associated habitats for their sustained and equitable use, and for the benefit, welfare and enjoyment of the citizens of this state and its visitors.

Mission Motto: "Serving People, Managing Wildlife"

"The vision of the South Dakota Ring-necked Pheasant Management Plan is to maintain abundant populations of pheasants for South Dakotans and our visitors by fostering a partnership-driven approach for habitat development and management, to ensure public access opportunities, and to increase public awareness of the broad benefits of quality habitat and hunting."

This document is for general, strategic guidance for the Division of Wildlife (DOW) and serves to identify the role that the DOW plays, how we function and what we strive to accomplish related to the **Ring-necked Pheasant Management Plan for South Dakota 2009-2014**. The planning process is more important than the actual document. By itself this document is of little value; the value is in its implementation. This process will emphasize working cooperatively with private landowners and interested publics in both the planning process and the regular program activities related to the management of ring-necked pheasants.

Important sections of this plan include:

- Public attitudes related to wildlife and habitat
- Historical description of pheasant introductions and distribution
- Ecology and management of pheasants in South Dakota
- Pheasant population and habitat trends
- Issues, challenges and opportunities facing pheasant management
- Management goals, objectives and strategies for successful implementation
- Bibliography of past research studies on pheasants conducted in South Dakota
- Implementation schedule and primary responsibilities

This document is **Version 09-01** (year-consecutive number) of the **Ring-necked Pheasant Management Plan for South Dakota 2009-2014**.

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LIST OF ACRONYMS

CP	Conservation Practice
CRP	Conservation Reserve Program
CREP	Conservation Reserve Enhancement Program
CSP	Conservation Stewardship Program
DOW	Division of Wildlife
DU	Ducks Unlimited
EQIP	Environmental Quality Incentives Program
FSA	Farm Service Agency
GIS	Geographic Information System
GPA	Game Production Area
GRP	Grasslands Reserve Program
JRW	James River Watershed
NRCS	Natural Resources Conservation Service
PF	Pheasants Forever
SD DOT	South Dakota Department of Transportation
SD GFP	South Dakota Department of Game, Fish and Parks
SD SPL	South Dakota School and Public Lands
SDSU	South Dakota State University
SAFE	State Acres for Wildlife Enhancement
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
WHIP	Wildlife Habitat Incentive Program
WIA	Walk-In Area
WILMA	Wildlife Inventory and Land Management Application
WRP	Wetlands Reserve Program

EXECUTIVE SUMMARY

Ring-necked pheasants, hereafter referred to as pheasants, and pheasant hunting are a significant part of South Dakota's culture. Similar to the bountiful crops produced in South Dakota, pheasants are a product of our landscape. The same weather that influences our everyday conversations also has a profound effect on pheasant populations. Pheasant populations also respond to land use and available habitat to meet their annual life cycle needs. As a result, much of this plan is focused on the habitat development and management necessary to meet the seasonal and spatial requirements of our state bird.

The *"Ring-necked Pheasant Management Plan for South Dakota (2009-2014)"* provides a concise, yet comprehensive overview of topics such as public attitudes related to wildlife and habitat; pheasant introductions and distribution; pheasant ecology and management; population and harvest trends; pheasant research; pheasant economics; and issues, challenges, and opportunities facing pheasants, private landowners and wildlife managers.

This plan also identifies and provides direction with detailed goals, objectives and strategies to help maintain South Dakota as a showcase for pheasant management and the premiere destination for pheasant hunters across the nation. The primary goals are:

Goal #1: To partner with private landowners to conserve, restore and manage habitats critical for pheasants and other wildlife species.

Goal #2: To conserve, restore, manage and preserve habitats critical for pheasants and other upland nesting birds through fee title purchases, management agreements, and partnerships with other owners and managers of public land.

Goal #3: To continue to monitor population and habitat trends and conduct research as needed to address population and habitat-related questions.

Goal #4: To provide the public with access to quality pheasant habitat on private and public land.

Goal #5: To inform and educate the public on pheasant ecology, management, and research.

Objectives and strategies have been developed for each goal to guide implementation of the plan. The objectives and associated strategies identified in this plan are measurable and time bound, thus requiring careful planning and consideration. An implementation schedule is included and primary responsibilities have been assigned to ensure each strategy is accomplished. The successful implementation of this plan will require cooperation of the general public, private landowners, hunters, conservation partners, and businesses.

This is a plan for all South Dakotans interested in the conservation of pheasants and pheasant habitat. Wildlife managers and private landowners are challenged to use the available tools for the benefit and well-being of pheasants. In addition, a wide variety of wildlife species will benefit from these actions. With careful coordination among all stakeholders, we will be available to provide and support our pheasant hunting heritage for present and future generations.

INTRODUCTION

The diverse landscape of South Dakota is characterized by an assortment of habitats and an abundant array of natural resources. For many outdoor enthusiasts, no other wildlife species in the state is as recognized or valued as the ring-necked pheasant (*Phasianus colchicus*), hereafter pheasants. Though pheasants are not a native species to North America, they have become naturalized to this mosaic of grassland and agricultural land habitat found in much of South Dakota.

From the first successful releases of pheasants in 1908 to the current estimated population of around 10 million birds, South Dakotans and our visitors have built a rich and deeply rooted tradition around pheasants and pheasant hunting. The opening weekend in October is an event anticipated not only by pheasant hunters, but also family and friends who are reunited during this social gathering.

With a high rate of annual mortality, pheasants are a short-lived bird with a capability of high reproductive rates. The quantity, quality, and distribution of season-specific habitats and weather conditions are the primary factors that influence pheasant populations. As a result, private landowners and wildlife managers focus on the development and management of suitable habitat to meet the needs of pheasants throughout their annual life cycle.

Since their introduction and expansion in areas of interspersed cropland, grassland and other habitats, pheasant populations have been notably high on four occasions: the early 1930's following the Great Depression and drought period when much farmland was idle; the mid-1940's during and just after World War II when again much habitat was unintentionally created on idled cropland; the early 1960's at the peak of the Soil Bank Program; and currently as a result of the Conservation Reserve Program (CRP) acres and favorable weather conditions. Periods between these population peaks experienced large scale declines to upland habitat across much of the pheasant range (Switzer 2009).

Pheasant management in South Dakota currently consists of surveys to monitor populations and significant efforts by wildlife managers and private landowners to develop and manage pheasant habitat on both public and private lands. In addition, a wealth of knowledge has been obtained through research on pheasant biology and their response to various habitat management techniques and land use changes.

While South Dakota historically and currently supports high pheasant populations, there could be significant issues and challenges ahead for the future of South Dakota's state bird. The recent and anticipated loss of high quality habitat provided by CRP, reduction in acres and funding available for conservation programs in the 2008 Farm Bill, changing landowner demographics, commercialization of wildlife, budget and funding sources, and the need for additional public hunting access are issues that face private landowners and wildlife managers today and will continue to do so in the future.

The South Dakota Department of Game, Fish and Parks (SD GFP) is responsible for the conservation and management of pheasants and their associated habitats for the benefit of this wildlife resource and for the citizens of this state and our visitors. Therefore, a proactive approach is necessary to address these emerging issues to ensure that

abundant pheasant populations will be available to provide and support our hunting heritage for present and future generations.

In 2008, an estimated 76,000 residents and 100,000 non-residents, from all 50 states, harvested approximately 1.9 million pheasants in South Dakota. Whatever their reasons, hunters target South Dakota as a primary destination for pheasant hunting and have a significant impact on local economies. In both 2007 and 2008, pheasant hunting and its associated activities brought an estimated $219 million into the state's economy each year.

This management plan identifies and provides direction in detailed goals, objectives and strategies to help maintain South Dakota as a showcase for pheasant management and a destination for pheasant hunters across the nation. Particular attention is focused on habitat on both private and public land, population dynamics, public access and public awareness. The objectives and strategies identified in this plan are measurable and time bound, requiring careful planning and consideration to be accomplished. The successful implementation of this plan will require cooperation of the general public, private landowners, hunters, conservation partners, and businesses.

This is a plan for all South Dakotans interested in the conservation of pheasants and pheasant habitat. Wildlife managers, landowners and the public are challenged to use the available tools for the benefit and well-being of pheasants. In addition, pheasant management can support the conservation goals of other wildlife species and their associated habitats.

PUBLIC ATTITUDES RELATED TO WIDLIFE & HABITAT

According to the 2006 National Survey of Fishing, Hunting and Wildlife-Associated Recreation, South Dakota has 171,000 hunters, 135,000 anglers, and 432,000 wildlife watchers (U.S. Department of Interior 2006). Approximately 76,000 residents and 100,000 non-residents participated in the 2008 pheasant hunting season.

A significant proportion of South Dakota residents feel that it is very important (69%) or moderately important (26%) that South Dakota conserves or protects as much fish and wildlife as possible, and where appropriate. Also, a significant proportion of South Dakota residents feel that healthy fish and wildlife populations are very important (78%) or moderately important (19%) to the economy and well-being of South Dakota residents (Gigliotti 2004).

According to Gigliotti (2004), when hunters were asked to pick their top reason among eight possible reasons for why they like to hunt pheasants in South Dakota, the top reason (43%) for both residents and non-residents alike was the enjoyment of spending time with friends and family. The second most important reason by both residents (22%) and non-residents (15%) was to enjoy nature, the outdoors and the beauty of the area.

From the same public opinion survey conducted by Gigliotti (2004), pheasant hunters were asked to indicate their satisfaction while considering their total pheasant hunting experience in 2003. In summarizing their responses, 81% of resident and 92% of non-resident hunters reported that they were satisfied. In addition, both resident (67%) and

non-resident (43%) hunters indicated they hunted “private land—no fees” during the 2003 regular pheasant season.

Efforts to communicate and understand the differences and similarities between public attitudes and values of all involved parties will strengthen and improve the effectiveness of SD GFP’s pheasant management and its habitat and public access programs.

PHEASANT INTRODUCTIONS & DISTRIBUTION

Records of initial pheasant introductions in South Dakota from the late 1800’s and early 1900’s are too vague or incomplete to provide accurate numbers, origin or exact locations of releases. According to Trautman (1982), Dr. A. Zetlitz of Sioux Falls had several varieties shipped to South Dakota in 1891. These pheasants consisted of ringnecks (assumed to be of the English ringneck variety) and a few of the golden and silver varieties. These birds, along with others hatched and reared from his home, were released at the junction of the Split Rock and Sioux rivers in Minnehaha County. It is reported that some of these birds were seen as far away as Yankton County by 1902, but the population eventually disappeared from uncontrolled hunting.

The first successful introductions occurred in 1908-1909 on farms found in Spink County. According to Trautman (1982), A. E. Cooper and E. L. Ebbert introduced several pairs from a Pennsylvania game farm in 1908. Although it is mentioned that all of these birds were lost during the following winter, they again released a few dozen birds (origin unknown) that are believed to have helped establish the pheasant population in that local area.

H. P. Packard, H. J. Schalke and H. A. Hageman of Redfield released an unknown number of pheasants in 1908 on Bert Hageman’s farm just north of Redfield along the James River. That same year, it is reported that A. C. Johnson released 25 pheasants south of Frankfort on a ranch owned by A. C. Johnson. In 1911, the Redfield Chamber of Commerce released another 30 pair of pheasants on the Bert Hageman farm (Trautman 1982).

While other private releases continued in the early 1900’s to establish pheasant populations, SD GFP began releasing pheasants in 1911 and continued until 1919. The first open season was held in South Dakota for one day in Spink County in 1919.

Once populations were established in central and eastern South Dakota, SD GFP trapped and transferred some 33,000 pheasants to Corson, Fall River, Lawrence, Meade, Perkins, Pennington and Ziebach counties from 1926 through 1941. Trap and transfer projects continued to supplement areas of the state that experienced significant losses due to severe winter conditions and to fill unoccupied areas containing suitable pheasant habitat (Hipschman 1959).

Although trap and transfer projects were used to fill suitable pheasant habitat primarily in western South Dakota, this technique has not been utilized since the mid-1990s. As a result of public pressure during periods of low pheasant densities, SD GFP has in the past paid private landowners and other interested groups to raise and release pen-reared pheasants. This state-sponsored program was discontinued in 1990.

After the success of initial stockings and the saturation of the state's traditional pheasant range, pheasant populations have been particular high on four occasions: the early 1930s following the Great Depression and drought period when much farmland was idle; the mid-1940s during and just after World War II when again much habitat was unintentionally created on idled cropland; once more in the early 1960s at the peak of the Soil Bank Program; and currently as a result of CRP acres and favorable weather conditions.

It's not surprising that these periodic high pheasant numbers were the result of the widespread availability of adequate pheasant habitat. Large scale declines in upland habitat across much of the pheasant range resulted in far fewer pheasants during the interim time periods.

PHEASANT ECOLOGY

The pheasant life cycle is usually split into three biological seasons: breeding, brood-rearing, and winter. Because of this, discussion of pheasant population dynamics and habitat requirements are often discussed in reference to one of these three seasons. An informative and in-depth overview of pheasant bioenergetics throughout the annual life cycle is described by Solomon (1983, 1984*a*, 1984*b*, 1984*c*, 1984*d*, and 1984*e*). The following is a brief summary of the ecology of pheasants in South Dakota, including annual life cycle, habitat requirements, and limiting factors. This is not intended to be an in-depth look at pheasant ecology, but instead a quick summary for the reader.

Quality nesting habitat is an important limiting factor for pheasants in South Dakota, with the presence of winter cover being another essential habitat component. Research has indicated that idle, herbaceous grasslands are the most important habitats for nesting pheasants (Trautman 1965*b*, Fedeler 1973, Olson and Flake 1975, Craft 1986, Schilowsky 2007). And although other habitats are attractive to nesting pheasants, such as alfalfa, roadside ditches, and small grains, these habitats generally do not produce many broods due to mowing and farming activities (Baskett 1947, Grode 1972, Hanson and Progulske 1973, Olson and Flake 1975, Craft 1986, Leif 2004).

The breeding period begins when males begin their breeding displays in April and May. Male pheasants establish breeding territories during this time of year and attract females by crowing and flapping their wings rapidly. Males are capable of breeding with many (polygynous) female pheasants (Trautman 1982) and in captivity have been shown to breed with up to 50 females without loss of fertility (Shick 1947). Female pheasants are capable of producing an entire clutch of eggs from a single copulation (Schick 1952).

After courtship, female pheasants begin developing eggs which they lay at a rate of approximately 1 egg per day (Baskett 1947, Trautman 1982). Clutch sizes range from 8-12 eggs, of which most are fertile (Trautman 1982). Once all eggs have been laid, females begin incubation which peaks in May and lasts 23 days (Baskett 1947, Trautman 1982). All fertile eggs hatch within 24 hours, after which the brood will leave the nest. If a nest is destroyed or abandoned, female pheasants will attempt to renest (Gates 1966) and have been shown to attempt up to 4 nests in a single season (Dumke and Pils 1979). Female pheasants are also well known for "dumping" their eggs in the nests of other pheasants (Baskett 1947, Trautman 1982) and other upland nesting birds, such as prairie grouse (Simpson and Westemeier 1987), turkeys (Schmutz 1988), and ducks (Bennett 1936).

Pheasant broods typically have an even sex ratio at the time of hatching (Rodgers 1984). After hatching, pheasant chicks are covered in down, but quickly begin growing feathers and are capable of short flights at 2 weeks of age (Trautman 1950*a*). Chicks remain with a hen for approximately 8 weeks (Trautman 1982) and are dependent upon insects for food during this time (Hill 1985). Because of this dependence upon insects, grassland habitats with a high proportion of forbs are important for pheasant chicks (Hill 1985, Riley et al. 1998). Typically, at least one third of the brood will die during the first 8 weeks of life, with predators, farm machinery, and extreme weather being significant mortality factors (Baskett 1947, Riley et al. 1998). During late summer, it is common to see several female pheasants with mixed broods of varying size and age.

By fall, summer-hatched pheasant chicks are the size of adult birds, with males being larger and more brightly colored than females. As weather turns colder, pheasants begin to concentrate in areas of preferred winter habitat. As a result, the presence of winter cover is another essential habitat component. In South Dakota, pheasants typically choose cattail wetlands and dense shrubs or woodlands (Fedeler 1973, Craft 1986, Gabbert et al. 1999) to withstand cold winds and snow. Food plots of corn and sorghum are often planted near these winter habitats to help sustain pheasant populations through the season. Pheasants have been documented moving 3 to 5 km in winter months to take advantage of preferred winter habitats (Gabbert, unpublished data). Research has indicated that pheasants generally do not die from severe weather itself, but due to severe weather (e.g. deep snow), makes them more susceptible to predators (Dumke and Pils 1973, Perkins et al. 1997, Gabbert et al. 1999). In the past, development of winter cover for pheasants has been a primary objective in South Dakota (Pheasants for Everyone 1988).

Late-fall also brings the much anticipated pheasant hunting season, which results in approximately 45% mortality for male pheasants in eastern South Dakota Leif (2003). In addition, approximately 3% of females are incidentally shot during the hunting season (Leif 1996). However, fall harvest rarely removes all the available “excess” males from the population and there are sufficient breeding males the following spring.

Wildlife managers focus on the development and management of suitable habitat to meet the needs of pheasants during these biological seasons. Even with the best habitat management, weather is an uncontrollable factor that can jeopardize local pheasant populations. However, providing pheasants with these season-specific habitat requirements can greatly enhance survival and reproduction.

PHEASANT MANAGEMENT

SURVEYS

After the initial stocking efforts of pheasants during the early 20th century, pheasant management by SD GFP primarily included the trap and transfer of wild pheasants to fill pockets of suitable habitat void of pheasants. Management efforts continued to evolve throughout the years and currently include a broad spectrum of activities to monitor populations, strategic planning efforts, and partnerships to develop and manage pheasant habitat on public and private lands.

A long-term, historic record of pheasant population trends and statistics are necessary to measure the effects of various land-use changes, climatic conditions, harvest levels, and sociological changes on pheasant populations. Three methods are used to collect this

information: pheasant brood survey, winter sex ratio survey, and the hunter harvest survey.

The pheasant brood survey is conducted by SD GFP staff annually to determine pheasant reproductive success, population trends, relative densities of populations throughout the state, 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 specific geographic areas of the state.

Survey indices are currently derived from 110, 30-mile pheasant brood routes that are distributed across South Dakota where pheasants are found in sufficient number for surveying (Appendix Figure 1). Routes are surveyed from 25 July through 15 August each year using standardized methods on mornings when weather conditions are optimal for observing pheasants. Also, pheasant broods 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 mean brood sizes and broods observed with numbers of cocks and hens observed on each route. PPM estimates for the prior year and the average of the previous 10 years are compared with the respective year survey results. Results are compared within local areas using 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.

The pheasant winter sex ratio survey is conducted annually from the end of the hunting season through March 30th to estimate winter sex ratios of pheasant populations throughout the state. The winter sex ratio indicates the degree of rooster harvest during the previous hunting season compared to a pre-hunting season sex ratio of approximately 90 roosters per 100 hens. According to Trautman (1982), 10 roosters per 100 hens is an ample sex ratio for breeding purposes. Any roosters in excess of this winter sex ratio indicate an under utilization of surplus roosters from the previous hunting season.

The hunter harvest survey is conducted annually to obtain harvest-related statistics for pheasants. These statistics include number of residents and non-residents hunters, number of days hunted, number of pheasants harvested, and hunter satisfaction (Appendix Table 1).

The pheasant brood survey, pheasant winter sex ratio survey, and the hunter harvest survey provide the information used in the pre-season (P_1) population estimate formula as developed by Hickey (1955) and used first by Dahlgren (1963). Reliable estimates of pre-season populations have been calculated with this formula since 1947 and have been used for evaluating density trends (Trautman 1982). The variables in the formula are defined as follows: P_1 = pre-season population estimate; f_1 = pre-season sex ratio; f_2 = post-season sex ratio; K_f = estimated hen harvest; and K_t = estimated total harvest.

$$P_1 = \frac{\left(f_2 K_t - K_f\right)}{\left(f_2 - f_1\right)}$$

Data collected from the surveys described above can be used to estimate average pheasant and hunter densities by county (Appendix Figures 2-3). In addition, a measure of hunter satisfaction is obtained through the hunter harvest survey by asking hunters their satisfaction, with 1 being least satisfied and 7 being most satisfied. During the past 10 years (1999-2008), resident hunters have reported an average satisfaction of 4.86, with a low of 4.28 and a high of 5.39. Nonresident hunters have reported an average satisfaction of 5.51, with a low of 5.01 and a high of 6.00 (Appendix Figure 4).

SEASON STRUCTURE

During the past 90 years, pheasant hunting regulations have fluctuated considerably. Regulations have varied from a 163-day season, 10-bird daily bag limit that included 5 hens in 1944, to a 10-day season and 2-rooster daily bag limit in 1950 (Trautman 1982). During the 1944-45 pheasant season, the state included 11 units to manage pheasant harvest. More recently, up until 2006,, the season was structured around two units; Unit 1 included all of South Dakota except the area included in Unit 2, which included the counties of Butte, Meade, Lawrence and Pennington west of the Cheyenne River. In 2007, these two units were merged into one statewide hunting unit, with certain restrictions applying to state and federal public lands.

The start date for the regular pheasant opener on the third Saturday of October is a tradition going back to 1958. Rooster-only hunting seasons have been authorized since 1947 (Trautman 1982). The daily bag limit of 3 roosters has been in effect since 1964, except for 1976-1978, when the daily bag limit was reduced to 2 roosters. Biologically, a daily bag limit greater than 3 roosters could be implemented; however, pheasant hunters have become accustomed to the current bag limit and many see no need for adjustment. Shooting hours from Noon to sunset has been consistent since 1958. Currently, shooting hours change to 10:00 a.m., Central Daylight Time, the second Saturday of the season and end at sunset for the remainder of the season.

In 1999, a youth-only pheasant season was incorporated into the season structure as a way to encourage youth participation in pheasant hunting. The youth-only season is currently open statewide on private and public land for five consecutive days beginning on the first Saturday of October. All public road rights-of-way are closed, except for the one-half of the road rights-of-way next to and part of public hunting lands. All youth must be accompanied by an unarmed adult.

In 2001, a resident-only pheasant season was initiated statewide for three consecutive days beginning on the second Saturday of October. This season is only open to hunting on public lands, or leased private property open to the hunting of upland game birds. In addition, public road rights-of-way that are contiguous to and a part of those public lands are open during this season.

A mentored hunting program was introduced in 2008 as a way to allow parents to decide when their children are ready to begin hunting. Any resident youth, at least 10 years of age and less than 16 years of age, is not required to posses a hunting license as long as they are accompanied by a licensed, hunter safety certified mentor at least 18 years of age. The one-on-one interaction in the field is intended to teach hunter safety, hunter ethics, and respect for wildlife and their habitats. According to the latest hunter harvest survey, approximately 2,566 youth participated in the mentored hunting program during the 2008-2009 pheasant season.

HABITAT & PUBLIC ACCESS

Since the majority of the land base in South Dakota is privately owned (80%), private landowners are the primary stewards of wildlife habitat. Recognizing that high quality habitat on private land is necessary to sustain good pheasant populations, SD GFP has focused much effort on agricultural land use issues (eg. Federal farm bill and agriculture policy), as well as habitat development and management on private land. This collaborative approach between private landowners, SD GFP, and other conservation partners have been and will continue to be critical in providing for proper pheasant management and public hunting opportunities at a statewide level.

The SD GFP Division of Wildlife delivers a comprehensive private lands habitat and access program, with numerous options available to private landowners for habitat development. Cost-share and incentive programs are available for food habitat plots, woody habitat, habitat fencing, grass seedings, grazing systems, wetland creations, wetland restorations and riparian area enhancement.

In order to address the need for additional hunting access to areas with high quality habitat, SD GFP introduced the Walk-In Area Program in 1988. This program has become an attractive alternative for private landowners to lease CRP and other quality habitat to SD GFP for public hunting access. Since its inception, the Walk-In Area Program has remained adaptive to accommodate private landowners and to address the needs of hunters across the state.

The private lands habitat and access programs are described in much greater detail in the SD GFP Private Lands Habitat & Access—Strategic Plan (Murano & Switzer 2008). This comprehensive plan provides a thorough background on past and present efforts, while serving as an adaptive and flexible plan to address emerging issues and future opportunities.

Since the quantity and quality of available habitat is such a vital component of pheasant management, private landowners and wildlife managers must use every available resource to put habitat projects on the ground. Many of SD GFP's private lands programs are tailored to complement U.S. Department of Agriculture (USDA) conservation programs, such as CRP, Wetlands Reserve Program (WRP), Wildlife Habitat Incentive Program (WHIP), Environmental Quality Incentives Program (EQIP), Grassland Reserve Program (GRP), and the Conservation Stewardship Program (CSP). As these USDA conservation programs have the potential to impact thousands of acres, SD GFP Private Lands Biologists and a Farm Bill/Access Coordinator serve on the USDA Natural Resources Conservation Service State Technical Committee and sub-committees of WRP, WHIP, EQIP, GRP and CSP. In addition, SD GFP staff serve on the USDA Farm Service Agency (FSA) CRP sub-committee. This allows for significant input from wildlife managers in establishing program goals and objectives at the state level, developing ranking criteria, and creates a communication connection with USDA.

Strong working relationships with conservation partners is essential in maximizing the implementation of habitat development and management on private land. Therefore, SD GFP partners at varying levels of participation and commitment with numerous local, county, state and federal government agencies and non-governmental organizations. For example, through a unique partnership with Pheasants Forever and USDA Natural Resources Conservation, Farm Bill Biologists are located in specific USDA Service Center Offices in priority habitat areas throughout central and eastern South Dakota.

Farm Bill Biologists have training and knowledge of local, state and federal programs to assist landowners in meeting their personal habitat and land use goals. However, it's the cooperation of private landowners that allows for most habitat accomplishments.

SD GFP owns or manages approximately 290,000 acres of Game Production Areas (GPAs) across the state. Many GPAs located in central and eastern South Dakota are managed with a strong emphasis towards pheasant habitat. With approximately 10% of South Dakota's land base under public ownership, SD GFP works closely with other public land agencies to incorporate habitat management for pheasants where feasible and appropriate with their land management objectives.

PHEASANT DEPREDATION

Recently, SD GFP staff has been working more with landowners to address pheasant depredation on row crops in areas with high pheasant densities. Most depredation occurs on planted and emerging corn, with landowner complaints varying with changes in pheasant densities across the state. Though depredation complaints have only been recorded for a relatively short period, it appears that landowners report more depredation complaints during years of increased agricultural inputs costs and commodity prices. SD GFP staff has responded to approximately 75-125 different complaint sites per year during the past five years, primarily in eastern South Dakota.

In order to identify more proactive means to address this emerging depredation issue, SD GFP helped fund a study through South Dakota State University (SDSU), which evaluated the use of anthraquinone to reduce pheasant depredation on corn. SD GFP staff currently provides information to landowners on the use of seed corn treated with anthraquinone. As a short stop measure, SD GFP also spreads corn around the perimeters of fields experiencing pheasant depredation to try and reduce the damage caused by pheasants and with the intention of reducing the damage to a level tolerable by landowners.

SHOOTING PRESERVES

SD GFP regulates and monitors licensed shooting preserves according to Administrative Rule 41:09:01, which allows for the hunting of released pheasants and other game birds. The number of licensed shooting preserves has increased from 157 in 2001 to 229 in 2008 approved for operation in South Dakota (Appendix Figure 5). All licensed shooting preserves are required to maintain accurate records of birds released and all birds harvested. The number of pen-raised pheasants released has increased from 219,869 in 2001 to 439,454 released in 2008, with the harvest ratio of pen-raised and wild pheasants remaining steady (Appendix Figure 6). It should be noted that no license shooting preserve statistics are used in the statewide population or harvest estimates.

In summary, pheasant management in South Dakota primarily involves working with private landowners and cooperating agencies to develop and manage quality pheasant habitat, monitoring populations, and finally, developing season structures that allow the harvest of surplus roosters and maximum hunter participation.

POPULATION & HARVEST TRENDS

Since the pheasant brood survey began in 1949, the lowest statewide PPM of 1.03 was recorded in 1976 and the highest statewide PPM of 11.38 was recorded in 1961 (Appendix Table 1; Appendix Figure 7). The previous ten-year (2000-2009) average is

5.77 pheasants per mile (Appendix Figure 8). Pheasant brood sizes have been documented since 1946, with the highest of 7.89 recorded in 1952 and the lowest of 5.70 recorded in 1959 (Appendix Table 1; Appendix Figure 9). The previous ten-year (2000-2009) average is 6.52 chicks per brood (Appendix Figure 10).

The winter sex ratio survey is conducted annually to determine winter sex ratios of pheasant populations. This survey was initiated in 1947, with the lowest ratio of 21 roosters per 100 hens recorded in 1980, 1981 and 1983, and the highest ratio of 63 roosters per 100 hens recorded in 1950 (Appendix Table 1; Appendix Figure 11). The previous ten-year (2000-2009) average is 39 roosters per 100 hens (Appendix Figure 12).

