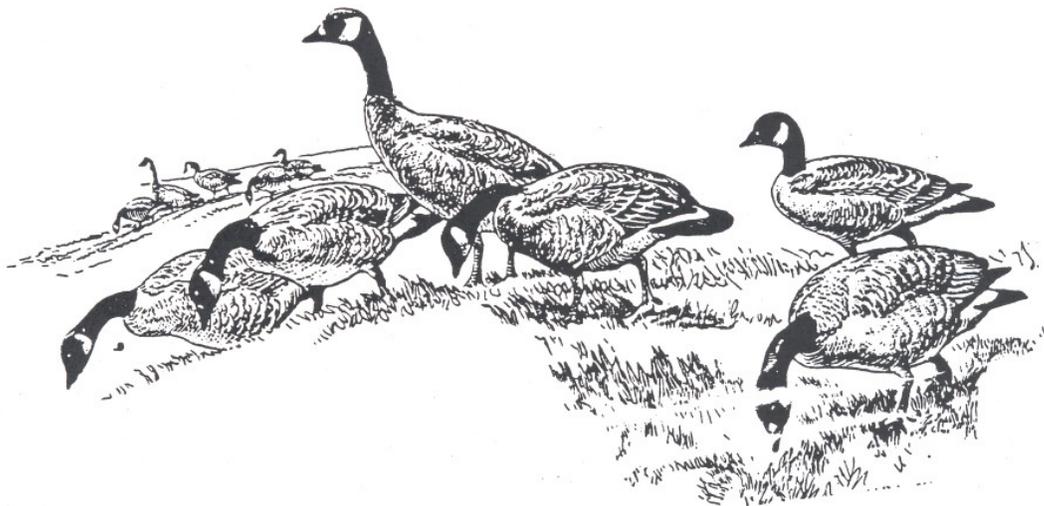


SOUTH DAKOTA GIANT CANADA GOOSE MANAGEMENT PLAN 2016-2020



**SOUTH DAKOTA DEPARTMENT OF GAME, FISH AND PARKS
PIERRE, SOUTH DAKOTA**

WILDLIFE DIVISION REPORT 2016-02

APRIL 2016

This document is for general, strategic guidance for the Division of Wildlife and serves to identify what we strive to accomplish related to Giant Canada Goose Management. This process will emphasize working cooperatively with interested publics in both the planning process and the regular program activities related to Canada goose management.

This plan will be utilized by SDGFP staff on an annual basis and will be formally evaluated at least every five years. Plan updates and changes, however, may occur more frequently as needed.

ACKNOWLEDGEMENTS

This plan is a product of substantial discussion, evaluation, and input from many wildlife professionals, constituents, and the 2015-2016 South Dakota Canada Goose Stakeholder Group. In addition, those comments and suggestions received from private landowners, hunters, and those who recognize the value of giant Canada geese and their associated habitats were also considered.

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Individuals who served on the South Dakota Canada Goose Stakeholder Group during this planning process included: Jack Broome (Central SDGFP Regional Advisory Panel); Mark DeVries (South Dakota Stockgrowers Association); Paul Dennert (SDGFP Commissioner); Drew Ellis (U.S. Fish and Wildlife Service); Mike Elsen (South Dakota Farm Bureau); Richard Grosz (U.S. Fish and Wildlife Service); Chris Hesla (South Dakota Wildlife Federation); Brad Johnson (U.S. Fish and Wildlife Service); John Johnson (Northeast SDGFP Regional Advisory Panel); Rolf Kraft (Western SDGFP Regional Advisory Panel); Eric Reisenweber (Delta Waterfowl); and Spencer Vaa (South Dakota Waterfowl Association).

All text and data contained within this document are subject to revision for corrections, updates, and data analyses.

Recommended Citation:

South Dakota Department of Game, Fish and Parks. 2016. South Dakota Giant Canada Goose Management Plan. Completion Report 2016-02. South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.

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LIST OF ACRONYMS

AMT	August Management Take
BPOP	Breeding Population and Habitat Survey
CREP	Conservation Reserve Enhancement Program
DOW	Division of Wildlife
GPA	Game Production Area
GPS	Global Positioning System
EF	Expansion Factor
HIP	Hunter Information Program
HPAI	Highly Pathogenic Avian Influenza
NAWCA	North American Wetland Conservation Act
NAWMP	North American Waterfowl Management Plan
NWR	National Wildlife Refuge
PF	Pheasants Forever
PPJV	Prairie Pothole Joint Venture
SDGFP	South Dakota Department of Game, Fish and Parks
TIB	Total Indicated Birds
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
VCF	Visibility Correction Factor
VHF	Very High Frequency
WBHPS	Waterfowl Breeding Habitat and Population Survey
WDM	Wildlife Damage Management
WIA	Walk-In Area

EXECUTIVE SUMMARY

Giant Canada geese (*Branta canadensis maxima*) historically nested across the Midwest of the United States and the northern Great Plains of North America including South Dakota. Settlers hunted Canada geese year-round and gathered their eggs in spring. Giant Canada geese were nearly extirpated from South Dakota by 1900. In fact, many authorities believed the giant Canada goose was extinct by the 1950's. However, flocks of the birds remained in the Ft. Sisseton and Waubay National Wildlife Refuge areas of northeast South Dakota. Hanson (1965), in his book "The Giant Canada Goose" considered the birds in the Waubay area to be the "gold standard" of remaining wild giant Canada geese. Restoration efforts across its former range proved successful. Giant Canada geese provide a valuable resource, highly sought after by South Dakota hunters and viewers alike.

The South Dakota Department of Game, Fish, and Parks (SDGFP) manage wildlife and their associated habitats for their sustained and equitable use, and for the benefit, welfare, and enjoyment of the people of South Dakota and its visitors. This management plan provides important historical background and significant biological information to aid in the management of giant Canada geese in South Dakota. Current monitoring and management tools are presented, along with a thorough discussion of objectives and strategies to guide management of this important resource into the future. This plan is intended to guide wildlife managers and biologists, and aid the decision making process of the Division of Wildlife and SDGFP Commission. It also serves to inform and educate sportsmen and women, landowners, and all others interested in giant Canada goose management in South Dakota.

SDGFP's goal for giant Canada goose populations in South Dakota is to manage for maximum recreational opportunity consistent with the welfare of the population, habitat constraints, and social tolerance. The South Dakota giant Canada goose population objective (three year average spring index) is 150,000 with an objective range of 125,000-175,000 geese. SDGFP will adjust season structure and daily bag limits to best maintain the goose population within the objective range. This population range was developed based on an analysis of past goose population data, private land depredation issues, and substantial input from a variety of stakeholders interested in goose management in South Dakota.

To achieve these population goals, the following objectives have been identified: 1) Manage the giant Canada goose population using South Dakota breeding population index (three-year average) objective range of 125,000 to 175,000 geese; 2) Provide maximum hunting opportunity consistent with Objective 1 while maintaining a quality hunting experience; 3) Cooperatively work with private landowners to reduce Canada goose depredation to growing crops; 4) Provide the public with quality goose hunting access opportunities onto private and public lands; 5) Utilize federal, state, and local partnerships and programs to address Canada goose habitat issues, challenges, and opportunities; 6) Evaluate and prioritize Canada goose research and management needs.

Population and harvest surveys for South Dakota’s giant Canada geese include the U.S. Fish and Wildlife Service (USFWS) May Waterfowl Breeding Habitat and Population Survey, the USFWS Parts Collection Survey, the federal Hunter Information Program survey, as well as SDGFP harvest surveys. Management direction for Canada geese will be based on a three-year average spring survey index number, other relevant biological data, and social data.

The *“South Dakota Giant Canada Goose Management Plan, 2016-2020”* will serve as the guiding document for management decisions to ensure Canada goose populations and their habitats are managed appropriately, addressing both biological and social considerations. SDGFP will work closely with private landowners, USFWS, and sportsmen and women to overcome challenges and capitalize on opportunities regarding the future management of Canada geese in South Dakota.

DRAFT

SOUTH DAKOTA GIANT CANADA GOOSE MANAGEMENT PLAN 2016-2020

INTRODUCTION

Giant Canada geese (*Branta canadensis maxima*) historically nested across the Midwest of the United States and the northern Great Plains of North America including South Dakota. Settlers hunted Canada geese year-round and gathered their eggs in spring. Giant Canada geese were nearly extirpated from South Dakota by 1900. In fact, many authorities believed the giant Canada goose was extinct by the 1950's. However, flocks of the birds remained in the Ft. Sisseton and Waubay National Wildlife Refuge (NWR) areas of northeast South Dakota. Hanson (1965), in his book "The Giant Canada Goose" considered the birds in the Waubay area to be the "gold standard" of remaining wild giant Canada geese. Restoration efforts across its former range proved successful. Giant Canada geese provide a valuable resource, highly sought after by South Dakota hunters and viewers alike.

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HISTORICAL BACKGROUND

The restoration of the giant Canada goose across its former range in the United States is one of the great conservation stories of the 20th century. Giant Canada goose restoration efforts by the SDGFP began during the 1960s. Working with sportsmen, farmers, ranchers, and the U.S. Fish and Wildlife Service (USFWS), this restoration effort emphasized the concept of a free flyer release program where 7- 8 week old goslings were released into suitable wetland habitats. Captive goose flocks at Sand Lake NWR, Shadehill Reservoir, and cooperating landowners provided birds for release into selected areas with suitable wetland habitat. The first release was completed in 1967 in Mellette County, when 32 giant Canada geese found homes in western South Dakota. Additional releases took place from 1967-77 in other western South Dakota counties. Restoration efforts switched to eastern South Dakota counties in 1977. The

total number of giant Canada geese released from 1967-98 include 4,189 in West River counties and 8,089 in East River counties (Appendix A).

Restoration strategies employed by SDGFP involved the release of 7-8 week old goslings into suitable wetland habitat and, at a minimum, a five-year closure on Canada goose hunting in this release area. Because most Canada geese do not nest until three years of age, it was important that sub adults were protected in these release areas. At the end of the five-year hunting moratorium, a hunting season analysis determined the most appropriate hunting strategy for a particular area. Normally a limited number of tags were issued for the release area. If the birds appeared to prosper with hunting pressure, the unit was opened to a general hunting season with harvest controlled by bag limit and season length. By 1999, nearly all of the original release areas in South Dakota were in a full framework season of 95 days with a daily bag limit of three Canada geese per hunter. In 2007, the federal framework was increased to 107 days, the maximum number of days allowed for hunting under the Migratory Bird Treaty Act. This demonstrates the success of the Canada goose restoration program in South Dakota.

As giant Canada goose populations increased during the 1980's and 1990's, conflicts with agriculture began to develop. Damage to agricultural crops, particularly soybeans, corn, and wheat increased significantly in 1995 and 1996 across eastern South Dakota. Consequently, the Department established the first ever early September Canada goose hunting season in 1996 for 10 counties in eastern South Dakota. This season was in addition to the regular Canada goose hunting season. Federal frameworks allowed a daily bag of up to five geese from September 1-15. In 2000, a three-year experimental late-September Canada goose hunting season was allowed by the USFWS for portions of eastern SD. This permitted hunting after September 15 up to the start of the regular Canada goose season. This season became operational in 2004 and is now called the Early Fall Canada goose hunting season. Beginning in 2010, an August Management Take (AMT) was implemented, allowing hunters to harvest birds outside the normal federal framework that begins on September 1. AMT is allowed by the USFWS to reduce populations of locally breeding geese in areas receiving high levels of agricultural depredation or to address issues of public safety.

In 1996, SDGFP developed an operational Wildlife Damage Management Program (WDM) designed to reduce crop damage by giant Canada geese. Management techniques available through this program to participating producers include the use of electric fences, vegetation barriers, buffer strips, food plots, hazing, as well as lethal control methods.

GIANT CANADA GOOSE RESEARCH IN SOUTH DAKOTA

Research on giant Canada goose populations in South Dakota began near the conclusion of goose restoration efforts in the late 1990's. Gleason (1997) conducted an analysis on 6,837 band recoveries from 26,141 Canada geese banded in South Dakota from 1955-1995. Gleason et al (2015) found that the percentage of reported bands versus banded individuals (recovery rates) for status three (normal wild) birds increased through time for both banded populations

east and west of the Missouri River indicating a gradual increase in harvest of Canada geese during restoration. Recovery rates for restored (released) birds subsequently declined through time indicating that those birds were becoming a smaller proportion of the population as wild production expanded. Gleason (1997) found survival estimates for Canada geese in western South Dakota declined over time while estimates for both restored and wild Canada geese in eastern South Dakota increased as populations in eastern South Dakota expanded. Furthermore, Gleason (1997) analyzed derivation of harvest and migration information for South Dakota giant Canada geese. While the highest percentage of Canada goose harvest (47%) occurred in South Dakota, wild birds from eastern South Dakota tended to migrate south to Nebraska and Kansas with restored birds from eastern South Dakota tending to migrate southeast to Missouri. Geese banded in western South Dakota tended to migrate in a southwestern direction to western Nebraska and Kansas. Analysis of band recoveries provided limited evidence for northerly molt movement of banded geese with <1% of direct and about 3% of indirect recoveries occurring north of South Dakota.

Giant Canada geese have been shown to select specific wetland types for breeding. Naugle (1997) used a discriminate function analysis to determine what factors influence wetland use by breeding Canada geese in eastern South Dakota. Wetlands were surveyed in 1995-1996 to identify habitat characteristics preferred by giant Canada geese. Naugle (1997) found giant Canada geese in South Dakota to be highly dependent on semi-permanent wetlands with little emergent cover. Average area of wetlands used by Canada geese (24.7ha) was much larger than unused wetlands (11.7ha) indicating a preference for larger wetlands. Nest site availability was also highly significant indicating the importance of islands and muskrat huts to nesting Canada geese.

Anderson (2005) conducted a comprehensive giant Canada goose banding and telemetry study from 2000-2004 in an attempt to gain information on vital rates for South Dakota's giant Canada geese as well as an understanding of molting and post-molt movements of Canada geese in eastern South Dakota. Anderson (2005) banded 3,839 Canada geese (1,516 adult and 2,323 goslings) during this time. Additionally, 148 adult females were fitted with very high frequency (VHF) collars and 38 adult females with satellite (GPS) collars. Anderson (2005) found an average of 45.4% of marked Canada geese made significant (> 40km) post molt movements from 2000-2003. Timing of these movements indicated that 46.6% of marked geese made significant movements prior to the start of the September Canada goose hunting season, 42.9% moved during the first week of the September hunting season, and 9.5% moved later in the fall. Goose movements were generally in a northerly direction prior to the start and during the first week of the September hunting season (Dieter 2010). Dieter (2009) documented molt and post-molt migrations with VHF, satellite telemetry, and through indirect recoveries of banded geese. Locations of VHF marked breeding age females showed that 56% of non-nesting females, 81% of unsuccessful nesting females, and 19% of successful nesting females initiated a molt or post-molt migration. Anderson (2005) received 86 indirect band recoveries north of South Dakota, revealing large areas north of South Dakota used by Canada geese for molting. Anderson (2005) documented one satellite marked female Canada goose undertaking a 2,080 km molt migration to Nunavut, Canada highlighting the large area Canada

geese are likely using for molting and post-molt habitat. Dieter (2010) analyzed vital rates, derivation, and chronology of harvest from 2000-2004. Direct recoveries (bands reported during the first hunting season after banding) were recorded from eight states with 77% of direct recoveries reported from South Dakota. Indirect recoveries (bands reported after the first hunting season) occurred in 12 states and provinces with 69% reported in South Dakota. From 2000-2004, 46% of geese harvested were taken during the September hunting season. Pooled recovery rates from 2000-2004 were 0.16 for adult geese and 0.18 for young-of-year birds with an estimated harvest rate of 23%. Average annual survival across years for adults was estimated at 0.52 and 0.67 for young-of-year geese. Dieter and Anderson (2009) monitored nest initiation and success on VHF collared females. From 2000-2003, 72% of these collared females initiated a nest with 71% of those nests being successful (Dieter 2009).

As Canada goose populations and conflicts with agricultural crops increased across South Dakota, the focus of research shifted from basic biological information to evaluating agricultural damage by Canada geese and evaluating methods to minimize this damage. Flann (1999) investigated Canada goose depredation abatement techniques including vegetative barriers and goose food plots. Alfalfa vegetative barriers proved ineffective at deterring Canada goose movements into adjacent agricultural fields while mowed wheat and barley food plots were utilized by Canada geese. Digestibility of a variety of forages including soybeans, wheat, barley, and Kentucky bluegrass were determined in captive trials with soybeans having the highest nutritive value. Radtke (2008), (2011) analyzed crop damage from Canada geese in eastern South Dakota. Mean damaged area for control fields was significantly higher (1.23 ha) than in fields where damage abatement techniques were employed (0.2 ha). Radtke (2008), (2010) found that geese selected fields close to water, with sparse vegetation allowing access to agricultural fields. Warner (2013) evaluated several foliar sprays for use as a Canada goose grazing deterrent on soybeans. Several commercial avian deterrents were tested with anthraquinone demonstrating effective deterrence for Canada geese. Geese spent more time feeding in control fields when compared to fields sprayed with anthraquinone. Crop damage was significantly higher on control fields compared to anthraquinone treated fields (Dieter 2014).

Future Research and Monitoring Needs

Canada goose band recovery data is crucial for obtaining vital rate information including harvest rate information, annual survival, and derivation of harvest. We recommend SDGFP commit to a long term operational Canada goose banding program to ensure a consistent source of vital rate data. The development of a habitat based population model would be useful to better understand landscape carrying capacity for Canada geese as well as potential impacts of landscape changes through wetland drainage, wetland consolidation, and row crop expansion. Future human dimensions research on public attitudes and social tolerance of Canada geese would aid wildlife managers when developing management objectives and harvest strategies. Exploring potential impacts of pesticides on giant Canada goose populations may be warranted to assess non-hunting mortality or reduced reproductive success that may be occurring due to pesticide use in South Dakota.

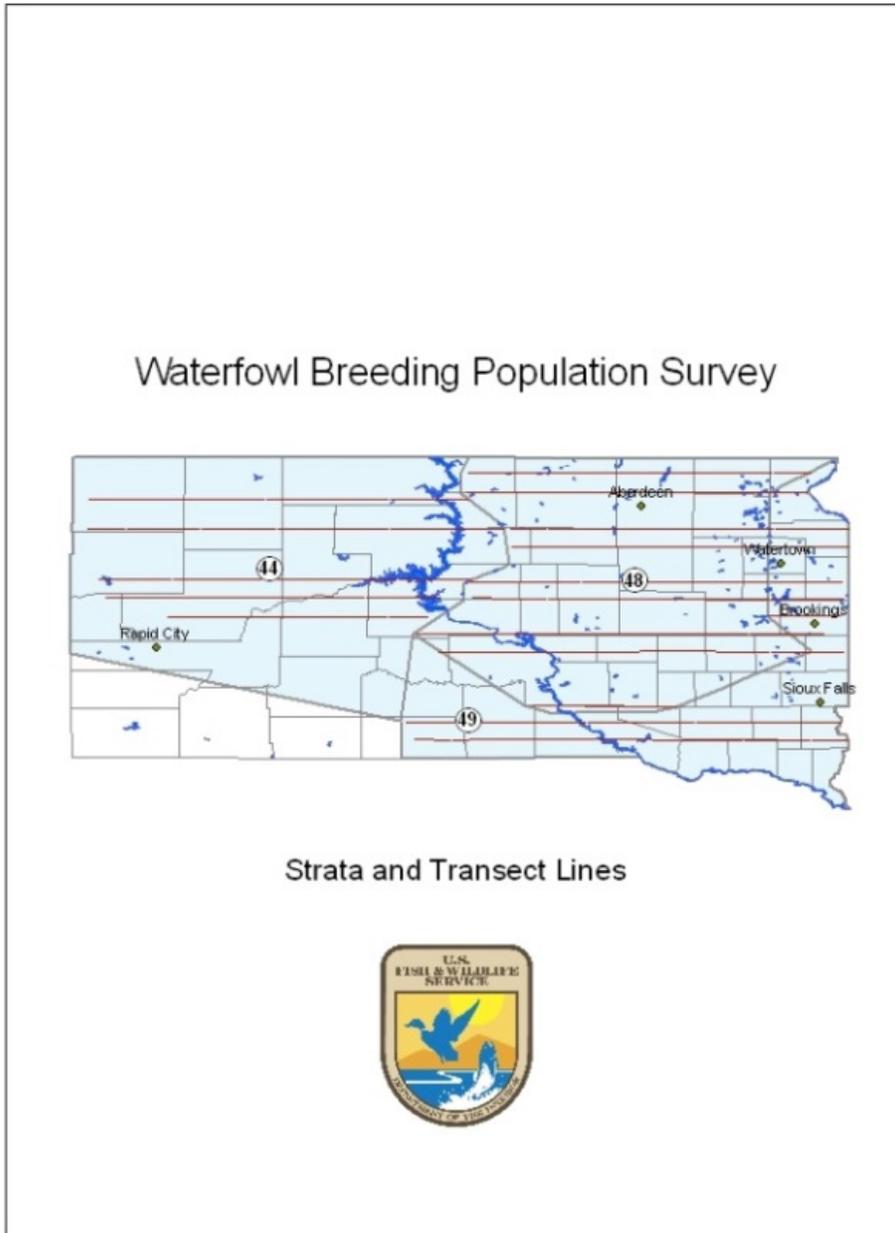
CURRENT MANAGEMENT SURVEYS AND MONITORING

Population and harvest surveys for South Dakota's giant Canada geese include the USFWS May Waterfowl Breeding Habitat and Population Survey (WBHPS), the USFWS Parts Collection Survey, the federal Hunter Information Program (HIP) survey, as well as SDGFP harvest surveys.