Pre-season pheasant population estimates have ranged from 100,000 pheasants in 1919 during the inaugural pheasant season to a staggering high estimate of 16 million pheasants in 1945 (Appendix Table 1; Appendix Figure 13). The previous ten-year (1999-2008) average pre-season population estimate is 8 million pheasants (Appendix Figure 14).

The first pheasant season held in 1919 included an estimated harvest of 200 pheasants, with approximately 7.5 million pheasants harvested in 1945 (Appendix Table 1, Appendix Figure 15). It should be noted that in 1945, the daily bag limit included 8 pheasants, and allowed for 4 hens. The previous ten-year (1999-2008) average for pheasant harvest is 1.7 million rooster pheasants (Appendix Figure 16).

As expected, there is strong correlation between pheasant populations, pheasant harvest, and the number of pheasant hunters. An estimated 1,000 hunters participated during the opening pheasant season in 1919, with approximately 212,000 hunters during the high pheasant year of 1963 (Appendix Table 1; Appendix Figure 17). During the past ten years (1999-2008), the average number of residents, non-residents and total hunters are reported as 78,477, 84,703, and 163,180, respectively (Appendix Figure18).

While season length and bag limits have changed throughout the years, the average reported pheasant harvest per hunter has ranged from 0.2 in 1919 to 54.1 in 1944 (Appendix Table 1; Appendix Figure 19). Since the daily bag limit change to 3 roosters (1979), an average harvest of 8.9 pheasants per hunter has been reported. The previous ten-year (1999-2008) average is 10.2 roosters per hunter (Appendix Figure 20).

A resident-only pheasant season has occurred the weekend prior to the opener of the regular pheasant season since 2001. From 2001-2008, an average of 21,418 hunters have participated, with an average total harvest of 41,621 pheasants, or an average bag of 1.94 pheasants (Appendix Figure 21).

Since 2001, the youth-only pheasant season has opened on the weekend prior to the resident-only season and currently is open for five days. From 2001-2008, approximately 28.8% of eligible hunters who hold a youth small game license and 3.8% of eligible hunters who hold a junior combination license have participated in this season (Appendix Figure 22).

Since its inception the length of the regular pheasant season has been adjusted many times (Trautman 1982). Nevertheless, the length of the hunting season has little, if any biological impact on the population. From a one day season held in 1919 to a 163 day

season in 1944, the season length has been relatively stable during the past 30 years with only incremental increases (Appendix Table 1; Appendix Figure 23). During the past ten years (1999-2008), the average length of the regular pheasant season has been 75 days (Appendix Figure 24).

HABITAT & PUBLIC ACCESS TRENDS

Pheasants are a product of South Dakota's diverse agricultural landscape and pheasant populations are strongly associated with land use trends and farmland habitat. In addition to the affects of weather conditions, the quantity, quality and interspersion of habitat types are major factors in the seasonal and annual survival and reproductive capability of pheasants. Monitoring agricultural statistics is necessary when determining available habitats and the response of pheasant populations, both at a landscape and local scale. The following South Dakota agricultural statistics were obtained from the USDA National Agricultural Statistics Service (2008).

The number of farms in South Dakota has decreased from a high of 84,300 farms in 1931 to 31,300 farms in 2007 (Appendix Figure 25). As a result, the average size of farms in South Dakota has increased from 1,076 acres in 1976 to 1,396 acres in 2007 (Appendix Figure 26).

Corn production has historically been cyclic, with producers responding to market prices and demand, USDA commodity program structure, and more recently to meet the need for corn-based ethanol production (Appendix Figure 27). The number of acres planted to soybeans has dramatically increased since the 1980's, with an 800% increase in the number of acres planted in 2008 compared to 1980 (Appendix Figure 28). Herbicide and drought resistant genetics have allowed the range of both corn and soybeans to expand both north and west in South Dakota. Sunflowers, the other major row crop, overall has seen a general increase in production from just over 100,000 acres in 1977 to 600,000 acres planted in 2008 (Appendix Figure 29).

Depending on overall plant phenology and time of harvest, small grains have the potential to provide annual nesting and brood-rearing habitat for pheasants and other upland nesting birds. However, except for the number of acres planted to wheat (Appendix Figures 30-31), South Dakota has seen a dramatic decline in the number of acres planted to grain sorghum, barley, flaxseed, rye, and oats (Appendix Figures 32-36). For the first time since 1927, the number of acres planted to row crops exceeded that of all acres planted to small grains in 1994 (Appendix Figure 37).

Alfalfa harvest grew significantly during the 1940s and 1950s and has remained stable at 2.5 million acres for the past 35 years (Appendix Figure 38). The number of hayland acres has remained relatively steady during the past 50 years (Appendix Figure 39). Cattle production had significant increases from 1940-1975, with a small decline reported in all cattle numbers during the past 35 years (Appendix Figure 40).

Average cropland and pastureland values and rent prices differ across the state, with the highest values reported in the southeast portion of South Dakota and a trend that generally decreases in value in a northwesterly direction across the state (Appendix Figures 41-44).

According to the U.S. Government Accountability Office (2007) and information obtained from the South Dakota State FSA Office, an estimated 325,000 acres of native grassland without any prior cropping history was converted to cropland from 2002-2007. Native grassland loss continues to occur at an alarming rate, and has resulted in localized loss of available nesting and brood-rearing habitat for pheasants and other upland nesting birds.

Federal agricultural programs have historically, and will continue to have a profound effect on the availability of habitat types and wildlife populations, in particular, ring-necked pheasants. No other collection of programs can impact the number of acres as agricultural polices and conservation programs administered by the USDA. Recent federal farm bills have provided numerous programs, such as CRP, and billions of dollars to address environmental issues on private land, and at the same time, create millions of acres of wildlife habitat.

Enacted in the 1985 Farm Bill, CRP is one of the most successful conservation programs for wildlife ever implemented across the nation and in South Dakota. Although the objectives of CRP were to address soil erosion and water quality, many wildlife species, in particular pheasants, rapidly responded to the undisturbed blocks of habitat interspersed within an agricultural landscape. Landowners are attracted to CRP as it is a voluntary, incentive-based conservation program that meets the land management needs and serves as a risk management tool for many South Dakota producers. The enrollment of marginal cropland into CRP grew rapidly during the late 1980s and CRP acres have remained relatively stable until large amounts of expiring CRP acres began reverting back to crop production starting in 2007 (Appendix Figure 45). The previous ten-year average for CRP enrollment in South Dakota is 1.4 million acres (Appendix Figure 46). As of October 31, 2009, there were 1,019,672 million acres of CRP, with marginal cropland being enrolled into numerous CRP conservation practices (http://www.fsa.usda.gov). Approximately 798,000 acres (78%) of the total CRP acres currently in the program were enrolled under general CRP sign-ups (Appendix Figure 47).

The recent and future loss of expiring CRP acres is a major concern of wildlife managers in the Northern Great Plains. In 2007 and 2008, approximately 380,000 acres of CRP expired in South Dakota, with a majority of these acres expected to be placed into row crop production. From federal fiscal years 2010-2014, an estimated 805,000 acres of CRP are scheduled to expire, thus having the potential to drastically affect pheasant and other wildlife populations (Appendix Figure 48).

A recent study conducted by the Economics Department of SDSU, surveyed current CRP contract holders to estimate the number of CRP acres that are likely to revert back to crop production and to determine the main factors that influence post-CRP land use decisions. According to Janssen et al. (2008), compared to all South Dakota producers, producers with CRP contracts are older, have more formal education, are less likely to have farming as their primary occupation, and have lower gross farm income. Over half of the CRP acres (57.8%) are held by either retirees or those who do not consider farming or ranching as their primary business or income. A majority of respondents indicated the re-enrollment options and market prices were the most important factors that will influence their decisions. In addition, CRP rental rates can play a significant role in landowner decisions. Current CRP county average soil rates can be found in Appendix Figure 49.

Based on respondent land use plans and re-enrollment preference and the amount of CRP acres held by each group, Janssen et al. (2008) project that 34.2% of respondent CRP acres are considered "very likely" to be enrolled, 28.8% of their CRP acres are "somewhat likely" to be re-enrolled, and 37.0% of their CRP acres are "not likely" to be enrolled and would be converted.

Janssen et al. (2008) found that 94% of their respondents reported that CRP lands were used for hunting by themselves, their family and friends, or other hunters. Only 10% of respondents with 17% of CRP acres reported that fee hunting occurs on their land. In addition, approximately 60% of respondents consider wildlife and wildlife habitat as important factors in their decision of whether to re-enroll their CRP contracts.

Although pheasants will select and use other habitats, there is a strong connection between pheasants and CRP. Favorable weather conditions and habitat provided by CRP have allowed pheasant populations to reach levels not seen since the Soil Bank era of the mid-1960s. The State Acres for Wildlife Enhancement (SAFE), a relatively new continuous CRP practice, was developed in cooperation with FSA and other conservation partners to provide a simple and attractive practice with a focus on pheasants in South Dakota. SAFE is a great tool for landowners to enroll larger blocks of marginal cropland into continuous CRP and a method of re-enrolling expiring CRP acres. An initial allocation of 20,200 acres to South Dakota's Pheasant SAFE was rapidly used by landowners and an additional allocation of 30,000 acres was entered into contracts within months. As of July 2009, South Dakota had utilized all of its allocated acres, with a recent request for more Pheasant SAFE acres declined by USDA.

Public pheasant hunting access has played a large roll in pheasant management. In 2009, 1.3 million acres of publicly accessible hunting land was enrolled in the Walk-In Area (WIA) Program. While a large percentage of these acres are enrolled in western South Dakota, an estimated 400,000 acres are located within the core pheasant range. The number of acres enrolled into the program continues to increase (Appendix Figure 50) and an estimated 165,000 hunters per year have hunted pheasants on private land enrolled in the WIA Program from 1999-2008. The WIA Program has strong ties to private land with CRP, as one of its founding purposes was to provide hunting access to land enrolled in CRP. Since 2004, a CRP permanent habitat and retention bonus has been paid on WIA contracts to give landowners an incentive to keep their marginal cropland acres in CRP.

The soon to be available James River Watershed Conservation Reserve Enhancement Program (JRW CREP), a state-sponsored CRP practice targeted towards 100,000 acres within the James River Watershed, will allow landowners to voluntarily enroll marginal cropland or re-enroll expiring CRP. As part of the contract and in return for providing public hunting access, SD GFP will provide a 40% rental rate incentive and cover all remaining costs of installing most conservation practices.

Agricultural land use and CRP have the greatest impact on the availability and distribution of wildlife habitat in South Dakota. In addition, SD GFP private lands habitat and access programs and other conservation partners provide an attractive tool box of programs to landowners to implement conservation practices. Extensive descriptions of

these conservation programs can be found in the SD GFP Private Lands Habitat & Access—Strategic Plan (Murano & Switzer 2008).

PHEASANT RESEARCH

The following is a brief summary of past pheasant research trends, major highlights and findings conducted in South Dakota. This is by no means an exhaustive review of past research, but does include an extensive list of references of pheasant research in South Dakota in the Literature Cited & Publications Related to Ring-necked Pheasants in South Dakota section found on page 29.

Research on pheasants in South Dakota increased rapidly in the 1940s and 1950s with the primary concerns being survey techniques (Banko 1948; Dahlgren 1956, 1959; Kimball 1949; Nelson 1949; Smith 1949, 1950, 1951, 1952; Trautman 1950*a*, 1952a, 1955) and winter habitat requirements (Bue and Nelson 1948, Bue 1949*a*, 1949*b*; Kirsch 1950*b*; Nelson 1950*a*; Norstog 1948). By the 1970s, biologists were concentrating more on reproduction and nesting ecology (Kuck et al. 1970, Olson and Flake 1975) and habitat use and selection (Grode 1972, Linder 1972, Fedeler 1973). By this time managers had realized that pheasants were truly a product of their environment (more specifically, habitat). Therefore, research continued to focus on influences of habitat (Craft 1986, Gabbert et al. 1999, Eggebo et al. 2003, Leif 2005, Schilowsky 2007) and land management programs on pheasants over the past 20-30 years (Trautman 1965c, Keyser 1986, Eggebo et al. 2003).

Many different survey techniques have been used in South Dakota, including crowing counts, rural mail carrier surveys, brood surveys, sex ratio counts, hunter questionnaires and hunter bag checks (Trautman 1982). Currently, pre-hunt population estimates in South Dakota are largely determined through summer brood surveys, winter sex-ratio counts, and hunter questionnaires using a formula presented by Hickey (1955) and first used by Dahlgren (1963) in South Dakota.

Nesting habitat selection has also been well documented in South Dakota with most studies indicating that pheasants select undisturbed, herbaceous grassland cover for nesting (Trautman 1965b, Fedeler 1973, Olson and Flake 1975, Craft 1986, Schilowsky 2007). Olson and Flake (1975), Craft (1986), and Leif (2004) documented the importance of roadside ditches as pheasant nesting cover and Hanson and Progulske (1973) stated that roadside ditches were ranked as the second most important habitat to female pheasants during all months of the year. Elliot and Linder (1972) found that undisturbed uplands and wetlands provided by state-owned lands produced 50% of all pheasant chicks in northeastern South Dakota. They also found that late-mowed alfalfa and small grains were important nesting habitats on private lands. Grode (1972) monitored penned female pheasants and discovered they selected alfalfa over warm-season grasses as nesting cover. Similarly, Hanson and Progulske (1973) concluded that alfalfa was the most preferred habitat of female pheasants. Eggebo (2003) documented higher numbers of broods in undisturbed cool-season grasses than in undisturbed warm-season grasses. Additionally, the importance of set-aside land programs as nesting habitat has been documented by Trautman (1965b; Soil Bank Cropland Retirement Program), Keyser (1986; Pheasant Restoration Program), and Eggebo et al. (2003; Conservation Reserve Program).

In South Dakota where winter weather can often be severe, researchers have found that having available winter habitat may be just as important as quality nesting habitat. Leif (2005) found that male pheasants selected for undisturbed herbaceous habitats followed by woody cover. Similarly, Schilowsky (2007) found that female pheasants selected for undisturbed herbaceous and woody habitats more than they were available during late winter. Craft (1986) found that female pheasants selected for wetlands in the fall and woody cover in the winter. Fedeler (1973) found male pheasants selected for areas of harvested corn and woody cover in the winter. Schneider (1984) found that wetlands did the best job of reducing wind velocity at roost sites and that coniferous shelterbelts provided more favorable roost sites than deciduous shelterbelts due to higher temperatures and decreased wind velocity.

Pheasants are short-lived species (Bever 1962) with high annual turnover and reproductive rates. Predators have the most profound effect on pheasants by destroying nests (Olson and Flake 1975, Leif 2004) and killing adult birds (Gabbert et al. 1999, Leif 1996, Leif 2003). Leif (1996) recorded a 46% mean annual survival of female pheasants with survival being the lowest during May (Leif 1996). He also found no significant difference in survival between incubating and non-incubating females or females with broods and females without broods. Leif (2003) documented a 31% mean annual survival of male pheasants with predators being the primary cause of mortality. In addition, he determined that although mammalian predators killed the majority of pheasants during the breeding season, avian predators were the main predators during the winter. Researchers have found that severe winters often lower survival not by the weather conditions themselves, but by causing greater exposure of pheasants to predators (Gabbert et al. 1999). However, Bue and Nelson (1948) concluded that if winter storms occur at night while pheasants are roosting, losses could be severe.

Food plots are often planted for pheasants in South Dakota, with the majority of these being corn and sorghum. Crookston (1991) and Larsen et al. (1994) found that pheasant selected for food plots that were adjacent to dense wetland habitats. Bogenshutz (1992) found that wild foods and soybeans provided lower quality diets than corn or sorghum based on fat reserves and gut size of female pheasants. In addition, he found that female pheasants in areas without food plots were in poorer physical condition than those found in areas with food plots. Gabbert et al. (2001) documented higher survival of female pheasants whose home ranges contained a food plot compared to females whose home ranges did not contain a food plot.

Pheasants typically spend the majority of their lives in a relatively small area, but have the ability to move long distances when needed (e.g. disperse to better winter habitat during severe winters). Bue and Nelson (1948) found that pheasants seldom traveled farther than 450 m from loafing cover in the winter, and daily movements seldom exceeded 275 m. Ruth (1972) found no significant effect of weather, including precipitation, wind, and barometric pressure, on daily movements of pheasants. Mean annual home range of female pheasants studied by Hanson and Progulske (1973) was 36 ha. Gabbert et al. (2001) estimated a 21 ha median winter home range and Kuck et al. (1970) reported a mean home range of 12 ha during the nesting season for female pheasants. Fedeler (1973) studied male pheasants using radiotelemetry and discovered that individuals used less than 40 ha annually. He also found that they made shifts in their center of activity throughout the year, but the location of their home ranges seldom shifted. Leif (2003) found that the home range of male pheasants averaged 18 ha for breeding males and 45 ha for males without established territories. Additionally,

Leif (2003) discovered that male pheasants dispersed a mean distance of 3 km from winter capture locations to the center of their breeding season home ranges.

Research conducted in South Dakota comparing wild pheasants to pen-raised pheasants have all indicated that stocking of pen-raised pheasants is neither economical nor recommended to impact pheasant populations. Grode (1972) discovered that raising pheasants by allowing wild males to breed with pen-raised females resulted in low rates of reproduction. Leif (1994) documented significantly lower survival, nest success, and brood rearing success of pen-reared females compared to wild females.

PHEASANT ECONOMICS

According to a survey of resident and non-resident hunters by Gigliotti (2004), hunters reported that "time spent with friends and family, and the overall outdoor experience", were the top reasons why they enjoyed pheasant hunting in South Dakota. Whatever their reasons, the activities and expenditures associated with pheasant hunting has a significant impact on local economies across the state.

For motels, restaurants, convenience stores and other businesses, the annual pheasant season has a profound impact on local communities. Using survey statistics from the 2006 National Survey of Fishing, Hunting and Wildlife-Associated Recreation (U.S. Department of Interior 2006) and an inflation rate of 3%, the estimated economic impact attributed to pheasant hunting was $219 million in 2008. The previous ten-year average for total pheasant hunting-related expenditures is $139.4 million (Appendix Figure 51).

Resident license sales have remained relatively steady, while non-resident license sales have increased significantly during the past ten years (Appendix Table 1). The revenue generated through license sales provides income for SD GFP to develop and manage wildlife habitat and to provide public access opportunities for hunters. The relationship between pheasant populations and license sales is obvious. High pheasant populations generally indicate strong license sales, thus a budget that allows SD GFP to invest in habitat and public access for pheasant hunters and to meet the goals of other conservation efforts.

The annual Governor's Pheasant Hunt markets the quality of life and economic opportunities available in South Dakota to business leaders from across the nation. Habitat development for pheasants has other indirect economic benefits, such as expanded opportunities for bird watching and the reduction in flooding and soil erosion. In addition, revenue generated from the sale of small game licenses is used to work with private landowners in developing and managing wildlife habitat and to provide and improve upon lands available for public hunting opportunities.

ISSUES, CHALLENGES & OPPORTUNITIES

The management of pheasants in a dynamic agricultural environment creates numerous challenges for private landowners and wildlife managers. While not an exclusive list, the most important issues are described below. They are the foundation for the goals, objectives, and strategies articulated in this plan and must be addressed for the plan to be successfully implemented.

LOSS OF HABITAT

The increasing loss of habitat has the potential to adversely affect pheasants and other wildlife populations in South Dakota. Wildlife managers, in close cooperation with outdoor enthusiasts and the general public, need to find solutions to address the recent and anticipated loss of CRP, conversion of native grassland to cropland, wetland drainage, and other issues adversely affecting our natural resources and wildlife habitat.

FEDERAL FARM BILL PROGRAMS

While the new farm bill provides a variety of conservation programs, the reduction in the national allocation of CRP acres from 39.2 to 32.0 million acres will likely increase competition among states and limit the opportunities available to many landowners who consider CRP as an option in their land management decisions. General CRP sign-ups may be limited in the future; therefore it will be critical that private landowners and wildlife managers work with USDA officials to encourage general sign-ups and to maximize the use of all continuous CRP practices. In addition, the use of EQIP, WHIP, WRP, and GRP should be promoted to address other resource concerns while also providing pheasant habitat. To maximize the impact of federal conservation programs, SD GFP should continue to complement CRP and other programs by providing additional incentives where appropriate and designing other habitat programs to increase the wildlife habitat value of selected federal farm bill programs.

LANDOWNER DEMOGRAPHICS

South Dakota landowner demographics are rapidly changing and have the potential to impact private lands management and, consequently, could influence wildlife habitat and populations. In many areas, traditional family farms are being replaced by agri-business where more intensive farming practices have resulted in decreased habitat. In addition, during the past decade, South Dakota has seen an increase in recreational or non-traditional land buyers seeking a place to hunt or otherwise enjoy the outdoors. This recent surge in recreational landowners has created thousands of acres of quality wildlife habitat, but has the potential to reduce traditional access to wildlife populations by the general public.

COMMERCIALIZATION OF WILDLIFE

Commercial hunting operations have been present in South Dakota for many years, with fee hunting for pheasants providing alternative sources of income for some family farms and the growth of businesses for others. Fee hunting will continue to have both direct and indirect impacts, some negative and positive, on wildlife populations, habitat, and public access. While many fee hunting operations provide excellent pheasant habitat, some hunters and others feel fee hunting reduces the amount of land available for non-fee hunting and access opportunities. A South Dakota state law prohibits those who do not allow reasonable, free public hunting access from eligibility to the SD GFP habitat cost-share programs. Thus, an increase in commercial hunting operations and licensed shooting preserves has the potential to impact the agency's private lands and access programs. Cooperation among commercial hunting operators, pheasant hunters and wildlife managers is essential for the success of pheasant management in South Dakota.

BUDGET & FUNDING SOURCES

The primary funding source for the DOW private land habitat programs is hunting license dollars. Conservation programs available through federal farm programs have placed numerous acres of habitat on marginal cropland acres. As a result of prospering wildlife populations, in particular pheasants, hunting license sales have provided adequate funding to support habitat and public access programs that complement CRP and other

habitat programs. While reliable funding has been provided by traditional sources, SD GFP should explore and consider alternative sources to meet the demand of maintaining a solid foundation of high quality habitat.

CONSERVATION PARTNERS

To complete habitat projects on private lands and make recommendations for federal agricultural policies, SD GP participates with private landowners and conservation partners on numerous projects. It is important that SD GFP continues to maintain existing partnerships and seek new conservation partners to meet the challenges and opportunities of working with private landowners.

PUBLIC HUNTING ACCESS

The availability of public hunting opportunities is another significant priority for SD GFP wildlife managers and pheasant hunters. South Dakota's (WIA) Program has been very successful for hunters and landowners alike. The (WIA) Program has been quite attractive to private landowners and efforts continue to improve the availability and quality of private land enrolled into the program. Keeping program guidelines adaptive to meet the needs of landowners will be important for the future growth of this program.

OUTREACH & EDUCATION

Efforts to inform the public and landowners on the proper management of pheasant habitat are critical to maintaining desired pheasant populations. Increased collaboration between private landowners and private, state, federal, and non-governmental agencies is essential, along with the dissemination of important information through public meetings or workshops and other media outlets.

GUIDING PHILOSOPHIES OF THE SOUTH DAKOTA DEPARTMENT OF GAME, FISH & PARKS—DIVISION OF WILDILFE

Values are deeply held beliefs. They form the salient basis for all decisions, actions and attitudes. Agencies do not have values; people do. The following statement reflects the collective values of the people with the Division of Wildlife in relation to ring-necked pheasant management in South Dakota.

WE BELIEVE…

- That wildlife, including ring-necked pheasants, contributes significantly to the quality of life in South Dakota and therefore must be sustained for future generations.
- In providing for and sustaining the diversity of our wildlife heritage for present and future generations.
- That recreational hunting is a legitimate use of ring-necked pheasants and must be encouraged and preserved.
- That the stewardship provided by private landowners is critical to the future of ring-necked pheasants and deserving of recognition and respect.
- In the management of wildlife in accordance with biologically sound principles.
- That pheasants serve as a flagship species for the conservation of other species and their habitats.
- That the future of wildlife, including ring-necked pheasants, depends on a public that appreciates, understands and actively supports wildlife conservation and has the right to participate in decisions related to wildlife issues.

GOALS, OBJECTIVES & STRATEGIES

PRIVATE LANDS HABITAT

GOAL 1: The Division of Wildlife, through its Private Lands Habitat Program, will partner with private landowners to conserve, restore and manage habitats critical for pheasants and other wildlife species.

CONSERVATION RESERVE PROGRAM (CRP)

OBJECTIVE 1.1: Maintain at least one million acres of undisturbed CRP grassland habitat on private lands in South Dakota from 2009 through 2014.

STRATEGIES

1.1.1 Maintain support for CRP in federal farm legislation through continued cooperation with the Governor's Office, SD Department of Agriculture, SD Department of Environment and Natural Resources, USDA, other state and federal agencies, non-governmental conservation organizations, coalition groups (e.g. Northern Great Plains Working Group, Association of Fish & Wildlife Agencies, etc.), private landowners and agricultural groups.

1.1.2 Continue to advocate the use and proper timing of CRP general sign-ups.

1.1.3 Continue to advocate for strategic use of existing and new continuous CRP practices that provide quality pheasant nesting habitat (e.g. CP-37, CP-38).

1.1.4 Annually seek and provide assistance to landowners with expiring CRP contracts, by providing re-enrollment options into general and continuous CRP, or other programs that are available for maintaining all or a portion of this grassland habitat.

1.1.5 Maintain existing partnerships with Pheasants Forever, NRCS and SD GFP to fund a minimum of seven Farm Bill Biologists in NRCS Offices to assist private landowners with technical assistance and in the promotion of all habitat programs.

1.1.5*a* Expand the existing partnership to fund eight Farm Bill Biologists by 2010 and fund two additional Farm Bill Biologists by 2011 for a total of ten positions.

1.1.6 Continue to seek opportunities with conservation partners to create new partnerships in western South Dakota to deliver technical assistance to private landowners for Farm Bill programs.

1.1.7 By 2012, enroll 100,000 acres of marginal cropland or expiring CRP into the James River Watershed CREP.

GRASSLAND MANAGEMENT

OBJECTIVE 1.2: Advocate improved management of range and pastureland to enhance quantity and quality of nesting and brood-rearing habitat on private grazing lands through 2014.

STRATEGIES

1.2.1 Continue to support the increased use of planned range management through USDA's EQIP program, as well as other partnership efforts involving the USFWS Partners for Fish & Wildlife Program, South Dakota Grassland Coalition and local conservation districts to improve range and nesting conditions on native range and tame pastures.

1.2.2 SD GFP private lands biologists will remain involved with appropriate State Technical sub-committees that recommend/develop range management initiatives through USDA programs (e.g. CRP, WHIP, WRP, EQIP, CSP, GRP).

1.2.3 When applicable, SD GFP private lands biologists will provide input for mid-term management, managed haying and grazing, and emergency haying and grazing guidelines on appropriate CRP contracts.

1.2.4 SD GFP will continue to contribute funds to range management projects available through conservation districts that often involve USFWS private lands staff.

1.2.5 SD GFP private lands biologists will continue to increase landowner participation by implementing grazing stewardship practices through department cost-share

programs, including managed grazing systems designed to measurably benefit wildlife and long-term sustainable use of native rangelands and tame pastures for livestock production.

1.2.6 Continue to collaborate with conservation partners and seek opportunities to provide technical and financial assistance to incorporate prescribed fire as a management tool for grassland plant communities.

1.2.7 By 2010, SD GFP will provide recommendations to private landowners on alternative options to use haying as a management tool for grassland plant communities that could increase pheasant production.

WINTER COVER

OBJECTIVE 1.3: Advocate the establishment and maintenance of quality winter cover on private lands to increase winter survival of pheasants through 2014.

STRATEGIES

1.3.1 Where possible, continue to restore hydrology on temporary, seasonal and semi-permanent wetlands throughout the pheasant range to provide dense emergent vegetation for heavy winter cover habitat.

1.3.2 Continue to work closely with private landowners to maintain and increase food habitat plot projects in conjunction with other winter cover such as emergent wetland vegetation and woody cover.

1.3.3 By 2010, complete an inventory of all winter cover habitats (e.g. natural and planted woody cover, emergent wetlands) to identify areas that lack sufficient winter cover habitat.

1.3.4 Continue to work closely with department staff, state foresters, Pheasants Forever Farm Bill Biologists, and USDA Offices to establish quality woody winter cover through department cost-share programs.

OTHER HABITAT PROGRAMS & INITIATIVES

OBJECTIVE 1.4: Promote the establishment and maintenance of high quality pheasant habitat on private lands using other programs and initiatives available from conservation partners to maintain and expand pheasant habitat in South Dakota through 2014.

STRATEGIES

1.4.1 Continue to work with Pheasants Forever Farm Bill Biologists, USDA Offices, USFWS, and other partners to promote habitat cost-share programs.

1.4.2 Continue to promote and inform private landowners of the availability to protect habitat through the USFWS wetland and grassland easement programs.

1.4.3 Annually coordinate efforts with conservation partners to fully utilize funding opportunities available through matching grant programs (e.g. North American Wetlands Conservation Act).

1.4.4 Working with conservation partners, annually evaluate, modify, develop, and deliver an adaptive suite of programs to maintain and increase pheasant habitat across South Dakota.

1.4.5 Continue to support and promote DU's Winter Cereal Program to provide additional annual nesting cover.

DEPREDATION

OBJECTIVE 1.5: The Division of Wildlife will continue to assist private landowners experiencing pheasant depredation using the tools available in a comprehensive wildlife depredation program through 2014.

STRATEGIES

1.5.1 Annually work with landowners to reduce pheasant depredation to tolerable levels.

1.5.2 Continue to upgrade and improve the department's comprehensive wildlife depredation program to address pheasant depredation in the future.

PUBLIC LAND HABITAT

GOAL 2: The Division of Wildlife will conserve, restore, manage and preserve habitats critical for pheasants and other upland nesting birds through fee title purchases, management agreements, and partnerships with other owners and managers of public land.

ACQUISITION OF GAME PRODUCTION AREAS

OBJECTIVE 2.1: The Division of Wildlife will acquire land for GPAs, from willing sellers, for the purposes of developing and managing habitats to benefit local pheasant populations through 2014.

STRATEGIES

2.1.1 When appropriate, expand existing GPAs through on-going acquisition efforts from willing sellers.

2.1.2 When appropriate, acquire new GPAs from willing sellers with the focus being on farmlands with habitat development potential, existing high quality habitats (e.g. CRP, WRP), wetlands, and remnant native prairie tracts.

2.1.3 Continue to utilize funding partnerships (e.g. PF, DU, etc.), funding grants and Federal Aid in Wildlife Restoration (Pitman-Robertson Act) funds to acquire GPAs from willing sellers.

MANAGEMENT OF GAME PRODUCTION AREAS

OBJECTIVE 2.2: The Division of Wildlife will utilize science-based habitat development and management practices on GPAs, within fiscal, biological, and land use constraints, to benefit local pheasant populations through 2014.

STRATEGIES

2.2.1 Annually identify existing GPAs where pheasants are the primary habitat management species. As necessary, update and amend land management plans in the Wildlife Inventory and Land Management Application (WILMA) database for GPAs to emphasize and reflect pheasant habitat development and management objectives.

2.2.2 Annually maintain and improve nesting and brood rearing habitats for pheasants on GPAs using proper management techniques (e.g. prescribed fire, grazing, haying).

2.2.3 Continue to develop properly designed and located winter habitat for pheasants on GPAs.

2.2.4 Continue to use native species whenever possible for habitat developments on GPAs. Where appropriate and within the parameters of respective management plans, dense nesting cover mixtures (e.g. introduced cool season grasses and legumes) are encouraged to provide nesting and brood-rearing habitat.

2.2.5 Continue to protect wetlands and native prairie habitat communities on GPAs from destructive practices.

2.2.6 Continue to remove invasive, encroaching, and low-quality (i.e. does not provide thermal protection at ground level) planted woody cover in and adjacent to nesting and brood rearing habitats on GPAs.

2.2.7 Continue to support scientific evaluation, including cost-effectiveness of nesting, brood rearing and winter habitat developments and management practices utilized on GPAs.

2.2.8 When necessary (e.g. new employees, research results), provide information and training to department staff on pheasant ecology, pheasant habitat management practices and research project findings that contribute to improving management decisions on GPAs.

OTHER PUBLIC LAND

OBJECTIVE 2.3: The Division of Wildlife will encourage other public land management agencies to protect, acquire, maintain and improve habitat to benefit local pheasant populations through 2014.

STRATEGIES

2.3.1 By 2010, promote and encourage the SD DOT to develop and maintain perennial grassland cover, including the use of native grass and forb species in state highway right-of-ways, and to improve production potential of roadside grasslands by strict enforcement of haying dates.

2.3.2 Continue to coordinate habitat enhancement projects with South Dakota School and Public Lands (SD SPL), where appropriate, to develop and implement habitat practices that will provide essential pheasant and other wildlife habitat, while providing a no net-loss or increase of income for SD SPL and their respective tenants.

2.3.2 Continue to support USFWS acquisition of Waterfowl Production Areas, wetland easements and grassland easements.

2.3.4 Continue to support the efforts of the South Dakota Parks and Wildlife Foundation, Northern Prairie Lands Trust and other conservation organizations in the preservation and protection of wildlife habitat.

POPULATION DYNAMICS

GOAL 3: The Division of Wildlife will continue to monitor population and habitat trends and conduct research as needed to address population and habitat-related questions.

SURVEYS

OBJECTIVE 3.1: The Division of Wildlife will continue to use and improve upon current population, harvest, and public opinion surveys to monitor population trends and estimate harvest and hunter satisfaction through 2014 with the objective to meet or exceed the previous 10-year average (1999-2008).

STRATEGIES

3.1.1 Annually conduct the pheasant brood survey to determine reproductive success, population trends, relative densities of populations, and to evaluate the effects of weather and land-use changes on pheasant production.

3.1.2 Annually conduct the pheasant winter sex ratio survey to determine the degree of harvest from the previous hunting season and for conversion of data to true indices of productivity.

3.1.3 Annually conduct hunter harvest surveys to obtain harvest statistics for pheasants and other upland game species and to determine hunter satisfaction.

3.1.4 By 2010, provide all surveyors with a Global Positioning System unit or a Personal Digital Assistant equipped with CyberTracker software to collect data while conducting both the pheasant brood survey and the pheasant winter sex ratio survey. Electronic data collection will improve efficiency, reduce or eliminate data entry errors, and enhance data analysis by providing geo-referenced data.

3.1.5 Annually discuss the need for public opinion surveys to determine hunter and landowner preference and satisfaction. All public opinion surveys will be coordinated through the SD GFP Human Dimensions Specialist for survey design and analysis.

3.1.6 Upland game management staff will attend the biennial meeting of the Midwest Pheasant Study Group. This meeting facilitates the exchange of information between states on survey techniques, harvest regulations, research and habitat management.

RESEARCH

OBJECTIVE 3.2: The Division of Wildlife will continue science-based research and habitat inventories to answer questions related to pheasant biology, effects of land use and effect of habitat management practices to enhance pheasant populations through 2014.

STRATEGIES

3.2.1 Due to recent and expected losses of CRP acres, land use changes, and a shift in landowner demographics, future research will focus on habitat inventory and pheasant response to habitat management practices and land use changes (e.g. cellulosic biofuel production, conversion of native grasslands, genetically modified crops).

3.2.2 Use the upland game management and other department staff to develop, conduct and report findings of small-scale pheasant related research projects.

3.2.3 Continue to coordinate and provide funding for large-scale research projects with South Dakota State University, South Dakota Cooperative Fish and Wildlife Research Unit, and other academic institutions.

3.2.4 By 2012, develop a region-specific pheasant model to predict local pheasant population dynamics using land cover data and historical pheasant survey data. This model will be compared to a similar model developed by the USDA Farm Service Agency.

3.2.5 Annually collect information from USDA, USFWS and other agencies to determine the composition and configuration of different habitat types. This data will be analyzed in a Geographic Information System and used to direct and implement current and future habitat programs.

3.2.6 By 2010, develop a Geographic Information System using high-resolution infrared photography to determine the composition and configuration of all land use and cover types related to pheasant habitat management.

3.2.7 By 2010, develop a WILMA database for the SD GFP Private Lands Habitat Program to emphasize and reflect pheasant habitat development accomplishments.

3.2.8 By 2010, develop an annotated bibliography of pheasant related research conducted in South Dakota. Update as necessary to include future research findings.

PUBLIC ACCESS

GOAL 4: The Division of Wildlife will provide the public with access to quality pheasant habitat on private and public land.

OBJECTIVE 4.1: By 2013, increase the average number of user days hunting on private and public lands by five percent over those in 2005 (use Hunter Evaluation of the 2005 Walk-In Area Survey as a benchmark).

STRATEGIES

4.1.1 Focus access efforts to maximize hunting opportunities on habitat provided by local, county, state, federal and non-governmental programs.

4.1.2 Beginning in 2009, enroll an additional 3,000 acres per year in private land access programs that provide quality pheasant hunting opportunities.

4.1.3 From 2010 to 2012, annually enroll 33,333 acres of private land into the James River Watershed CREP to provide access to quality pheasant hunting opportunities.

4.1.4 Continue to monitor and maintain habitat quality on all private lands enrolled in access programs for hunting opportunities.

4.1.4*a* Monitor hunter perception of habitat quality using future Hunter Evaluation Surveys (e.g. Hunter Evaluations of Walk-In Area Surveys).

4.1.4*b* Maintain efforts to respond to hunter complaints regarding habitat quality on specific tracts of public and private land open to public hunting.

4.1.5 Annually seek opportunities to create new programs to secure additional access that cannot be secured using existing SD GFP private lands programs.

4.1.6 Continue to assist SD SPL with posting of boundaries and access trails for public hunting opportunities.

PUBLIC AWARENESS

GOAL 5: The Division of Wildlife will inform and educate the public on pheasant ecology, management, and research.

OBJECTIVE 5.1: The Division of Wildlife will continue to promote public, landowner, and conservation agency awareness of pheasant and habitat management and issues of highest conservation concern through 2014.

STRATEGIES

5.1.1 By the end of 2009, provide paper and electronic copies of the *"Ring-necked Pheasant Management Plan for South Dakota (2009-2014)"* to all conservation partners, the public, private landowners, and all communities and businesses that benefit from pheasants, pheasant hunting, and related activities.

5.1.2 By 2010, develop and distribute detailed information to improve public knowledge of pheasant biology, including habitat requirements and population dynamics. When and where appropriate, such information should also include facts regarding the limitations of some SD landscapes in supporting large numbers of pheasants (e.g. parts of western SD).

5.1.3 Provide articles for inclusion in the SD GFP Landowners Matter newsletter regarding pheasant habitat and available habitat development options.

5.1.4 By 2010, include a one page section in the SD Conservation Digest titled "Habitat Notes".

5.1.5 Annually provide updated information for the landowner contact packets which are distributed by department staff.

5.1.6 By 2010, write and distribute an informational guide for the public and private landowners emphasizing South Dakota-specific pheasant habitat requirements, management options, and greatest risks to pheasant populations.

5.1.7 Annually review the need to develop and distribute clear and concise information related to federal farm programs and other habitat programs through multiple delivery methods described above.

5.1.8 Annually review the need to provide training workshops for department staff (e.g. new staff, new and updated programs) related to habitat programs, pheasant habitat requirements and habitat management.

5.1.9 Working with other conservation partners, annually review the need to provide landowner/habitat workshops to inform and promote technical and financial assistance available to landowners in developing and managing wildlife habitat.

5.1.10 By 2010, provide to the public all published research and other information related to pheasants and their habitats in an electronic format on the SD GFP website.

5.1.11 By 2010, identify habitat improvement and management demonstration areas on private land and GPAs.

5.1.12 By 2010, work with conservation partners (e.g. Pheasants Forever) to deliver an annual, two-day habitat conference at rotating locations across the state to deliver professional presentations to wildlife professionals, the public, and private landowners related to wildlife habitat development and management.

5.1.13 Annually determine the economic and recreational value of pheasants and pheasant hunting to justify staff time and expenditures in meeting the goals of all pheasant management activities.

5.1.14 Continue to regularly recognize the role private landowners have in wildlife habitat management.

LITERATURE CITED[LC] AND PUBLICATIONS RELATED TO RING-NECKED PHEASANTS IN SOUTH DAKOTA

Acker, D. C. 1968. What pheasants mean to South Dakota. Proceedings of the Pheasant Seminar, South Dakota Chapter of The Wildlife Society, November 1968, Brookings, South Dakota, USA.

Agee, C. P., W. Jackson, D. R. Cook, and D. Fisher. 1968. Management and techniques to increase pheasant production in the Midwest. Proceedings of the Pheasant Seminar, South Dakota Chapter of The Wildlife Society, November 1968, Brookings, South Dakota, USA.

Allen, D. C. 1969. Evaluation of the ovulated follicle technique as a means of determining pheasant production. Thesis, South Dakota State University, Brookings, South Dakota, USA.

Atkins, T. D. 1966. Effects of dieldrin on reproduction of penned hen pheasants. Thesis, South Dakota State University, Brookings, South Dakota, USA.

Atkins, T. D., and R. L. Linder. 1967. Effects of dieldrin on reproduction of penned hen pheasants. Journal of Wildlife Management 31:746-753.

Banko, W. 1948. The radius of audibility of pheasant cock calls. Pitman-Robertson Quarterly Progress Report 17-R-2, No. 8, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA. [LC]

Baskett, T. S. 1947. Nesting and production of the ring-necked pheasant in north-central Iowa. Ecological Monographs 17:1-30.[LC]

Baxter, W. L. 1968. Effects of dieldrin on penned hen pheasants in the second generation. Thesis, South Dakota State University, Brookings, South Dakota, USA.

Baxter, W. L., R. L. Linder, and R. B. Dahlgren. 1969. Dieldrin effects in two generations of penned hen pheasants. The Journal of Wildlife Management 33(1):96-102.

Beatty, R. L. 1953. Non-resident pheasant hunting as a source of business and revenue in South Dakota. Bulletin 31, Business Research Bureau, School of Business Administration, University of South Dakota, Madison, South Dakota, USA.

Bender, J. J. (In progress). The effect of intensity and season of harvest on wildlife and biomass production. Thesis, South Dakota State University, Brookings, South Dakota, USA.

Bennett, L. J. 1936. The ring-necked pheasant as a nesting parasite of other game birds. Iowa State College Journal of Science 10:373-375.[LC]

Berman, G. M. 2007. Nesting success of grassland birds in fragmented and unfragmented landscapes of north central South Dakota. Thesis, South Dakota State University, Brookings, South Dakota, USA.

Bever, W. 1962. Pheasant feeding: fact and fancy. South Dakota Conservation Digest 29(3):8-11, 28-30. **LC**

Bogenschutz, T. R. 1992. An evaluation of corn and sorghum as a winter food source for ring-necked pheasants. Thesis, South Dakota State University, Brookings, South Dakota, USA. **LC**

Bue, I. G, and B. A. Nelson. 1948. Pheasants and winter cover. Pitman-Robertson Special Report W-19-D-2, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA. **LC**

Bue, I. G. 1949*a*. Pheasants and winter cover. Pitman-Robertson Quarterly Progress Report W-75-R-11, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA. **LC**

Bue, I. G. 1949*b*. Winter behavior and mortality of pheasants in relationship to various types of cover, food and predation. Pitman-Robertson Special Report 19-D-2 and 17-R-3, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA. **LC**

Carter, A. V. 1970. Pheasant body condition as related to winter weather factors 1964, 1965, and 1969, South Dakota. Pitman-Robertson Quarterly Progress Report W-75-R-11, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Carter, A. V. 1971. Seasonal movements and behavior of ring-necked pheasants in eastern South Dakota. Thesis, South Dakota State University, Brookings, South Dakota, USA.

Carter, A. V. 1973. Pheasant nesting preference study, 1968-73. Pitman-Robertson Quarterly Progress Report W-75-R-15, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Carter, A. V. and C. G. Trautman. 1973. Effect of predator control upon pheasant nesting success, 1966-1971. Pitman-Robertson Quarterly Progress Report W-75-R-14, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Cluett, J. W. 1941. Fifty million pheasants. South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Cool, K. L. 1971. Effects of chick stimuli and dieldrin on adoptive behavior of penned hen pheasants. Thesis, South Dakota State University, Brookings, South Dakota, USA.

Cool, K. L., R. L. Linder, and D. R. Progulske. 1972. Adoptive behavior of caged pheasants exposed to chicks and dieldrin. American Midland Naturalist 88:262-269.

Craft, K. P. 1986. Ring-necked pheasant cover use in eastern South Dakota. Thesis, South Dakota State University, Brookings, South Dakota, USA. **LC**

Crookston, P. L. 1991. Habitat characteristics associated with ring-necked pheasant use of winter food plots in eastern South Dakota. Thesis, South Dakota State University, Brookings, South Dakota, USA. **LC**

Dahlgren, R. 1970. Pheasant use and waterfowl production on state and private lands. Thesis. South Dakota State University, Brookings, South Dakota.

Dahlgren, R. B. 1956. Pheasant crowing count census, 1954-55. Pitman-Robertson Quarterly Progress Report W-17-R-10, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA. **LC**

Dahlgren, R. B. 1958. The effect of flushing bars in reducing hen pheasant mortality in hayfield mowing: a review of literature. Special Report, South Dakota Game, Fish and Parks, Pierre, South Dakota, USA.

Dahlgren, R. B. 1959. An evaluation of South Dakota's pheasant population surveys. Proceedings of the 21st Annual Midwest Wildlife Conference, December 1959, Minneapolis, Minnesota, USA. **LC**

Dahlgren, R. B. 1961. Pheasant study area investigations, 1959-60. Pitman-Robertson Quarterly Progress Report W-75-R-2, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Dahlgren, R. B. 1962. Pheasant Soil Bank nesting study, 1960. Pitman-Robertson Quarterly Progress Report W-75-R-3, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Dahlgren, R. B. 1963. Rhythmic fluctuations in South Dakota pheasant populations and associated adult mortality, 1947-62. Transactions of North American Wildlife Natural Resources Conference 28:284-297. **LC**

Dahlgren, R. B., C. M. Twedt, and C. G. Trautman. 1965. Lens weights of ring-necked pheasants. Journal of Wildlife Management 29:212-214.

Dahlgren, R. B. 1967*a*. The effects of a closed season on pheasant populations. South Dakota Department of Game, Fish & Parks. Special Research Report. (Mimeo). 8pp.

Dahlgren, R. B. 1967*b*. Pheasant heart hemorrhaging. Transactions of the Midwest Pheasant Council, Association of Midwest Fish, Game and Conservation Commission, 29 March 1967.

Dahlgren, R. B. 1967*c*. Pheasant stocking; why it fails. South Dakota Conservation Digest 34:18-21.

Dahlgren, R. B. 1970. The pheasant decline. Special Research Report, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Dahlgren, R. B., G. C. Parikh, and C. G. Trautman. 1974. Pheasant mortality and production in South Dakota related to antibodies for Western and Eastern Viral Encephalitis. American Midland Naturalist 91(1):237-241.

Dietz, N. J. 1990. Surveys of citizens attitudes towards hunting, hunters and wildlife in South Dakota. Thesis, South Dakota State University, Brookings, South Dakota, USA.

Docken, N. (In Progress). Evaluation of duck and pheasant nest success in large block predator management in northeast South Dakota. Thesis, South Dakota State University, Brookings, South Dakota, USA.

Drieslein, R. L. 1967. Fox-prey relationships in eastern South Dakota. Thesis, South Dakota State University, Brookings, South Dakota, USA.

Dumke, R. T., and C. M. Pils. 1973. Mortality of radio-tagged pheasants on the Waterloo Wildlife Area. Technical Bulletin 72, Wisconsin Department of Natural Resources. **LC**

Dumke, R. T., and C. M. Pils. 1979. Renesting and dynamic of nest site selection by Wisconsin pheasants. Journal of Wildlife Management 43:705-716. **LC**

Dvorak, D. 1972. Habitat evaluation report of set aside acres, 1971. Special Survey Report, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Eggebo, S. L. 2001. Ring-necked pheasant and passerine abundance in Conservation Reserve Program grasslands of differing age-classes and cover types in eastern South Dakota, 1998-2000. Thesis, South Dakota State University, Brookings, South Dakota, USA.**LC**

Eggebo, S. L., K. F. Higgins, D. E. Naugle, and F. R. Quamen. 2003. Effects of CRP field age and cover type on ring necked pheasants in eastern South Dakota. Wildlife Society Bulletin 31(3):779-785. **LC**

Elliott, C. R. 1970. Pheasant use and waterfowl production on state and private lands. Thesis, South Dakota State University, Brookings, South Dakota, USA.

Elliot, C. R., and R. L. Linder. 1972. Use of state and private lands by pheasants and waterfowl in South Dakota. American Midland Naturalist 88:257-261. **LC**

Erickson, R. B. 1967*a*. The effects of a closed season on pheasant populations. Special Research Report, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Erickson, R. E., and J. E. Wiebe. 1973. Pheasants, economics and land retirement programs in South Dakota. Wildlife Society Bulletin 1:22-27.

Fedeler, R. A. 1973. Seasonal movements and habitat selection of pheasant cocks in eastern South Dakota. Thesis, South Dakota State University, Brookings, South Dakota, USA. **LC**

Field, N. H. 1971. Effects of dieldrin on the social interactions of penned pheasants and chickens. Thesis, South Dakota State University, Brookings, South Dakota, USA.

Field, N. H., and R. L. Linder. 1979. Social hierarchies among penned pheasants and effects of dieldrin on interactions. Proceedings of the South Dakota Academy of Science 58:39-51.

Fisk, K. (In Progress). An evaluation of nesting success of ring-necked pheasants and waterfowl in relation to patch size, shape, landscape composition and the predator community on public lands and areas enrolled in the farmable wetlands program in eastern South Dakota. Thesis, South Dakota State University, Brookings, South Dakota, USA.

Foss, W. C. 1974. Pheasant harvest regulations study, 1973-74, South Dakota. Pitman-Robertson Quarterly Progress Report W-95-R-8, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Foss, W., C. G. Trautman, and G. C. Parikh.1974. Pheasant mortality and production in South Dakota. South Dakota Department of Game, Fish & Parks. P-R Progress Report, Project W-95-R-8. 34pp.

Fowler, R. 1975. Comment to Department of Transportation on proposed rule governing mowing of highway right-of-way. South Dakota Department of Game, Fish and Parks, Pierre, South Dakota.

Fowler, R., C. Trautman, A. Carter, L. Rice, and J. Kranz. 1975. The Pheasant in South Dakota. Management Bulletin, South Dakota Department of Game, Fish & Parks, Pierre, South Dakota, USA.

Fredrickson, L. 1967. Fox-prey relationships in eastern South Dakota. Thesis, South Dakota State University, Brookings, South Dakota, USA.

Fredrickson, L. F. 1970. The importance of sloughs to wildlife. South Dakota Conservation Digest 37:25-28.

Fredrickson, L. F. 1974. Pheasant reproduction and survival as related to agricultural fertilizer use. Thesis, South Dakota State University, Brookings, South Dakota, USA.

Fredrickson, L. F. 1975. The impact of organized landowner-sportsmen small carnivore harvest upon red fox, raccoon, badger, skunk and pheasant populations. Pitman-Robertson Quarterly Progress Report W-75-R-17, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Fredrickson, L. F., R. L. Linder, R. B. Dahlgren, and C. G. Trautman. 1978. Pheasant reproduction and survival as related to agricultural fertilizer use. Journal of Wildlife Management 42:40-45.

Gabbert, A. E. 1997. Food plot effects on winter home range and survival of radio-marked pheasant hens in east-central South Dakota. Thesis, South Dakota State University, Brookings, South Dakota, USA.

Gabbert, A. E., A. P. Leif, J. R. Purvis, and L. D. Flake. 1999. Survival and habitat use by ring-necked pheasants during two disparate winters in South Dakota. Journal of Wildlife Management 63:711-722. **LC**

Gabbert, A. E., J. R. Purvis, L. D. Flake, and A. P. Leif. 2001. Winter survival and home range of female ring-necked pheasants in relation to food plots. Prairie Naturalist 33:31-40. **LC**

Gates, J. M. 1966. Renesting behavior in the ring-necked pheasant. Wilson Bulletin 78:309-315. **LC**

Gigliotti, L. M. 2000*a*. South Dakota pheasant hunter report, 2000: comparing residents and nonresidents. Report HD-6-01 SAM, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Gigliotti, L. M. 2000*b*. South Dakota nonresident pheasant hunter report, 2000. Report HD-4-01.SAM, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Gigliotti, L. M. 2000*c*. South Dakota nonresident pheasant hunter report, 2000. Report HD-5-01.SAM, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Gigliotti, L. M. 2001*a*. South Dakota pheasant hunter report, 2001: evaluation of the first week of the regular pheasant season comparing residents and nonresidents. Report HD-3-02.AMS, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Gigliotti, L. M. 2001*b*. South Dakota resident pheasant hunter report, 2001: evaluation of the first week of the regular pheasant season and evaluation of the resident-only pheasant season. Report HD-2-02.AMS, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Gigliotti, L. M. 2001*c*. South Dakota nonresident pheasant hunter report, 2001: evaluation of the first week of the regular pheasant season and evaluation of the resident-only pheasant season. Report HD-1-02.AMS, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Gigliotti, L. M. 2004. Wildlife values and beliefs of South Dakota residents. Report: HD-2-06.AMS, South Dakota Game, Fish and Parks, Pierre, South Dakota, USA. **LC**

Gilbertson, D. E., and E. J. Hugghins. 1964. Helminth infections in pheasants from Brown County, South Dakota. Journal of Wildlife Management 28(3):543-546.

Grode, M. R. 1972. Pheasant production using wild cocks and penned game-farm hens. Thesis, South Dakota State University, Brookings, South Dakota, USA. **LC**

Hall, J. E. 1970. Effects of aldrin on young pen-reared pheasants. Thesis, South Dakota State University, Brookings, South Dakota, USA.

Hankins, J. C. 2007. Evaluation of mixed-vegetation plantings as avian nesting habitat in eastern South Dakota. Thesis, South Dakota State University, Brookings, South Dakota, USA.

Hanson, L. E. 1971. Movements and habitat use by hen pheasants during brood rearing. Thesis, South Dakota State University, Brookings, South Dakota, USA.

Hanson, L. E., and D. R. Progulske. 1973. Movements and cover preferences of pheasants in South Dakota. Journal of Wildlife Management 37(4):454-461. **LC**

Harmon, K. W., M. M. Nelson, W. C. Foss, and C. Gifford. 1968. What can we do in South Dakota? Proceedings of the Pheasant Seminar, South Dakota Chapter of The Wildlife Society, November 1968, Brookings, South Dakota, USA.

Hickey, J. J. 1955. Some American population research on gallinaceous birds. Pages 326-396 *in* A. Wolfson, editor. Recent studies in avian biology. University of Illinois Press, Urbana, Illinois, USA. **LC**

Hill, D. A. 1985. The feeding ecology and survival of pheasant chicks on arable farmland. Journal of Applied Ecology 22:646-654. **LC**

Hipschman, D. 1959. Department history. South Dakota Department of Game, Fish and Parks. Annual Report. 1958-1959:13-73. **LC**

Hodne-Fischer, E. A. 2009. Anthraquinone corn seed treatment (AVITEC™) as a feeding repellent for ring-necked pheasants on newly planted corn in eastern South Dakota. Thesis. South Dakota State University, Brookings, South Dakota.

Jackson, W. R. 1970. State prison farm pheasant project-summary. South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Jackson, W. R. 1972. Pheasant harvest: Product of good management. South Dakota Conservation Digest 39:28-30.

Janson, R. 1949. Seasonal pheasant movements. Pitman-Robertson Quarterly Progress Report 17-R-2, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Janssen, L., N. Klein, G. Taylor, E. Opoku and M. Holbeck. 2008. Conservation Reserve Program in South Dakota. Economics Research Report 2008-1. South Dakota State University, Brookings, South Dakota, USA. **LC**

Keyser, E. J. III. 1986. Pheasant nesting and vegetation development in dense nesting cover established under the South Dakota Pheasant Restoration Program. Thesis, South Dakota State University, Brookings, South Dakota, USA. **LC**

Kimball, J. W. 1944. Age gauge for pheasants. Journal of Wildlife Management 8:263-264.

Kimball, J. W. 1948. Pheasant population characteristics and trends in the Dakotas. Transactions of the North American Wildlife Natural Resources Conference 13:291-314.

Kimball, J. W. 1949. The crowing count pheasant census. Journal of Wildlife Management 13:101-120. **LC**

Kirsch, L. M. 1950*a*. Pheasant hunter success, 1949. Pitman-Robertson Quarterly Progress Report 17-R-4, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Kirsch, L. M. 1950*b*. Winter mortality, 1949-50. Pitman-Robertson Quarterly Progress Report 17-R-4, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA. **LC**

Kirsch, L. M. 1951. Pheasant hunter success, 1950. Pitman-Robertson Quarterly Progress Report 17-R-5, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Kopischke, E. D., and M. M. Nelson. 1966. Grit availability and pheasant densities in Minnesota and South Dakota. Journal of Wildlife Management 30(2):276-279.

Kuck, T. L. 1968. Movements and behavior of pheasants during the breeding cycle as determined by radio-tracking. Thesis, South Dakota State University, Brookings, South Dakota, USA.

Kuck, T L., R. B. Dahlgren, and D. R. Progulske. 1970. Movements and behavior of hen pheasants during the nesting season. Journal of Wildlife Management 34(3):626-630. **LC**

Lamb, D. W. 1966. Dieldrin residues in eggs and fat of penned pheasant hens. Thesis, South Dakota State University, Brookings, South Dakota, USA.

Lamb, D. W. 1969. Pharmacodynamics of dieldrin-C14 in pheasants. Dissertation, South Dakota State University, Brookings, South Dakota, USA.

Larsen, D. T. 1992. Food plot and habitat characteristics associated with ring-necked pheasant use of winter food plots in east-central South Dakota. Thesis, South Dakota State University, Brookings, South Dakota, USA.