USFWS May Waterfowl Breeding Habitat and Population Survey and Methodology

The USFWS WBHPS is one of the longest running wildlife surveys, becoming operational in the early 1950's. This aerial survey is conducted over 49 sampling strata in the United States and Canada of which three (strata 44, 48, and 49) occur in South Dakota (Figure 1). SDGFP uses the latest three year average spring population index to assess the spring population relative to population management range objectives as well as guiding harvest management decisions. Three year averages are used in lieu of annual index numbers in an attempt to reduce biases associated with individual yearly survey data such as extreme weather events or observer bias.

Figure 1. South Dakota strata included in the USFWS May waterfowl breeding habitat and population survey.



The USFWS WBHPS occurs annually in early May. Fixed-winged aircraft fly at speeds between 90-105 mph and at low altitude, generally 100'-150' above the ground. Two observers are present, the pilot observing out the left side of the aircraft and the second observer surveying out the right side of the aircraft. Waterfowl and wetlands are surveyed up to 1/8 mile (660') from the aircraft. Observers record observations on laptop computers which are georeferenced via the aircraft's global positioning (GPS) system. Each transect line is divided into 18 mile segments. Within each segment 4.5 square miles are surveyed. Due to the timing of the survey and breeding behavior of Canada geese, any lone (single) goose is counted as a pair (two birds). This is done because nesting female geese are difficult to observe from an aircraft. If a pair is observed they are counted as two birds. Any group of three or more (up to 45) is counted as "face value". Larger groups are excluded from the survey and are assumed to be either non breeding flocks or migrating geese.

Example:

Below is an example of how geese are counted within a strata segment:

3 lone (single) Canada geese: $3 \times 2 = 6$

4 pair Canada geese: $4 \times 2 = 8$

A group of 7 Canada geese: 7

The total indicated birds (TIB) for this single segment is $(3 \times 2) + (4 \times 2) + 7 = 21$.

Now in order to figure out the spring breeding population (BPOP) index for the whole Stratum, we need to know the expansion factor (EF) and the visibility correction factor (VCF).

$$\text{BPOP Index} = \text{TIB} \times \text{VCF} \times \text{EF}$$

In Strata 48 for example, there are 70 segments. 70 segments x 4.5 square miles per segment = 315 square miles. There are 24,587 square miles within the boundary of Strata 48. Dividing 24,587 by 315 = an EF of 78.05.

VCF – A pilot and his observer do not see all the birds as they fly over. They use a visibility correction factor (VCF) determined by the ground crews. The VCF for Strata 48 in 2003 was 2.51.

$$\text{BPOP index} = \text{TIB} \times \text{VCF} \times \text{EF}$$

$$470 \times 2.51 \times 78.05 = 92,100 \text{ BPOP Index}$$

SD May Waterfowl Breeding Habitat and Population Survey
(example continued)

Example: 2003 Canada goose data

STRATUM	SINGLES	PAIRS	GROUPS	TIB	VCF	EX	BPOP
44	5	14	4	42	2.27	126.38	12.0
48	39	184	24	470	2.51	78.05	92.1
49	18	37	3	113	2.51	92.57	26.3
Total 2003 Spring Population Index = 130,400							

SD GFP Harvest Survey

Canada goose harvest is estimated by utilizing five harvest surveys which are sent via email and U.S. mail. Harvest for the August Management Take is estimated by surveying a random sample of residents who purchased a migratory bird certificate prior to August 26. All nonresident Early Fall Canada Goose license holders and resident Special Canada Goose (Bennett County) license holders are sent questionnaires at the close of those seasons at the end of September and mid-December, respectively.

Total Canada goose harvest is estimated using a Migratory Bird Harvest survey and a Nonresident Waterfowl Harvest survey at the seasons end in mid-February (Table 1). Nonresidents are randomly selected from the nonresident waterfowl unit they were licensed in and residents are selected from the list of Migratory Bird Certificate holders. Residents are asked to separate their harvest from the August Management Take (Table 2) to prevent it from being included in the regular season estimate. Residents are also asked to separate their Early Fall Canada goose (September) harvest in order to estimate harvest from that portion of the season (Table 3). Both resident and nonresident recipients are asked to list which county they hunted the most which is used to estimate the distribution of harvest across the state. It is assumed that the majority of harvest occurs in the county hunted most. Historical statistics for all Canada goose harvest can found at: <http://www.gfp.sd.gov/hunting/harvest/default.apx>.

Table 1. All seasons Canada goose harvest survey summary, 2005-2014. (Huxoll 2014)

Year	Resident Hunters					Nonresident Hunters				
	Number Hunters	Harvest	Ave Day Hunted	Ave Bag	Satisfaction	Number Hunters	Harvest	Ave Day Hunted	Ave Bag	Satisfaction
2005	15,288	83,167	6.53	5.44	4.65	2,343	4,803	3.84	2.05	4.97
2006	16,103	118,357	7.53	7.35	4.95	2,789	7,419	4.03	2.66	5.21
2007	14,026	94,535	7.24	6.74	4.81	2,349	6,248	3.82	2.66	5.21
2008	13,463	97,068	7.21	7.21	5.03	2,483	6,381	3.89	2.57	5.24
2009	12,927	98,892	7.25	7.65	4.92	1,986	5,561	4.14	2.80	5.27
2010	13,552	123,188	7.53	9.09	5.19	2,198	6,440	4.45	2.93	5.50
2011	13,376	131,505	7.28	9.83	5.31	2,167	6,332	4.25	2.92	5.63
2012	13,725	157,363	7.61	11.47	5.19	2,277	7,054	4.37	3.10	5.44
2013	12,004	117,846	7.54	9.82	5.06	2,160	6,310	4.24	2.92	5.37
2014	12,130	97,956	6.92	8.08	4.96	1,969	5,193	4.31	2.76	5.22

Table 2. August Management Take Canada goose harvest survey summary, 2010-2015. (Huxoll 2015)

Year	Hunters	Harvest	Average Days Hunted	Average Season Bag
2010	3,538	29,047	2.99	8.21
2011	3,211	30,300	2.74	9.44
2012	3,581	36,757	3.08	10.26
2013	2,345	18,592	3.42	7.93
2014	2,302	20,671	3.24	8.98
2015	1,686	10,221	3.03	6.06

Table 3. Early fall Canada goose harvest survey summary, 2005-2014. (Huxoll 2014)

<i>Year</i>	<i>Number Hunters</i>	<i>Harvest</i>	<i>Average Season Bag</i>
2005	5,686	21,499	3.78
2006	6,095	25,755	4.23
2007	5,876	26,698	4.54
2008	5,275	27,924	5.29
2009	6,157	39,275	6.38
2010	5,767	44,183	7.66
2011	5,417	50,361	9.30
2012	3,636	28,788	7.92
2013	4,528	29,887	6.60
2014	5,106	28,814	5.64

Migratory Bird Parts Collection Survey

Each year the (USFWS) conducts the Migratory Bird Parts Collection Survey, often referred to as the Wing Survey. The survey contains includes waterfowl, dove, and woodcock. Each year, the USFWS asks a sample of hunters from across the U.S. to send in one wing from each duck, dove, and woodcock that they harvested and the wing tips and tail feathers from each goose. Before the start of every hunting season, the USFWS provides each survey participant with postage-paid, wing envelopes for them to send in their parts. These wing envelopes are addressed to one of the four collection points throughout the United States, one in each flyway.

Nationwide, the USFWS receives in excess of 100,000 duck wings and goose tail fans annually. When the parts arrive, they are sorted by species and stored in a freezer until late February, when state and federal biologists from each flyway examine these parts in greater detail at the annual wing-bees. Data from the wing-bees provide estimates of the species, sex, and age composition of the harvest, in addition to supplying information on how harvest has changed through space and time (Tables 4 and 5). These data from the Wing Surveys are important pieces of information used in waterfowl population models and help waterfowl managers set and evaluate management activities. Additional information regarding the federal parts collection survey can be found at <http://central.flyways.us/surveys/large-national-scale-surveys/harvest-survey>.

Table 4. Central Flyway all season harvest for large Canada geese, 1999-2014. (Kruse 2015)

YR	CO	KS	MT	NE	NM	ND	OK	SD	TX	WY	CEN FLYWAY
1999	32,103	52,570	15,109	54,500	968	57,700	22,765	128,967	2,896	7,440	375,018
2000	63,823	71,902	31,708	94,961	1,452	69,342	34,508	113,138	9,152	21,401	511,387
2001	29,836	52,248	15,717	65,180	1,194	69,855	8,657	141,110	9,485	11,147	404,430
2002	32,251	56,109	22,386	41,165	673	83,486	11,337	107,376	4,478	11,835	371,097
2003 ¹	53,447	88,653	29,953	82,333	792	92,034	11,248	129,960	19,840	16,906	525,166
2004 ¹	36,918	64,904	19,807	44,546	1,102	83,877	11,088	83,878	5,703	18,637	370,460
2005 ¹	38,884	75,111	8,351	70,835	1,444	92,345	11,705	68,260	3,118	16,003	386,056
2006 ¹	22,425	41,813	10,611	43,915	369	85,707	15,552	106,366	4,694	13,637	345,090
2007 ¹	36,858	30,422	6,715	50,091	1,689	83,965	22,507	76,399	3,224	9,500	321,369
2008 ¹	27,993	36,672	4,431	63,477	557	68,047	20,775	74,958	6,092	14,460	317,462
2009 ¹	43,025	73,332	2,839	64,697	1,524	69,234	15,014	78,929	5,458	12,310	366,361
2010 ¹	20,457	47,884	2,073	78,969	1,324	33,523	12,503	68,755	8,347	16,222	290,057
2011 ¹	13,268	34,784	2,053	55,910	4,652	71,219	11,754	79,798	10,337	11,342	295,117
2012 ¹	49,744	42,765	1,219	75,699	2,893	104,293	17,320	87,580	10,687	20,942	413,142
2013 ¹	43,446	67,601	1,000	90,463	2,204	139,827	20,918	130,155	2,172	19,288	517,073

Table 5. Central Flyway Canada goose age ratios, 1999-2014. (Kruse 2015)

YEAR	CEN FLYWAY	ATL FLYWAY	MISS FLYWAY	PAC FLYWAY	U.S.
1999	0.55	0.60	0.54	0.67	0.59
2000	0.53	0.41	0.50	0.60	0.49
2001	0.58	0.48	0.59	0.56	0.53
2002	0.45	0.40	0.61	0.51	0.50
2003 ¹	0.53	0.56	0.55	0.71	0.56
2004 ¹	0.40	0.46	0.38	0.61	0.43
2005 ¹	0.54	0.62	0.52	0.47	0.54
2006 ¹	0.47	0.53	0.54	0.45	0.51
2007 ¹	0.40	0.40	0.50	0.44	0.44
2008 ¹	0.51	0.59	0.51	0.38	0.52
2009 ¹	0.57	0.37	0.47	0.50	0.46
2010 ¹	0.60	0.63	0.55	0.45	0.57
2011 ¹	0.64	0.34	0.52	0.50	0.49
2012 ¹	0.55	0.46	0.40	0.45	0.47
2013 ¹	0.36	0.47	0.39	0.60	0.45
2014 ¹	0.47	0.36	0.37	0.59	0.42

Central Flyway Canada Goose Banding Program

Banding migratory waterfowl is an important management tool, aiding in the determination of vital rates needed for management decisions. From 2012-2015, South Dakota along with other participating states in the Central Flyway initiated a four year cooperative banding program with the following objectives:

- 1) Determine timing, distribution, and derivation of harvest
- 2) Calculate survival rates
- 3) Calculate harvest rates
- 4) Use a Lincoln estimator to calculate indirect population estimates and associated growth rates
- 5) Determine future banding needs

South Dakota has been a strong contributor to this program, banding over 8,300 Canada geese since 2012 (Table 6). Harvest rate (recovery rate/reporting rate) analysis indicates a relatively high harvest rate for banded giant Canada geese in South Dakota ranging from 14%-20% during 2012-2015 hunting seasons. (Table 6). This harvest rate is similar to what was observed by Anderson (2005) and highlights how liberal regulations have maintained high harvest rates while populations have expanded and hunter participation has declined (Huxoll 2014). Further analysis of these band recoveries will greatly aid wildlife managers and help to understand the population dynamics of giant Canada geese in the Central Flyway. Beginning in the summer of 2016 SDGFP will begin operational goose banding in eastern South Dakota. This long term commitment will allow wildlife managers to better monitor vital rates of giant Canada geese into the future.

Table 6. SD giant Canada geese banded, recovery rates, and harvest rates, 2012-2015.

Year	# Banded	# Direct Recoveries	Recovery Rate	Harvest Rate (Recovery Rate/.84)
2012	1,824	307	17%	20%
2013	1,872	313	17%	20%
2014	2,503	404	16%	19%
2015	2,179	254	12%	14%
Combined	8,375 (total)	1,278 (total)	15% (mean)	18% (mean)

CITIZEN INVOLVEMENT AND PUBLIC OUTREACH

Effective decision-making by wildlife agencies necessitates the need to consider public perceptions and opinions, along with potential responses to management policies. In conjunction with hunter harvest and biological data, public involvement is an important component in revising and implementing a Canada goose management plan in South Dakota. Public participation helps ensure decisions are made in consideration of public needs and preferences. It can help resolve conflicts, build trust, and inform the public about Canada goose management in South Dakota. Successful public participation is a continuous process, consisting of a series of activities and actions to inform the public and stakeholders, as well as obtain input regarding decisions which affect them. Public involvement strategies provide more value when they are open, relevant, timely, and appropriate to the intended goal of the process. It is important to provide a balanced approach with representation of all stakeholders. A combination of informal and formal techniques reaches a broader segment of the public; therefore, when possible, combining different techniques is preferred to using a single public involvement approach. No single citizen or group of citizens is able to represent the views of all citizens. Multiple avenues for public involvement and outreach, therefore, were used in the revision of the Giant Canada Goose Management Plan including open houses, SDGFP Commission meetings, social media, written public comment, stakeholder groups, and other avenues. These approaches are designed to involve the public at various stages of plan development and to ensure opportunities for participation are accessible to all citizens.

Canada Goose Stakeholder Group

A stakeholder for this purpose is defined as a person, group, or organization with an interest in the management of Canada geese. Because Canada geese valued by many South Dakota residents, SDGFP felt it was important to have a diverse representation of stakeholders to provide input for future management of Canada geese in South Dakota. The formation and input from this stakeholder group, however, did not inhibit SDGFP from obtaining and incorporating additional input or opinions on Canada goose management in South Dakota.

The 2016-2016 South Dakota Canada Goose Stakeholder Group included representation from the following: general public, goose hunters, private landowners, agricultural interests, and conservation organizations. Those who served on the South Dakota Canada Goose Stakeholder Group during this planning process can be found on page *ii*. A Canada Goose Stakeholder Group Charter (Appendix B) was shared with all stakeholders that described the purpose, objectives, authority, roles and responsibilities of this group.

The South Dakota Canada Goose Stakeholder Group held three meetings in 2015 and 2016 (September 3, November 10, and February 12) in Pierre. Information and supportive data were provided by SDGFP staff to ensure all members were knowledgeable about the topics and issues were discussed and deliberated by the group. Key topics and issues discussed by the stakeholder group included the following: status of Canada geese, SDGFP Canada goose

depredation program, overview of current management plan, current challenges and opportunities, statewide population objective, harvest strategies, habitat and access programs, outreach and education, urban goose management, and review of the draft revision of the Canada goose management plan.

Individual views and opinions varied amongst the broad representation of this stakeholder group. While many topics were discussed at length, a great deal of time was devoted to the statewide population objective. It should be noted that there were contrasting opinions at differing levels among those who wanted to maximize hunter opportunities and those who had concerns over crop damage caused by high population levels of Canada geese. As a result, careful considerations of these opinions were included in the identification of the management objectives and strategies necessary to successfully manage Canada geese within the varying social carrying capacities.

Public Meetings

The term *public meeting* is used as an umbrella term for all types of meetings including but not limited to public hearings, open houses, or workshops. SDGFP uses a variety of public meeting formats designed to be accessible by all members of the public and to provide meaningful opportunities for public involvement. Two formal involvement opportunities are the Regional Advisory Panels and through the SDGFP Commission. As part of the rule setting process, the SDGFP Commission formally holds a public hearing at each meeting where it takes public testimony regarding pending matters, including but not limited to Canada goose management. In addition to the public hearing process, the Commission also reviews department management plan drafts, related public comments, and formally approves final plans. The SDGFP Division of Wildlife also has four Regional Advisory Panels, which meet to share information and receive feedback from wildlife stakeholders. Panels typically consist of around eight members. Members to the panels are selected, with selection designed to be representative of the stakeholders in their respective regions.

In addition to these formal involvement opportunities, SDGFP provides informal opportunities for public participation. In an effort to ensure accessibility to all interested individuals, multiple regional open houses are held each year in different locations and at various times to provide for maximum participation. These open houses are advertised to the public through a variety of outlets, and are designed to both inform the public about specific topics (e.g., Canada goose population, season dates, units, etc.) and to gather input and feedback from the public. Canada goose planning meetings and working groups are also used to inform and collect input from targeted stakeholders and groups regarding Canada goose populations and season recommendations. Each given situation is different and each approach to a specific challenge is unique, therefore public involvement strategies use a variety of techniques to encourage all citizens to actively participate.

Social Media

The South Dakota Giant Canada Goose Management Plan is located on the South Dakota Game, Fish and Parks website along with other wildlife management plans are at <http://gfp.sd.gov/wildlife/management/plans/default.aspx>. Updates on the management plan revision process are provided at <http://gfp.sd.gov/hunting/waterfowl/goose-management-plan.aspx>. Information on goose hunting season dates and other surveys and reports can be found at <http://gfp.sd.gov/hunting/waterfowl/goose.aspx>.

Feedback on the plan was solicited through several different platforms by way of a stakeholder workgroup as well as through public meetings, open house events, news release in the spring of 2015 soliciting comments on the current management plan and future considerations, and the standard SDGFP Commission meeting process. Plan updates and other information were provided through digital platforms by using Facebook, Twitter and targeted email messaging. A week prior to the comment period deadline, a targeted email was sent to a distribution group of approximately XX,XXX email recipients who opted to receive information on SDGFP Commission agenda topics and public comment periods. Scheduled Facebook and Twitter posts were also made after the release date of the plan as reminders to let followers know that this information is available online. However, when users made comments via social networking, they were directed to provide those comments in writing to canadagooseplan@state.sd.us or mail them to 523 E. Capitol Ave., Pierre, S.D. 57501 and include a full name and city of residence in order for them to be a part of the official public record.

In addition, a short questionnaire was sent to 32,570 recipients of the SDGFP Landowner's Matter Newsletter and this same questionnaire was sent via e-mail to approximately 23,500 hunters who purchased a South Dakota Migratory Bird Certificate in 2015 to poll their opinion on the draft population index objective of 125,000-175,000 Canada geese and where they reside within the state.

Media was also informed of the plan through the standard press release distribution process. Press releases were sent via email to a group of over X,XXX recipients (media and customers alike) who have opted in to receive all SDGFP News (or press releases). Press release information was also shared internally with over 550 SDGFP employees and was posted to all SDGFP digital platforms mentioned above as well as online at: <http://gfp.sd.gov/news/default.aspx> and <http://news.sd.gov/>

GOALS, OBJECTIVES, & STRATEGIES

The following statements have guided the development of the giant Canada goose management goal and objectives and reflect the collective values of SDGFP in relation to management of giant Canada geese in South Dakota.