Larsen, D. T., and L. D. Flake. 1994. Winter food plots for ring-necked pheasants. Cooperative Extension Service, South Dakota State University, Brookings, South Dakota, USA.

Larsen, D. T., P. L. Crookston, and L. D. Flake. 1994. Factors associated with ring-necked pheasant use of winter food plots. The Wildlife Society Bulletin 22:620-626. LC

Leathers, R. J. 2003. Relative invertebrate availability in Nebraska's Conservation Reserve Management Access Program. Thesis, South Dakota State University, Brookings, South Dakota, USA.

Leif, A. P. 1993. Survival and productivity of wild and pen-reared ring-necked pheasants in South Dakota, 1990-92. Completion Report 93-02, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Leif, A. P. 1994. Survival and reproduction of wild and pen-reared ring-necked pheasant hens. Journal of Wildlife Management 58:501-506. LC

Leif, A. P. 1996. Survival and reproductive chronology of female ring-necked pheasants in South Dakota. Prairie Naturalist 28:189-198. LC

Leif, A. P. 2003. Survival, spatial ecology and habitat use of hen pheasants in South Dakota. Game Report 2003-08, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA. LC

Leif, A. P. 2004. Avian nest densities and success in state highway roadsides in South Dakota. Game Report 2004-11, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA. LC

Leif, A. P. 2005. Spatial ecology and habitat selection of breeding male pheasants. Wildlife Society Bulletin 33(1):130-141. LC

Leif, A. P. 2007. Pheasant history. South Dakota Conservation Digest 74:12-13.

Linder, R. L., and D. W. Lamb. 1967. Relationship of dieldrin and penned pheasants. South Dakota Farm and Home Research 18:10-12.

Linder, R. L, R. B. Dahlgren, and C. R. Elliot. 1971. Primary feather pattern as a sex criterion in the pheasant. Journal of Wildlife Management 35:840-843.

Linder, R. L. 1972. Pheasant stocking: No cure for low pheasant numbers. South Dakota Conservation Digest 39:31. LC

Matson, A. J. 1964. An analysis of economic factors and institutions effecting the productivity of South Dakota land and water resources for upland game birds and migratory waterfowl. South Dakota State University Agriculture Experiment Station, Agriculture Economics Pamphlet 123:50-115.

Montag, D. G. 1972. Use of electrophoresis to determine populations of pheasants in South Dakota. Thesis, South Dakota State University, Brookings, South Dakota, USA.

Murano, R. J. D., and C. T. Switzer. 2008. Private lands habitat and access programs, strategic plan. South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Nelson, B. A. 1948. Pheasant data from a two-year bag study in South Dakota. Journal of Wildlife Management 12:20-31.

Nelson, B. A. 1949. Aerial census of upland game, 1949. Pitman-Robertson Quarterly Progress Report 17-R-3, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA. **LC**

Nelson, B. A., and R. G. Janson. 1949. Starvation of pheasants in South Dakota. Journal of Wildlife Management 13(3):308-309.

Nelson, B. A. 1950*a*. Aerial census of pheasants, 1950. Pitman-Robertson Quarterly Progress Report 17-R-4, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA. **LC**

Nelson, B. A. 1950*b*. Pheasant nesting studies, 1946-1949. Pitman-Robertson Quarterly Progress Report 17-R-4, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Norstog, K. 1948. Estimating time of pheasant kill. South Dakota Department of Game, Fish and Parks. P-R Project 17-R-2. Quarterly Report No. 8:54-59. **LC**

Olson, R. A. 1975. Nesting ecology of the ring-necked pheasant in eastern South Dakota. Thesis, South Dakota State University, Brookings, South Dakota, USA.

Olson, R. A., and L. D. Flake. 1975. Nesting of ring-necked pheasants in eastern South Dakota. Proceedings of the South Dakota Academy of Science 54:126-136. **LC**

Over, W. H. 1961. The ring-necked pheasant in South Dakota. Museum News 22:1-5.

Parikh, G. C., and R. F. Schryer. 1975. Pheasant reproduction as related to viral encephalitis, 1968-1975. Pitman-Robertson Completion Report W-75-R-17, South Dakota Department of Game, Fish and Parks, Pierre, USA.

Perkins, A. L., W. R. Clark, T. Z. Riley, and P. A. Vohs. 1997. Effects of landscape and weather on winter survival of ring-necked pheasant hens. Journal of Wildlife Management 61:634-644. **LC**

Pheasant Congress Task Force Committee. 1976. Farming and pheasants in South Dakota. Pamphlet FS 656, South Dakota State University Cooperative Extension Service, Brookings, South Dakota, USA.

Pheasants for Everyone—A Plan to Increase South Dakota's Pheasant Population. 1988. A cooperative effort of Governor George S. Mickelson, the South Dakota Pheasant Congress, and the South Dakota Department of Game, Fish & Parks. LC

Pheasant Seminar. 1968. Proceedings of numerous reports presented at the South Dakota Chapter of The Wildlife Society on November 22, 1968.

Popowski, J. 1972. The answer is clear: Peak ringneck populations occurred when pheasant habitat was exceptional. South Dakota Conservation Digest 39:14-17.

Priewert, F. A., and R. B. Dahlgren. 1966. A comparison of pheasant densities and sex ratios in areas open and closed to hunting in 1965. South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Purvis, J. R., A. E. Gabbert, and L. D. Flake. 1999. Nest characteristics of ring-necked pheasants in eastern South Dakota. Prairie Naturalist 31(1):1-8.

Purvis, J. R., A. E. Gabbert, L. D. Flake, and A. P. Leif. 1999. Over-winter condition changes in female ring-necked pheasants during two mild winters. Proceedings of the South Dakota Academy of Science 78:177-183.

Purvis, J. R., A. E. Gabbert, M. L. Brown, and L. D. Flake. 1999. Estimation of ring-necked pheasant condition with total body electrical conductivity. Wildlife Society Bulletin 27:216-220.

Riley, T. Z., W. R. Clark, D. E. Ewing, and P. A. Vohs. 1998. Survival of ring-necked pheasant chicks during brood rearing. Journal of Wildlife Management 62:36-44. LC

Rodgers, R. D. 1984. Ring-necked pheasant. Pages 89-94 *in* F. R. Henderson, editor. Guidelines for increasing wildlife on farms and ranches. Kansas State University Cooperative Extension Service, Manhattan, Kansas, USA. LC

Rock, M. E. 2006. Avian nesting density and success in alfalfa, cool season CRP, and warm season CRP planting in eastern South Dakota. Thesis, South Dakota State University, Brookings, South Dakota, USA.

Rohlfing, M. B. 2004. Avian nest densities and success in introduced cool-season grass-legume plantings versus warm-season native grass plantings in South Dakota, 2002-2003. Thesis, South Dakota State University, Brookings, South Dakota, USA.

Rohwer, T. 1961. Snow ridging to alleviate pheasant crop depredation in Brown County, 1960-1961. South Dakota Department of Game, Fish and Parks, Pierre, USA.

Ruth, J. M. 1972. Influence of weather on movement and habitat use of hen pheasants during brood rearing. Thesis, South Dakota State University, Brookings, South Dakota, USA. LC

Sather-Blair, S. 1979. Pheasant use of wetlands during the winter and application of landsat imagery for assessing winter habitat. Thesis, South Dakota State University, Brookings, South Dakota, USA.

Sather-Blair, S. and R. L. Linder. 1980. Pheasant use of South Dakota wetlands during the winter. Proceedings of the South Dakota Academy of Science 59:147-155.

Schilowsky, R. D. 2007. Habitat selection and use by breeding hen pheasants in eastern South Dakota, 1999-2001. Thesis, South Dakota State University, Brookings, South Dakota, USA. **LC**

Schmutz, J. A. 1988. Ring-necked pheasant parasitism of wild turkey nests. Wilson Bulletin 100:508-509.**LC**

Schneider, T. M. 1984. Effectiveness of shelterbelts in improving microclimatic conditions for pheasants in eastern South Dakota. Thesis, South Dakota State University, Brookings, South Dakota, USA. **LC**

Seubert, J. L. 1960. Pheasant study area investigations, 1955-1959. Pitman-Robertson Quarterly Progress Report W-75-R-1, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Seubert, J. L., R. B. Dahlgren, and C. G. Trautman. 1960-66. Pheasant study area investigations. Pitman-Robertson Quarterly Progress Reports W-75-R-1 through W-75-R-6, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Shave, H. J. 1964. An analysis of economic factors and institutions affecting the productivity of South Dakota land and water resources for upland game birds and migratory waterfowl. Agriculture Economics Pamphlet, South Dakota State University, Brookings, South Dakota, USA.

Shave, H. J. 1971. A clinico-pathologic study of botulism in ring-necked pheasants. Thesis, South Dakota State University, Brookings, South Dakota, USA.

Shay, K. G. 1994. An evaluation of South Dakota pheasant preserve habitat and hunter clientele. Thesis, South Dakota State University, Brookings, South Dakota, USA.

Shick, C. 1947. Sex ratio-egg fertility relationships in the ring-necked pheasant. Journal of Wildlife Management 11:302-306. **LC**

Shick, C. 1952. A study of pheasants on the 9,000-acre prairie farm Saginaw County, Michigan. Pitman-Robinson Project 7-R, Game Division Bulletin, Michigan Department of Conservation, Lansing, Michigan, USA. **LC**

Simpson, S., and R. L. Westemeier. 1987. Pheasant control measures on prairie-chicken sanctuaries in Jasper County, Illinois. Prairie Grouse Technical Conference 17:7-8. **LC**

Smith, E. H. 1949. Refinement and practical application of the crowing count census. Proceedings of the 11th Midwest Wildlife Conference, December 1945, Madison, Wisconsin, USA. **LC**

Smith, E. H. 1950. The 1949 pheasant hatch analyzed from sight record data. Pitman-Robertson Quarterly Progress Report 17-R-4, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA. **LC**

Smith, E. H. 1951. Calculation of the breeding population of pheasants in terms of birds per unit area. Pitman-Robertson Quarterly Progress Report 17-R-5, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA. **LC**

Smith, E. H. 1952. Crowing count census, 1952. Pitman-Robertson Quarterly Progress Report 17-R-6, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA. **LC**

Smith, W. K. 1996. Responses of ring-necked pheasants to Conservation Reserve Program field during courtship and brood rearing in the High Plains. Thesis, Kansas State University, Manhattan, Kansas, USA.

Solomon, K. E. 1983. Pheasant Bioenergetics—Part 1 of 6. South Dakota Conservation Digest 50:22-27. **LC**

Solomon, K. E. 1984*a*. Pheasant Bioenergetics—Part 2 of 6. South Dakota Conservation Digest 50:21-24. **LC**

Solomon, K. E. 1984*b*. Pheasant Bioenergetics—Part 3 of 6. South Dakota Conservation Digest 51:11-15. **LC**

Solomon, K. E. 1984*c*. Pheasant Bioenergetics—Part 4 of 6. South Dakota Conservation Digest 51:20-25. **LC**

Solomon, K. E. 1984*d*. Pheasant Bioenergetics—Part 5 of 6. South Dakota Conservation Digest 51:25-29. **LC**

Solomon, K. E. 1984*e*. Pheasant Bioenergetics—Part 6 of 6. South Dakota Conservation Digest 51:20-25. **LC**

Solomon, K. E. 1988. South Dakota fee hunting: more headaches or more pheasants. Pages 229-238 in D. L. Hallett, W. R. Edwards, and G. V. Burger, editors. Pheasants: Symptoms of wildlife problems on agricultural lands. North Central Section of The Wildlife Society, Bloomington, Indiana, USA.

Solomon, K. E. 1988. South Dakota pheasants. Proceedings of the 8th Midwest Wildlife Conference, Date, City, State, USA.

Solomon, K. E., and R. L. Linder. 1978. Fault bars on feathers of pheasants subjected to stress treatments. Proceedings of the South Dakota Academy of Science 57:139-143.

Sprague, J. W. 1968. Pheasants in South Dakota. Proceedings of the Pheasant Seminar, South Dakota Chapter of The Wildlife Society, November 1968, Brookings, South Dakota, USA.

Streckfuss, J. 1975. Managing public shooting areas. South Dakota Conservation Digest 42:5-7.

Switzer, C. T. 2009. Empire of the ringneck: a century of pheasants in South Dakota. South Dakota Conservation Digest 76:10-13. **LC**

Thill, R. E. 1969. Effects of aldrin on young pheasants under semi-natural conditions. Thesis, South Dakota State University, Brookings, South Dakota, USA.

Trautman, C. G. 1949. Starvation of pheasants. South Dakota. Journal of Wildlife Management 13:308-309.

Trautman, C. G. 1950*a*. Criteria for determining the age of juvenile pheasants. Pitman-Robertson Quarterly Progress Report 17-R-4, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.**LC**

Trautman, C. G. 1950*b*. Determining the age of juvenile pheasants. South Dakota Conservation Digest 17:8-10.

Trautman, C. G. 1952*a*. Bag check of pheasants, 1950. Pitman-Robertson Quarterly Progress Report 17-R-6, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA. **LC**

Trautman, C. G. 1952*b*. Pheasant food habits in South Dakota. Technical Bulletin 1, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Trautman, C. G. 1955. Pheasant hunters bag check survey, 1951, 1952 and 1953. Pitman-Robertson Quarterly Progress Report W-17-R-8, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA. **LC**

Trautman, C. G. 1960. Evaluation of pheasant nesting habitat in eastern South Dakota. Transactions of the North America Wildlife Natural Resources Conference 25:202-213.

Trautman, C. G. 1962. Pheasant study area investigations, 1960-1961. Pitman-Robertson Quarterly Progress Report W-75-R-3, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Trautman, C. G. 1963. Pheasant study area investigations, 1961-1962. Pitman-Robertson Quarterly Progress Report W-75-R-4, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Trautman, C. G. 1964*a*. Pheasant study area investigations, 1962-1963. Pitman-Robertson Quarterly Progress Report W-75-R-5, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Trautman, C. G. 1964*b*. South Dakota pheasant range. Midwest Pheasant Council Report, South Dakota, USA.

Trautman, C. G. 1965*a*. Evaluation of ring-necked pheasants in eastern South Dakota. Prairie Naturalist 31:1-8. **LC**

Trautman, C. G. 1965*b*. Pheasant study area investigations, 1963-1964. Pitman-Robertson Quarterly Progress Report W-75-R-6, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA. **LC**

Trautman, C. G. 1965*c*. Evaluation of pheasant nesting habitat in eastern South Dakota. Pitman-Robertson Completion Report W-75-R-7, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA. **LC**

Trautman, C. G., and R. B. Dahlgren. 1965*d*. Causes and mechanics of pheasant population fluctuations. Management Bulletin, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Trautman, C. G., and W. L. Tucker. 1966. Pheasant population indices. Pages 8-16 *in* Fox-Pheasant relationships in South Dakota, 1965. Agricultural Experiment Station, South Dakota State University, Brookings, South Dakota, USA.

Trautman, C. G. 1967. The future of pheasants in South Dakota. Proceedings of the South Dakota Lodging Association Annual Conference, South Dakota, USA.

Trautman, C. G., and L. F. Fredrickson. 1967. Pheasant study area investigations, 1965-1966. Pitman-Robertson Quarterly Progress Report W-75-R-8, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Trautman, C. G. 1968. Gun harvest. Proceedings of the South Dakota Chapter of The Wildlife Society Pheasant Seminar, South Dakota, USA.

Trautman, C. G., and L. F. Fredrickson. 1968. Pheasant nesting preference study, 1967. Pitman-Robertson Quarterly Progress Report W-75-R-9, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Trautman, C. G., M. M. Nelson, J. B. Elder, R. B. Dahlgren, and W. L. Baxter. 1968. Factors affecting pheasant populations. Proceedings of the Pheasant Seminar, South Dakota Chapter of The Wildlife Society, November 1968, Brookings, South Dakota, USA.

Trautman, C. G. 1970. Pheasant study area investigations, 1968-1969. Pitman-Robertson Quarterly Progress Report W-75-R-11, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Trautman, C. G. 1972. The predator/prey study: What effect do predators have on pheasants? South Dakota Conservation Digest 39:8-13.

Trautman, C. G., L. F. Fredrickson, and A. V. Carter. 1973. Relationship of red fox and other predators to populations of ring-necked pheasants and other prey, 1964-1971. Pitman-Robertson Completion Report W-75-R-15, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Trautman, C. G., L. F. Fredrickson, and A. V. Carter. 1974. Relationship of red fox and other predators to populations of ring-necked pheasants and other prey, South Dakota. Transactions of the North America Wildlife Natural Resource Conference 39:241-252.

Trautman, C. G. 1974. Pheasant study area investigations. Pitman-Robertson Completion Report W-75-R-16, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Trautman, C. G. 1976. Predator control, is it practical? Proceedings of the 2nd International Waterfowl Symposium.

Trautman, C. G., L. Linder. 1980. Pheasant use of South Dakota wetlands during the winter. Proceedings of the South Dakota Academy of Science 59:147-155.

Trautman, C. G. 1982. History, ecology and management of ring-necked pheasant in South Dakota. Wildlife Research Bulletin 7, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA. **LC**

U.S. Department of Agriculture National Agricultural Statistics Service. 2008. South Dakota Agriculture 2008. South Dakota Field Office, Sioux Falls, South Dakota, USA. **LC**

U.S. Department of Agriculture Soil Conservation Service. 1977. A plan for pheasant habitat development and management: one hundred square miles in Brown County, South Dakota. United State Department of Agriculture Soil Conservation Service, Huron, South Dakota, USA.

U.S. Department of the Interior, Fish and Wildlife Services, and U.S. Department of Commerce, U.S. Census Bureau. 2006. National Survey of Fishing, Hunting and Wildlife-Associated Recreation. **LC**

United States Government Accountability Office. 2007. Agricultural conservation—farm payments are an important factor in landowners' decisions to convert grassland to cropland. GAO-07-1054. **LC**

Vandel, G. M. III. 1980. Land use changes and pheasant declines in eastern South Dakota. Thesis, South Dakota State University, Brookings, South Dakota. , USA.

Vandel, G. M. III, and R. L. Linder. 1981. Pheasants decline but cover-type acreages unchanged in South Dakota study area. Wildlife Society Bulletin 9:299-302.

Walker, R. E., and J. F. Suedkamp. 1977. Status of shelterbelts in South Dakota. Forestry Division Report, South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

Wentz, W. A. 1976. Pheasant restoration plan, South Dakota. Cooperative Extension Service, South Dakota State University, Brookings, South Dakota, USA.

Woehler, E. E., and J. M. Gates. 1970. An improved method of sexing ring-necked pheasant chicks. Journal of Wildlife Management 34:228-231.

APPENDIX

Appendix Table 1. Ring-necked pheasant statistics for South Dakota,1919-2008.

Ring-necked Pheasant Statistics for South Dakota													
Season Structure					Licensed Hunters			Population Estimates			Survey Indices		
Year	Length (days)	Opening Day	Bag limit	Hen limit	Residents	Nonresidents	Total	Harvest	Pheasants harvested per hunter	Preseason Population	Preseason pheasants per mile	Average brood size	Postseason cocks per 100 hens
1919	1	30-Oct	2	0	500	500	1,000	200	0.2	100,000			
1920	2	04-Nov	2	0	1,000	1,000	2,000	1,000	0.5	200,000			
1921	7	21-Nov	2	0	10,000	1,000	11,000	7,000	0.6	300,000			
1922	20	09-Nov	2	0	30,000	1,500	31,500	15,000	0.5	500,000			
1923	6	19-Nov	3	0	40,000	1,500	41,500	25,000	0.6	700,000			
1924	15	07-Nov	3	0	50,000	2,100	52,100	250,000	4.8	1,000,000			
1925	15	30-Oct	3	0	75,000	1,100	76,100	500,000	6.6	2,000,000			
1926	52	15-Oct	7	2	82,000	1,400	83,400	1,000,000	12.0	4,000,000			
1927	90	07-Oct	7	3	90,000	2,600	92,600	1,500,000	16.2	6,000,000			
1928	40	25-Oct	5	1	100,000	2,800	102,800	1,250,000	12.2	5,000,000			
1929	16	29-Oct	5	1	95,000	2,700	97,700	1,000,000	10.2	4,000,000			
1930	46	16-Oct	7	2	96,000	2,600	98,600	1,500,000	15.2	7,000,000			
1931	12	15-Oct	3	0	61,000	700	61,700	1,000,000	16.2	5,000,000			
1932	30	20-Oct	4	0	62,000	700	62,700	1,000,000	15.9	5,000,000			
1933	30	10-Oct	5	1	63,000	600	63,600	2,000,000	31.4	8,000,000			
1934	30	21-Oct	5	2	53,000	400	53,400	1,500,000	28.1	7,000,000			
1935	37	21-Oct	6	2	57,000	1,900	58,900	1,500,000	25.5	12,000,000			
1936	20	10-Oct	4	0	61,000	1,600	62,600	1,750,000	28.0	12,000,000			
1937	4	09-Oct	4	0	25,000	800	25,800	75,000	2.9	3,000,000			
1938	14	01-Oct	4	1	44,000	1,800	45,800	1,500,000	32.8	6,000,000			
1939	29	14-Oct	4	1	63,000	2,800	65,800	1,500,000	22.8	6,000,000			
1940	40	01-Oct	5	1	73,000	6,200	79,200	2,500,000	31.6	8,000,000			
1941	50	01-Oct	5	1	83,000	11,000	94,000	3,125,000	33.2	11,000,000			
1942	120	26-Sep	7	2	80,000	16,000	96,000	4,500,000	46.9	15,000,000			
1943	159	25-Sep	7	3	60,000	18,000	78,000	3,168,000	40.6	11,000,000			
1944	163	20-Sep	10	5	77,000	42,000	119,000	6,439,000	54.1	15,000,000			
1945	153	29-Sep	8	4	88,000	87,000	175,000	7,507,000	42.9	16,000,000			
1946	88	15-Oct	5	2	103,000	84,000	187,000	3,550,000	19.0	11,000,000		6.57	
1947	45	11-Oct	3	0	103,000	13,000	116,000	1,496,000	12.9	7,000,000		7.15	60
1948	55	09-Oct	4	0	123,000	26,000	149,000	2,148,000	14.4	9,600,000		7.63	53
1949	45	15-Oct	4	0	121,000	22,000	143,000	1,864,000	13.0	8,100,000	3.10	7.15	45
1950	10	04-Nov	2	0	88,000	2,000	90,000	507,000	5.6	3,200,000	1.99	6.79	63
1951	25	20-Oct	3	0	95,000	10,000	105,000	1,184,000	11.3	6,000,000	3.69	7.13	55
1952	30	18-Oct	3	0	107,000	13,000	120,000	1,490,000	12.4	6,100,000	5.62	7.89	43
1953	30	17-Oct	3	0	100,000	17,000	117,000	1,210,000	10.3	4,900,000	4.27	6.89	41
1954	30	23-Oct	3	0	105,000	17,000	122,000	1,672,000	13.7	6,200,000	4.84	6.92	37
1955	40	22-Oct	3	0	111,000	19,000	130,000	1,608,000	12.4	6,300,000	6.72	6.90	39
1956	35	27-Oct	3	0	102,000	20,000	122,000	1,221,000	10.0	4,300,000	6.46	6.88	34
1957	37	26-Oct	3	0	102,000	20,000	122,000	1,339,000	11.0	5,900,000	7.31	5.90	43
1958	51	18-Oct	4	0	125,000	36,000	161,000	2,635,000	16.4	11,100,000	11.03	6.80	40
1959	58	17-Oct	5	0	117,000	45,000	162,000	2,212,000	13.7	7,500,000	7.64	5.70	22
1960	42	22-Oct	4	0	130,000	28,000	158,000	2,574,000	16.3	9,500,000	6.73	6.23	28
1961	58	21-Oct	4	0	141,000	51,000	192,000	3,247,000	16.9	11,000,000	11.38	6.34	26
1962	61	20-Oct	4	0	138,000	57,000	195,000	2,790,000	14.3	10,200,000	6.52	5.80	44
1963	74	19-Oct	4	0	144,000	68,000	212,000	3,095,000	14.6	10,000,000	11.24	6.50	23
1964	60	17-Oct	3	0	124,000	23,000	147,000	1,474,000	10.0	5,100,000	3.74	5.91	24

Appendix Table 1 (cont.). Ring-necked pheasant statistics for South Dakota, 1919-2008.

Ring-necked Pheasant Statistics for South Dakota													
Season Structure					Licensed Hunters			Population Estimates			Survey Indices		
Year	Length (days)	Opening Day	Bag limit	Hen limit	Residents	Nonresidents	Total	Harvest	Pheasants harvested per hunter	Preseason Population	Preseason pheasants per mile	Average brood size	Postseason cocks per 100 hens
1965	44	16-Oct	3	0	102,000	14,000	116,000	797,000	6.9	3,300,000	2.55	6.28	37
1966	16	15-Oct	3	0	82,000	6,000	88,000	409,000	4.6	2,200,000	2.23	6.30	56
1967	37	21-Oct	3	0	111,000	15,000	126,000	908,000	7.2	2,900,000	2.42	6.30	39
1968	37	19-Oct	3	0	117,000	19,000	136,000	880,000	6.5	3,300,000	2.08	7.17	37
1969	30	18-Oct	3	0	96,000	14,000	110,000	622,000	5.7	2,700,000	1.91	7.60	48
1970	37	17-Oct	3	0	108,000	18,000	126,000	901,000	7.2	3,500,000	2.73	7.50	40
1971	42	16-Oct	3	0	117,000	25,000	142,000	1,106,000	7.8	3,700,000	2.45	7.22	32
1972	49	21-Oct	3	0	120,000	28,000	148,000	1,201,000	8.1	4,100,000	2.75	7.64	39
1973	64	20-Oct	3	0	127,000	37,000	164,000	1,283,000	7.8	4,200,000	3.51	7.04	29
1974	49	19-Oct	3	0	126,000	25,000	151,000	1,071,000	7.1	3,000,000	2.64	7.08	25
1975	23	18-Oct	2	0	100,000	12,000	112,000	497,500	4.4	2,100,000	1.53	7.08	42
1976	30	16-Oct	2	0	89,000	8,000	97,000	372,500	3.8	1,400,000	1.03	6.30	35
1977	44	15-Oct	2	0	90,000	10,000	100,000	518,600	5.2	2,300,000	1.62	7.33	43
1978	44	21-Oct	2	0	82,000	13,000	95,000	558,300	5.9	2,100,000	1.38	7.14	38
1979	51	20-Oct	3	0	105,000	18,700	123,700	934,000	7.6	3,600,000	3.20	7.50	39
1980	53	18-Oct	3	0	107,500	28,500	136,000	1,158,700	8.5	4,200,000	3.70	7.80	21
1981	51	17-Oct	3	0	106,300	33,000	139,300	1,299,100	9.3	4,200,000	3.60	6.84	21
1982	51	16-Oct	3	0	95,300	31,800	127,100	1,070,500	8.4	4,200,000	3.37	6.53	34
1983	51	15-Oct	3	0	102,300	36,400	138,700	1,416,600	10.2	4,800,000	3.80	6.66	21
1984	51	20-Oct	3	0	91,290	35,170	126,460	962,700	7.6	3,300,000	2.23	6.20	28
1985	51	19-Oct	3	0	85,500	34,700	120,200	801,700	6.7	3,200,000	2.27	6.19	31
1986	51	18-Oct	3	0	70,850	24,000	94,850	627,300	6.6	2,100,000	1.81	7.04	34
1987	51	18-Oct	3	0	83,000	31,900	114,900	929,700	8.1	3,800,000	2.58	7.01	34
1988	51	15-Oct	3	0	79,800	30,000	109,800	782,700	7.1	3,100,000	2.22	6.23	29
1989	51	21-Oct	3	0	71,700	26,100	97,800	687,000	7.0	2,700,000	2.08	6.54	27
1990	51	20-Oct	3	0	71,300	26,501	97,801	777,300	7.9	3,700,000	2.09	6.86	38
1991	65	19-Oct	3	0	91,200	32,127	123,327	1,222,600	9.9	5,000,000	3.25	6.63	31
1992	65	17-Oct	3	0	83,400	42,900	126,300	969,000	7.7	4,200,000	2.77	6.04	35
1993	65	16-Oct	3	0	78,900	45,500	124,400	1,213,800	9.8	5,500,000	2.90	6.33	36
1994	65	15-Oct	3	0	78,800	65,200	144,000	1,370,600	9.5	5,400,000	4.09	6.48	29
1995	65	21-Oct	3	0	75,286	65,361	140,647	1,292,400	9.2	4,900,000	2.66	6.22	26
1996	65	19-Oct	3	0	77,932	65,602	143,534	1,191,700	8.3	4,800,000	2.59	6.86	31
1997	65	18-Oct	3	0	70,573	42,808	113,381	920,700	8.1	3,600,000	2.64	7.63	32
1998	65	17-Oct	3	0	75,083	60,364	135,447	1,186,700	8.8	5,000,000	4.94	7.20	33
1999	65	16-Oct	3	0	84,342	71,956	156,298	1,464,200	9.4	6,100,000	4.51	7.07	32
2000	72	21-Oct	3	0	79,790	70,182	149,972	1,447,700	9.7	6,700,000	4.16	6.31	37
2001	73	20-Oct	3	0	76,772	73,425	150,197	1,361,300	9.1	6,000,000	3.38	6.76	38
2002	74	19-Oct	3	0	70,821	74,873	145,694	1,261,700	8.7	5,500,000	2.69	6.25	37
2003	75	18-Oct	3	0	78,394	83,544	161,938	1,815,000	11.2	8,700,000	6.20	7.55	40
2004	79	16-Oct	3	0	78,984	91,948	170,932	1,653,000	9.7	8,100,000	5.66	6.39	38
2005	79	15-Oct	3	0	79,359	94,959	174,318	1,960,000	11.2	9,200,000	6.63	6.72	39
2006	79	21-Oct	3	0	79,953	98,212	178,165	1,846,400	10.4	8,400,000	6.22	6.06	38
2007	79	20-Oct	3	0	77,879	103,231	181,110	2,122,700	11.7	11,900,000	7.85	6.71	48
2008	79	18-Oct	3	0	75,831	100,349	176,180	1,933,200	11.0	9,900,000	8.56	6.38	47

Appendix Table 2: Implementation Schedule and SD GFP Staff Assigned Primary Responsibility.

Goals, Objectives& Strategies	2009	2010	2011	2012	2013	2014	Primary Responsibility
Goal 1: The Division of Wildlife, through its Private Lands Habitat Program, will partner with private landowners to conserve, restore and manage habitats critical for pheasants and other wildlife species.							
Objective 1.1: Maintain at least one million acres of undisturbed CRP grassland habitat on private lands in South Dakota from 2009-2014.							
Strategies							
1.1.1: Maintain support for CRP in federal farm legislation through continued cooperation with the Governor's Office, SD Department of Agriculture, SD Department of Environment and Natural Resources, USDA, other state and federal agencies, non-governmental conservation organizations, coalition groups (e.g. Northern Great Plains Working Group, Association of Fish & Wildlife Agencies, etc.), private landowners and agricultural groups.	✓	✓	✓	✓	✓	✓	Administration Wildlife Program Administrator Habitat Program Administrator Farm Bill/Access Coordinator Private Lands Biologists
1.1.2: Continue to advocate the use and proper timing of CRP general sign-ups.	✓	✓	✓	✓	✓	✓	Farm Bill/Access Coordinator
1.1.3: Continue to advocate for strategic use of existing and new continuous CRP practices that provide quality pheasant nesting habitat (e.g. CP-37, CP-38).	✓	✓	✓	✓	✓	✓	Farm Bill/Access Coordinator Private Lands Biologists
1.1.4: Annually seek and provide assistance to landowners with expiring CRP contracts, by providing re-enrollment options into general and continuous CRP, or other programs that are available for maintaining all or a portion of this grassland habitat.	✓	✓	✓	✓	✓	✓	Farm Bill/Access Coordinator Private Lands Biologists Other Department Staff
1.1.5: Maintain existing partnerships with Pheasants Forever, NRCS and SD GFP to fund a minimum of seven Farm Bill Biologists in NRCS Offices to assist private landowners with technical assistance and in the promotion of all habitat programs.	✓	✓	✓	✓	✓	✓	Terrestrial Resources Chief Habitat Program Administrator Farm Bill/Access Coordinator Private Lands Biologists
1.1.5*a*: Expand the existing partnership to fund eight Farm Bill Biologists by 2010[1] and fund two additional Farm Bill Biologists by 2011[2] for a total of ten positions.	✓[1]	✓	✓[2]	✓	✓	✓	Habitat Program Administrator Farm Bill/Access Coordinator Private Lands Biologists
1.1.6: Continue to seek opportunities with conservation partners to create new partnerships in western South Dakota to deliver technical assistance to private landowners for Farm Bill programs.	✓	✓	✓	✓	✓	✓	Habitat Program Administrator Farm Bill/Access Coordinator Private Lands Biologists
1.1.7: By 2012, enroll 100,000 acres of marginal cropland or expiring CRP into the James River Watershed CREP.	✓	✓	✓	✓	✓	✓	Farm Bill/Access Coordinator Private Lands Biologists Other Department Staff
OBJECTIVE 1.2: Advocate improved management of range and pastureland to enhance quantity and quality of nesting and brood-rearing habitat on private grazing lands through 2014.							

Goals, Objectives& Strategies	2009	2010	2011	2012	2013	2014	Primary Responsibility
Strategies							
1.2.1: Continue to support the increased use of planned range management through USDA's EQIP program, as well as other partnership efforts involving the USFWS Partners for Fish & Wildlife Program, South Dakota Grassland Coalition and local conservation districts to improve range and nesting conditions on native range and tame pastures.	✓	✓	✓	✓	✓	✓	Habitat Program Administrator Farm Bill/Access Coordinator Private Lands Biologists
1.2.2: SD GFP private lands biologists will remain involved with appropriate State Technical sub-committees that recommend/develop range management initiatives through USDA programs (e.g. CRP, WHIP, WRP, EQIP, CSP, GRP).	✓	✓	✓	✓	✓	✓	Habitat Program Administrator Farm Bill/Access Coordinator Private Lands Biologists
1.2.3: When applicable, SD GFP private lands biologists will provide input for mid-term management, managed haying and grazing, and emergency haying and grazing guidelines on appropriate CRP contracts.	✓	✓	✓	✓	✓	✓	Farm Bill/Access Coordinator Private Lands Biologists
1.2.4: SD GFP will continue to contribute funds to range management projects available through conservation districts that often involve USFWS private lands staff.	✓	✓	✓	✓	✓	✓	Habitat Program Administrator Private Lands Biologists
1.2.5: SD GFP private lands biologists will work to increase landowner participation by implementing grazing stewardship practices through department cost-share programs, including managed grazing systems designed to measurably benefit wildlife and long-term sustainable use of native rangelands and tame pastures for livestock production.	✓	✓	✓	✓	✓	✓	Private Lands Biologists
1.2.6: Continue to collaborate with conservation partners and seek opportunities to provide technical and financial assistance to incorporate prescribed fire as a management tool for grassland plant communities.	✓	✓	✓	✓	✓	✓	Habitat Program Administrator Private Lands Biologists
1.2.7: By 2010, SD GFP will provide recommendations to private landowners on alternative options to use haying and mowing as a management tool to manage grassland plant communities that could increase pheasant production.	✓	✓	✓	✓	✓	✓	Private Lands Biologists
OBJECTIVE 1.3: Advocate the establishment and maintenance of quality winter cover on private lands to increase winter survival of pheasants through 2014.							
Strategies							
1.3.1: Where possible, continue to restore hydrology on temporary, seasonal and semi-permanent wetlands throughout the pheasant range to provide dense emergent vegetation for heavy winter cover habitat.	✓	✓	✓	✓	✓	✓	Private Lands Biologists
1.3.2: Continue to work closely with private landowners to maintain and increase food habitat plot projects in conjunction with other winter cover such as emergent wetland vegetation and woody cover.	✓	✓	✓	✓	✓	✓	Private Lands Biologists

Goals, Objectives& Strategies	2009	2010	2011	2012	2013	2014	Primary Responsibility
1.3.3: By 2010, complete an inventory of all winter cover habitats (e.g. natural and planted woody cover, emergent wetlands) to identify areas that lack sufficient winter cover habitat.		✓					Private Lands Biologists Upland Game Mgmt. Staff GIS Staff
1.3.4: Continue to work closely with department staff, state foresters, Pheasant Forever Farm Bill Biologists, and USDA Offices to establish quality woody winter cover through department cost-share programs.	✓	✓	✓	✓	✓	✓	Farm Bill/Access Coordinator Private Lands Biologists
OBJECTIVE 1.4: Promote the establishment and maintenance of high quality pheasant habitat on private lands using other programs and initiatives available from conservation partners to maintain and expand pheasant habitat in South Dakota through 2014.							
Strategies							
1.4.1: Continue to work closely with Pheasant Forever Farm Bill Biologists, USDA Offices, USFWS, and other partners to promote habitat cost-share programs.	✓	✓	✓	✓	✓	✓	Farm Bill/Access Coordinator Private Lands Biologists
1.4.2: Continue to promote and inform private landowners of the availability to protect habitat through the USFWS wetland and grassland easement programs.	✓	✓	✓	✓	✓	✓	Private Lands Biologists
1.4.3: Annually coordinate efforts with conservation partners to fully utilize funding opportunities available through matching grant programs (e.g. North American Wetlands Conservation Act).	✓	✓	✓	✓	✓	✓	Habitat Program Administrator Private Lands Biologists
1.4.4: Working with conservation partners, annually evaluate, modify, develop, and deliver an adaptive suite of programs to maintain and increase pheasant habitat across South Dakota.	✓	✓	✓	✓	✓	✓	Habitat Program Administrator Farm Bill/Access Coordinator Private Lands Biologists
1.4.5: Continue to support and promote DU's Winter Cereal Program to provide additional annual nesting cover.	✓	✓	✓	✓	✓	✓	Habitat Program Administrator Private Lands Biologists
OBJECTIVE 1.5: The Division of Wildlife will continue to assist private landowners experiencing pheasant depredation using the tools available in a comprehensive wildlife depredation program through 2014.							
Strategies							
1.5.1: Annually work with landowners to reduce pheasant depredation to tolerable levels.	✓	✓	✓	✓	✓	✓	Regional Wildlife Managers Wildlife Damage Mgmt. Staff
1.5.2: Continue to upgrade and improve the department's comprehensive wildlife depredation program to address pheasant depredation in the future.	✓	✓	✓	✓	✓	✓	Regional Wildlife Managers Wildlife Damage Mgmt. Staff
GOAL 2: The Division of Wildlife will conserve, restore, manage and preserve habitats critical for pheasants and other upland nesting birds through fee title purchases, management agreements, and partnerships with other owners and managers of public land.							

Goals, Objectives& Strategies	2009	2010	2011	2012	2013	2014	Primary Responsibility
OBJECTIVE 2.1: The Division of Wildlife will acquire land for GPAs, from willing sellers, for the purposes of developing and managing habitats to benefit local pheasant populations through 2014.							
Strategies							
2.1.1 When appropriate, expand existing GPAs through on-going acquisition efforts from willing sellers.	✓	✓	✓	✓	✓	✓	Habitat Program Administrator Regional Habitat Managers
2.1.2 When appropriate, acquire new GPAs from willing sellers with the focus being on farmlands with habitat development potential, existing high quality habitats (e.g. CRP, WRP), wetlands, and remnant native prairie tracts.	✓	✓	✓	✓	✓	✓	Habitat Program Administrator Regional Habitat Managers
2.1.3 Continue to utilize funding partnerships (e.g. PF, DU, etc.), funding grants and Federal Aid in Wildlife Restoration (Pitman-Robertson Act) funds to acquire GPAs from willing sellers.	✓	✓	✓	✓	✓	✓	Habitat Program Administrator Regional Habitat Managers
OBJECTIVE 2.2: The Division of Wildlife will utilize science-based habitat development and management practices on GPAs, within fiscal, biological, and land use constraints, to benefit local pheasant populations through 2014.							
Strategies							
2.2.1: Annually identify existing GPAs where pheasants are the primary habitat management species. As necessary, update and amend land management plans in the Wildlife Inventory and Land Management Application (WILMA) database for GPAs to emphasize and reflect pheasant habitat development and management objectives.	✓	✓	✓	✓	✓	✓	Habitat Program Administrator Regional Habitat Managers
2.2.2: Annually maintain and improve nesting and brood rearing habitats for pheasants on GPAs using proper management techniques (e.g. prescribed fire, grazing, haying).	✓	✓	✓	✓	✓	✓	Regional Habitat Managers
2.2.3: Continue to develop properly designed and located winter habitat for pheasants on GPAs.	✓	✓	✓	✓	✓	✓	Regional Habitat Managers
2.2.4: Continue to use native species whenever possible for habitat developments on GPAs. Where appropriate and within the parameters of respective management plans, dense nesting cover mixtures (e.g. introduced cool season grasses and legumes) are encouraged to provide nesting and brood-rearing habitat.	✓	✓	✓	✓	✓	✓	Habitat Program Administrator Regional Habitat Managers
2.2.5: Continue to protect wetlands and native prairie habitat communities on GPAs from destructive practices.	✓	✓	✓	✓	✓	✓	Regional Habitat Managers
2.2.6: Continue to remove invasive, encroaching, and low-quality (i.e. does not provide thermal protection at ground level) planted woody cover in and adjacent to nesting and brood rearing habitats on GPAs.	✓	✓	✓	✓	✓	✓	Regional Habitat Managers
2.2.7: Continue to support scientific evaluation, including cost-effectiveness of nesting, brood rearing and winter habitat developments and management practices utilized on GPAs.	✓	✓	✓	✓	✓	✓	Regional Habitat Managers Upland Game Mgmt. Staff

Goals, Objectives& Strategies	2009	2010	2011	2012	2013	2014	Primary Responsibility
2.2.8: When necessary (e.g. new employees, research results), provide information and training to department staff on pheasant ecology, pheasant habitat management practices and research project findings that contribute to improving management decisions on GPAs.	✓	✓	✓	✓	✓	✓	Private Lands Biologists Upland Game Mgmt. Staff Regional Habitat Managers
OBJECTIVE 2.3: The Division of Wildlife will encourage other public land management agencies to protect, acquire, maintain and improve habitat to benefit local pheasant populations through 2014.							
Strategies							
2.3.1: By 2010, promote and encourage SD DOT to develop and maintain perennial grassland cover, including the use of native grass and forb species in state highway right-of-ways, and to improve production potential of roadside grasslands by strict enforcement of haying dates.	✓	✓	✓	✓	✓	✓	Habitat Program Administrator Private Lands Biologists Upland Game Mgmt. Staff
2.3.2: Continue to coordinate habitat enhancement projects with South Dakota School and Public Lands (SD SPL), where appropriate, to develop and implement habitat practices that will provide essential pheasant and other wildlife habitat, while providing a no net-loss or increase of income for SD SPL and their respective tenants.	✓	✓	✓	✓	✓	✓	Habitat Program Administrator Private Lands Biologists Upland Game Mgmt. Staff
2.3.3: Continue to support USFWS acquisition of Waterfowl Production Areas, wetland easements and grassland easements.	✓	✓	✓	✓	✓	✓	Habitat Program Administrator Private Lands Biologists
2.3.4: Continue to support the efforts of the South Dakota Parks and Wildlife Foundation, Northern Prairie Lands Trust and other conservation organizations in the preservation and protection of wildlife habitat.	✓	✓	✓	✓	✓	✓	Habitat Program Administrator Private Lands Biologists
GOAL 3: The Division of Wildlife will continue to monitor population and habitat trends and conduct research as needed to address population and habitat-related questions.							
OBJECTIVE 3.1: The Division of Wildlife will continue to use and improve upon current population, harvest, and public opinion surveys to monitor population trends and estimate harvest and hunter satisfaction through 2014 with the objective to meet or exceed the previous 10-year average (1999-2008).							
Strategies							
3.1.1: Annually conduct the pheasant brood survey to determine reproductive success, population trends, relative densities of populations, and to evaluate the effects of weather and land-use changes on pheasant production.	✓	✓	✓	✓	✓	✓	Senior Upland Game Biologist Other Department Staff
3.1.2: Annually conduct the pheasant winter sex ratio survey to determine the degree of harvest from the previous hunting season and for conversion of data to true indices of productivity.	✓	✓	✓	✓	✓	✓	Senior Upland Game Biologist Other Department Staff
3.1.3: Annually conduct hunter harvest surveys to obtain harvest statistics for pheasants and other upland game species and to determine hunter satisfaction.	✓	✓	✓	✓	✓	✓	Game Harvest Survey Coordinator

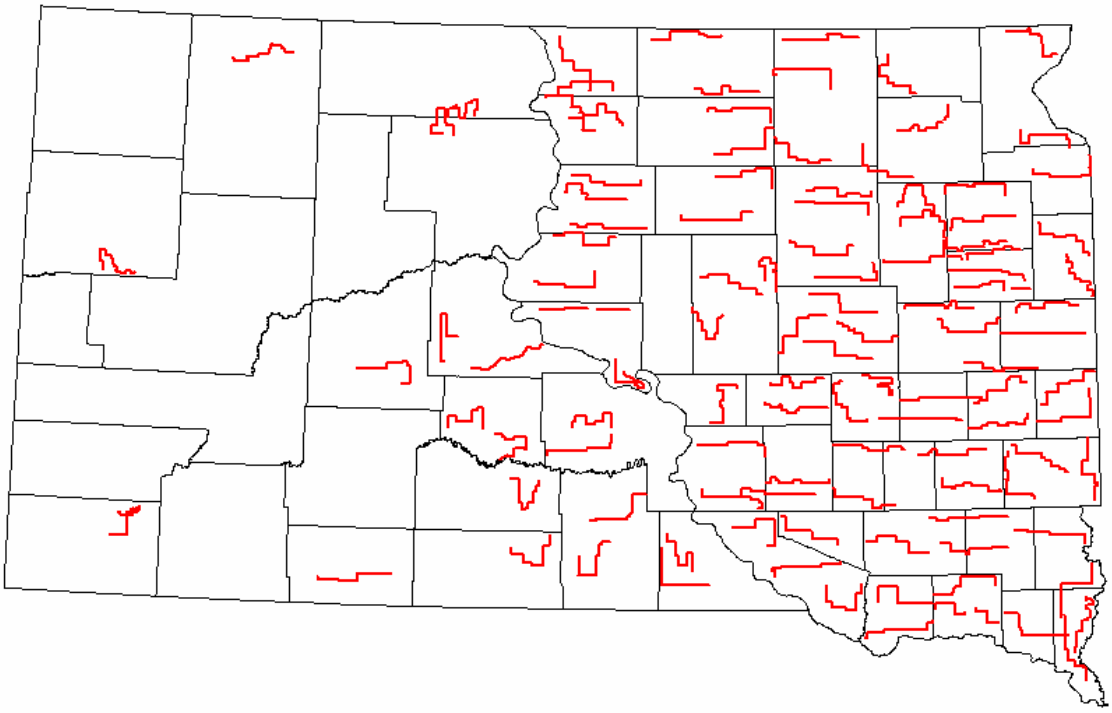
Goals, Objectives& Strategies	2009	2010	2011	2012	2013	2014	Primary Responsibility
3.1.4: By 2010, provide all surveyors with a Global Positioning System unit or a Personal Digital Assistant equipped with CyberTracker software to collect data while conducting both the pheasant brood survey and the pheasant winter sex ratio survey. Electronic data collection will improve efficiency, reduce or eliminate data entry errors, and enhance data analysis by providing geo-referenced data.		✓	✓	✓	✓	✓	Terrestrial Resources Chief Wildlife Program Administrator Upland Game Mgmt. Staff GIS Staff
3.1.5: Annually discuss the need for public opinion surveys to determine hunter and landowner preference and satisfaction. All public opinion surveys will be coordinated through the SD GFP Human Dimensions Specialist for survey design and analysis.	✓	✓	✓	✓	✓	✓	Terrestrial Resources Chief Wildlife Program Administrator Upland Game Mgmt. Staff Human Dimensions Specialist
3.1.6: Upland game management staff will attend the biennial meeting of the Midwest Pheasant Study Group. This meeting facilitates the exchange of information between states on survey techniques, harvest regulations, research and habitat management.		✓		✓		✓	Senior Upland Game Biologist
OBJECTIVE 3.2: The Division of Wildlife will continue science-based research and habitat inventories to answer questions related to pheasant biology, effects of land use and effect of habitat management practices to enhance pheasant populations through 2014.							
Strategies							
3.2.1: Due to recent and expected losses of CRP acres, land use changes, and a shift in landowner demographics, future research will focus on habitat inventory and pheasant response to habitat management practices and land use changes (e.g. cellulosic biofuel production, conversion of native grasslands, genetically modified crops).	✓	✓	✓	✓	✓	✓	Upland Game Mgmt. Staff Private Lands Biologists
3.2.2: Use the upland game management and other department staff to develop, conduct and report findings of small-scale pheasant related research projects.	✓	✓	✓	✓	✓	✓	Upland Game Mgmt. Staff Other Department Staff
3.2.3: Continue to coordinate and provide funding for large-scale research projects with South Dakota State University, South Dakota Cooperative Fish and Wildlife Research Unit, and other academic institutions.	✓	✓	✓	✓	✓	✓	Wildlife Program Administrator Senior Upland Game Biologist
3.2.4: By 2012, develop a region-specific pheasant model to predict local pheasant population dynamics using land cover data and historical pheasant survey data. This model will be compared to a similar model developed by the USDA Farm Service Agency.				✓			Wildlife Program Administrator Senior Upland Game Biologist
3.2.5: Annually collect information from USDA, USFWS and other agencies to determine the composition and configuration of different habitat types. This data will be analyzed in a Geographic Information System and used to direct and implement current and future habitat programs.	✓	✓	✓	✓	✓	✓	Habitat Program Administrator Farm Bill/Access Coordinator Upland Game Mgmt. Staff GIS Staff

Goals, Objectives& Strategies	2009	2010	2011	2012	2013	2014	Primary Responsibility
3.2.6: By 2010, develop a Geographic Information System using high-resolution infrared photography to determine the composition and configuration of all land use and cover types related to pheasant habitat management.		✓					Senior Upland Game Biologist GIS Staff
3.2.7: By 2010, develop a WILMA database for the SD GFP Private Lands Habitat Program to emphasize and reflect pheasant habitat development accomplishments.		✓					Habitat Program Administrator GIS Staff
3.2.8: By 2010, develop an annotated bibliography of pheasant related research conducted in South Dakota. Update as necessary to include future research findings.		✓					Upland Game Mgmt. Staff
GOAL 4: The Division of Wildlife will provide the public with access to quality pheasant habitat on private and public land.							
OBJECTIVE 4.1: By 2013, increase the average number of user days hunting on private and public lands by five percent over those in 2005 (use Hunter Evaluation of the 2005 Walk-In Area Survey as a benchmark).							
Strategies							
4.1.1: Focus access efforts to maximize hunting opportunities on habitat provided by local, county, state, federal, and non-governmental programs.	✓	✓	✓	✓	✓	✓	Habitat Program Administrator Farm Bill/Access Coordinator
4.1.2: Beginning in 2009, enroll an additional 3,000 acres per year in private land access programs that provide quality pheasant hunting opportunities.	✓	✓	✓	✓	✓	✓	Farm Bill/Access Coordinator Other Department Staff
4.1.3: From 2010 to 2012, annually enroll 33,333 acres of private land into the James River Watershed CREP to provide access to quality pheasant hunting opportunities.		✓	✓	✓			Farm Bill/Access Coordinator Private Lands Biologists Other Department Staff
4.1.4: Continue to monitor and maintain habitat quality on all private lands enrolled in access programs for hunting opportunities.	✓	✓	✓	✓	✓	✓	Farm Bill/Access Coordinator Other Department Staff
4.1.4*a*: Monitor hunter perception of habitat quality using future Hunter Evaluation Surveys (such as the Hunter Evaluations of Walk-In Area Surveys).		✓		✓		✓	Farm Bill/Access Coordinator Human Dimensions Specialist
4.1.4*b*: Maintain efforts to respond to hunter complaints regarding habitat quality on specific tracts of public and private land open to public hunting.	✓	✓	✓	✓	✓	✓	Farm Bill/Access Coordinator Other Department Staff
4.1.5: Annually seek opportunities to create new programs to secure additional access that cannot be secured using existing SD GFP private lands programs.	✓	✓	✓	✓	✓	✓	Habitat Program Administrator Farm Bill/Access Coordinator
4.1.6: Continue to assist SD SPL with posting of boundaries and access trails for public hunting opportunities.	✓	✓	✓	✓	✓	✓	Farm Bill/Access Coordinator Regional Habitat Managers
GOAL 5: The Division of Wildlife will inform and educate the public on pheasant ecology, management, and research.							
OBJECTIVE 5.1: The Division of Wildlife will continue to promote public, landowner, and conservation agency awareness of pheasant and habitat management and issues of highest conservation concern through 2014.							

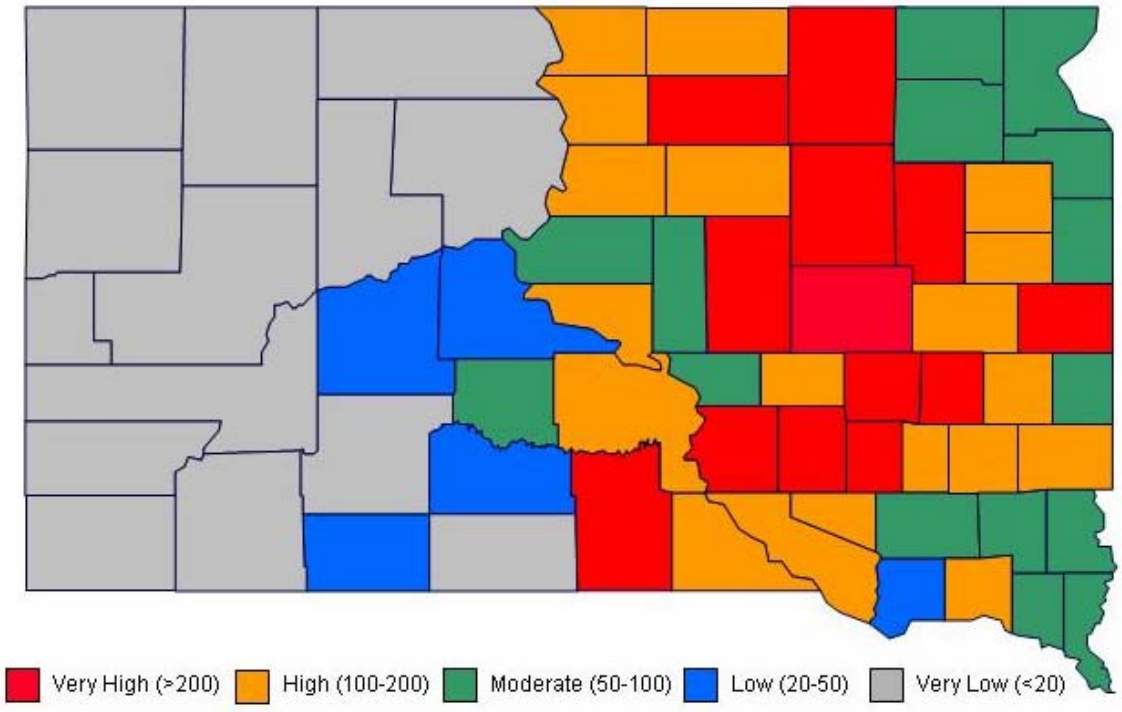
Goals, Objectives& Strategies	2009	2010	2011	2012	2013	2014	Primary Responsibility
Strategies							
5.1.1: By the end of 2009, provide paper and electronic copies of the *"Ring-necked Pheasant Management Plan for South Dakota (2009-2014)"* to all conservation partners, the public, private landowners, and all communities and businesses that benefit from pheasants, pheasant hunting, and related activities.	✓	✓	✓	✓	✓	✓	Wildlife Program Administrator Senior Upland Game Biologist Other Department Staff
5.1.2*:* By 2010, develop and distribute detailed information to improve public knowledge of pheasant biology, including habitat requirements and population dynamics. When and where appropriate, such information should also include facts regarding the limitations of some SD landscapes in supporting large numbers of pheasants (e.g. parts of western SD).		✓					Wildlife Program Administrator Senior Upland Game Biologist Private Lands Biologists Other Department Staff
5.1.3: Provide articles for inclusion in the SD GFP Landowners Matter newsletter regarding pheasant habitat and available habitat development options.	✓	✓	✓	✓	✓	✓	Private Lands Biologists Senior Upland Game Biologist
5.1.4: By 2010, include a one page section in the SD Conservation Digest titled "Habitat Notes".	✓	✓	✓	✓	✓	✓	Private Lands Biologists Communications Staff
5.1.5*:* Annually provide updated information for the landowner contact packets which are distributed by department staff.	✓	✓	✓	✓	✓	✓	Private Lands Biologists Farm Bill/Access Coordinator
5.1.6: By 2010, write and distribute an informational guide for the public and private landowners emphasizing South Dakota-specific pheasant habitat requirements, management options, and greatest risks to pheasant populations.		✓					Senior Upland Game Biologist Private Lands Biologists Regional Habitat Managers Other Department Staff
5.1.7: Annually review the need to develop and distribute clear and concise information related to federal farm programs and other habitat programs through multiple delivery methods described above.	✓	✓	✓	✓	✓	✓	Private Lands Biologists Farm Bill/Access Coordinator Senior Upland Game Biologist Communications Staff
5.1.8: Annually review the need to provide training workshops for department staff (e.g. new staff, new and updated programs) related to habitat programs, pheasant habitat requirements and habitat management.	✓	✓	✓	✓	✓	✓	Private Lands Biologists Farm Bill/Access Coordinator Senior Upland Game Biologist
5.1.9: Working with other conservation partners, annually review the need to provide landowner/habitat workshops to inform and promote technical and financial assistance available to landowners in developing and managing wildlife habitat.	✓	✓	✓	✓	✓	✓	Private Lands Biologists Farm Bill/Access Coordinator Other Department Staff
5.1.10: By 2010, provide to the public all published research and other information related to pheasants and their habitats in an electronic format on the SD GFP website.		✓					Senior Upland Game Biologist Communications Staff
5.1.11: By 2010, identify habitat improvement and management demonstration areas on private land and GPAs.		✓					Habitat Program Administrator Regional Habitat Managers

Goals, Objectives& Strategies	2009	2010	2011	2012	2013	2014	Primary Responsibility
5.1.12: By 2010, work with conservation partners (e.g. Pheasants Forever) to deliver an annual, 2-day habitat conference at rotating locations across the state to deliver professional presentations to wildlife professionals, the public, and private landowners related to wildlife habitat development and management.		✓	✓	✓	✓	✓	Private Lands Biologists Farm Bill/Access Coordinator Senior Upland Game Biologist Other Department Staff
5.1.13: Annually determine the economic and recreational value of pheasants and pheasant hunting to justify staff time and expenditures in meeting the goals of all pheasant management activities.	✓	✓	✓	✓	✓	✓	Wildlife Program Administrator Senior Upland Game Biologist
5.1.14: Continue to regularly recognize the role private landowners have in wildlife habitat management.	✓	✓	✓	✓	✓	✓	Department Staff

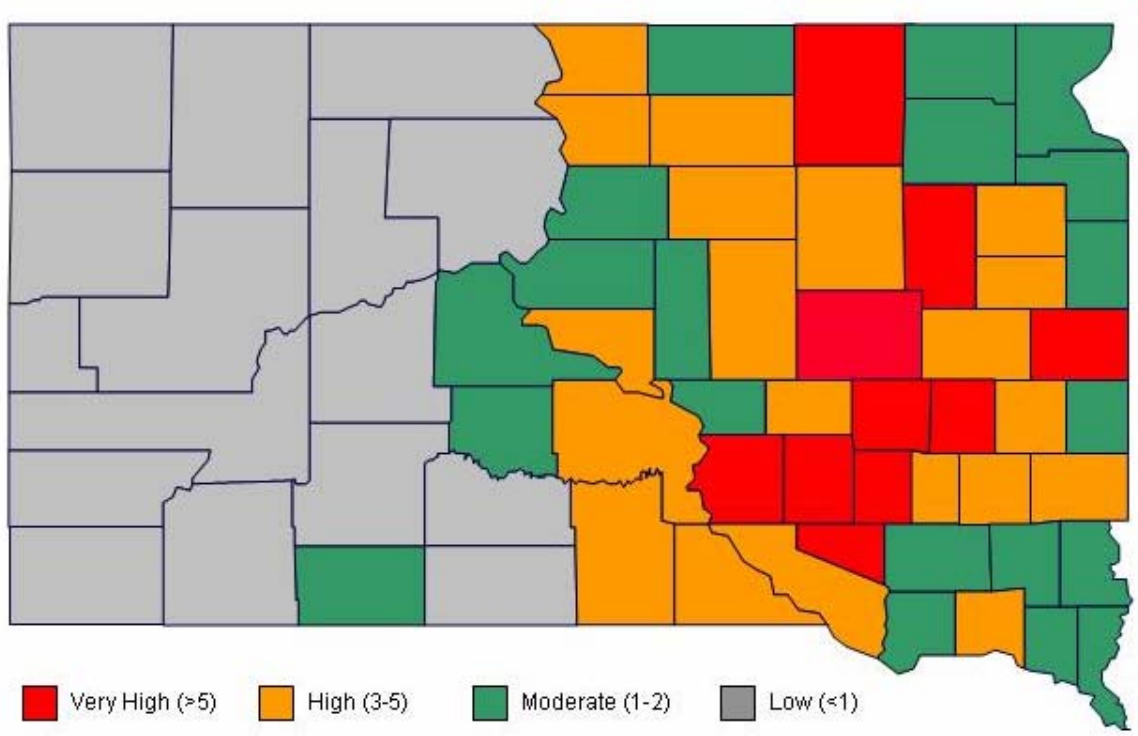
Appendix Figure 1. Pheasant brood survey routes.