- That wildlife, including giant Canada geese contribute 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.
- In management of giant Canada geese in accordance with sound biological principles.
- In providing accurate and timely information regarding giant Canada geese and recreational opportunities across South Dakota.
- That the future of giant Canada geese in South Dakota depends on a public that appreciates, understands, and supports giant Canada geese and their habitats.
- That the stewardship role played by landowners in South Dakota is critical to the future of giant Canada geese and deserving of recognition and respect.
- That damage to agricultural crops by giant Canada geese is a legitimate reason to control giant Canada goose populations below the biological carrying capacity in some areas.

GOAL: SDGFP will manage giant Canada goose populations breeding in South Dakota for maximum recreational opportunity consistent with the welfare of the population, habitat constraints, and social tolerance.

OBJECTIVES AND STRATEGIES

Objective 1: Manage the giant Canada goose population using South Dakota BPOP index (three-year average) objective range of 125,000 to 175,000 geese.

Strategy 1a: Annually use the USFWS May Waterfowl Breeding Habitat and Population Survey as the monitoring method to determine spring population index trends (three-year average) of Canada geese in South Dakota. Use strata level estimates to better guide regional management decisions.

Strategy 1b: Minimize other causes of mortality, particularly lead poisoning, disease, and wounding loss.

DISCUSSION

When the South Dakota Resident Canada Goose Management Plan was first drafted in 1998, the spring population index objective (three-year average) was 50,000. It was modified in the 2005 management plan to 60,000, and 80,000-90,000 for the 2010 update. The 2016 updated objective management range of 125,000 to 175,000 (Figure 2) was chosen to represent current social tolerance limits, reasonable population management goals, and expectations of sportsmen and women.

The 1998 plan also included an objective to expand breeding populations of giant Canada geese into suitable wetland areas of the Missouri Coteau region in central South Dakota by the year 2000. This objective was removed from the 2005 management plan as geese had pioneered and are established in this region. The captive goose flock at Sand Lake NWR used for releases was set free in 1998 marking an end to restoration efforts in South Dakota. The Canada goose restoration effort is considered complete and SDGFP's efforts are now focused on giant Canada goose management rather than restoration.

Disease and wounding loss can be significant forms of mortality in waterfowl, including Canada geese (Friend 1987). Wetlands with a history of botulism are monitored annually by Department personnel. Large wetland areas prone to botulism outbreaks include Mud Lake in Roberts County, Red Lake in Brule County, and Swan Lake in Walworth County. Other diseases including avian cholera and highly pathogenic avian influenza (HPAI) have the potential to cause mortality in Canada geese. Mortality events will be investigated and if possible causative agents will be determined through laboratory testing. Shooting clinics to improve hunter proficiency and understand effective shotgun ranges will be conducted with a goal of at least two per year. Past shooting clinics have been given in Pierre, Chamberlain, Watertown, Marshall County, Webster, Mobridge and Madison along with classroom presentations in Aberdeen, Watertown, Scotland and Pierre. Information on appropriate loads for hunting Canada geese will be provided in SDGFP publications via Tom Rosters Nontoxic Shot Lethality Table© found at http://www.gfp.sd.gov/hunting/docs/NontoxicShotLethality_TRoster.pdf.

POPULATION STATUS

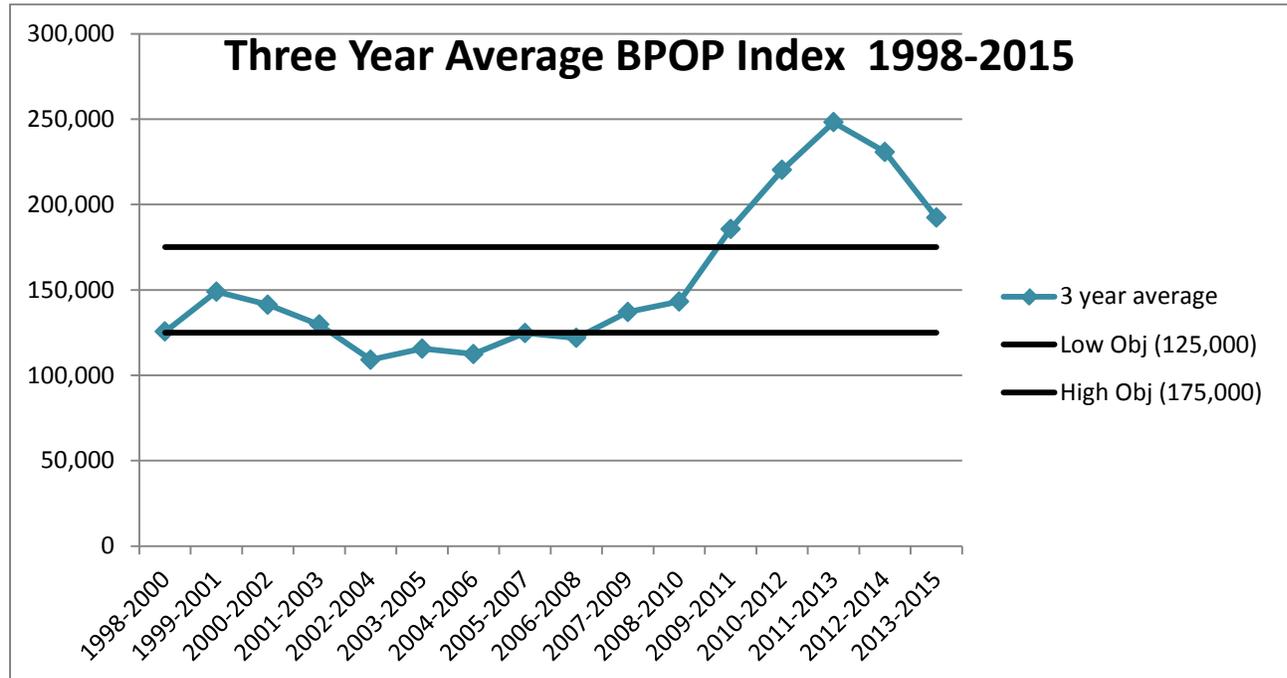
Since restoration efforts ended in the mid 1990's, spring population estimates have varied from a low of 112,416 from 2004-2006 to a high of 248,135 from 2011-2013. Since Canada geese are highly dependent on wetlands for all phases of their life cycle, populations rise and fall in response to regional wetland conditions. The average annual spring population index of Canada geese in South Dakota for the 5-year period 2010-2014 was 216,536 and the most recent three-year period (2013-2015) is 192,377 birds, according to data from the USFWS May Breeding Habitat and Population Survey (Zimpfer et al 2015) (Table 7). South Dakota is divided up into three strata and numerous transect lines (Appendix C). A statewide spring population index management range of 125,000-175,000 Canada geese should provide ample hunting

opportunities and manageable agricultural conflicts, considering an operational SDGFP wildlife damage management program is in place to cooperatively work with private landowners.

Table 7. SD Canada goose spring population index (three-year averages), 1998-2015.

3 Year Period	<u>Strata 44</u>	<u>Strata 48</u>	<u>Strata 49</u>	<u>Total</u>
1998-2000	16,153	79,044	30,416	125,614
1999-2001	19,045	96,269	33,659	148,974
2000-2002	22,180	91,866	27,255	141,300
2001-2003	18,711	85,443	25,543	129,697
2002-2004	14,128	72,539	22,401	109,068
2003-2005	13,262	75,748	26,555	115,565
2004-2006	16,723	70,815	24,878	112,416
2005-2007	19,668	78,626	26,410	124,704
2006-2008	18,959	76,727	26,202	121,888
2007-2009	18,230	82,269	36,549	137,048
2008-2010	18,531	83,173	41,490	143,194
2009-2011	17,377	116,892	51,412	185,681
2010-2012	16,664	140,726	62,953	220,185
2011-2013	14,693	164,062	69,381	248,135
2012-2014	17,951	147,972	64,782	230,706
2013-2015	16,893	124,606	50,878	192,377

Figure 2. South Dakota Canada goose spring population index (three-year averages), 1998-2015.



Objective 2: Provide maximum hunting opportunity consistent with Objective 1 while maintaining a quality hunting experience.

Strategy 2a: Use the full federal framework during the Early Fall and regular Canada goose hunting seasons with maximum bag limit and number of days allowed when the spring population index exceeds the population objective of 175,000 birds (two consecutive three-year averages). Consider an August Management Take in areas experiencing unacceptable levels of damage to agricultural crops (Table 8).

Strategy 2b: Use the full federal framework during the regular Canada goose hunting season and make appropriate adjustments to bag limit and/or season length during the Early Fall season when the three-year average spring population index is within the population index range of 125,000-175,000 birds (three-year average). Consider an August Management Take in areas experiencing unacceptable levels of damage to agricultural crops (Table 8).

Strategy 2c: Reduce bag limits and/or season length during the Early Fall September and regular Canada goose hunting seasons when the spring population index falls below the population objective of 125,000 birds (two

consecutive three-year averages). Do not utilize AMT unless human safety concerns are being addressed (Table 8).

- Strategy 2d:* Annually use a SDGFP post-season hunter survey to collect and monitor harvest data and hunter satisfaction for August Management Take, Early Fall September Canada goose, and regular goose hunting seasons.
- Strategy 2e:* Annually use USFWS parts collection surveys to collect and monitor harvest estimates and goose age ratio data for Canada goose hunting seasons.
- Strategy 2f:* Maintain an operational Canada goose banding program and conduct a standardized band analysis program in South Dakota.
- Strategy 2g:* Continue to support efforts to increase recruitment and retention of goose hunters in South Dakota.

DISCUSSION

The primary mortality factor for Canada goose populations in South Dakota is hunter harvest. Areas included in Unit 1 are primarily managed for locally breeding geese while Units 2 and 3 primarily target staging dark geese later in the season (Appendix D.) When populations exceed objective levels, use of the full federal framework days and daily bag during early fall and regular Canada goose hunting seasons in Unit 1 are warranted (Table 8). The maximum number of days allowed for hunting Canada geese is 107 days. When populations are within the objective range of 125,000-175,000 using the full framework during the regular Canada goose hunting season in Unit 1 and making adjustments to bag limits/season lengths during the August Management Take and Early Fall season may be warranted. If populations fall below objective levels, season restrictions should be considered (Table 8). Operational goose banding is a cost effective method to obtain harvest information, movement data, and population vital rates for South Dakota's Canada goose population (Figures 3, 4).

Recruitment and retention of goose hunters is an important aspect of Canada goose management and vital to the future of waterfowl management. Hunters are the most effective management tool for Canada geese and provide valuable political and financial support for habitat conservation. SDFGP encourages recruitment of new waterfowl hunters in various ways including loaning hunting equipment, youth and women's guided hunting events, Step Outside programming, Becoming and Outdoor Women events, and various waterfowl related programming at the two Outdoor Campuses.

HARVEST AND SEASON STRUCTURE

In 1996, South Dakota became the first Central Flyway state to implement September Canada goose hunting seasons (Table 9). These are seasons that occurred prior to the regular Canada goose hunting season. These 'early fall' seasons were designed to increase the harvest of local

Canada geese. From 1996-1999, early seasons were allowed only from September 1 to September 15. Average harvest during this time period was 16,468 birds.

From 2000-2002, South Dakota was authorized by the USFWS to conduct a three-year experimental late-September Canada goose hunting season. Hunting during the experimental period was allowed in eastern South Dakota counties starting on September 16 up to the start of the regular Canada goose hunting season. Harvest increased substantially when late-September hunting was also allowed. From 2000-2002, the average annual harvest increased to 41,229 birds.

In order for the experimental late-September season to become operational, South Dakota had to demonstrate that less than 10% of the harvest consisted of non-target small Canada geese. Subsequent analyses of 1,044 tail fans from the Parts Collection Survey during 5-day periods in September from 1996-2002 indicated less than 3% of the harvest consisted of non-target small Canada geese. All of South Dakota's early fall Canada goose hunting seasons became operational in 2003 after fulfilling federal evaluation requirements

Early Fall September Canada goose hunter participation and harvest has declined in recent years. From 1999-2003, hunter numbers and harvest averaged 9,457 and 38,412, respectively. From 2004-2014, hunter numbers began to decline with an average harvest of 31,754 (Table 9). This decline has occurred despite increasing the area open to hunting during the early fall season from 27 up to 56 counties as well as liberal bag limits. Hunter numbers and harvest in 2014 were 5,106 and 28,814, respectively, with a daily bag of 15 in 54 counties. Declines in Early Fall Canada goose hunter participation since the early 2000's is a concern with roughly half the number of hunters participating since 2003 (Table 9).

From 1998-2006, the federal framework for the regular Canada goose season allowed a 95-day season with a 3 bird daily bag. Beginning in 2007, the framework was extended to 107 days, the maximum allowed under the Migratory Bird Treaty Act. In addition, in 2010 South Dakota began to utilize an August Management Take (AMT) in areas of the state experiencing high levels of agricultural depredation or concerns regarding human safety (Table 10). These days open to hunters are outside the federal framework and are meant to address extreme levels of depredation on agricultural fields by locally breeding giant Canada geese. Despite high interest initially, participation and harvest has declined sharply since a peak of over 36,700 geese estimated to have been taken in 2012 by 3,636 hunters to 10,221 geese harvested by 1,686 hunters in 2015 (Table 10).

Table 8. Canada goose management decision table.

"MANAGEMENT TOOLS"	RESTRICTIVE MANAGEMENT	MODERATE MANAGEMENT	LIBERAL MANAGEMENT
	<i>Increase Population</i>	<i>Maintain Population</i>	<i>Decrease Population</i>
Justification	<p>Canada goose population below objective based on available biological data, hunter survey comments, landowner comments, public comments, and field staff observations.</p> <p>Goose depredation on row crops is expected to be limited and should be adequately addressed through the wildlife damage management program.</p> <p>Non-lethal tools will primarily be used; however, unique situations may be addressed using nest work or kill permits.</p>	<p>Canada goose population at objective based on available biological data, hunter survey comments, landowner comments, public comments, and field staff observations.</p> <p>Manageable Canada goose depredation on row crops is expected, but should be adequately addressed through wildlife damage management program.</p> <p>Non-lethal tools will primarily be used, but chronic depredation issues may be addressed using nest work and kill permits.</p>	<p>Canada goose population above objective based on available biological data, hunter survey comments, landowner comments, public comments, and field staff observations.</p> <p>Goose depredation on row crops is expected to be above desired levels. The wildlife damage management program has difficulty addressing requests in a timely manner. Non-lethal tools will be used, but nest work and kill permits will be used frequently to stop row crop damage.</p> <p>Indicators for this category would be moderate to overabundant populations causing moderate to major depredation issues.</p>
Spring Population Index (3-Year Average)	Below 125,000 (Two consecutive 3-year averages)	125,000-175,000	Above 175,000 (Two consecutive 3-year averages)
Regular Season Days	Full Framework	Full Framework	Full Framework
Regular Season Daily Bag	Daily Bag: Unit 1: 3 - 5 Units 2 and 3: 4	Daily Bag: Unit 1: 5 - 8 Units 2 and 3: 4	Daily Bag: Unit 1: Up to 8 Units 2 and 3: 4
Early Fall September Season (Unit 1)	Yes (Consider Restricting Season Length) Daily Bag: 3 - 5	Yes Daily Bag: 5 - 8	Yes Daily Bag: Up to 15
August Management Take	Not available except for human safety concerns.	Can be available in areas with unacceptable levels of crop depredation or human safety concerns. Daily Bag: 8	Can be available in areas with unacceptable levels of crop depredation or human safety concerns. Daily Bag: Up to 15

Table 9. Early fall Canada goose hunting seasons, 1996-2014.

Year	# Hunters	Daily Limit	# Counties Open	Harvest
1996	6,586	1 & 2	10	12,866
1997	6,506	2	13	11,281
1998	6,682	4	13	15,768
1999	9,173	5	14	25,960
2000	10,142	5	20	37,365
2001	8,358	5	27	51,491
2002	9,459	5	27	34,831
2003	10,152	5	27	42,417
2004	7,662	5	27	26,113
2005	5,686	5	28	21,499
2006	6,095	5	28	25,755
2007	5,876	5	56	26,698
2008	5,275	5	55	27,924
2009	6,157	5	55	39,275
2010	5,767	8	55	44,183
2011	5,417	8	55	50,361
2012	3,636	15	55	28,788
2013	4,528	15	54	29,887
2014	5,106	15	54	28,814

Table 10. August Management Take summary, 2010-2015.

Year	# Hunters	Daily Limit	# Counties Open	Harvest
2010	3,538	8	15	29,047
2011	3,211	8	17	30,300
2012	3,636	15	22	36,757
2013	2,345	15	23	18,592
2014	2,302	15	23	20,671
2015	1,686	15	23	10,221

South Dakota Derivation of Harvest

Band recovery analysis indicates the majority (74%) of Canada geese recovered in South Dakota in August and September from 1998-2014 were banded in South Dakota (Figure 3). Other important banding regions that contributed birds recovered in August and September in South Dakota from 1998-2014 were Kansas (8%), Nebraska (6%), Oklahoma (3%), and Canada (3%). There were a total of 3,117 Canada goose hunting recoveries in South Dakota during August and September from 1998-2014.

Analysis also indicates that 49% of Canada geese recovered in South Dakota during all Canada goose hunting seasons from 1926-2014 were banded in South Dakota (Figure 4). Other important banding regions that contributed birds recovered during all Canada goose hunting seasons from 1926-2014 in South Dakota were Saskatchewan (10%), North Dakota (7%), Kansas (4%), Minnesota (6%), Missouri (5%), and Nebraska (3%). There were a total of 18,971 Canada goose hunting recoveries in South Dakota during all Canada goose hunting seasons from 1926-2014.

Figure 3. Derivation of harvest for August/September hunter shot banded Canada geese in South Dakota, 1998-2014. (USGS 2015)

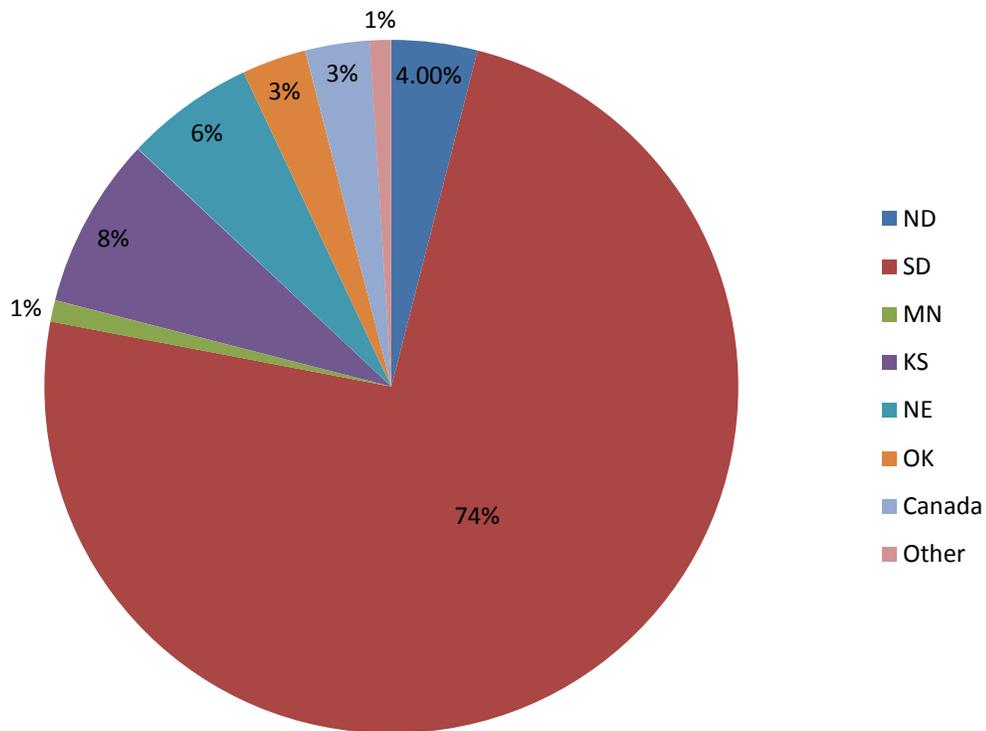
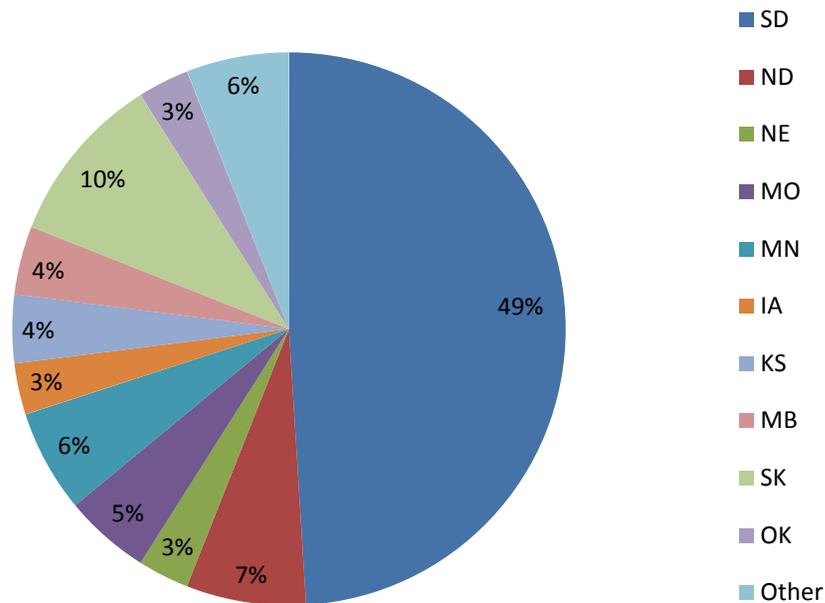


Figure 4. Derivation of harvest of all hunter shot banded Canada geese in South Dakota, 1926-2014. (USGS 2015)



Objective 3:

Cooperatively work with private landowners to reduce Canada goose depredation to growing crops.