Appendix Figure 2. Average pheasant density (miles^2) estimates during past 10 years, 1999-2008.

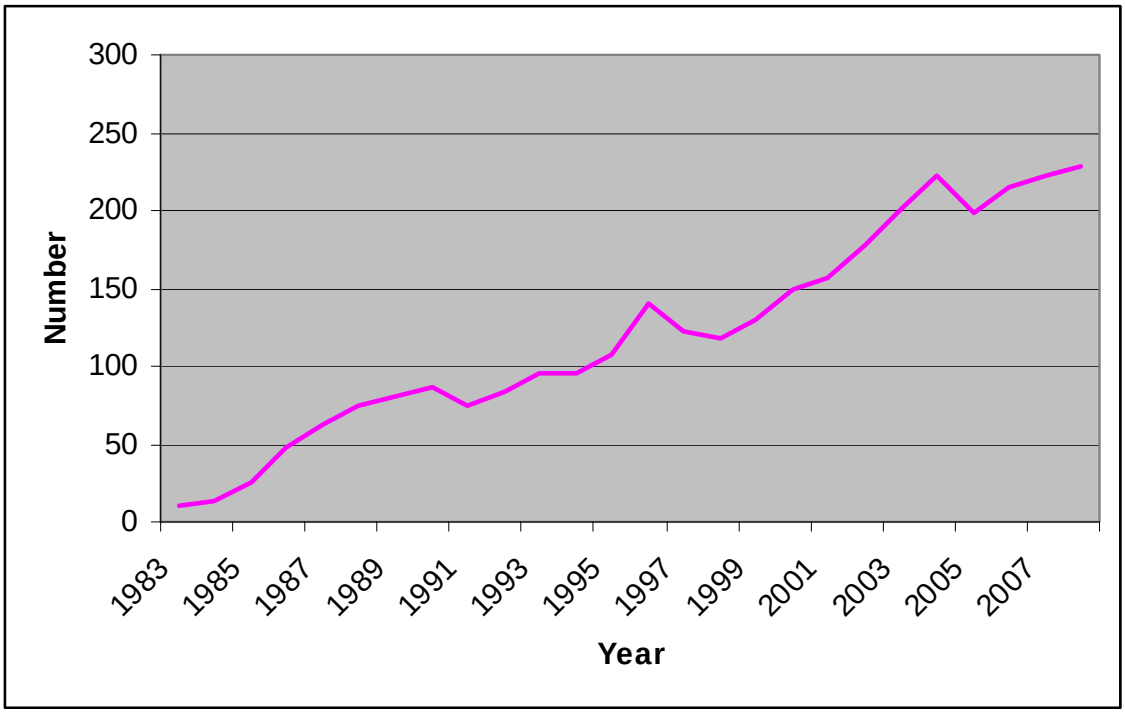


Appendix Figure 3. Average hunter density (miles^2) estimates during past 10 years, 1999-2008.

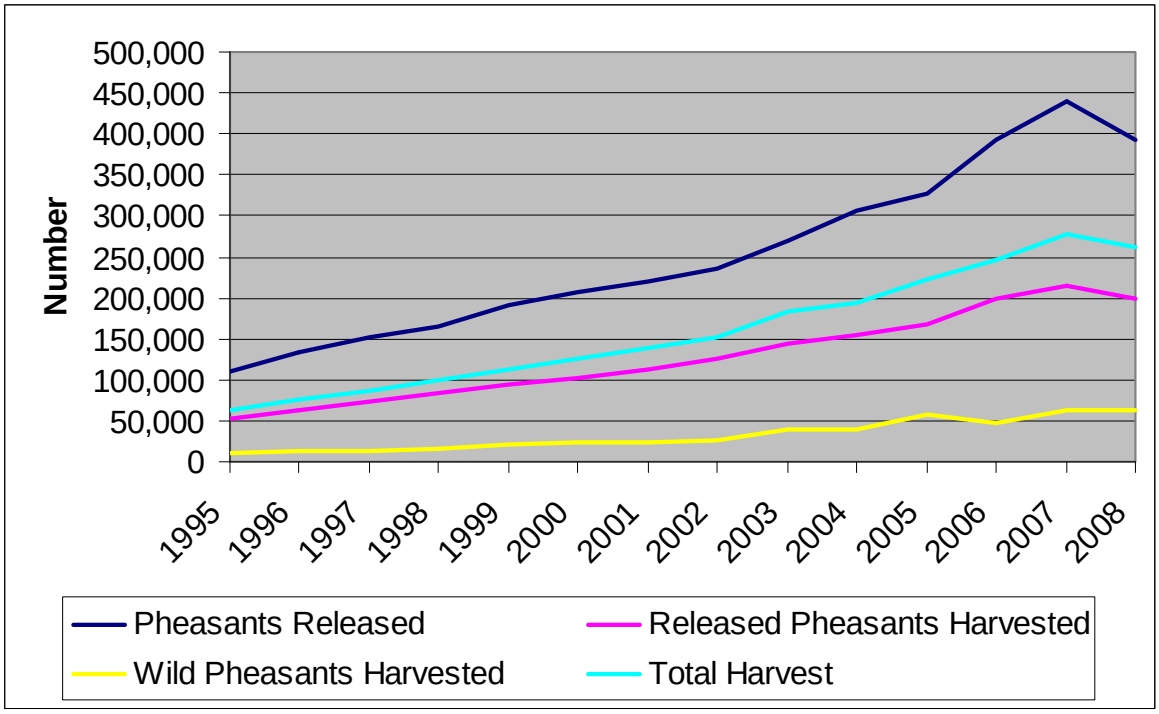


Appendix Figure 4. Resident and non-resident hunter satisfaction during past 10 years, 1999-2008.

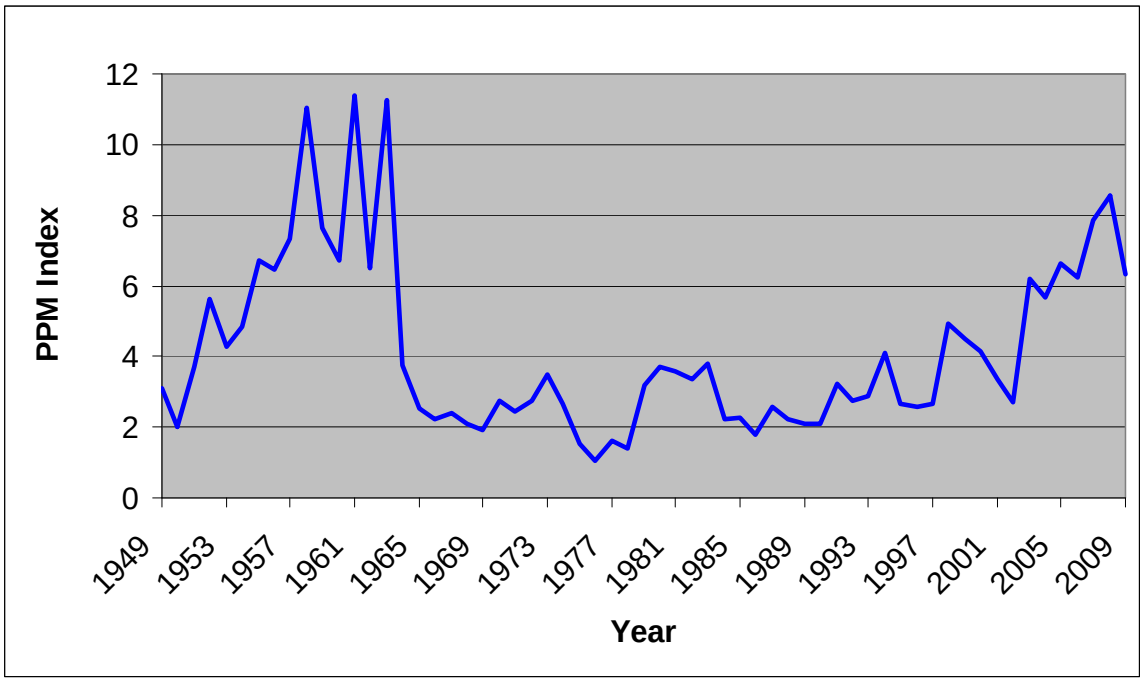
Appendix Figure 5. Number of licensed shooting preserves, 1983-2008.



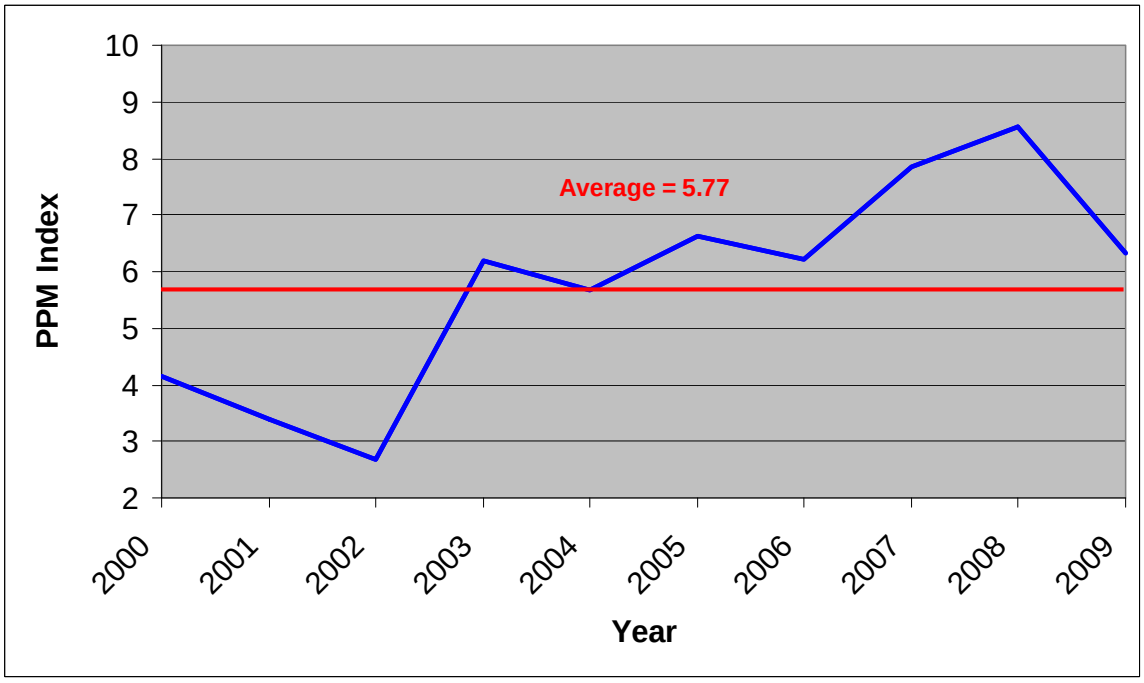
Appendix Figure 6. License shooting preserves release and harvest records, 1995-2008.



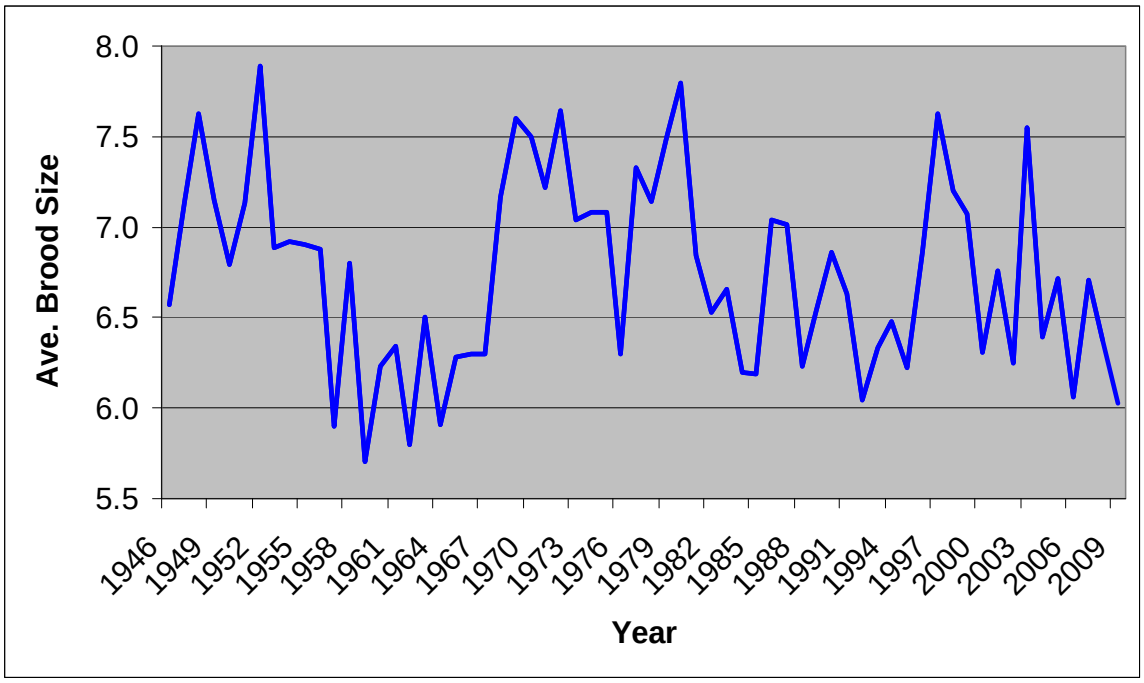
Appendix Figure 7. Statewide pheasants per mile index, 1949-2009.



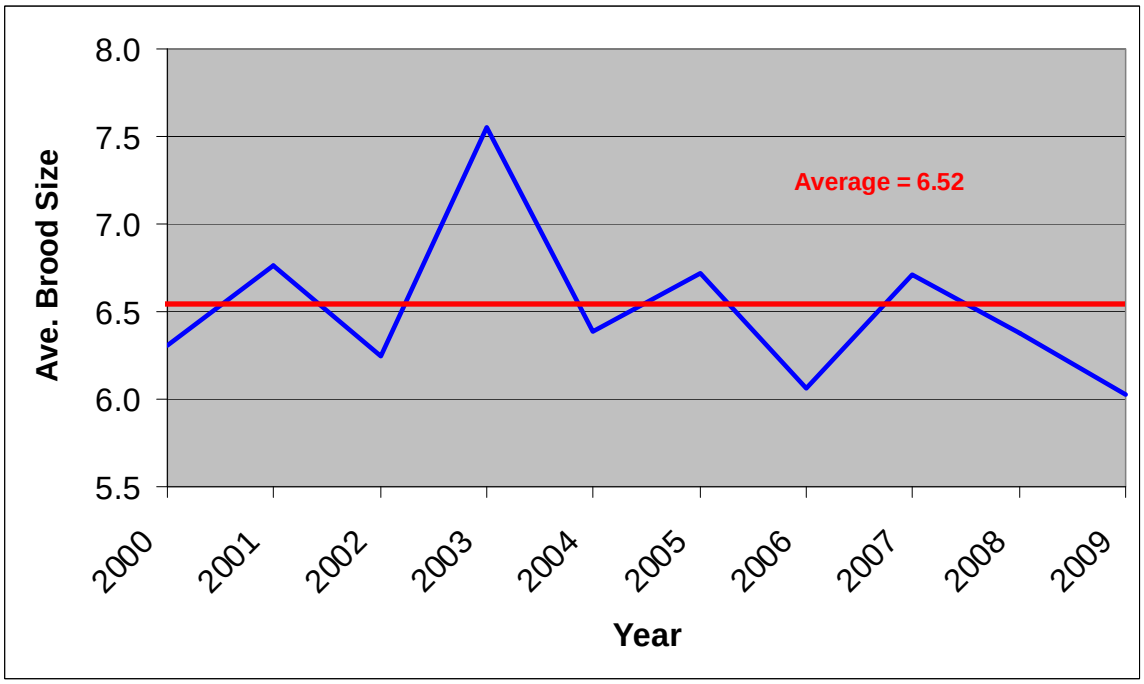
Appendix Figure 8. Statewide pheasants per mile index during past 10 years, 2000-2009.



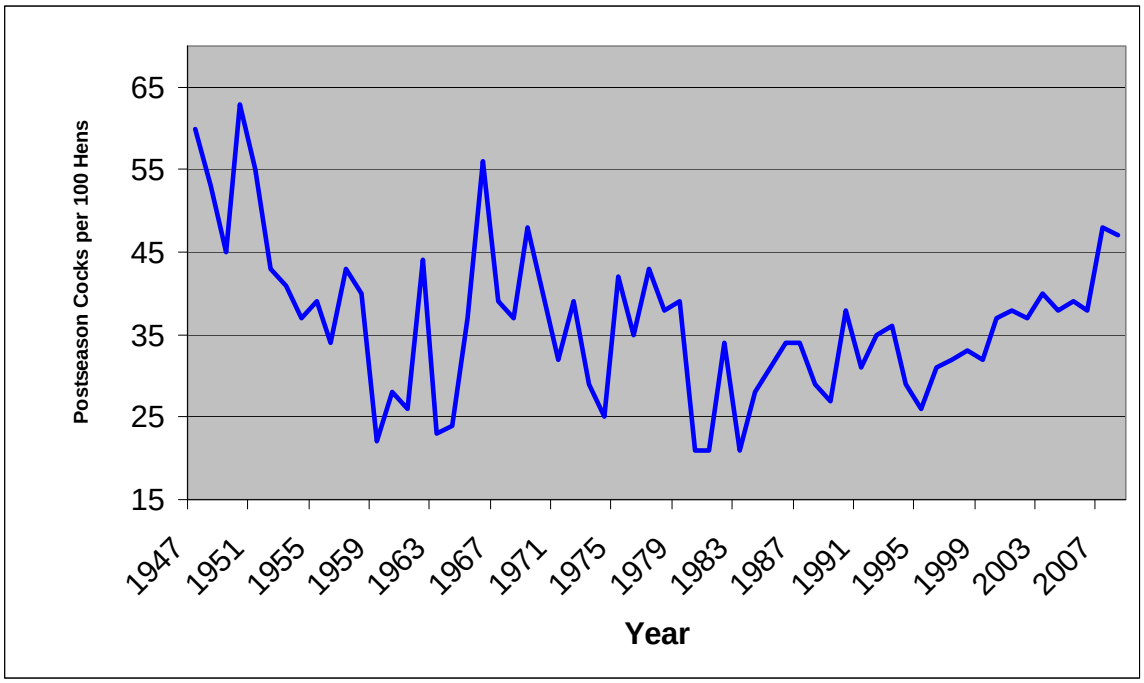
Appendix Figure 9. Statewide average brood size, 1946-2009.



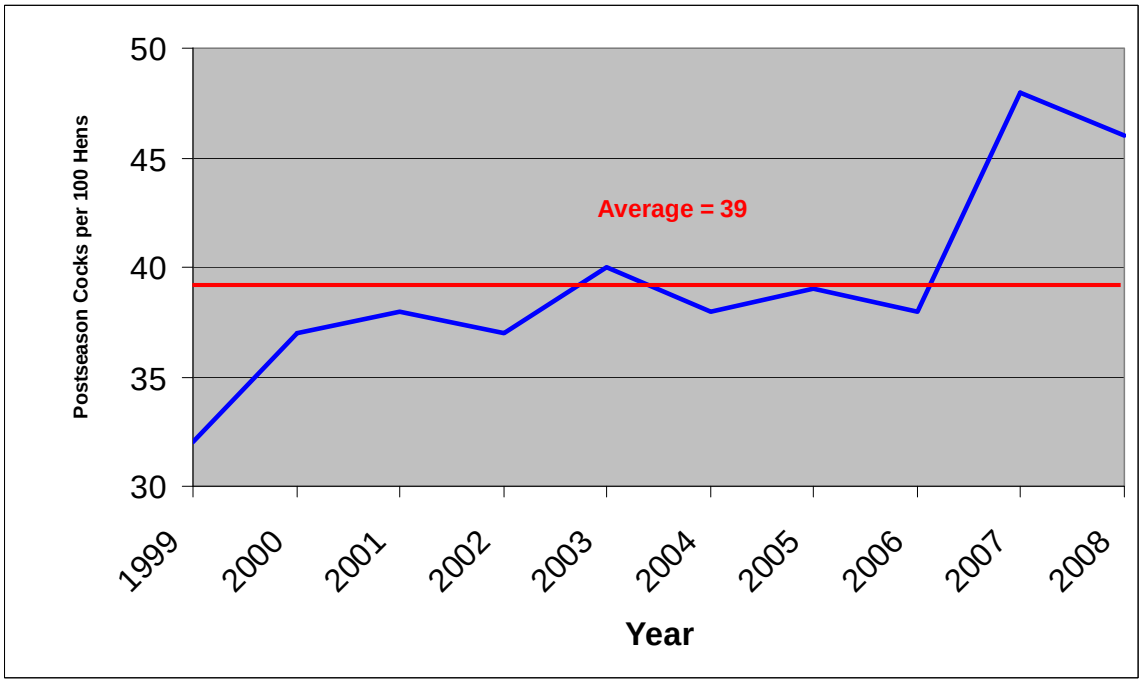
Appendix Figure 10. Statewide average brood size during past 10 years, 2000-2009.



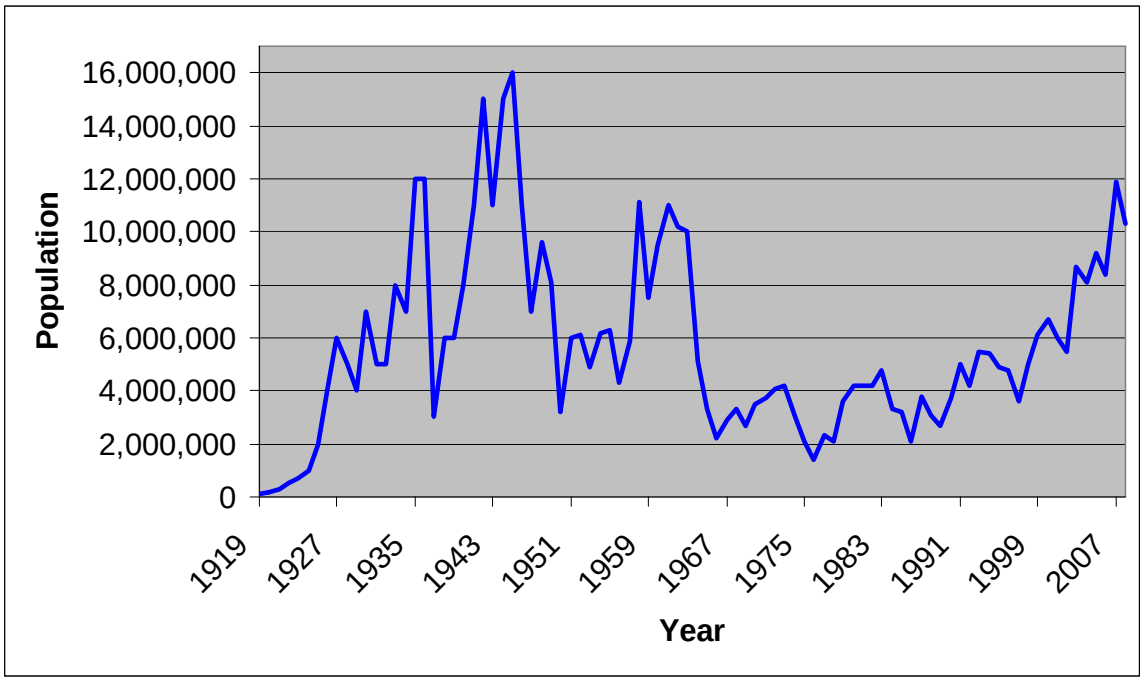
Appendix Figure 11. Statewide winter sex ratio, 1947-2008.



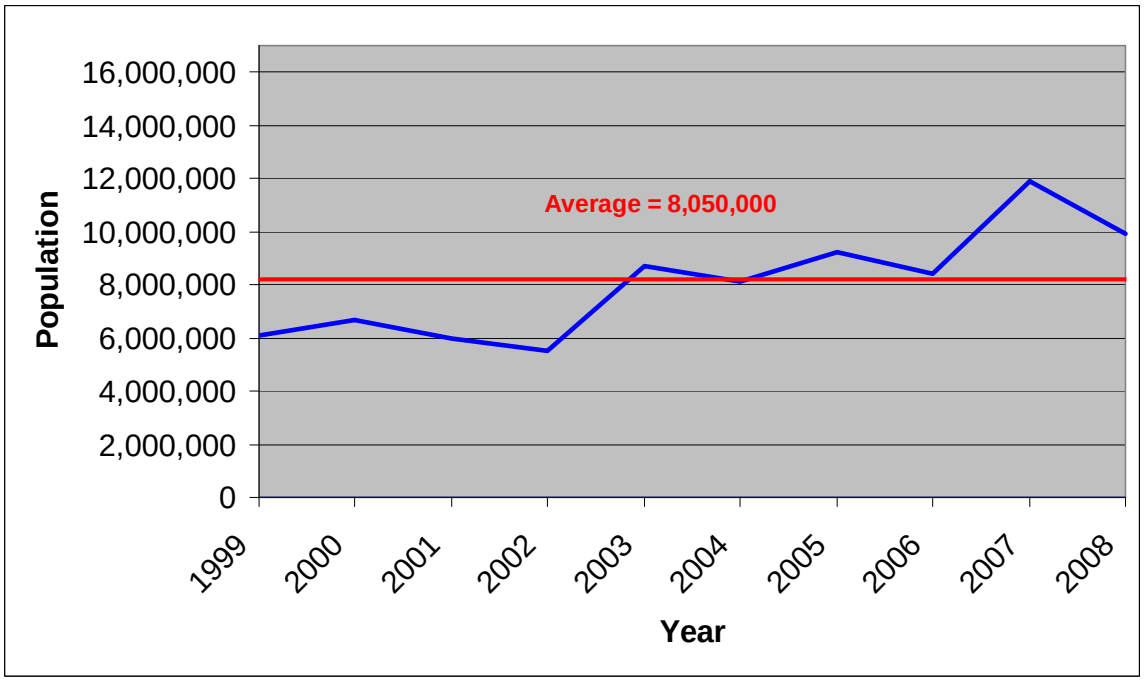
Appendix Figure 12. Average statewide winter sex ratio during past 10 years, 1999-2008.