Strategy 3a:

Respond to all Canada goose depredation concerns on private land in a timely manner.

Strategy 3b:

Annually evaluate effectiveness of WDM depredation abatement techniques, services, and programs such as:

- Non-lethal abatement techniques include: permanent fence, temporary electric fence, temporary and permanent vegetative barriers (i.e. wheat or CRP buffer strips), food plots, and various hazing techniques (i.e. propane cannons, cracker-shells, kites and flagging, coyote decoys, and harassment)
- Lethal techniques include: egg and nest destruction, trapping, relocating, and lethal take as authorized by USFWS permit.
- Discuss other alternative wildlife damage management tools.

Strategy 3c:

Continue to develop and research new techniques that can minimize crop damage and damage to private property caused by Canada geese.

Strategy 3d:

Continue to obtain and utilize the USFWS special state Canada goose permit to address Canada goose depredation concerns in areas where determined appropriate.

Strategy 3e: Continue to evaluate funding levels to ensure sufficient funds are available to address Canada goose depredation requests for assistance from private landowners.

Strategy 3f: Continue to utilize hunting opportunities where/when possible to address Canada goose depredation on private land.

DISCUSSION

Canada goose management in South Dakota is a complex and adaptive process that must include careful consideration of the biological, social, economic, and political impacts. Wildlife managers must make decisions that recognize these considerations because wildlife is a public-trust resource yet utilizes private lands throughout the year. Over 80% of South Dakota is comprised of private land ownership and sportsmen and women rely heavily on these private lands for hunting opportunities and access. Gigliotti (2009) found that 62% of resident waterfowl hunters relied on private land for hunting access. In 2014, there were over 12,000 licensed hunters estimated to have hunted Canada geese in South Dakota (Huxoll 2014). Canada goose populations have varied greatly over the past 20 years (Figure 2). From 2011-2013 goose numbers peaked in South Dakota, with the U.S. Fish and Wildlife Service estimating the spring population index (three-year average) at over 248,000 birds (Table 7) compared to South Dakota Department of Game, Fish and Parks (SDGFP) former management objective of 80,000 to 90,000 (three-year average) (Vaa et al. 2010). This elevated population level has resulted in decreased landowner tolerance due to crop damage experienced in many areas of eastern South Dakota. Werner and Clark (2006) also reported that increasing populations of Canada geese have led to more human-wildlife conflicts.

For wildlife management plans to be successful, private landowners must be considered and worked with in a cooperative manner to obtain effective results (Bookhout 1996). SDGFP strives to maintain a balance between viable Canada goose populations, social tolerances, and the needs of a variety of stakeholders. At times, this balance is difficult to achieve as landowners suffer crop damage from local Canada geese while sportsmen desire more Canada geese for hunting opportunities. Canada goose depredation has been a challenging issue for private landowners and wildlife agencies for many years (Fisk 2014, Reiter et al. 1999). SDGFP understands that cooperative partnerships with private landowners are an essential component to giant Canada goose management. Without this partnership, it would not be possible to meet the agency's responsibility of successfully managing South Dakota's Canada goose population. It is because of these important considerations that SDGFP operates such an active and comprehensive wildlife damage management program regarding Canada goose depredation. Human dimensions research suggests public support for management of wildlife that is causing damage to personal property when non-lethal techniques are employed (Reiter, et al. 1999) as well as when lethal techniques are utilized (Coluccy, et al. 2001 and Gigliotti 2010).

As the Canada goose population increased in South Dakota in the 1990's, SDGFP worked with the South Dakota Legislature to establish a funding mechanism to provide wildlife damage abatement services. In 1998, a five-dollar surcharge was established on most types of hunting licenses. Fifty-percent of these funds are allocated to SDGFP's wildlife damage management program and the other fifty-percent go to hunter access programs. This funding source was the financial foundation for which SDGFP's Canada goose depredation abatement program was initiated.

WILDLIFE DAMAGE MANAGEMENT ACTIVITIES

From the year 2000 through 2015, SDGFP has spent over \$5.6 million addressing Canada goose depredation on private lands (Figure 5). Annual expenditures range from approximately \$147,000 to \$717,000 and impact hundreds of landowners. Because these programs are funded one-hundred percent by sportsmen and women, SDGFP requires that all landowners that participate in Canada goose depredation abatement programs sign an agreement that states, *"the Producer agrees to allow reasonable, free public hunting access to non-family members who obtain proper permission" and "the Producer agrees NOT to charge any person or entity a fee or payment for Canada goose hunting access"*. To achieve successful Canada goose management, it is imperative that sportsmen and women have access to private lands and Canada goose populations are largely managed through regulated hunting. Additionally, hunting has been shown to increase social/landowner tolerance of wildlife damage in some situations (Conover 2001).

The demand for Canada goose damage abatement services fluctuates annually due to population levels, reproductive success, time of year, wetland conditions, and changes to agricultural practices. However, the most significant factors that affect social tolerance and demand for Canada goose damage abatement services are local Canada goose population levels and landowners' financial dependency on affected crops. For example, Lacey et al. (1993) found that tolerance for wildlife depredation quickly diminished as landowners' economic dependency on their land increased. When the spring Canada goose population index peaked in South Dakota in 2012, SDGFP experienced record numbers of requests for assistance from landowners as well as record amounts of expenditures to reduce Canada goose damage on private property (Figure 6). In a survey conducted by Longmire (2014) 42% of responding landowners that had Canada geese present on their property indicated that Canada geese had caused damage to their property within the last year. Similarly, Gigliotti (2007) found that 37% of landowners that responded to the survey indicated they had Canada goose damage within the past two years.

In eastern South Dakota, conflicts with Canada geese occur during the summer months (mid-May through early-August) when adult birds are molting feathers and are flightless and when goslings are being raised and haven't fledged. When these conditions occur adjacent to agricultural areas, Canada geese can cause damage to growing crops (Schaible et al. 2005).

Spring and fall migrations primarily occur before and after crop development and harvest, limiting the potential for agricultural depredation. Due to the wetland-agriculture matrix that occurs in eastern South Dakota, there are many areas where depredation occurs. Flightless geese gain access into agricultural fields from adjacent water bodies and begin feeding on growing crops. While a variety of growing crops (wheat, oats, corn, soybeans, etc.) can be damaged, the majority of the damage occurs in soybean fields. Radtke and Dieter (2011) also found that this flightless period is the most problematic because it overlaps with the early stages of crop development, specifically for soybeans. Corn and wheat typically grow fast enough that the plants can outgrow the feeding activity from the Canada geese. While these crops can be damaged in the very early stages of development, they can recover quickly and are not as sought after by Canada geese later in development. Soybeans are planted later in the growing season, with early stages of growth coinciding with the Canada goose flightless period. Dieter, et al. (2013) utilized time-lapse photography and documented substantial damage to soybean plants from 20-30 Canada geese in a single day. Radtke (2008) found that soybean fields near water bodies or wetlands that were not protected by SDGFP's damage abatement programs experienced approximately three acres of damage. Schaible et al. 2005 documented damaged as high as 11.6 acres in some extreme cases. In both situations damage estimates were based from visual observations and not yield data. The damage to soybeans can be severe and dependent upon the growth stages of the plants. The soybean plants can recover but yields can be impacted. Other times, growing points of the soybean plant are damaged, preventing re-growth. Damage to crops caused by Canada geese can be substantial to some producers (Appendix E).

SDGFP's Canada goose depredation abatement program and services are multi-faceted and designed to prevent and/or reduce crop damage caused by Canada geese. SDGFP's non-lethal abatement techniques include: permanent fence, temporary electric fence, temporary and permanent vegetative barriers (i.e. wheat or grass buffer strips), food plots, and various hazing techniques (i.e. propane cannons, cracker-shells, kites and flagging, coyote decoys, and harassment). SDGFP also utilizes their Special state Canada goose permit obtained from the USFWS which allows SDGFP and its sub-permittees to conduct resident Canada goose management and control activities through egg and nest destruction, trapping, relocating, and lethal take of Canada geese in order to contribute to human health and safety, protect personal or public property, and prevent injury to people and property in accordance with all conditions specified in 50 CFR 21.26. This permit allows SDGFP the annual take of up to 9,000 Canada geese and 2,500 nests (Appendix F). Use of this permit varies due to the number of local birds, overall population levels, effectiveness of non-lethal techniques, severity of crop damage, and the history of crop damage at certain locations (Figure 7). SDGFP has increased the use of landowner kill permits in recent years. The ability to issue landowner kill permits has better engaged producers and increased social tolerance for Canada geese in many situations. The human disturbance caused by removing a small number of birds at a specific location often hazy geese away from the immediate area. Kill permits have limited negative affects to the overall population as a small number of birds are removed relative to the total population (i.e. less than 1% of the population in 2015). In 2015, 348 kill permits were issued with 1,118 birds taken or an average take per permit of approximately three birds.

SDGFP has implemented egg addling techniques in certain areas of South Dakota that have a history of crop damage. The USFWS permit allows the use of three techniques: puncturing, shaking, or oiling. Once SDGFP determines that egg addling is an appropriate management approach at a specific location, SDGFP staff locates nests (typically on islands) and apply oil (mineral oil) or drill holes in the eggs, killing the developing embryo. Both of these egg addling techniques are effective at reducing hatching success (Christen, et al.1995 and Cooper and Keefe 1997). Eggs are addled once the majority of females have completed clutches and are incubating eggs. Addled eggs are left in the nest while the female continues to incubate the eggs even though they will not hatch. By the time the female goose realizes that the eggs are not going to hatch it is too late to re-nest. Christen, et al. (1995) found that Canada geese whose eggs were addled did not re-nest in the immediate area. SDGFP also has experienced essentially no re-nesting at addling sites as repeated visits to the nesting islands typically results in no new nests being found.

The use of trap and relocation of Canada geese to address crop damage or urban conflicts has not been utilized in South Dakota since 2012. Canada geese have expanded their range to nearly all areas of South Dakota and this technique requires substantial staff resources to capture and relocate the birds. Also, unless the birds are young and have not gained flight, they may return to the location where they were captured. SDGFP utilized trap and relocation of a limited number of urban and nuisance birds (1,442) during the years from 2000 to 2011 (Appendix G, H). Due to Canada geese expanding their current occupied range in South Dakota and the potential conflicts when croplands are present, SDGFP discontinued relocating Canada geese.

The most successful and widely used abatement technique used to address crop damage from Canada geese is the installation of temporary electric fence (Appendix I). The fence is installed along the edge of the water body and is approximately 12 inches above the ground and utilizes energized solar units and plastic posts. This fence serves as an effective barrier to flightless Canada geese and unless a large number of birds put pressure on the fence to gain access to growing crops, can be very effective. (Radtke and Dieter 2011) found that utilizing electric fence to protect growing crops is effective at limiting crop damage at certain locations in eastern South Dakota. For many years, SDGFP has successfully implemented this management technique across eastern South Dakota to reduce Canada goose damage to growing crops.

SDGFP also provides cooperative funding to landowners that plant wheat or other small grains as food plots or plant native grasses as buffer-strips around wetland edges (Appendix J). These buffers strips can provide a feeding area and/or a protective band of taller vegetation which serves as a visual barrier around the wetland limiting Canada geese access to cropped fields. Radtke and Dieter (2010) documented that Canada geese would only travel inland to feed on soybeans a maximum of 36 meters during their research. Food plots provide an area along wetland edges that serve as feeding sites while providing a visual barrier to the cropped field. In fiscal year 2015, SDGFP spent over \$50,000 in cost-share assistance to cooperating landowners that planted food plots and buffer-strips of wheat, primarily in northeastern South

Dakota. Landowners that experience Canada goose usage and want to plant an area of their field for Canada geese to feed are eligible for up to \$2,000 of cost-share assistance which consists of an average rental rate per acre to cover the establishment of the food plot. Canada geese can find these areas highly attractive and dependent upon other factors (i.e. availability of other food and local population levels) may attract large concentrations of Canada geese. Landowners that plant wheat buffer-strips as a protective barrier around other crop types such as soybeans are eligible for up to \$4,000 of cost-share assistance to establish the buffer-strip. This assistance includes a \$40 per acre payment in addition to the average rental rate. Native grass buffer-strips provide a barrier of tall grasses to protect crops while also providing wildlife habitat. Landowners that plant these buffer-strips receive annual payments between 120% - 160% of the average rental rate as well as incentive payments for signing a Conservation Reserve Program (CRP) contract. Due to fluctuating water-levels, certain restrictions from USDA, and different management practices needed to establish and manage these native grass buffer-strips, the interest from landowners for this component of the program has been minimal.

Finally, SDGFP employs a number of hazing techniques (i.e. propane cannons, pyrotechnics, dogs, flags, kites, coyote decoys and harassment with boats or ATV's) to scare and haze the birds away from the immediate areas (Appendix K). Hazing can be an effective management tool but takes repeated and consistent efforts to be effective. Many times, Canada geese can become habituated to these hazing efforts and they are effective for only short amounts of time (Heinrich and Craven 1990).

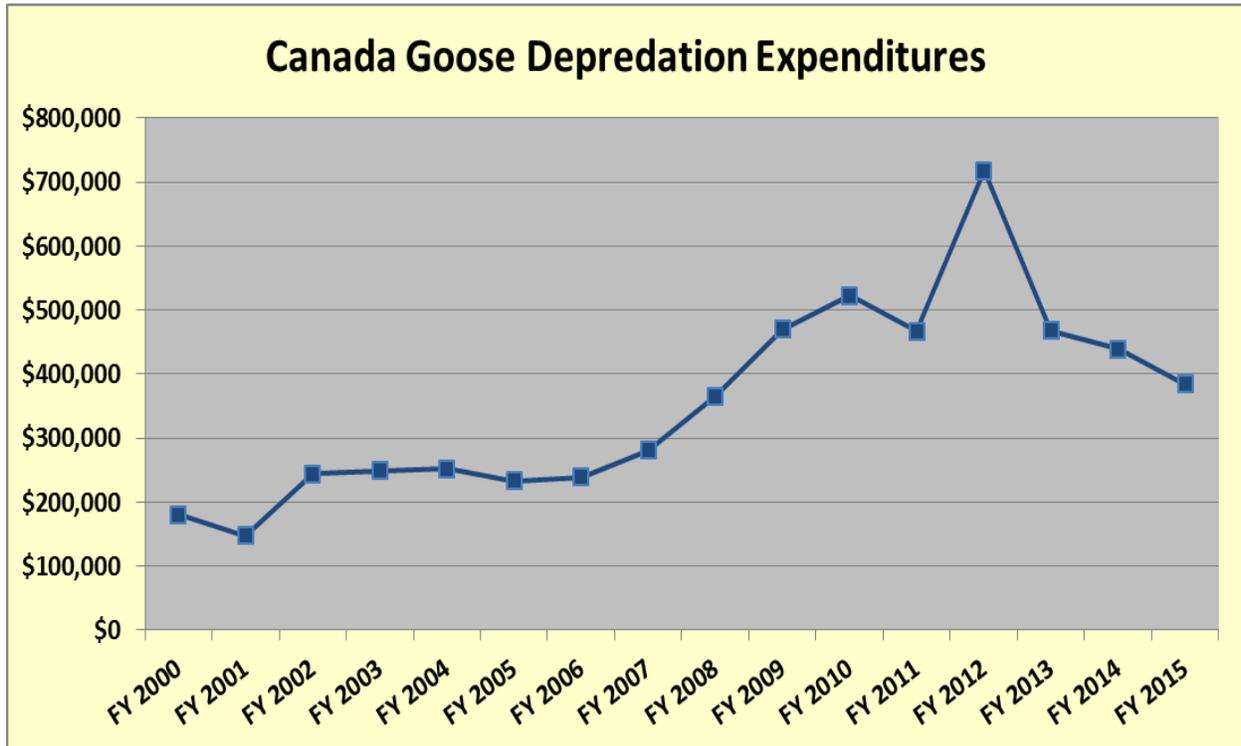
SDGFP utilizes hunting as the primary management tool to address Canada goose populations whenever possible. The Early Fall September season and AMT were developed to reduce local populations in areas experiencing high levels of depredation using hunters. Unfortunately, most depredation situations occur outside the frameworks of available hunting seasons. In an effort to haze local birds away from traditional locations that experienced crop damage, SDGFP implemented the Spring Canada Goose Program in 2013 and 2014. This experimental program utilized volunteers to take Canada geese from identified areas under SDGFP's special state Canada goose permit authorized by the USFWS. The Spring Canada Goose Program was an attempt to utilize human disturbance to move birds away from traditional damage areas as well as reduce the overall number of birds in localized areas during the month of April. In 2013 and 2014, volunteers took 820 birds and 665 birds, respectively. Based upon weights from birds that were killed, SDGFP reported that approximately 95% of the birds killed were giant Canada geese, not smaller arctic nesting Canada geese. The number of birds taken was substantially lower than SDGFP anticipated. Reported comments from volunteers indicated that killing Canada geese was very difficult because the use of more traditional hunting tools and techniques (i.e. calls, blinds, decoys, etc.) could not be utilized under the special state Canada goose permit authorization. Other reported comments were related to time conflicts with other activities such as spring fishing and turkey hunting. Due to the minimal number of birds killed, difficulty of killing the birds, and negative comments received from non-participating hunters that did not support the program, SDGFP determined to no longer utilize this management tool.

SDGFP continues to research and evaluate new and innovative ideas and solutions to address Canada goose conflicts with agricultural crops. Most recently, SDGFP has worked cooperatively with a private chemical company, South Dakota State University, and the USDA National Wildlife Research Center on the development of a chemical deterrent and the associated best management practices that when applied to soybean plants, would protect the plants from Canada goose damage. Chemical deterrents have the potential to be effective at reducing crop damage (Werner et al. 2009) as well as potentially being more economical and less labor intensive than current abatement techniques (Dieter, et al. 2014). This ongoing research will take time to develop and meet all the regulatory requirements but has potential as another non-lethal management tool to reduce Canada goose damage to soybean fields in the future. While many of these management techniques and strategies have proven successful over the past 20 years, Canada goose depredation and the associated conflicts will continue to challenge SDGFP. These matters not only involve the management of Canada geese but also include socio-economic and political dynamics that must be considered as well. To help reduce or alleviate many of these conflicts, SDGFP must ensure that Canada goose populations are managed effectively and that all management objectives are being met. Defined wildlife population levels and management objectives are critical to effectively manage wildlife populations. SDGFP also acknowledges that its wildlife damage programs will not be able to completely resolve all issues regarding Canada goose depredation. However, SDGFP has a proven history of working with private landowners and is committed to cooperatively working with private landowners into the future to implement reasonable solutions to address most concerns.