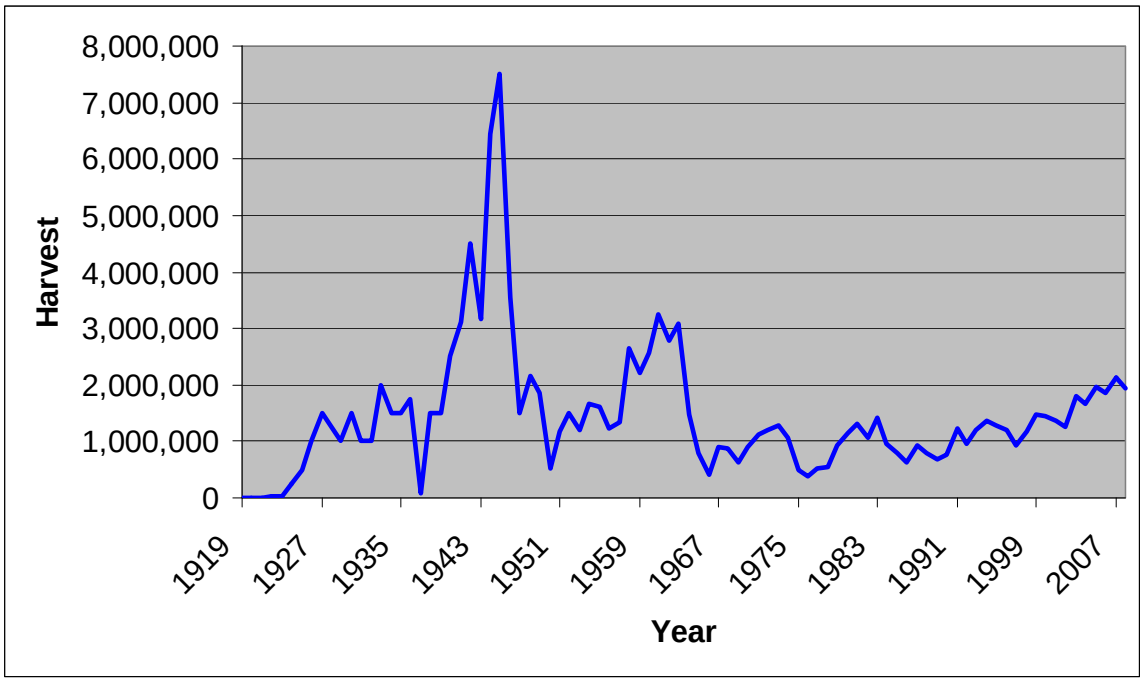
Appendix Figure 13. Pre-season pheasant population, 1919-2008.



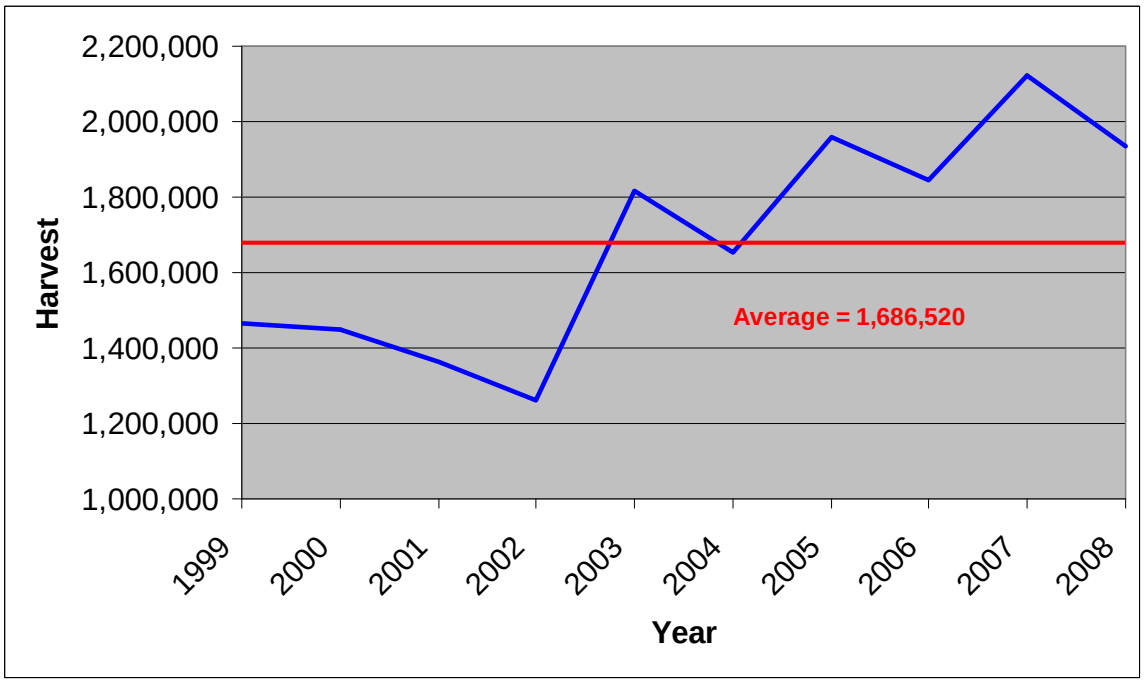
Appendix Figure 14. Pre-season pheasant population during past 10 years, 1999-2008.



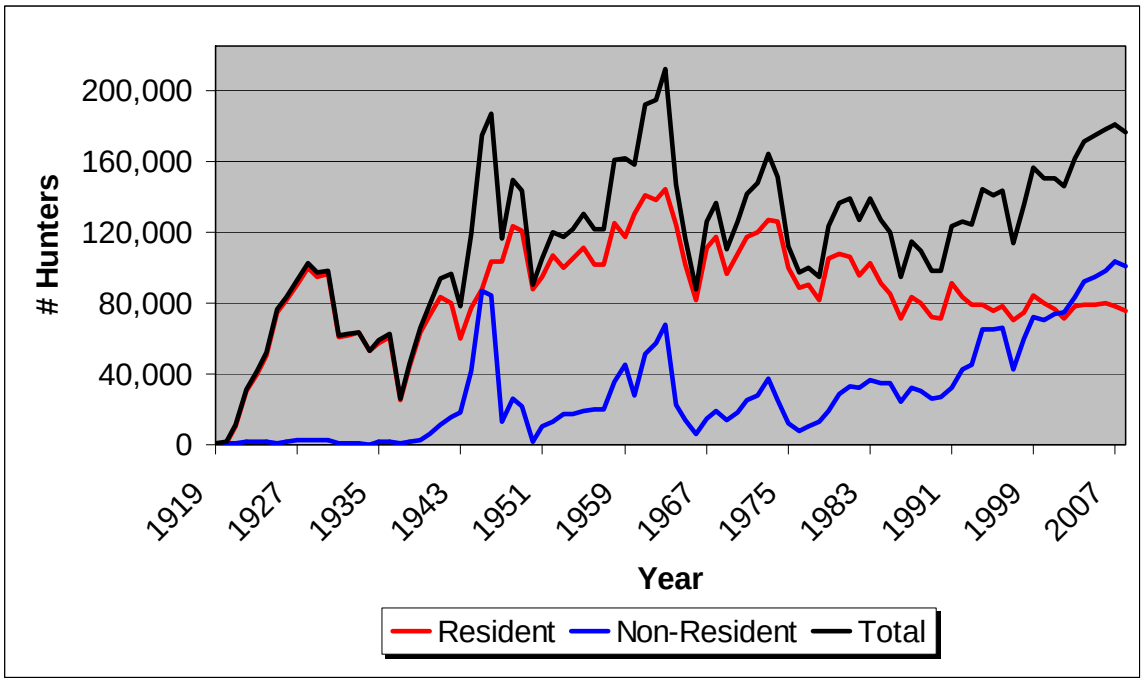
Appendix Figure 15. Pheasant harvest, 1919-2008.



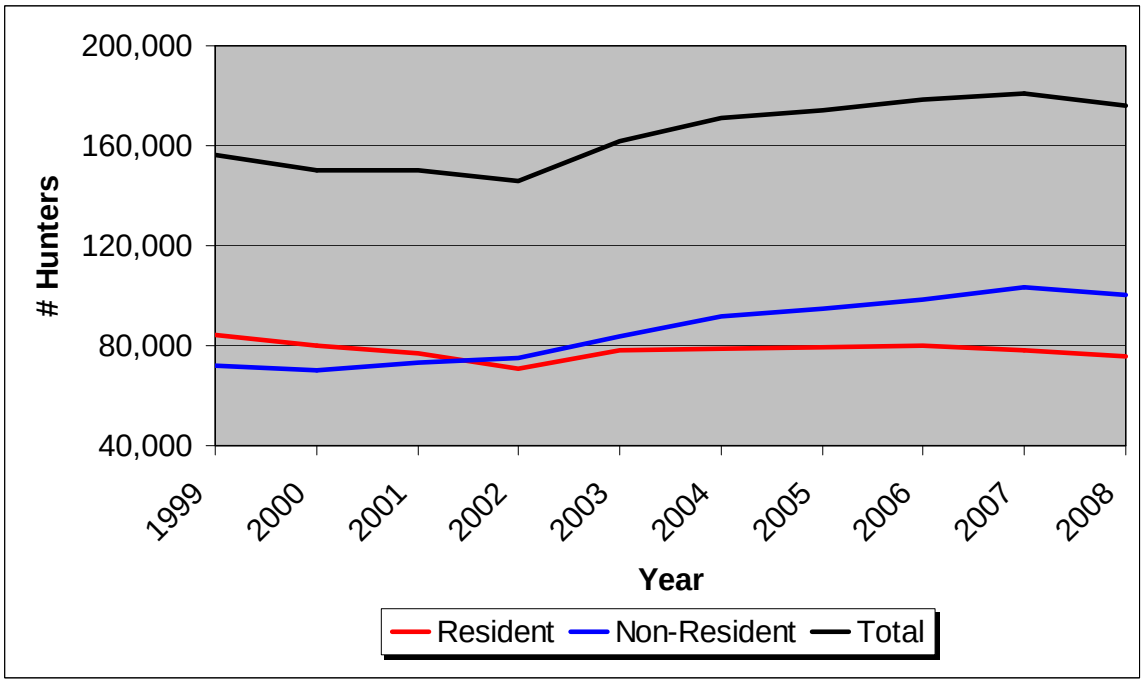
Appendix Figure 16. Pheasant harvest during past 10 years, 1999-2008.



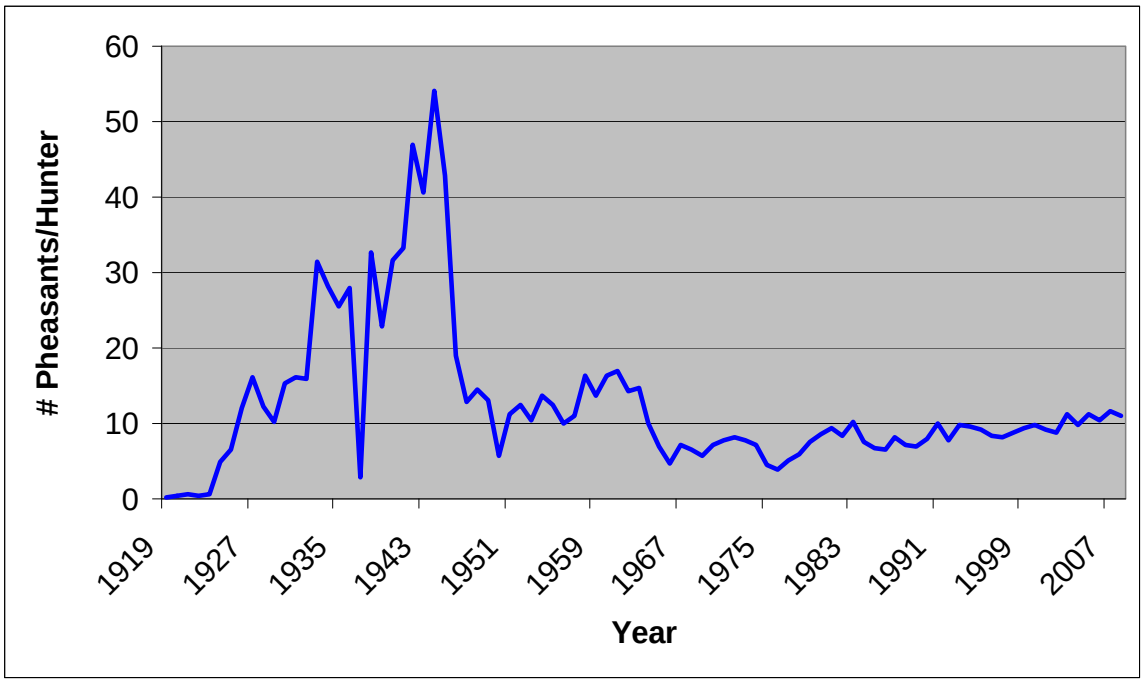
Appendix Figure 17. Resident and non-resident pheasant hunters, 1919-2008.



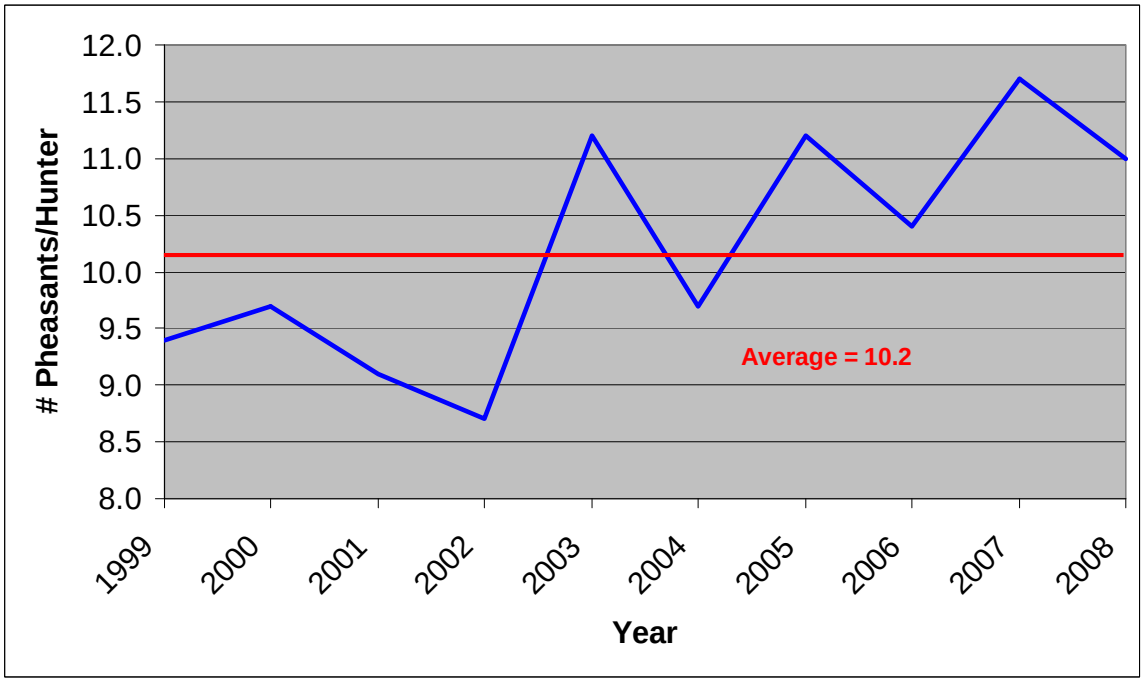
Appendix Figure 18. Resident and non-resident pheasant hunters during past 10 years, 1999-2008.



Appendix Figure 19. Pheasant harvest per hunter, 1919-2008.

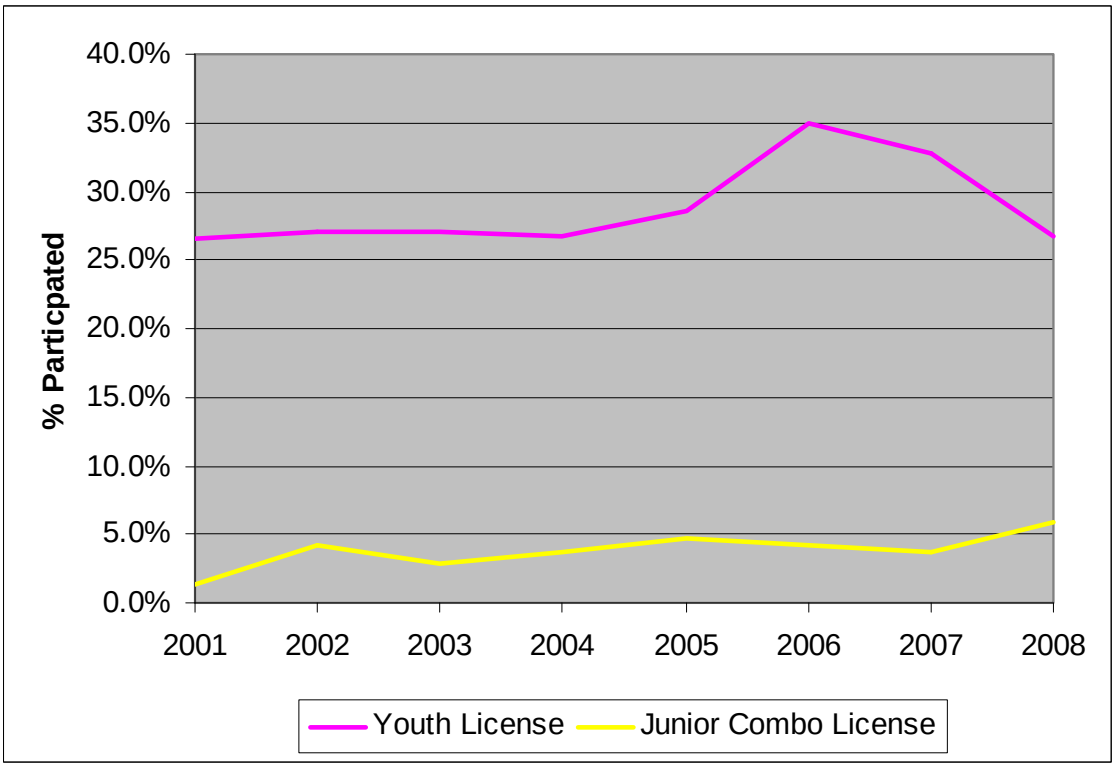


Appendix Figure 20. Pheasant harvest per hunter during past 10 years, 1999-2008.

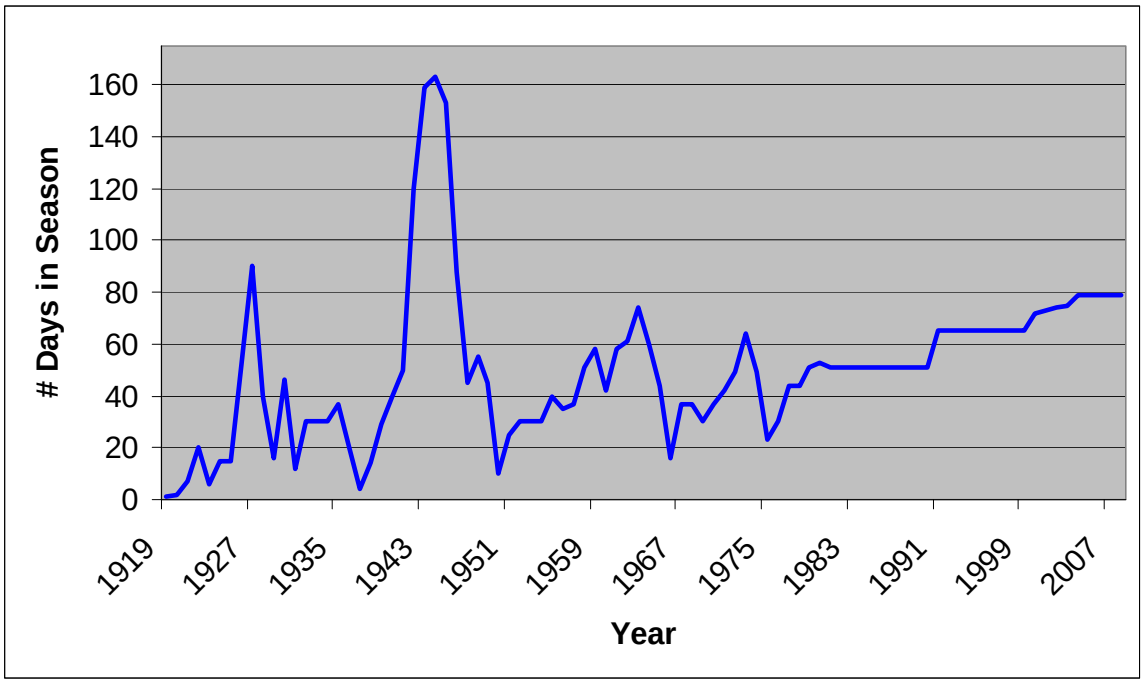


Appendix Figure 21. Resident hunters, pheasants harvested and average bag during the resident-only pheasant season (2001-2008).

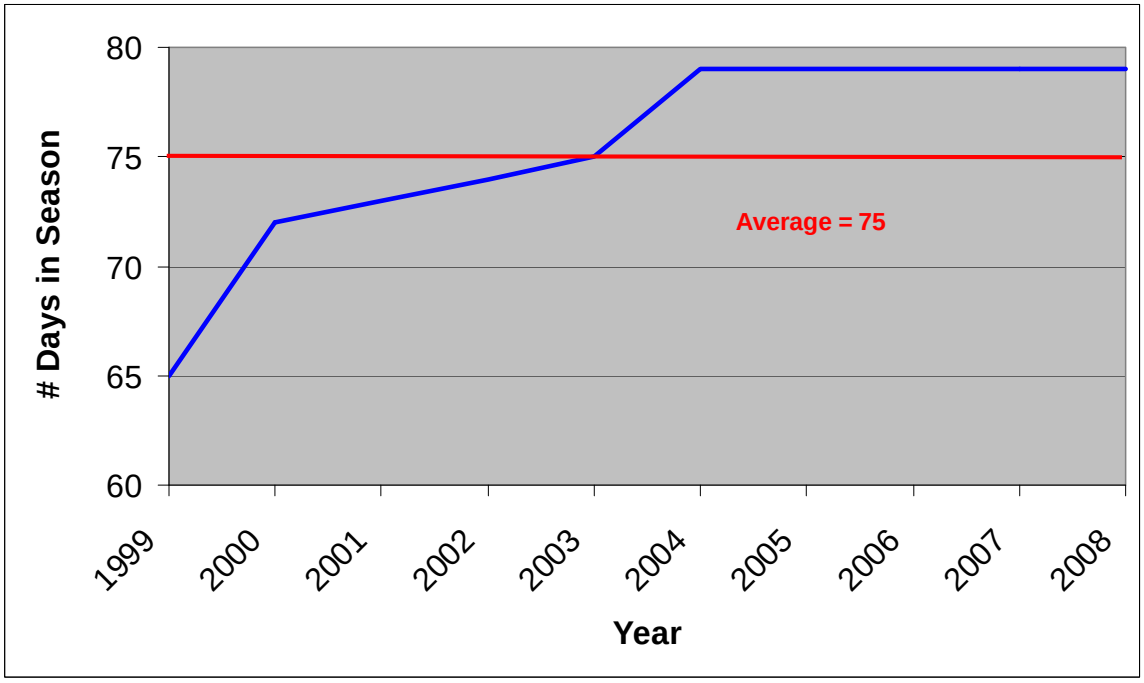
Appendix Figure 22. Percentage of youth license and junior combination license holders that participated in the youth pheasant season (2001-2008).



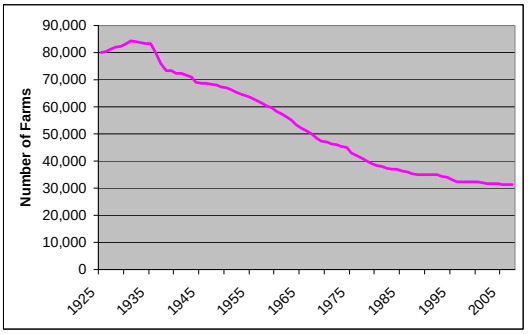
Appendix Figure 23. Number of days in hunting season, 1919-2008.



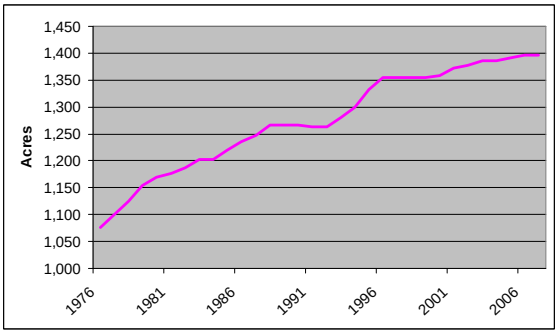
Appendix Figure 24. Number of days in hunting season during past 10 years, 1999-2008.



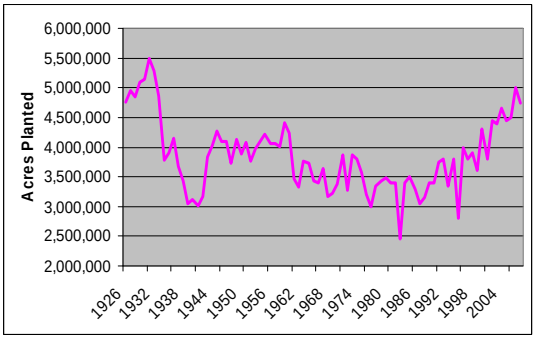
Appendix Figure 25. Number of farms in SD, 1925-2007.



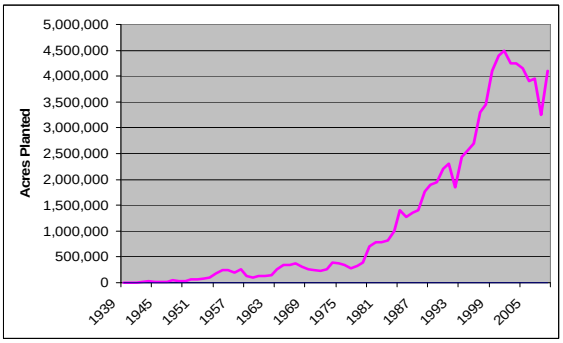
Appendix Figure 26. Average farm size in SD, 1976-2007.



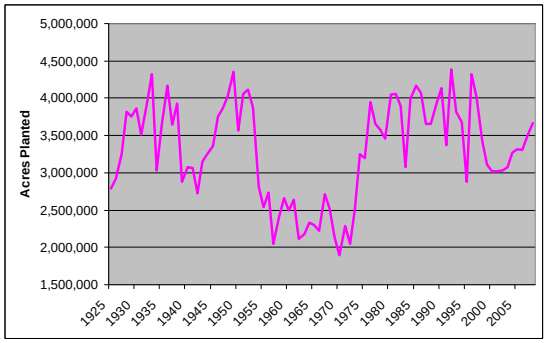
Appendix Figure 27. Corn planted in SD, 1926-2008.



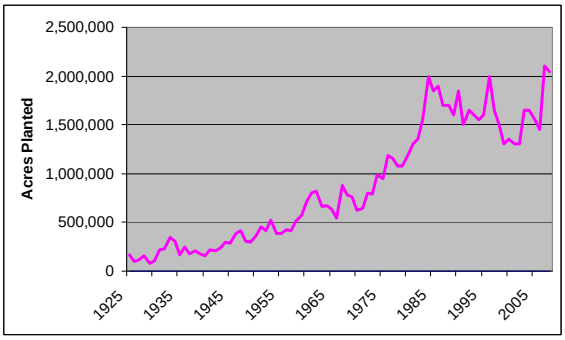
Appendix Figure 28. Soybeans planted in SD, 1939-2008.



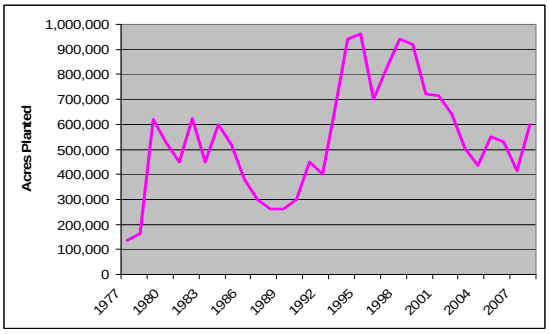
Appendix Figure 29. All wheat planted in SD, 1925-2008.



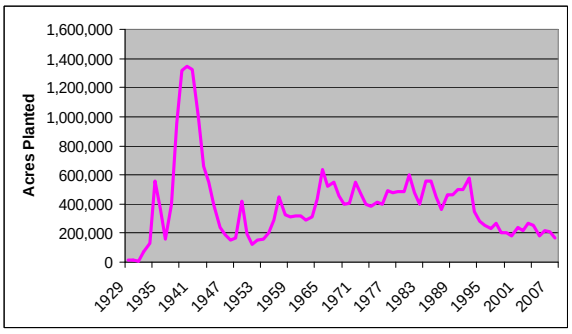
Appendix Figure 30. Winter wheat planted in SD, 1925-2008.



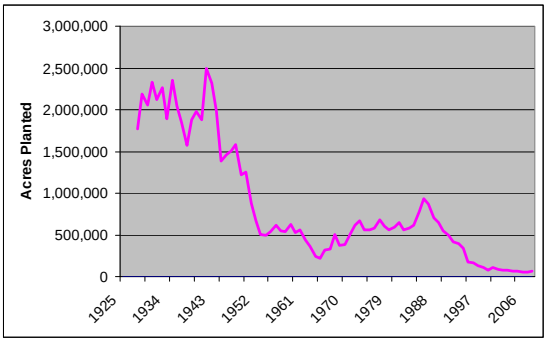
Appendix Figure 31. Sunflowers planted in 1977- SD, 2008.



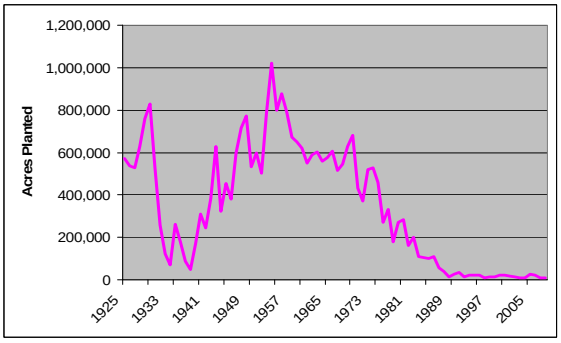
Appendix Figure 32. Grain sorghum planted in SD, 1929-2008.



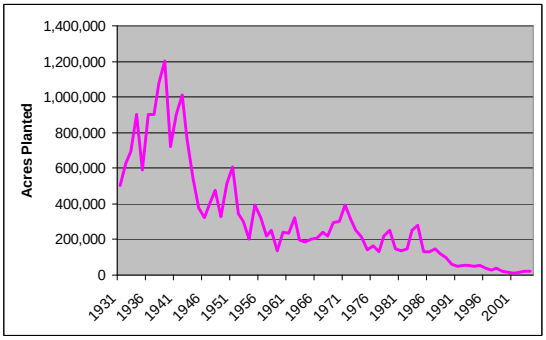
Appendix Figure 33. Barley planted in SD, 1928-2008.



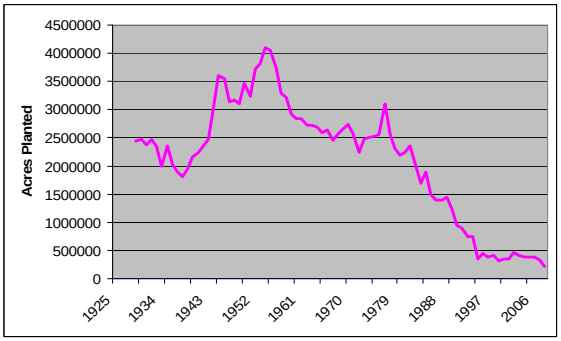
Appendix Figure 34. Flaxseed planted in SD, 1925-2008.



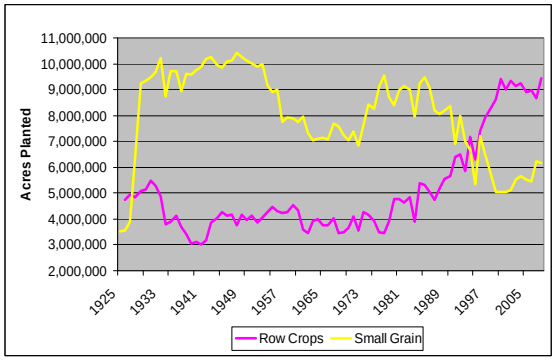
Appendix Figure 35. Rye planted in SD, 1931-2004.



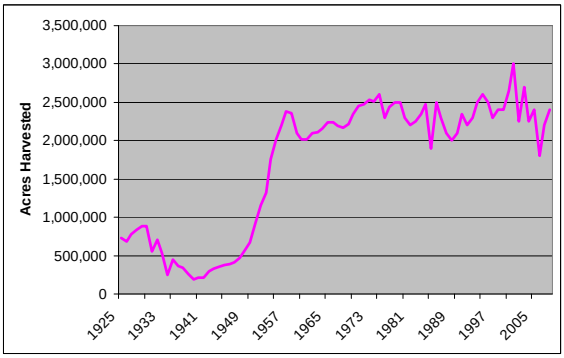
Appendix Figure 36. Oats planted in SD, 1925-2008.



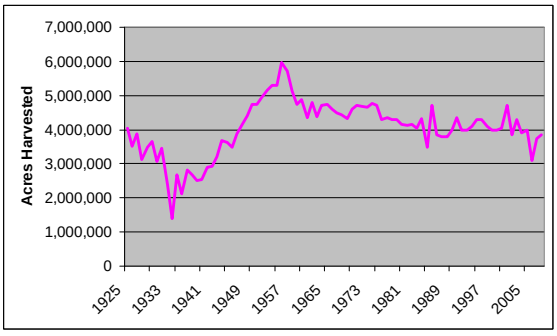
Appendix Figure 37. Comparison of planted row crops and small grains in SD, 1925-2008.



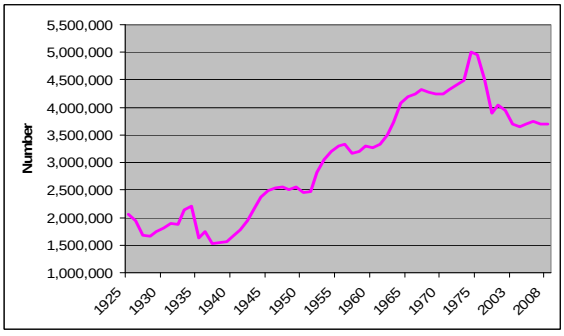
Appendix Figure38. Alfalfa harvest in SD, 1925-2008.



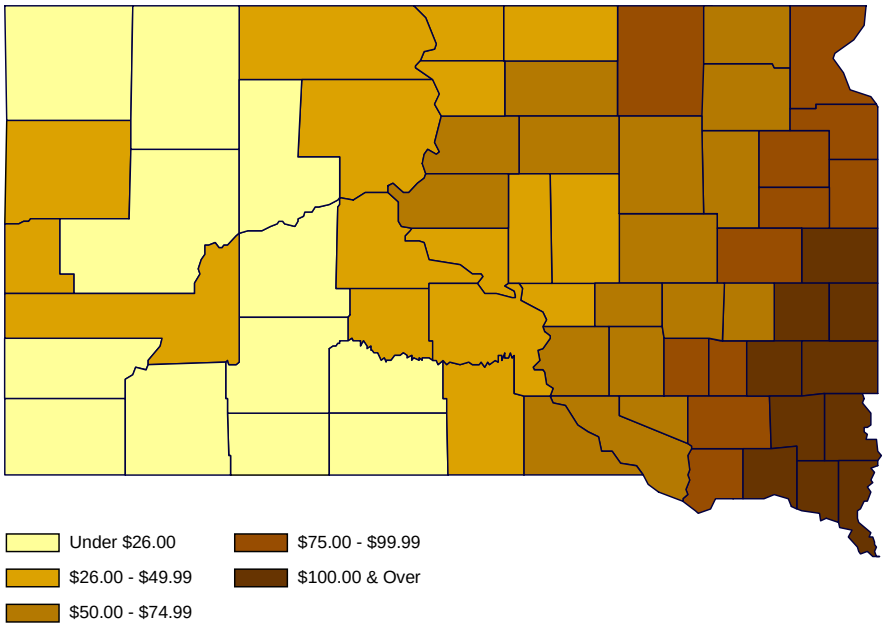
Appendix Figure 39. All hay harvest in SD, 1925-2008.



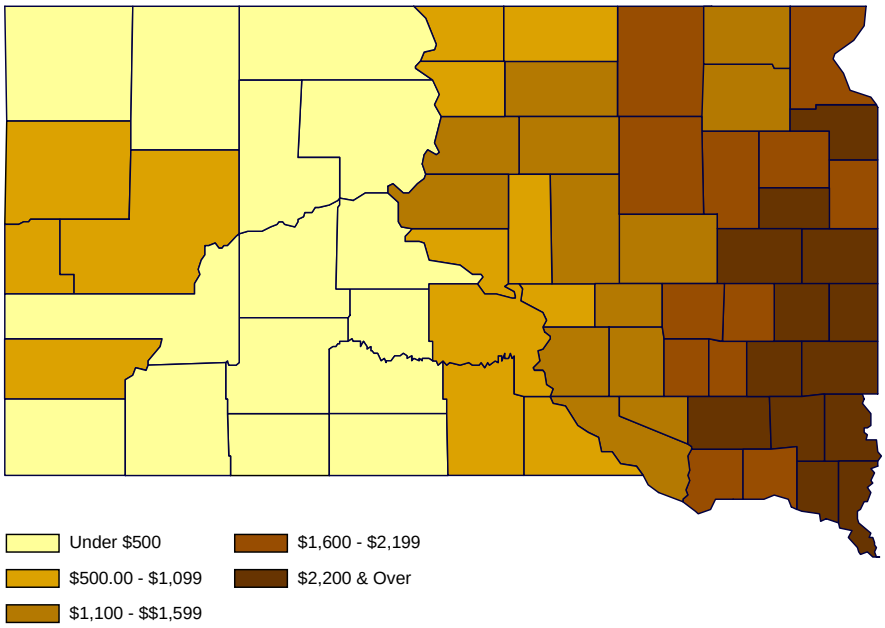
Appendix Figure 40. All cattle in SD, 1925-2008.



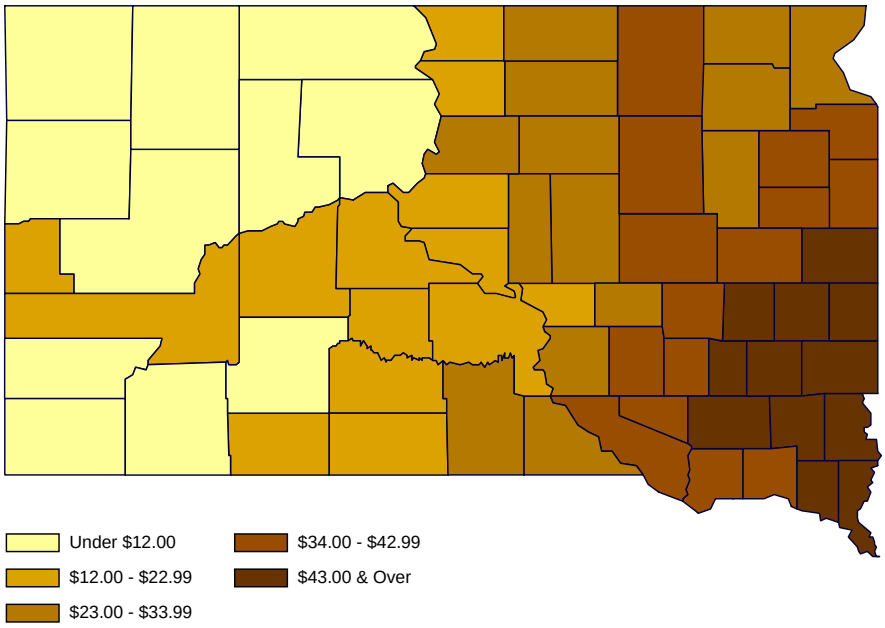
Appendix Figure 41. 2008 average cropland rent (dollars per acre).



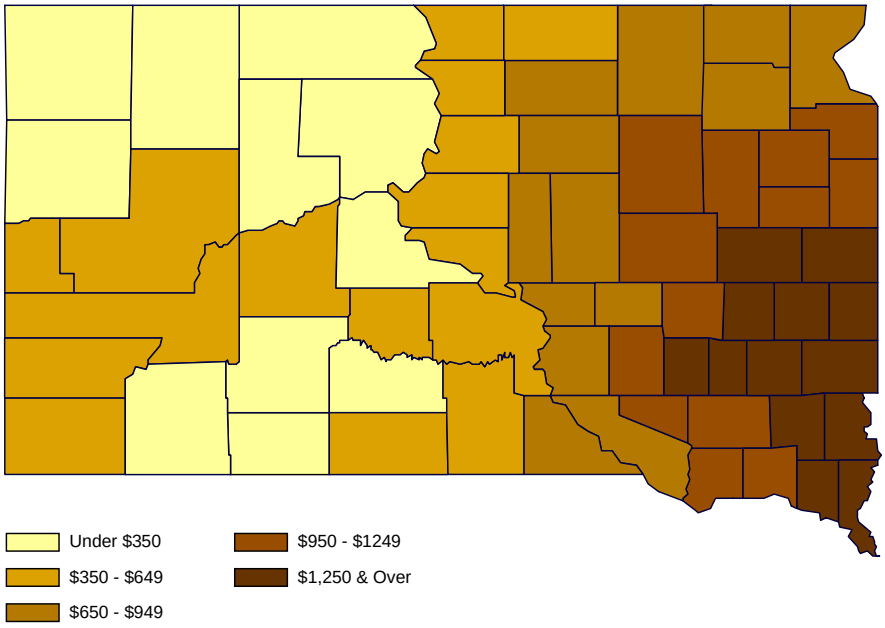
Appendix Figure 42. 2008 average cropland value (dollars per acre).



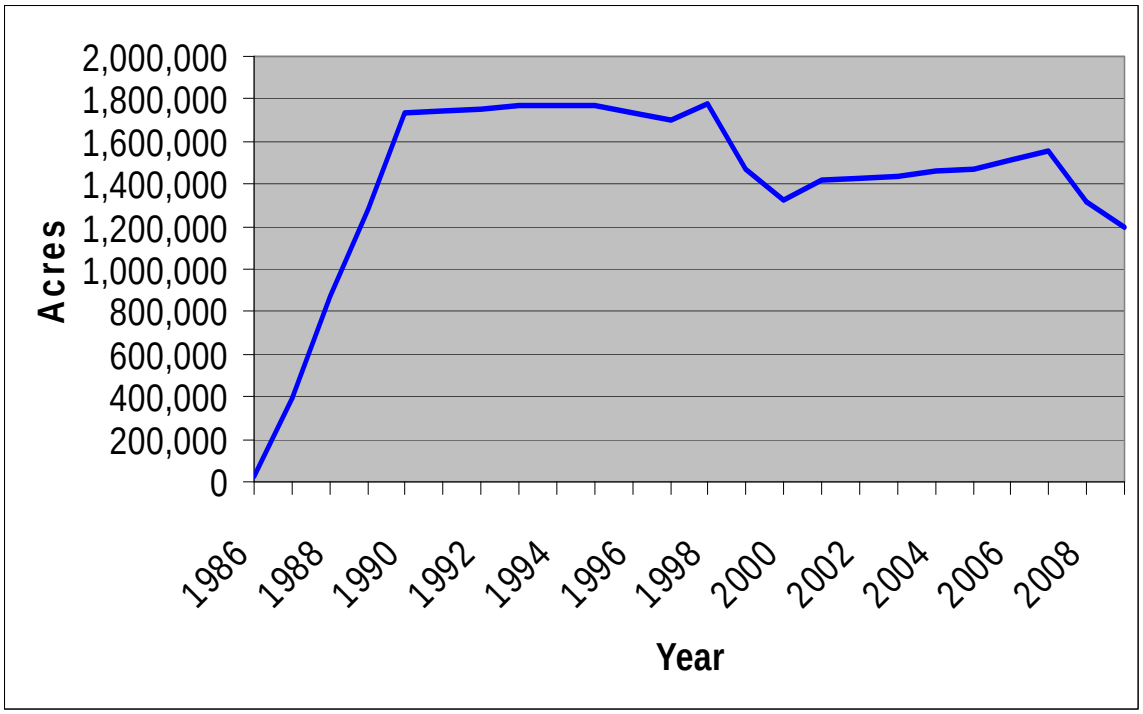
Appendix Figure 43. 2008 average pastureland rent (dollars per acre).



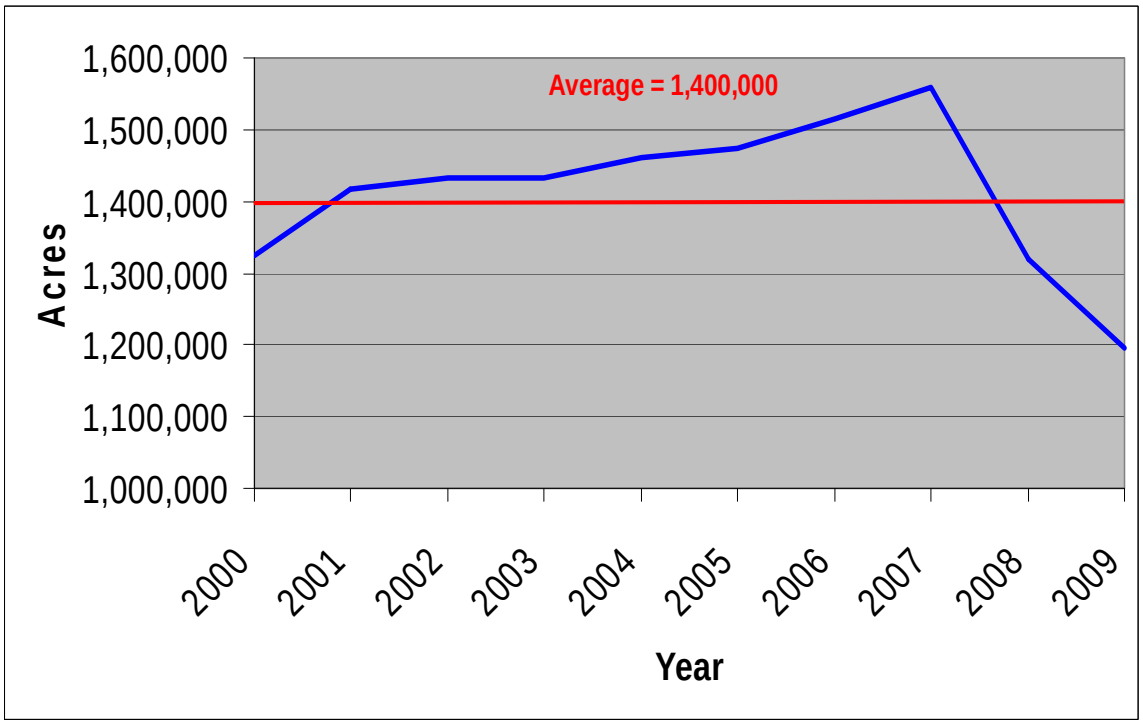
Appendix Figure 44. 2008 average pastureland value (dollars per acre).



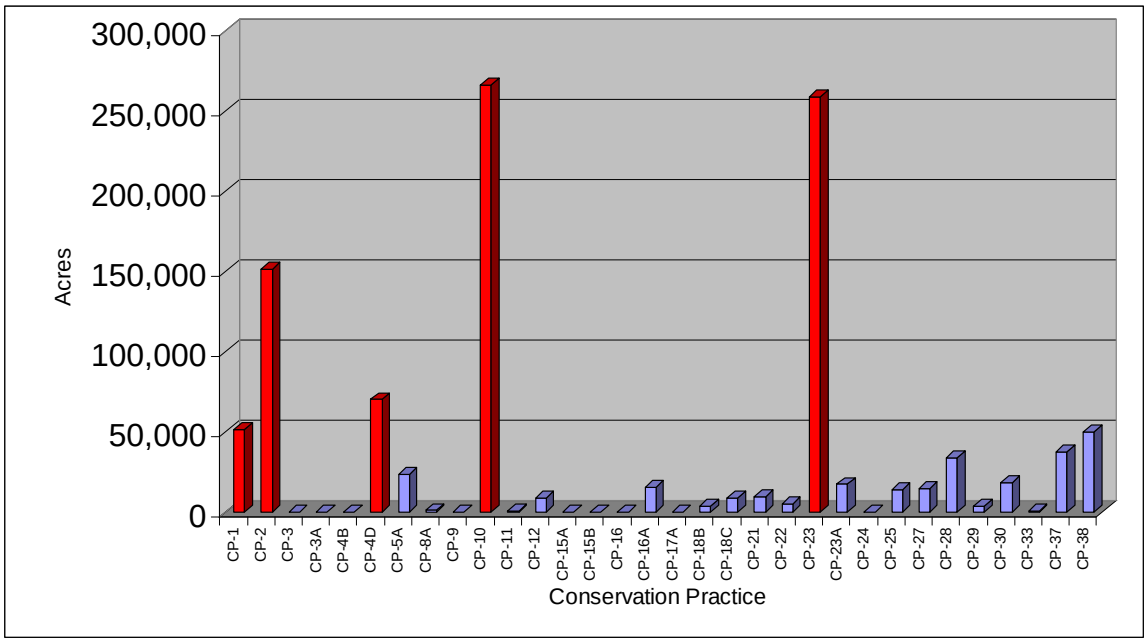
Appendix Figure 45. South Dakota CRP enrollment, 1986-2009.



Appendix Figure 46. South Dakota CRP enrollment during past 10 years, 2000-2009.

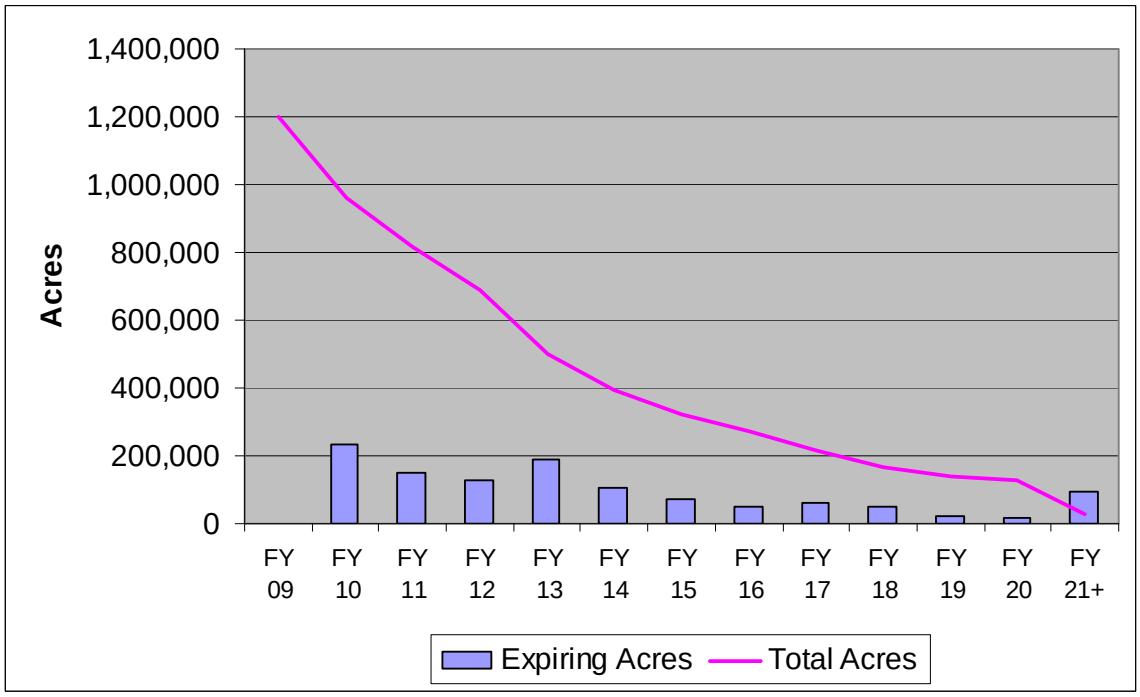


Appendix Figure 47. South Dakota CRP acres by conservation practice type as of October 31, 2009[1].

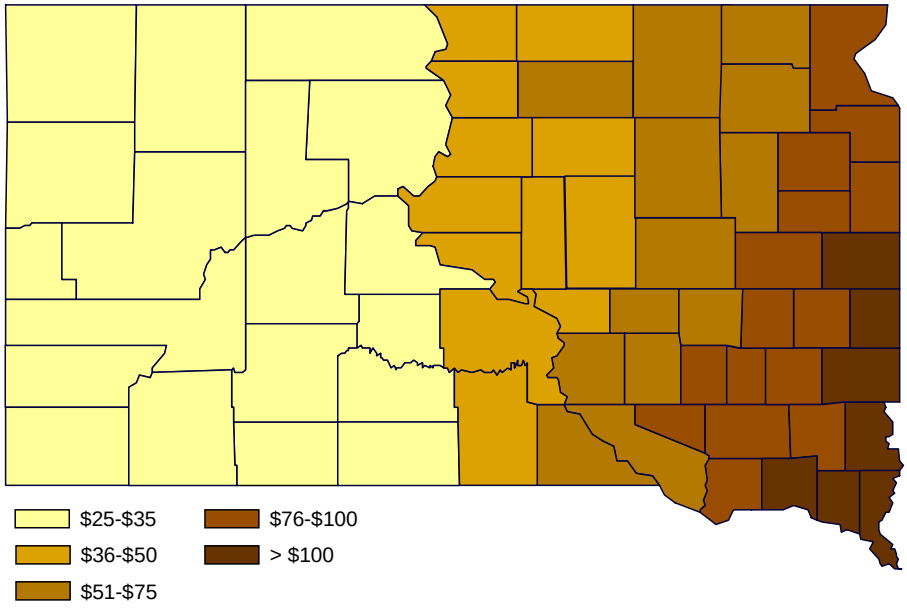


[1]Conservation practices shaded in red are generally associated with general CRP sign-ups; conservation practices shaded in blue are generally associated with continuous CRP sign-ups.

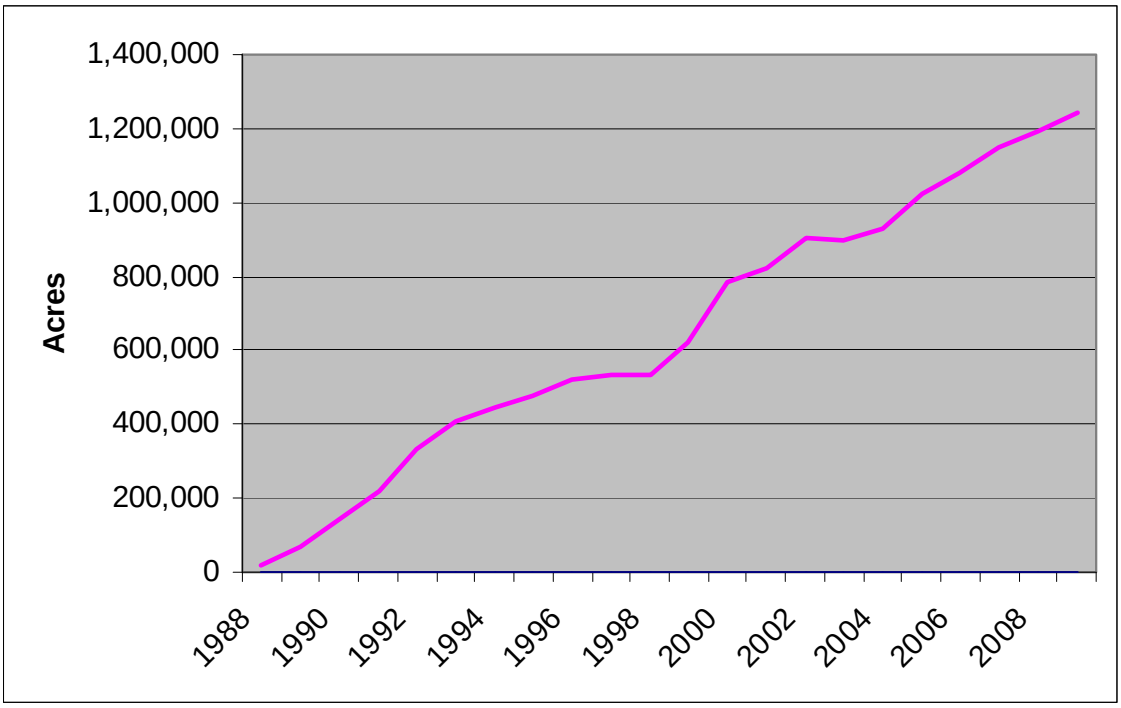
Appendix Figure 48. Future enrollment and expiration of CRP acres in South Dakota.



Appendix Figure 49. 2009 CRP county average soil rental rates (dollars per acre).



Appendix 50. Walk-In Area enrollment, 1988-2009.



Appendix Figure 51. South Dakota pheasant economics during past 10 years, 1999-2008.