There are several municipalities in South Dakota that deal with urban geese and associated conflicts. In most situations, GFP only provides technical assistance as GFP's wildlife damage management program does not operate within city limits. In urban and suburban areas where hunting is not a management option due to firearm restrictions and human safety concerns, municipalities can implement population reduction techniques such as egg/nest destruction and other culling techniques may be considered (per USFWS regulations) along with hazing, fencing, the development of alternative feeding/loafing sites. GFP has also begun working with individual cities on cooperative goose management plans to address urban goose conflicts.

Starting in late 2008 GFP staff started to work with Rapid City to help alleviate urban goose and domestic waterfowl complaints. The end result was the development of a city waterfowl management plan in 2009. In 2011, the city of Sioux Falls has also adopted an urban wildlife management plan that includes Canada goose management. These plans follow several basic concepts also used in urban deer management plans: enactment of no-feeding bans, short- and long-term management options, long-term evaluations of the plan's effectiveness and results of the management options, and partnership with GFP staff. (Appendix L).

Figure 5. Annual Canada goose depredation expenditures for fiscal years, 2000-2015.



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Figure 6. Requests for depredation service versus Canada goose yearly spring population index, 2006-2015.

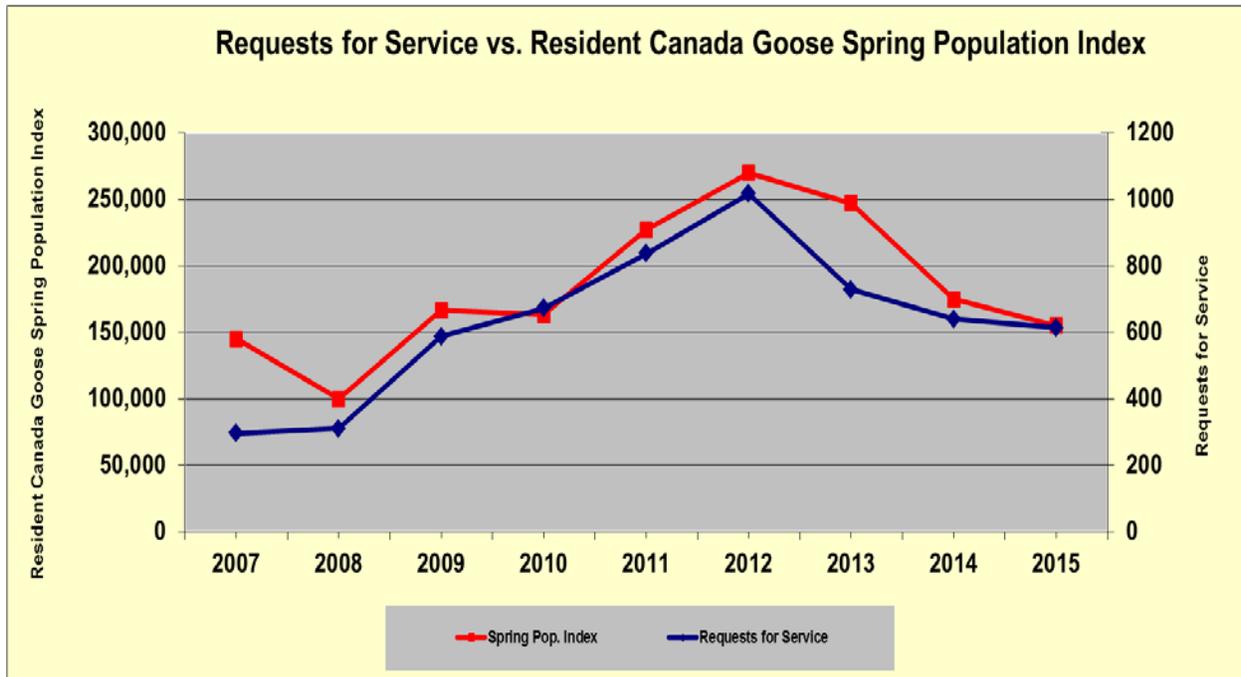
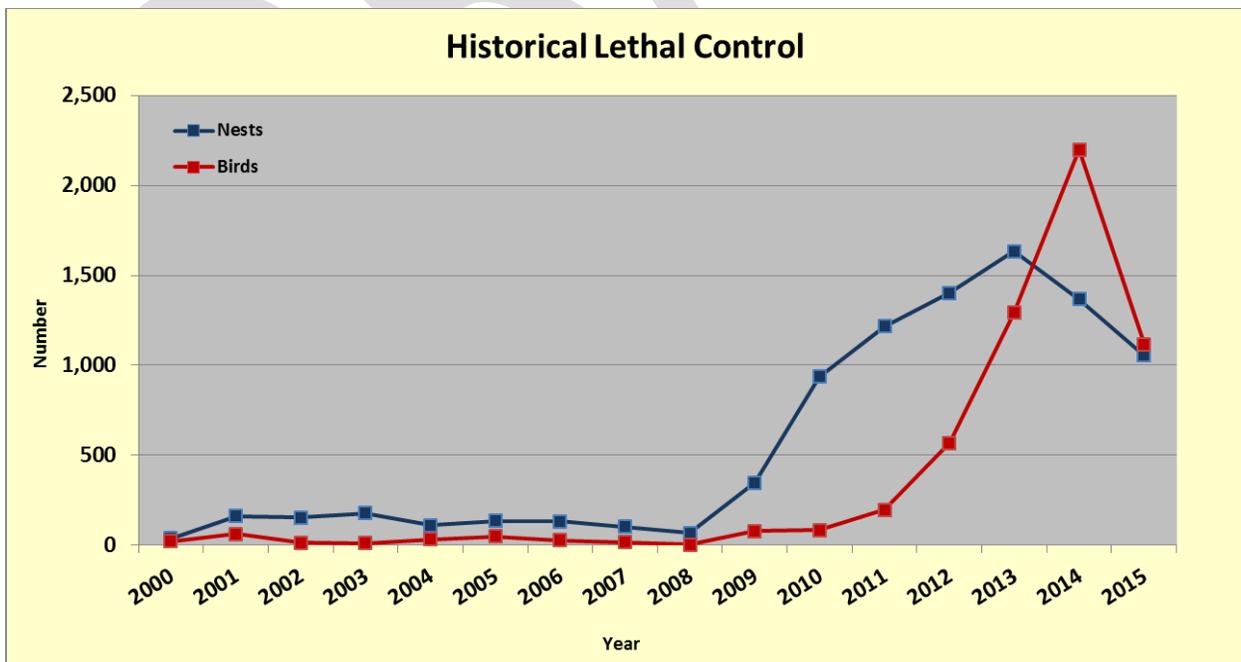


Figure 7. Special state Canada goose permit activities, 2000-2015.



- Objective 4:** Provide the public with quality Canada goose hunting access opportunities on private and public lands.
- Strategy 4a:* Continue to promote, utilize, and target SDGFP’s Walk-In Area and Controlled Hunting Access Programs specifically for Canada goose hunting opportunities.
- Strategy 4b:* Continue to provide up-to-date private land hunting access and public hunting land layers for free download to GPS units and smartphones.
- Strategy 4c:* Continue to acquire Game Production Areas offering Canada goose hunting opportunities from willing sellers.
- Strategy 4d:* Continue to utilize social media and other effective communications methods to promote and encourage hunters to ask permission to hunt private lands.

DISCUSSION

Providing quality hunting access to both public and private land is important for hunter recruitment and retention, and critical for managing Canada goose populations. Maintaining and increasing goose hunter numbers in South Dakota also serves to strengthen support for wetland and grassland conservation in South Dakota. Additionally, the North American model for wildlife management primarily uses sportsmen’s dollars for the continued management and sustainable use of Canada geese in South Dakota.

PUBLIC ACCESS

All public wildlife lands including Game Production Areas, Waterfowl Production Areas, and National Wildlife Refuges are open to the public hunting during open seasons and for viewing and photographic opportunities year round. SDGFP owns approximately 717 Game Production Areas (GPA’s) in fee title with over 295,000 acres. The USFWS owns 1,000 Waterfowl Production areas in South Dakota totaling nearly 150,000 acres. SDGFP has an active land acquisition program and should continue to purchase high quality Canada goose habitat in the form of GPA’s from willing sellers into the future. Beginning in 2009, SDGFP began a ground breaking habitat and access program in partnership with USDA, the James River Watershed Conservation Reserve Enhancement Program (CREP). As of the fall of 2015, over 81,000 acres were enrolled into this highly successful habitat and access program. Both wetlands and uplands are restored through CREP, providing nesting and brood rearing habitat for Canada geese. The South Dakota James River CREP has provided a strong boost for wildlife in eastern South Dakota, while providing hunters with quality hunting access to private lands. South Dakota GFP also leases roughly 1.2 million acres as part of its Walk-In Area (WIA) program, many in prime Canada goose hunting areas. A portion of the WIA enrolled lands includes

46,000 acres enrolled as Cooperative Hunting Access where driving is permitted to place and retrieve waterfowl decoys. SDGFP also currently leases over 31,000 acres of private land in Hughes and Sully Counties as part of the Lower Oahe Waterfowl Access Program. This unique mixture of decoy and pass shooting opportunities provides public access to late season Canada goose hunting on private land adjacent to Lake Oahe. In addition, decoys, blinds, and trailers are available on loan to hunters in need of equipment. Information on the most recent updated boundaries and rules for public and private lands open to hunting in South Dakota can be found at www.gfp.sd.gov/hunting/areas/maps/updates.aspx. In addition, maps can be downloaded into GPS units and smartphones at www.gfp.sd.gov/hunting/areas. Since 2011, SDGFP also acquired 14 properties as GPA's for \$2.5 million dollars, leading to the protection of 830 acres of upland and 424 acres of wetland habitat.

- Objective 5:** Utilize federal, state, and local partnerships and programs to address Canada goose habitat issues, challenges, and opportunities.
- Strategy 5a:* Continue active involvement in the Prairie Pothole Joint Venture through participation on both the management board and technical committee.
- Strategy 5b:* Continue to engage in state level and local partnerships to guide development and delivery of state and federal habitat programs benefitting Canada geese.
- Strategy 5c:* Continue to support an active private lands habitat program, and provide cost share and technical assistance to landowners for wetland and grassland habitat conservation.
- Strategy 5d:* Continue to support the placement of Pheasants Forever Farm Bill Biologists in USDA offices to support and deliver farm bill conservation programs.
- Strategy 5e:* Continue to restore, create, enhance, and protect wetlands and grassland buffers throughout South Dakota to provide habitat for giant Canada geese.
- Strategy 5f:* Encourage the use of and cost share for Canada goose nesting structures when populations fall below objective levels of 125,000 (three year index average).

DISCUSSION

The Prairie Pothole Joint Venture (PPJV) is a voluntary, self-directed partnership that functions as a network of partners at the local, regional, national and international levels. The joint

venture system across North America serves to step down habitat goals and objectives outlined in the North American Waterfowl Management Plan (NAWMP). The partnership involves federal and state agencies, non-governmental conservation groups, private landowners, scientists, universities, policy makers, resource managers, corporations interested in conservation, and others interested in prairie habitat conservation. SDGFP participates directly in the PPJV via its seats on the management board and technical committee.

Pheasants Forever Farm Bill Biologists are specialized staff in conservation programs and habitat planning. The purpose of Pheasants Forever (PF) Farm Bill Biologists is to assist landowners in designing, developing, and funding habitat improvements on private lands. PF Farm Bill Biologists possess the knowledge of federal, state, and local programs to assist landowners in finding the right program to meet their personal habitat and land use goals. Through a unique partnership, PF Farm Bill biologists are located in eleven different USDA service centers across South Dakota. Farm Bill biologists make over 3,500 conservation project contacts with landowners annually, resulting in direct habitat conservation practices being applied to thousands of acres each year. These positions are possible due to the support of partners such as the SDGFP, USDA Natural Resources Conservation Service, and local Pheasants Forever Chapters.

SDGFP has had a long and highly successful history working with private landowners to develop wetland and grassland habitat within the PPJV. SDGFP private lands staff works cooperatively with farmers and ranchers to improve management of wetland and grassland habitats through the department's Wetland and Grassland Habitat Program. Private lands biologists located across the state work with landowners – primarily producers engaged in grass-based livestock operations – to plan and implement a variety of on-the-ground conservation practices. Technical and financial assistance is provided for a variety of wetland and grassland habitat restoration techniques including wetland restoration, wetland enhancement, upland restoration, and upland enhancement. Go to www.habitat.sd.gov to learn more about the landowner programs and assistance available.

PARTNERSHIPS AND PROGRAMS

From 2009-2015 SDGFP private lands biologists completed 355 projects with private landowner cooperators to enhance or restore 55,879 acres of upland habitat and 213 acres of wetland habitat within the Prairie Pothole Joint Venture portion of South Dakota. Total cost of all projects was \$3,077,334 with cost-share of \$1,532,513 provided to landowners by SDGFP. Landowner partners contributed \$1,272,875 and other conservation partners provided \$271,946 toward the projects. Canada geese are highly dependent on seasonal and semi-permanent wetlands for many aspects of their life cycle including nesting, brood rearing, and molting (Naugle 1997). Restoring, maintaining, creating, and enhancing wetlands are vital in providing the necessary habitat to meet the needs of Canada goose populations. SDGFP should encourage policies and programs that facilitate wetland conservation and maintain an active private lands habitat program. Nesting sites can be a limiting factor for Canada geese, especially during periods of drought (Naugle 1997). When goose populations are below

objective 125,000 (three-year average index) SDGFP should promote the use of artificial nesting structures and provide cost share through its private lands habitat program.

Another extremely important source of funding for prairie conservation work in South Dakota is the North American Wetland Conservation Act (NAWCA) grant program. This federal program is administered by the USFWS and is intended to fund migratory bird conservation projects delivered by joint venture partnerships throughout North America. Generating required non-federal matching funds has always been a challenge in South Dakota and SDGFP has long played a vital role in providing needed matching funds to project partners. Since 2005, SDGFP has provided nearly \$8.8 million in matching funds to NAWCA funded projects that have focused on delivering wetland and grassland conservation and enhancement projects on private and public lands. Much of that match (\$6.9 million) was committed to 14 separate partner grants/projects that focused on acquiring conservation easements from willing sellers to protect wetland and grassland habitats in priority landscapes within the PPJV portion of the state.

Objective 6: Evaluate and prioritize Canada goose research and management needs.

Strategy 6a: Periodically collaborate with stakeholders to collect and assess research and management needs and ideas.

Strategy 6b: Periodically review Canada goose survey protocol and discuss changes that could improve data collection efficiency and accuracy.

Strategy 6c: Formally evaluate the Giant Canada Goose Management Plan at least every five years. Updates and changes to the plan, however, may occur more frequently as needed.

Strategy 6d: The SDGFP will send at least one staff member to Central Flyway Council and Technical Committee meetings. These meeting facilitate the exchange of information between member states and USFWS on survey techniques, harvest regulations, research and habitat management.

Strategy 6e: The SDGFP will consider sending a representative to scientific meetings that will exchange information related to Canada goose research and management.

Strategy 6f: The SDGFP will continue to send at least two representatives to the Central Flyway Wing-bee to assist in aging and classifying Canada geese sent in through the USFWS parts collection survey.

DISCUSSION

Scientific research is an important way for SDGFP to learn about and assist in management decisions regarding wildlife populations, including Canada geese. As information needs arise, proposals are generated, evaluated, and prioritized during the SDGFP's annual research review process. Since 1948 waterfowl have been managed cooperatively along administrative flyway boundaries based on migratory pathways: the Atlantic, Mississippi, Central, and Pacific (Appendix M). SDGFP is an active partner in the Central Flyway Council and Central Flyway Technical Committee. The Flyway Councils and Technical Committees are involved in many aspects of migratory game bird management, including development of recommendations for hunting regulations and assisting in research and habitat management activities. South Dakota currently serves as chair of the Western Prairie/Great Plains east tier Canada goose committee within the Central Flyway Technical Section. This committee deals with management issues concerning temperate nesting giant Canada geese in North Dakota, South Dakota, Nebraska, Kansas, and Oklahoma. The Flyway process is the primary venue for SDGFP to engage with the USFWS on migratory bird management issues. More information on the Flyway system can be found at www.flyways.us.

COMPLETED RESEARCH

Since the early 1990's, SDGFP has funded six Canada goose research projects resulting in the completion of five masters theses, one PhD dissertation, and numerous peer reviewed journal publications. SDGFP has also partnered with USFWS on several projects including a reward band study during the mid-2000's to update reporting rate estimates for Canada geese in the Central Flyway. SDGFP annually sends at least two representatives to assist processing federal parts collection data at the annual wing bee. These data are used to generate harvest estimates and give an indication of production through age ratio information. Since 2012, SDGFP has participated in a flyway wide Canada goose banding effort (Table 1.) Recoveries from these bandings will help to better understand and cooperatively manage giant Canada geese across the Central Flyway (Appendix N, O).

Objective 7:

Inform and educate the public on giant Canada goose ecology, management and research.

Strategy 7a:

By August 2016, provide an electronic copy of the "South Dakota Giant Canada Goose Management Plan, 2016-2020" on the department's website. Printed copies will be available upon request.

Strategy 7b:

In 2018, host an interim meeting of the Canada goose management stakeholders group to review and discuss progress towards implementing this plan.

- Strategy 7c:* Provide research completion reports on the SDGFP website at <http://gof.sd.gov/wildlife/management/research-projects>.
- Strategy 7d:* Continue to include a one-page section in the South Dakota Conservation Digest titled “Conservation Corner” in which habitat management techniques are discussed.
- Strategy 7e:* Continue to provide hunter harvest and public opinion survey reports on the SDGFP website.
- Strategy 7f:* Annually update Canada goose hunting statistics of this plan and provide the updated plan on the department’s website.

DISCUSSION

Informing and educating the public on giant Canada goose management activities is critical for an understanding of why certain management tools are being implemented. A multitude of outreach efforts will be used to ensure this information is being made available to the greatest extent possible for those interested in the management of Canada geese.

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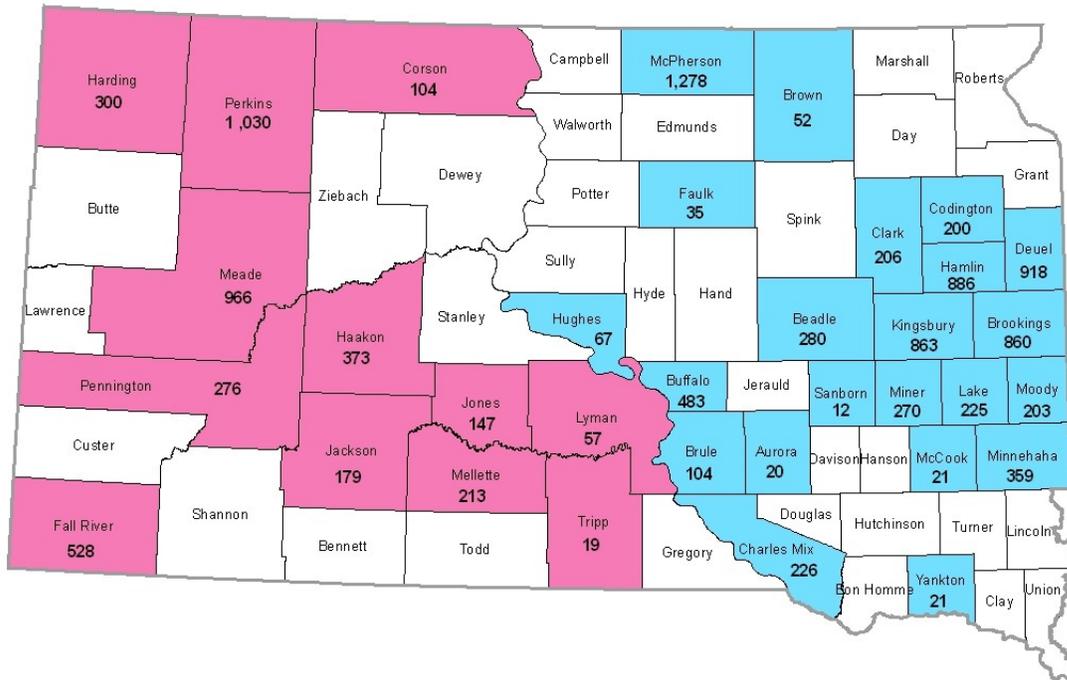
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Appendix A. Giant Canada goose restoration releases by county, 1967-1998.



WEST RIVER TOTAL - 4,189
 EAST RIVER TOTAL - 8,089
 STATEWIDE TOTAL - 12,278

Appendix B. Canada goose management stakeholder group.

Canada Goose Management Stakeholder Group

Purpose – The SD Game, Fish and Parks (GFP) “Canada Goose Management Stakeholder Group” is a diverse group of citizen stakeholders who have been asked to assist Department of Game, Fish and Parks Staff and the Game, Fish and Parks Commission in conducting a review of the broad range of issues affecting Canada goose management in South Dakota. The Canada Goose Management Stakeholder Group will assist GFP Staff and the GFP Commission by offering insight, ideas, and alternatives that could be considered in regard to the Department and Commission positions on various Canada goose management goals, strategies, challenges and related recreational opportunities.

Objectives – The basic objectives of the Canada Goose Management Stakeholder Group are to:

- Provide an additional link between the GFP Staff and the GFP Commission and the citizens we serve;
- Identify challenges and opportunities and develop ideas and suggestions regarding the range of issues affecting the management of Canada geese and associated recreation in South Dakota; and
- Promote communication, increased awareness and mutual understanding between and among the Stakeholder Group members regarding the diversity of Canada goose management challenges.

Scope of Authority – The Stakeholder Group will function in an advisory capacity only and will provide a discussion forum for members to share their personal perspective and the perspective of the group or organization they may represent on a diversity of issues related to Canada goose management. Members who serve on the Stakeholder Group do so solely in a volunteer capacity. The Stakeholder Group is granted no authority over rule-making or rule enforcement on public or private land, has no budgetary authority or authority over personnel management, nor is it granted any authority over any state or federal agency or non-governmental organization. The Stakeholder Group was assembled as an additional citizen participation opportunity but is not designed to supplant or curtail any other type of citizen participation or public involvement opportunities that may be further utilized by GFP.

Organizational Structure and Stakeholder Group Membership - The Stakeholder Group is comprised of a diverse group of citizen stakeholders who may represent a broad range of public interests in the management of Canada goose in South Dakota. Participants will attend 2 to 4 structured meetings to hear GFP Staff presentations and offer their ideas and perspectives on Canada goose management. The Stakeholder Group meetings will be facilitated by GFP staff or a third party facilitator hired by GFP.

Stakeholder Group Member Roles and Responsibilities – Working Group members will:

- Make a commitment to attend the scheduled Stakeholder Group meetings;
- Offer their thoughts and ideas and communicate with others in a respectful manner while maintaining an open mind with regard to the views and perspectives of other Working Group members, and;
- Serve as a sounding board and provide feedback and ideas to GFP Staff and the GFP Commission.

GFP Staff Roles and Responsibilities – GFP Staff will:

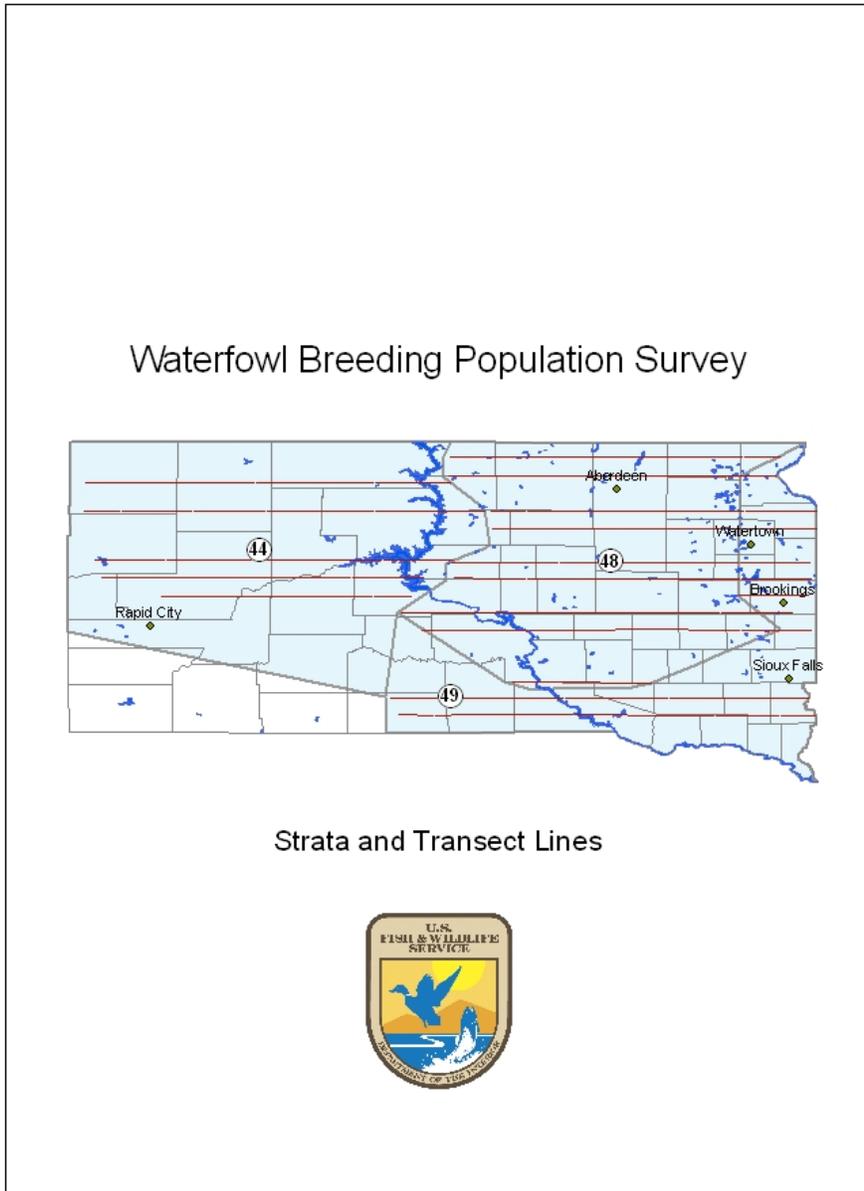
- Provide a diversity of information regarding Canada goose management to the Stakeholder Group;
- Serve the role of facilitator for the meetings, including keeping order, achieving the meeting agenda and providing a comfortable working atmosphere for Working Group members to share ideas and opinions;
- Schedule and arrange meeting room facilities, including providing all necessary communication related to the meetings;
- Listen attentively and respectfully to all viewpoints; and
- Gather meeting notes and make them available to the public via the GFP website.

Meeting Guidelines and Communication – The purpose of the Canada Goose Management Stakeholder Group is to provide a forum to promote understanding of Canada goose management issues and challenges from diverse perspectives, therefore voting or other similar methods will not be used to formulate final group consensus on issues discussed.

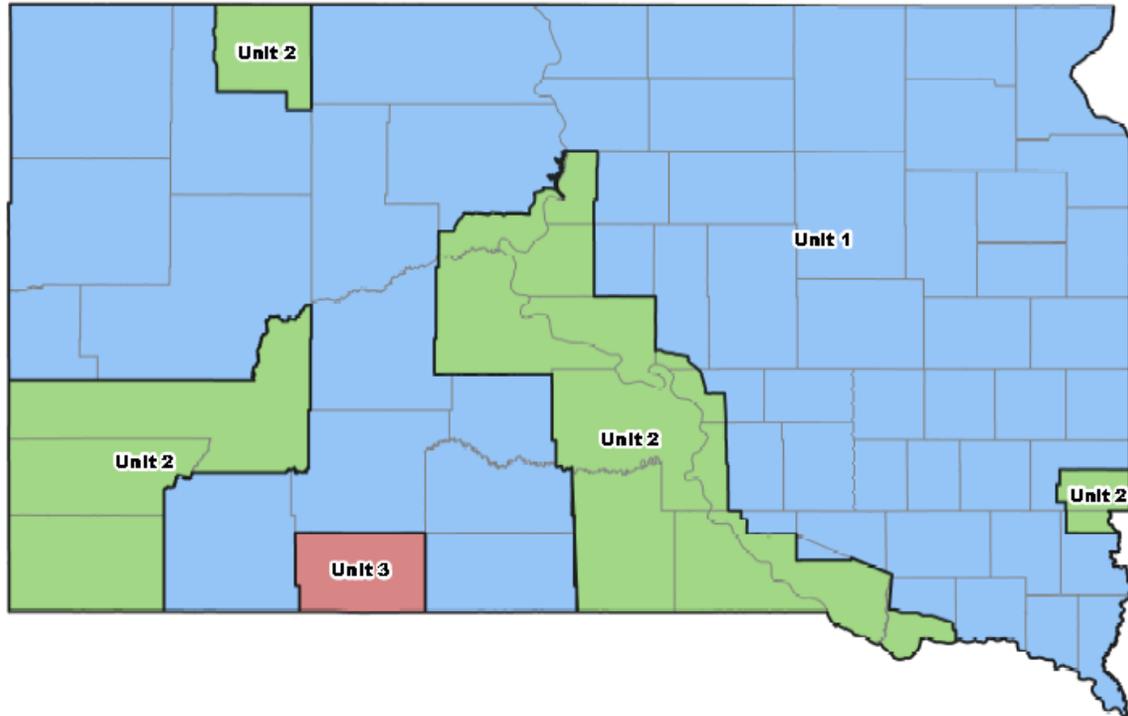
- Additional Open House meetings, citizen surveys or other public involvement techniques may be used as a means to share information and gather additional public input on any proposed changes in Canada goose management.
- Stakeholder Group members are encouraged to discuss and communicate with others about specific Canada goose management issues discussed at the Stakeholder Group meetings.

Travel Expenditures – Travel expenses (lodging, per diem and vehicle mileage) for Stakeholder Group members will be reimbursed in accordance with State Reimbursement Rules for those members who are not reimbursed by another organization or agency.

Appendix C. South Dakota strata included in the USFWS May waterfowl breeding habitat and population survey.

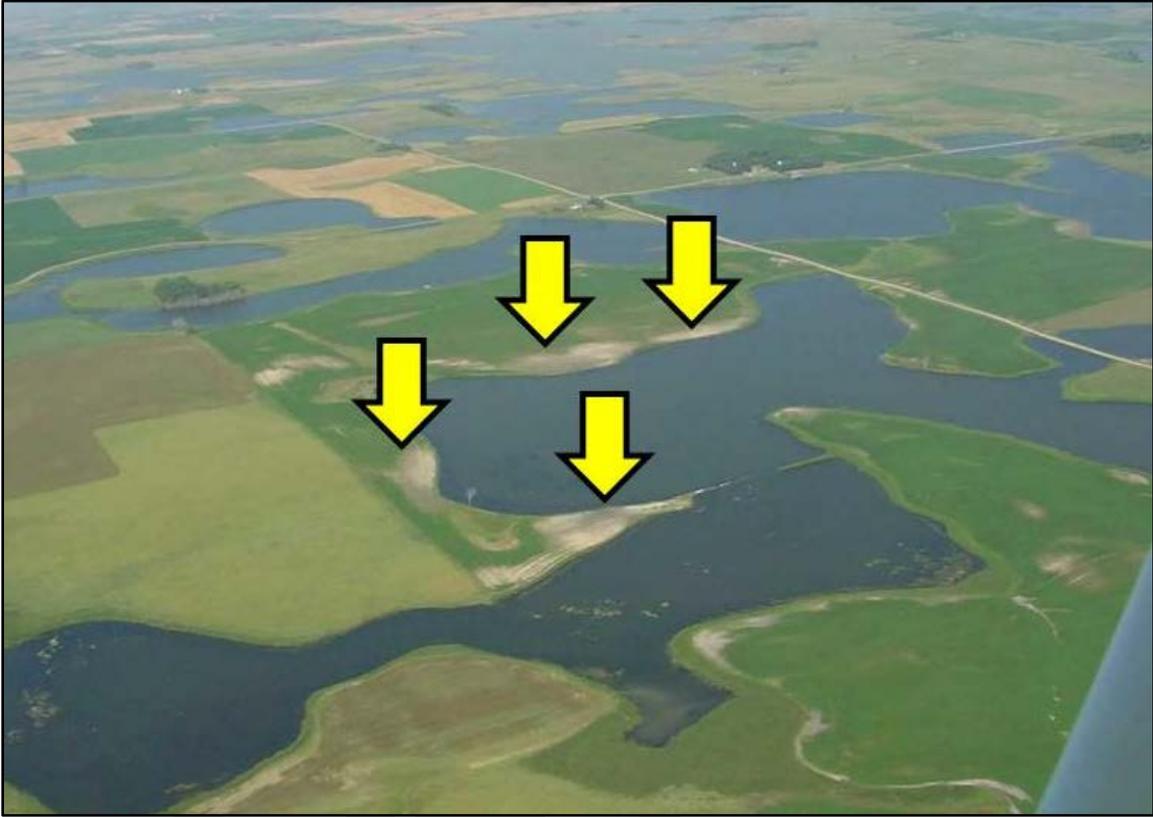


Appendix D. 2015 Goose hunting season Units.

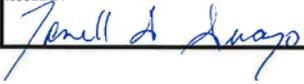


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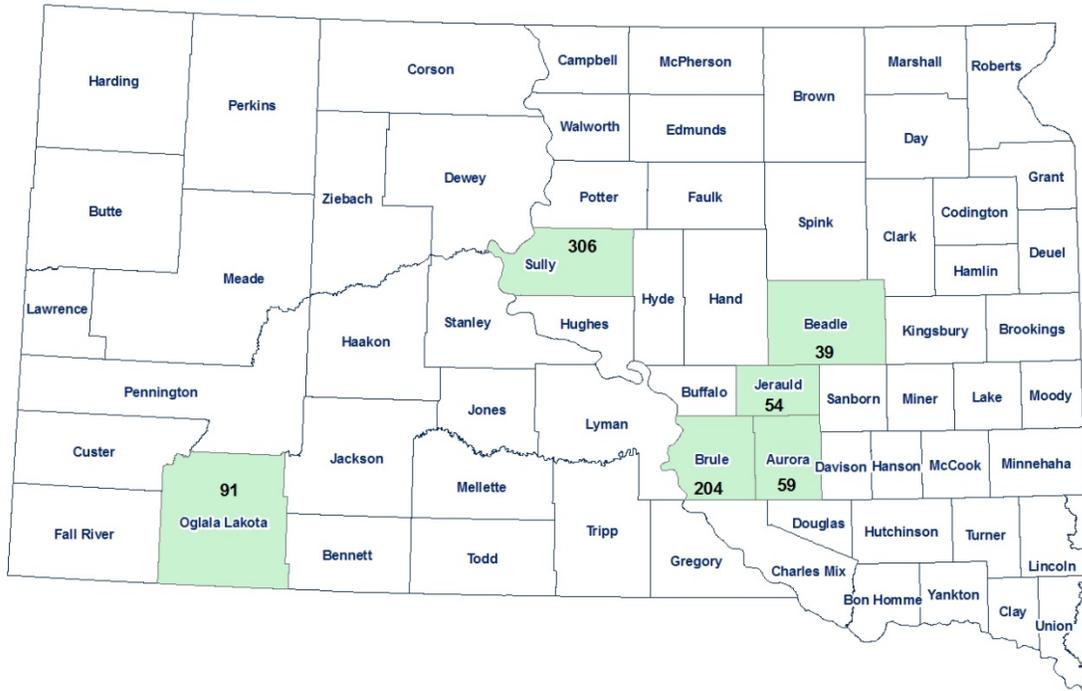
Appendix E. Aerial photo illustrating Canada goose depredation around a wetland. Yellow arrows identify areas of crop damage.



Appendix F. Special state Canada goose permit.

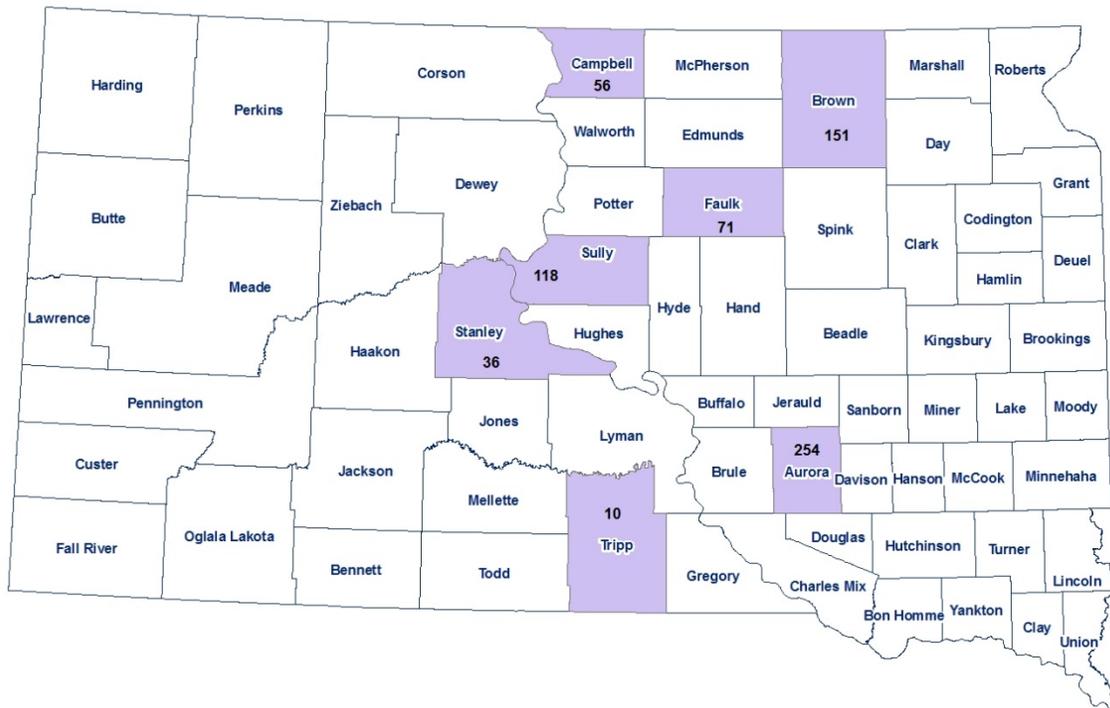
 <p>DEPARTMENT OF THE INTERIOR U.S. FISH AND WILDLIFE SERVICE</p> <p>FEDERAL FISH AND WILDLIFE PERMIT</p> <p>U. S. Fish and Wildlife Service Migratory Bird Permit Office P.O. Box 25486, DFC (60154) Denver, Colorado 80225-0486 (303) 236-8171</p>		<p>2. AUTHORITY-STATUTES 16 USC 703-712</p> <p>REGULATIONS 50 CFR 13 50 CFR 21.26</p>				
<p>1. PERMITTEE</p> <p>SOUTH DAKOTA DEPARTMENT OF GAME, FISH AND PARKS ATTN: KEITH FISK FOSS BUILDING 523 EAST CAPITOL AVENUE PIERRE, SD 57501-3182 U.S.A.</p>		<p>3. NUMBER MB023529-1 AMENDMENT</p>				
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6. EFFECTIVE 06/13/2014	7. EXPIRES 03/31/2019					
<p>8. NAME AND TITLE OF PRINCIPAL OFFICER (<i>If not a business</i>) KEITH FISK WILDLIFE DAMAGE PROGRAM ADMINISTRATOR</p>		<p>9. TYPE OF PERMIT SPECIAL STATE CANADA GOOSE PERMIT</p>				
<p>10. LOCATION WHERE AUTHORIZED ACTIVITY MAY BE CONDUCTED</p> <p style="text-align: center;">SOUTH DAKOTA</p>						
<p>11. CONDITIONS AND AUTHORIZATIONS:</p> <p>A. GENERAL CONDITIONS SET OUT IN SUBPART D OF 50 CFR 13, AND SPECIFIC CONDITIONS CONTAINED IN FEDERAL REGULATIONS CITED IN BLOCK #2 ABOVE, ARE HEREBY MADE A PART OF THIS PERMIT. ALL ACTIVITIES AUTHORIZED HEREIN MUST BE CARRIED OUT IN ACCORD WITH AND FOR THE PURPOSES DESCRIBED IN THE APPLICATION SUBMITTED. CONTINUED VALIDITY, OR RENEWAL, OF THIS PERMIT IS SUBJECT TO COMPLETE AND TIMELY COMPLIANCE WITH ALL APPLICABLE CONDITIONS, INCLUDING THE FILING OF ALL REQUIRED INFORMATION AND REPORTS.</p> <p>B. THE VALIDITY OF THIS PERMIT IS ALSO CONDITIONED UPON STRICT OBSERVANCE OF ALL APPLICABLE FOREIGN, STATE, LOCAL, TRIBAL, OR OTHER FEDERAL LAW.</p> <p>C. VALID FOR USE BY PERMITTEE NAMED ABOVE.</p> <p>The following subpermittees are authorized: South Dakota Game, Fish and Parks, Wildlife Damage Specialist personnel and any other persons under the direct control of, under, contract to, or employed by the permittee only to the extent necessary in accomplishing the purpose authorized below. Submit a list of subpermittees with annual report.</p> <p>D. You and subpermittees are authorized to conduct resident Canada goose management and control activities to resolve or prevent injury to people or property and to contribute to human health and safety in accordance with the conditions specified in 50 CFR 21.26.</p> <p>Specifically, you are authorized per year to:</p> <ol style="list-style-type: none"> (1) destroy up to two thousand five hundred (2,500) resident Canada goose (<i>Branta canadensis</i>) nests and the eggs therein; (2) capture and relocate up to three hundred (300) resident Canada geese (<i>Branta canadensis</i>) within the state of South Dakota and to other states on an annual basis; (3) lethally remove up to nine thousand (9,000) resident Canada geese (<i>Branta canadensis</i>)* <p>E. Any State employee or designated subpermittee must carry a legible copy of this permit and designation when exercising its authority.</p> <p>F. Permit amended to change Item 11D as identified by asterisk. *</p> <p><input checked="" type="checkbox"/> ADDITIONAL CONDITIONS AND AUTHORIZATIONS ALSO APPLY</p>						
<p>12. REPORTING REQUIREMENTS</p> <p>ANNUAL REPORT DUE: 01/31. You must submit an annual report to your Regional Migratory Bird Permit Office each year, even if you had no activity. Form: www.fws.gov/forms/3-202-10.pdf.</p>						
<p>ISSUED BY</p> 	<p>TITLE</p> <p>CHIEF, MBPO, REGION 6</p>	<p>DATE</p> <p>06/13/2014</p>				

Appendix G. Giant Canada goose Wildlife Damage Management trap/relocate by county, 1999-2011.



Canada geese trapped from city of Sioux Falls (Minnehaha County), Dakota Dunes pond (Union County), and city of Freeman pond (Hutchinson County) located in Region 3, and city of Rapid City Canyon Lake (Pennington County) in Region 1.

Appendix H. Giant Canada goose surplus releases by county, 1999-2011.



Surplus releases made after termination of Restoration Program. Geese came from the Great Plains Zoo, Wylie Zoo, and Sand Lake NWR captive flock.

Appendix I. Electric fence successfully protecting a soybean field.



Appendix J. Small grain buffer strip between a soybean field and wetland.



Appendix K. Propane cannon used to haze geese away from a soybean field.



Appendix L. City of Sioux Falls/Rapid City urban Canada goose management plans.

City of Sioux Falls, South Dakota

Wildlife Management Plan

Canada Goose Management Appendix

Overview of Problem

- Canada geese can and do cause concerns for private property owners, air traffic, golf courses, parks, and a variety of other locations within the city limits of Sioux Falls. SDGFP assists with some limited control by hazing, removing some of the goslings each spring in two to three different locations (an apartment complex, a golf course, and the Great Plains Zoo), and through regulated hunting seasons located just outside the city limits. The South Dakota Air National Guard and the Sioux Falls Regional Airport are very concerned about the possibility of serious health and human safety concerns within the city.
- The feeding of geese is prohibited in some places in the city where birds congregate but in other places people are allowed to feed the birds, which results in the concentration of fecal droppings and unwanted damage to grasses and other vegetation in parks, golf courses, private residences, and other locations within the city. The feeding of Canada geese also increases the possibility of disease transfer between birds. During the breeding season, Canada geese pairs can also become aggressive as they nest and protect their young from what they believe to be a threat, which could be a potential hazard to humans in certain circumstances.

Objectives

- To maintain the number of Canada geese at a level acceptable to the public, City, and SDGFP.
- To encourage Canada geese to seek alternative habitat outside city limits by limiting desirable locations and using a variety of hazing techniques within the city limits.
- To initiate a Canada goose population reduction program within the Sioux Falls city limits to relocate, destroy nests, and euthanize problematic wild Canada geese.

Scope of Activities

Overview:

- Relocation, nest destruction, and the euthanization of Canada geese may be used to bring the population of geese within the city to a more tolerable level; a long-term management plan for managing existing goose populations within Sioux Falls city limits shall be implemented.

Reconditioning:

- Existing Canada geese may be reconditioned to seek out new locations either on the fringe or outside the city limits in an effort to deter the congregation of geese near parks, golf courses, airports, homes, walkways, and other locations that can cause potential problems. City officials will use its best efforts to implement a

more rigorous hazing and site aversion programs within city limits to attempt to move geese outside of the city limits.

Removal of Canada Geese:

- The City of Sioux Falls, in cooperation with SDGFP under the authorization of USFWS, will use its best efforts to relocate, destroy nests, and euthanize problematic Canada geese from the city limits or do so when the population exceeds acceptable levels.
- Any Canada geese euthanized will be donated to food pantries or other charitable organizations whenever possible.
- Only capture nets or firearms using shotshells or rimfire cartridges will be used in the euthanization of Canada geese.
- Canada goose relocation will only be done if SDGFP is able to identify suitable sites for the stocking of the captured birds and authorizes such relocation.
- No more nests and Canada geese per calendar year may be destroyed or euthanized as outlined in the permit, unless specifically approved by the USFWS and SDGFP.
- Canada geese of either sex may be euthanized, but steps will be taken to attempt to relocate all goslings if the proper conditions exist (suitable age to move and sites available to relocate); otherwise, they may be euthanized.
- The City of Sioux Falls will prepare an annual report for the USFWS and SDGFP stating the number of geese relocated, the number of nests destroyed, the number of geese euthanized, and dates when the activity occurred.
- The management plan will be evaluated on an annual basis by all agencies that cooperated to develop this plan to determine needed adjustments.

Public Involvement and Education:

- The agencies that cooperated to develop this plan will in their best efforts provide volunteers or staff for on-site distribution of educational literature when and where geese are removed.
- The City of Sioux Falls will provide information to the public of the Canada Goose Management Plan.

Summary

If and when the population of Canada geese within the city limits of Sioux Falls reaches an unacceptable level, implementation of this section of the Sioux Falls Wildlife Management Plan is strongly supported by SDGFP. The management plan is meant to be comprehensive and applicable to future wild goose populations, as well as current populations within the city limits of Sioux Falls. Canada goose populations will continue to be monitored to assist in the implementation of this section of the plan.

A. General Overview of Waterfowl Management Plan

The waterfowl management plan outlines methods to reduce the total number of waterfowl (wild and domestic) that occur in Rapid City. The plan also details three strategies to help maintain an acceptable population level of waterfowl in Rapid City. The strategies are:

- A population stabilization program that reduces the population growth of resident and domestic geese as well as geese loyalty to the area;
- A nuisance abatement/site aversion program that resolves nuisance issues at target sites in each community; and
- Public education explaining that feeding both domestic and wild waterfowl does not help, and in fact, harms them.

Objective: To begin a humane resolution to waterfowl issues in Rapid City and to establish a framework for city wide implementation in 2009.

Scope: The waterfowl management plan will implement a Waterfowl Reduction Program as well as three maintenance strategies of Population Stabilization, Site Aversion and Public Education as follows:

- The Waterfowl Reduction Program will cover areas where waterfowl occur in the City of Rapid City.
- The Population Stabilization Program will cover areas where waterfowl occur in the City of Rapid City.
- The Site Aversion program will include areas where waterfowl occur in the City of Rapid City.
- The Public Education program will encompass all of the City of Rapid City.

Organizations: The waterfowl management plan will be implemented by three partner organizations:

- The City of Rapid City Department of Parks and Recreation
- South Dakota Department of Game, Fish & Parks, and
- Citizen volunteers

Responsibilities:

Waterfowl Reduction (March – July)

- City of Rapid City obtains permit from US Fish and Wildlife Service (Permit needs to be submitted by early January)
- City of Rapid City and SD Game, Fish & Parks will conduct capture, euthanization and donation of waterfowl.

Population Stabilization (Late March – Early May)

- City of Rapid City obtains permit from US Fish and Wildlife Service (Permit needs to be submitted by early January)
- City of Rapid City and SD Game, Fish & Parks will recruit volunteers; prepare final report and provide training for egg addling.

Site Aversion (year-round)

- City of Rapid City identifies one staff member, obtains dogs and other necessary items.

Public Education (year-round)

- All partners will provide volunteers or staff for on-site distribution of educational literature.
- City of Rapid City and SD Game, Fish & Parks will conduct public meetings.
- City of Rapid City will provide signage.

Time Line and Schedule:

January

- City of Rapid City and all partners commit to program
- Permit Application submitted to US Fish & Wildlife Service by mid January
- Partner planning and organization meeting

February - March

- Community meeting detailing waterfowl management plan.
- Develop information articles and press releases about the egg addling program.
- All partners will participate in signing up golf courses and home owner's associations as managers/owners of property where geese may be nesting
- The City of Rapid City will present public information meeting
- Identify sites for the site aversion program

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- All partners will participate in signing up golf courses and home owner's associations as managers/owners of property where geese may be nesting
- The City of Rapid City will present public information meeting
- Identify sites for the site aversion program

- Game, Fish & Parks will coordinate egg addling training

March – July

- Rapid City Egg Addling Program
- Waterfowl Reduction
- SD Game, Fish & Parks will coordinate waterfowl trapping and euthanization.

May – June

- Site Aversion

August – October

- Post Molt Site Aversion

September – November

- Landscape/Habitat Modifications

B. Current Domestic and Wild Waterfowl Populations in the City of Rapid City

I. Waterfowl Reduction

Overview. A waterfowl reduction program is necessary to bring the total numbers of waterfowl (wild and domestic) down to an acceptable level and to maintain that level in conjunction with the other strategies detailed below. Reduction will start in the spring before the waterfowl hatch their young and continue as needed through the summer during the molt. The City of Rapid City with assistance from SD Game, Fish and Parks and volunteers will conduct the capture, euthanization and donation of waterfowl.

Waterfowl Reduction Program: Waterfowl reduction is accomplished by capturing waterfowl with traps and then transporting them for euthanization and donation to local charities and/or needy families. This operation will begin in late March and go through July. It requires a federal permit which will be obtained by the City of Rapid City.

II. Population Stabilization

Overview: A population stabilization program is a necessary ingredient of successful long-term Canada geese nuisance abatement. Beginning in February geese stop moving in flocks and start to pair with their mate. They will locate a nesting site in the vicinity of their birth or where they had nested the previous year. Geese that are three years and older, will nest. The younger geese will pair up, but will not build a nest. Geese should be allowed to nest (unless the nest is located in an inappropriate site) so the nests can be easily located. Harassing or chasing nesting geese during the nesting season is counter productive since the geese will simply hide the nests or relocate them nearby. Allowing geese to nest on known sites will aid in the long-term population stabilization. Once the geese are unsuccessful in the nesting (due to the addling program) they will have no need to remain in the area. This is enhanced by the site aversion program that begins in mid May.

This program will begin in late March. GFP will facilitate training for egg addling to ensure a safe and professional program.

Canada goose Population Stabilization: Population stabilization is accomplished by locating Canada geese nests and using a portable drill to drill into the eggs in the nests. This operation begins in late March and continues until early May. It requires a federal permit which will be obtained by the City of Rapid City. Population stabilization is an integral part of the geese management program for three significant reasons:

1. Population Stabilization slows or reverses the growth in resident geese population. We estimate that for every treated nest, 52 fewer geese will be in the area after an eight-year period.
2. Population Stabilization reduces the loyalty of adult geese to a specific site for future nesting and molting. When geese have a failed nesting season some of these geese may fly north in a "molt migration" thus reducing the number of geese in the nesting area and surrounding regions for the summer and fall seasons.
3. Population Stabilization breaks the biological necessity for adult geese to stay in Rapid City through molting season (late July). Because geese tend to be more of a nuisance in spring and summer, and because this is the time when goslings are born and are tended to by parent geese, the lack of goslings means the parent geese can be flushed from the area. Otherwise they will remain in the area until at least mid August when their goslings are first able to fly.

Community Participation: The Population Stabilization program should cover as large an area as possible. In particular, it is important to enlist the support of property owners in the area to participate in the egg addling program. The City of Rapid City and the SD Game Fish & Parks Office will assist in recruiting property owners for the Population Stabilization program. One significant helpful factor in a long-term program is that geese are exceptionally loyal to a nest site. Therefore, once the team has identified the nest sites in year one, tracking sites in subsequent years will be significantly easier.

III. Site Aversion/Nuisance Abatement Program

Objectives:

- ▶ Be geese nuisance free during the spring, summer and fall months for all participating sites, after beginning the nuisance abatement program;
- ▶ Be well on the way to establishing a long-term maintenance program that will sustain geese nuisance free facilities in the years to come.

Geese Flushing:

The table below shows the period when geese flushing using a trained dog may be conducted. During these periods the geese will be reconditioned to view identified areas as an unsafe, undesirable habitat for them.

	Start	Date	End	Date
Spring	After mating and nesting season ends	Early May	When geese molt (lose wing feathers and are unable to fly)	Mid to late June
Summer	When geese are again able to fly after the molt	Late July/ Early August	Anytime prior to mating and nesting season begins	Late January

Each period begins with a 2-day intensive harassment of geese. This initial period will be followed by a reduced effort for 2 weeks and then a long-term maintenance program. A Canada geese exclusion zone should be established for sites included in the program. The goal is for all geese that can fly to be out of the exclusion zone by the end of the first or second day.

Harassment of geese will be accomplished using trained dogs. The dogs will be on a lead or under the voice control of a handler. At times the dogs will be let off leash to flush geese. Here is how it works.

Geese need water for safety. Geese on land are vulnerable to predators. Water is their safe haven, their sanctuary. When there is grass near the water body, they feed on grass knowing that they can run or fly to the safety of the water body to escape a land predator. Although a dog is not really a predator, it still looks and acts like a predator to the geese. When the geese fly to their safe haven, a water body, the dog pursuit continues with the aid of a remote controlled boat operated by the appropriate staff.

Geese can out swim any land predator including dogs. It is suggested that the dog always wears a flotation jacket to improve its endurance in the water and courage to swim in deep water and far from land. Also, the flotation jacket identifies the dog as a working dog rather than an unauthorized dog harassing geese. The geese also recognize the jacket from the air.

During the intensive phase, the geese will first move to one side of the lake or onto another area of the park. Eventually the geese give up, learn that the park is not a safe sanctuary and find another place to stay.

Long Term Program: Geese will land at each program site from time to time but will quickly leave when the dog arrives. We should notice several consecutive weeks when there will be no geese. Then one goose in the flock will get the courage to return to the area leading a few others to follow it. Depending on the numbers that arrive we will let

them stay or reintroduce the dog, assisted by a boat. The geese will leave the lake quickly, within 30 minutes at most. Using this method and managing the frequency of dog visits you can control the number of geese at the program site.

IV. Public Education

- a. General Public: The City will host public events at city facilities as a partnership or on an individual basis as well as make presentations and provide displays at other events throughout the City to inform the general public of the waterfowl management plan. A Public Service Announcement will be developed, press releases will be distributed, and other media coverage will be arranged as necessary.
- b. Schools: Develop instructional materials for students in grades three and four and make them available to all Rapid City schools serving those grades. The message will be that we should enjoy these birds in the wild and do what we can to keep them wild. Feeding ducks and geese in the parks makes them dependent on humans. They stop eating the foods that keep them healthy and they do less flying. Wild ducks and geese migrate in the spring to places where they can find their natural food and safe nesting sites. Feeding them at Canyon Lake Park and Storybook Island keeps them in the city year round, and this causes problems for the birds and for people.
- c. Feeding Geese: Feeding of geese causes them to congregate in areas resulting in a concentration of fecal droppings, overgrazing of grass and increases the possibility of transfer of disease between birds. Also, geese can become aggressive as they fight for food.

We recommend providing information to the community through local newspapers or in community newsletters informing the public that feeding of waterfowl is prohibited within the City of Rapid City.

V. Alternate Relocation Plan

Careful planning is required to minimize stress and reduce the potential of capture myopathy. Capture myopathy is a complex degenerative disease of skeletal muscle associated with increased muscular exertion and over stimulation of the nervous system as a result of the capture, restraint, and transportation of wildlife. Capture myopathy causes wildlife to be more susceptible to predation. The following suggestions may help reduce the occurrence of capture myopathy:

- The City of Rapid City will coordinate capture and transport of selected domestic waterfowl. SD Game, Fish & Parks will assist with capture process. All partners will participate in oversight of capture and will assist adopters with transport arrangements.
- Relocation sites should be identified and prepared prior to initiating capture.

- Capture should be overseen by personnel experienced in handling and restraining waterfowl, and conducted using humane methods.
- Sufficient transport crates (to prevent overcrowding) and transport vehicles must be available prior to capture.
- Capture should be conducted when climates will not contribute to over heating.
- Captured waterfowl should be monitored to identify stress-related health issues.
- Transportation to the relocation site should occur within a few hours of capture. Normal wildlife transport protocols should be observed.

Criteria for selection of relocation sites:

- Potential relocation sites will receive an informational list which outlines the requirements necessary to “adopt” waterfowl. Prescreening of application will be required.
- The relocation sites should provide domestic waterfowl with a comparable environment including access to a water body, protection from predators, etc. The relocation sites should be conducive to long term survival. Relocation sites may not include locations where the waterfowl will be intended for food or breeding.
- Parties responsible for ensuring a source of supplemental feeding and ongoing health monitoring should be identified.
- The relocation sites should be evaluated regarding potential impact on existing waterfowl and neighboring community.
- The relocation sites should be provided with information on implementing long-term humane management of waterfowl populations
- If approved relocation sites are not available, waterfowl may be euthanized in a humane manner as recommended by the SD Department of Game, Fish & Parks. The meat will be distributed to organizations that serve the needy population in the community.

a. Alternate Plan. If relocation is not feasible, a long-term management plan for managing existing waterfowl populations in Rapid City must be implemented.

Long-term management should be executed in combination with the city-wide waterfowl management plan for population reduction, site aversion, population stabilization and public education. The long-term management should incorporate the following items:

- Existing waterfowl will be reconditioned to seek out new roosting locations in an effort to deter congregating near parking lots, walkways, picnic areas and public access ramps.

- Conditioning will include establishing a location furthest from high traffic where feeding can occur. The optimal goal would be to gradually eliminate feeding sites.
- Existing members of the public will be recruited to provide supplemental feedings during the transition period as well as at the new feeding locations.
- Park staff will begin luring waterfowl to new locations through bait feeding in early spring.
- To aid monitoring in the overall health of the waterfowl located in Rapid City, identification of sick or injured domestic waterfowl will be reported to the SD Department of Game Fish & Parks.

b. Feeding Regimen

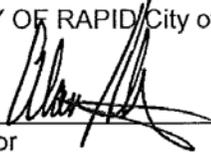
To facilitate conditioning of waterfowl to gradual acceptance of designated feeding sites, supplemental feeding may be provided. Feeding station(s) will be set up at areas to be determined by park officials. Temporary feeding stations may be set up to allow gradual movement of birds to desired permanent feeding station. Controlled supplemental feeding will be done at feeding stations only. No other feeding of waterfowl will be allowed.

VI. FUTURE DOMESTIC WATERFOWL POPULATIONS

The Waterfowl Management Plan is meant to be comprehensive and applicable to future domestic waterfowl populations in the City, in addition to current populations. The plan will be monitored on a regular basis by the partnership for its effectiveness at keeping population levels stable and manageable, and changes or modifications will be made by the partnership as necessary. In addition, this plan can serve as a template for other city parks or communities with similar waterfowl issues that wish to implement a humane management plan.

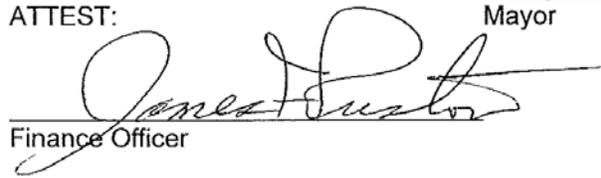
Dated this 6 day of April, 2009.

CITY OF RAPID CITY / City of Rapid City



Mayor

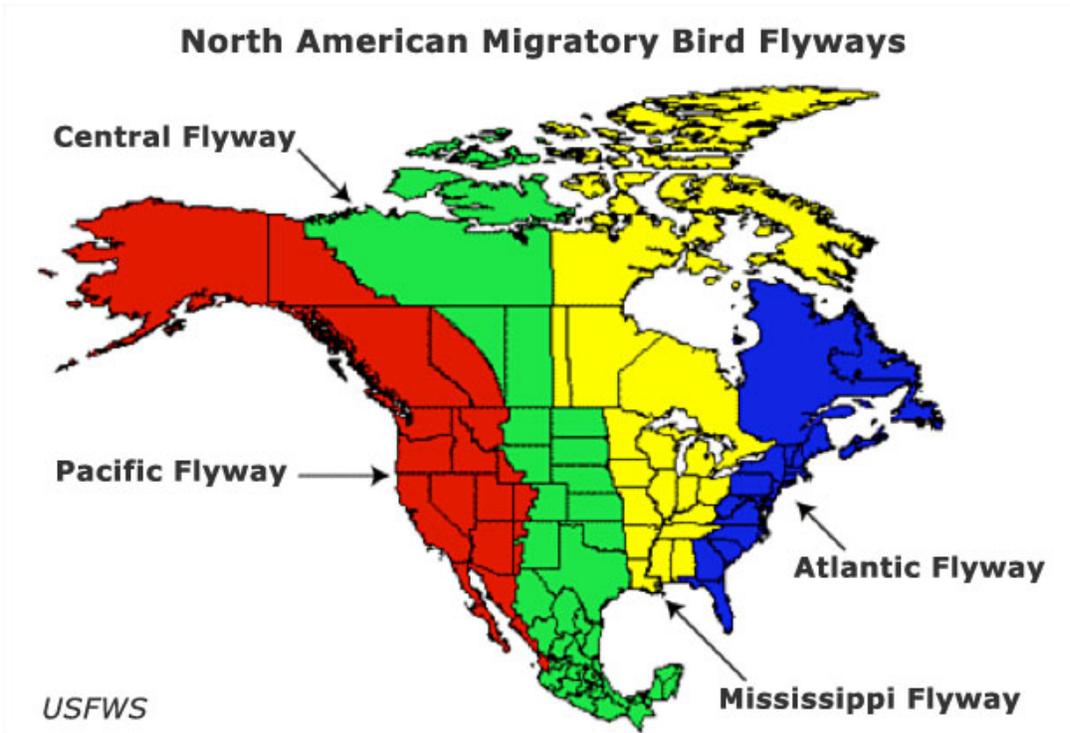
ATTEST:



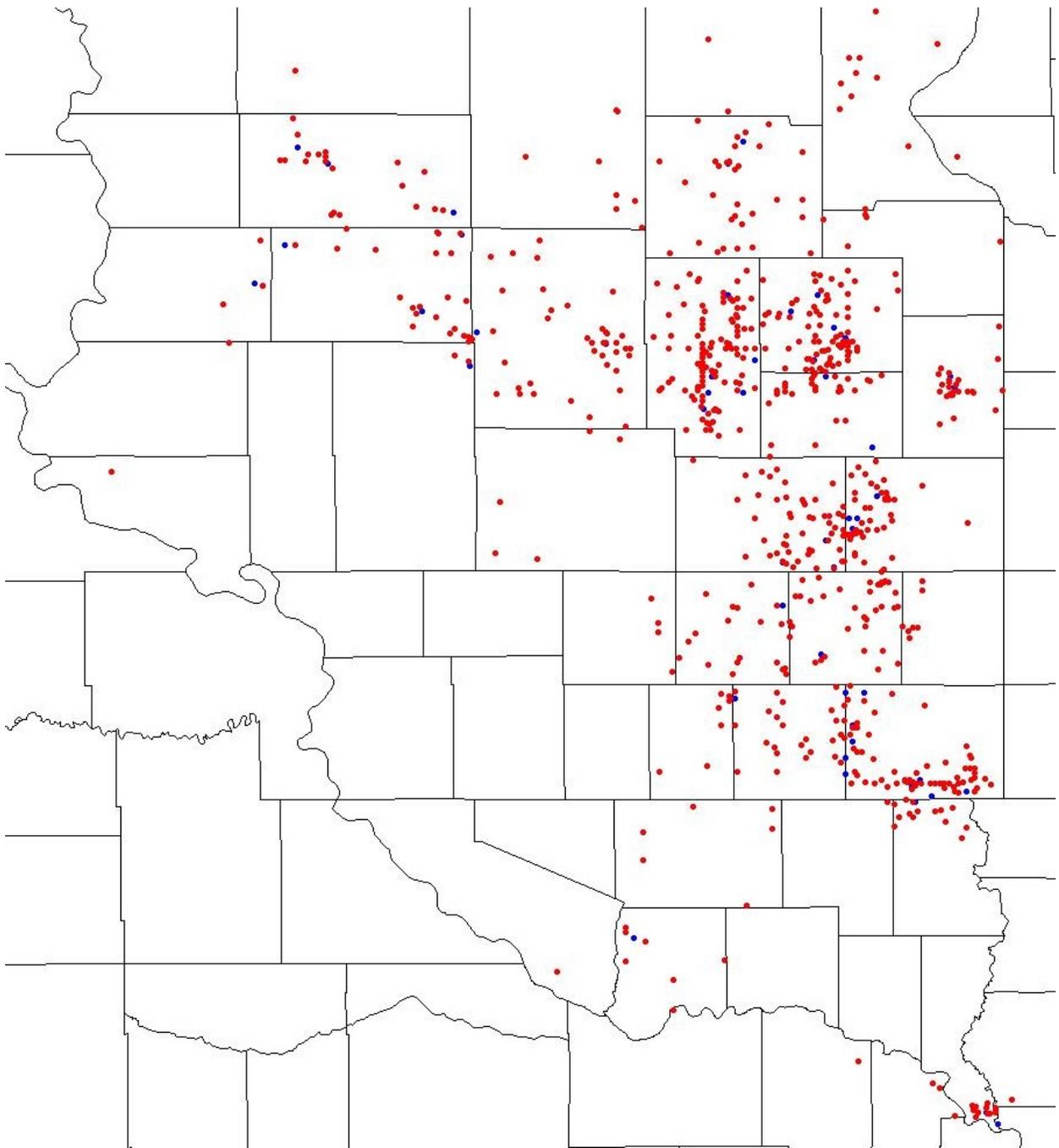
Finance Officer

(SEAL)

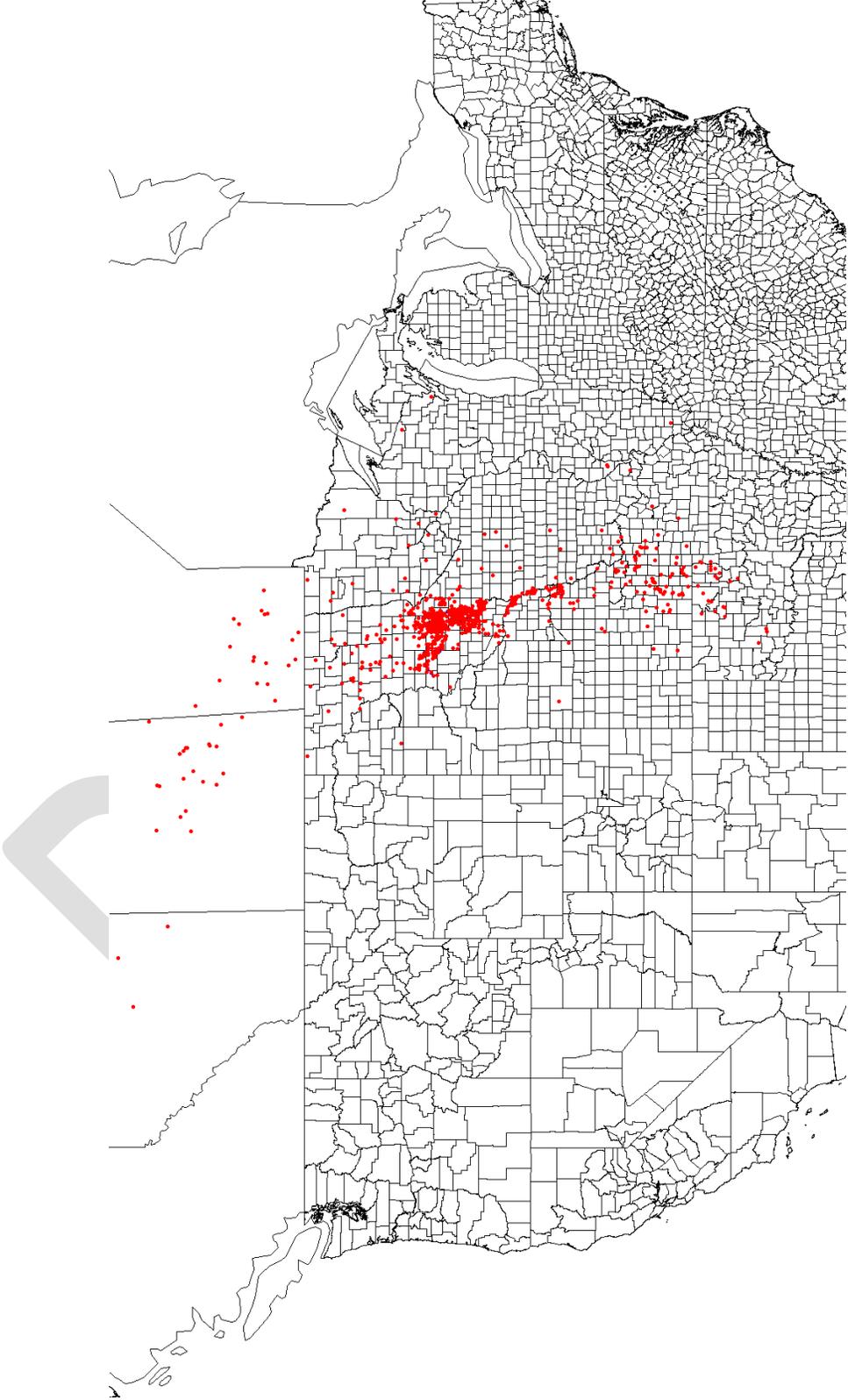
Appendix M. Administrative Flyway boundaries.



Appendix N. South Dakota Canada goose banding locations (blue) and recoveries (red) 2012-2014.



Appendix O. All Canada goose band recoveries from geese banded in South Dakota, 2012-2014.



Appendix P. Implementation schedule and primary responsibility.

Goals, Objectives & Strategies	2016	2017	2018	2019	2020	Primary Responsibility
GOAL: <i>The Division of Wildlife will manage giant Canada goose populations breeding in South Dakota for maximum recreational opportunity consistent with the welfare of the population, habitat constraints, and social tolerance.</i>						
OBJECTIVE 1: <i>Manage the giant Canada goose population using South Dakota BPOP index (three-year average) objective range of 125,000 to 175,000 geese.</i>						
Strategies						
Strategy 1a: <i>Annually use the USFWS May Waterfowl Breeding Habitat and Population Survey as the monitoring method to determine spring population index trends (three-year average) of Canada geese in South Dakota. Use strata level estimates to better guide regional management decisions.</i>	✓	✓	✓	✓	✓	<i>U.S. Fish and Wildlife Service Waterfowl Staff Regional Wildlife Manager</i>
Strategy 1b: <i>Minimize other causes of mortality, particularly lead poisoning, disease, and wounding loss.</i>	✓	✓	✓	✓	✓	<i>Waterfowl Staff Department Staff</i>
OBJECTIVE 2: <i>Provide maximum hunting opportunity consistent with Objective 1 while maintaining a quality hunting experience.</i>						
Strategies						
Strategy 2a: <i>Use the full federal framework during the early fall and regular Canada goose hunting seasons with maximum bag limit and number of days allowed when the spring population index exceeds the population objective of 175,000 birds (two consecutive three-year averages). Utilize an August Management Take in areas experiencing unacceptable levels of damage to agricultural crops (Table 8).</i>	<i>Annually Reviewed</i>					<i>Waterfowl Staff Regional Wildlife Manager Administration</i>
Strategy 2b: <i>Use the full federal framework during the regular Canada goose hunting season and make appropriate adjustments to bag limit and/or season length during the early fall season when the three-year average spring population index is within the population index range of 125,000-175,000 birds (three-year average). Consider an August Management Take in areas experiencing unacceptable levels of</i>	<i>Annually Reviewed</i>					<i>Waterfowl Staff Regional Wildlife Manager Administration</i>

damage to agricultural crops (Table 8).						
Strategy 2c: Reduce bag limits and/or season length during the early fall September and regular Canada goose hunting seasons when the spring population index falls below the population objective of 125,000 birds (two consecutive three-year averages). Do not utilize AMT unless human safety concerns are being addressed (Table 8).	Annually reviewed.					Waterfowl Staff Regional Wildlife Manager Administration
Strategy 2d: Annually use a SDGFP post-season hunter survey to collect and monitor harvest data and hunter satisfaction for August Management Take, Early Fall September Canada goose, and regular goose hunting seasons.	✓	✓	✓	✓	✓	Human Dimensions Specialist Harvest Survey Coordinator
Strategy 2e: Annually use USFWS parts collection surveys to collect and monitor harvest estimates and goose age ratio data for Canada goose hunting seasons.	✓	✓	✓	✓	✓	Central Flyway Waterfowl Staff
Strategy 2f: Maintain an operational Canada goose banding program and conduct a standardized band analysis program in South Dakota.	✓	✓	✓	✓	✓	Waterfowl Staff Department Staff
Strategy 2g: Continue to support efforts to increase recruitment and retention of goose hunters in South Dakota.	✓	✓	✓	✓	✓	Department Staff Administration
OBJECTIVE 3: Cooperatively work with private landowners to reduce Canada goose depredation to growing crops.						
Strategies						
Strategy 3a: Respond to all Canada goose depredation concerns on private land in a timely manner.	✓	✓	✓	✓	✓	Regional Wildlife Manager Wildlife Damage Mgmt. Staff
Strategy 3b: Annually evaluate effectiveness of WDM depredation abatement techniques, services, and programs such as: <ul style="list-style-type: none"> ○ Non-lethal abatement techniques include: permanent fence, temporary electric fence, temporary and permanent vegetative barriers (i.e. wheat or CRP buffer strips), food plots, and various hazing techniques (i.e. propane cannons, cracker-shells, kites and flagging, coyote decoys, and harassment) ○ Lethal techniques include: egg and nest destruction, trapping, relocating, and lethal take as authorized by USFWS permit. ○ Discuss other alternative wildlife damage management tools. 	✓	✓	✓	✓	✓	Regional Wildlife Manager Wildlife Damage Mgmt. Staff Wildlife Damage Administrator
Strategy 3c: Continue to develop and research new techniques that can minimize crop damage and damage to private property caused by	✓	✓	✓	✓	✓	Regional Wildlife Manager Wildlife Damage Mgmt. Staff

Canada geese.						Wildlife Damage Administrator
Strategy 3d: Continue to obtain and utilize the USFWS special state Canada goose permit to address Canada goose depredation concerns in areas where determined appropriate.	✓	✓	✓	✓	✓	Regional Wildlife Manager Wildlife Damage Mgmt. Staff Wildlife Damage Administrator
Strategy 3e: Continue to evaluate funding levels to ensure sufficient funds are available to address Canada goose depredation requests for assistance from private landowners.	✓	✓	✓	✓	✓	Regional Wildlife Managers Wildlife Damage Mgmt. Staff Administration
Strategy 3f: Continue to utilize hunting opportunities where/when possible to address Canada goose depredation on private land.	✓	✓	✓	✓	✓	Regional Habitat Manager Farm Bill/Access Coordinator
OBJECTIVE 4: Provide the public with quality Canada goose hunting access opportunities on private and public lands.						
Strategies						
Strategy 4a: Continue to promote, utilize, and target SDGFP's Walk-In Area and Controlled Hunting Access Programs specifically for Canada goose hunting opportunities.	✓	✓	✓	✓	✓	Regional Habitat Manager Habitat Program Administrator Farm Bill/Access Coordinator
Strategy 4b: Continue to provide up-to-date private land hunting access and public hunting land layers for free download to GPS units and smartphones.	✓	✓	✓	✓	✓	Habitat Program Administrator Farm Bill/Access Coordinator GIS Staff
Strategy 4c: Continue to acquire Game Production Areas offering Canada goose hunting opportunities from willing sellers.	✓	✓	✓	✓	✓	Habitat Program Administrator Regional Habitat Manager
Strategy 4d: Continue to utilize social media and other effective communications methods to promote and encourage hunters to ask permission to hunt private lands.	✓	✓	✓	✓	✓	Communications Staff
OBJECTIVE 5: Utilize federal, state, and local partnerships and programs to address Canada goose habitat issues, challenges, and opportunities.						
Strategies						
Strategy 5a: Continue active involvement in the Prairie Pothole Joint Venture through participation on both the management board and technical committee.	✓	✓	✓	✓	✓	Habitat Program Administrator Farm Bill/Access Coordinator
Strategy 5b: Continue to engage in state level and local partnerships to guide development and delivery of state and federal habitat programs benefitting Canada geese.	✓	✓	✓	✓	✓	Habitat Program Administrator Farm Bill/Access Coordinator

Strategy 5c: Continue to support an active private lands habitat program, and provide cost share and technical assistance to landowners for wetland and grassland habitat conservation.	✓	✓	✓	✓	✓	Habitat Program Administrator Farm Bill/Access Coordinator Private Lands Habitat Biologists
Strategy 5d: Continue to support the placement of Pheasants Forever Farm Bill Biologists in USDA offices to support and deliver farm bill conservation programs.	✓	✓	✓	✓	✓	Habitat Program Administrator Farm Bill/Access Coordinator
Strategy 5e: Continue to restore, create, enhance, and protect wetlands and grassland buffers throughout South Dakota to provide habitat for giant Canada geese.	✓	✓	✓	✓	✓	Habitat Program Administrator Private Lands Habitat Biologists
Strategy 5f: Encourage the use of and cost share for Canada goose nesting structures when populations fall below objective levels of 125,000 (three year index average).						Habitat Program Administrator Senior Waterfowl Biologist Private Lands Habitat Biologists
OBJECTIVE 6: Evaluate and prioritize Canada goose research and management needs.						
Strategies						
Strategy 6a: Periodically collaborate with stakeholders to collect and assess research and management needs and ideas.	✓	✓	✓	✓	✓	Department Staff
Strategy 6b: Periodically review Canada goose survey protocol and discuss changes that could improve data collection efficiency and accuracy.	✓	✓	✓	✓	✓	Senior Waterfowl Biologist Regional Wildlife Managers Wildlife Program Administrator
Strategy 6c: Formally evaluate the Giant Canada Goose Management Plan at least every 5 years. Updates and changes to the plan, however, may occur more frequently as needed.	✓	✓	✓	✓	✓	Department Staff
Strategy 6d: The SDGFP will send at least one staff member to Central Flyway Council and Technical Committee meetings. These meeting facilitate the exchange of information between member states and USFWS on survey techniques, harvest regulations, research and habitat management.	✓	✓	✓	✓	✓	Senior Waterfowl Biologist
Strategy 6e: The SDGFP will consider sending a representative to scientific meetings that will exchange information related to Canada goose research and management.	✓	✓	✓	✓	✓	Senior Waterfowl Biologist
Strategy 6f: The SDGFP will continue to send at least 2 representatives to the Central Flyway Wing-bee to assist in aging and classifying Canada geese sent in through the USFWS parts collection survey.	✓	✓	✓	✓	✓	Waterfowl Staff

OBJECTIVE 7: Inform and educate the public on giant Canada goose ecology, management, and research.						
Strategies						
Strategy 7a: By August 2016, provide an electronic copy of the “South Dakota Giant Canada Goose Management Plan, 2016–2020” on the department’s website. Printed copies will be available upon request.	✓	✓	✓	✓	✓	Communications Staff Wildlife Program Administrator
Strategy 7b: In 2018, host an interim meeting of the Canada goose management stakeholders group to review and discuss progress towards implementing this plan.			✓			Canada Goose Management Team
Strategy 7c: Provide research completion reports on the department website at http://gfp.sd.gov/wildlife/management/research-projects .	✓	✓	✓	✓	✓	Communications Staff Wildlife Program Administrator
Strategy 7d: Continue to include a 1-page section in the South Dakota Conservation Digest titled “Conservation Corner” in which habitat management techniques are discussed.	✓	✓	✓	✓	✓	Communications Staff Habitat Program Administrator Wildlife Program Administrator
Strategy 7e: Continue to provide hunter harvest and public opinion survey reports on the department’s website.	✓	✓	✓	✓	✓	Communications Staff Human Dimensions Specialist Harvest Survey Coordinator
Strategy 7f: Annually update Canada goose hunting statistics of this plan and provide the updated plan on the department’s website.	✓	✓	✓	✓	✓	Senior Waterfowl Biologist Communications Staff