SOUTH DAKOTA RESIDENT CANADA GOOSE MANAGEMENT PLAN

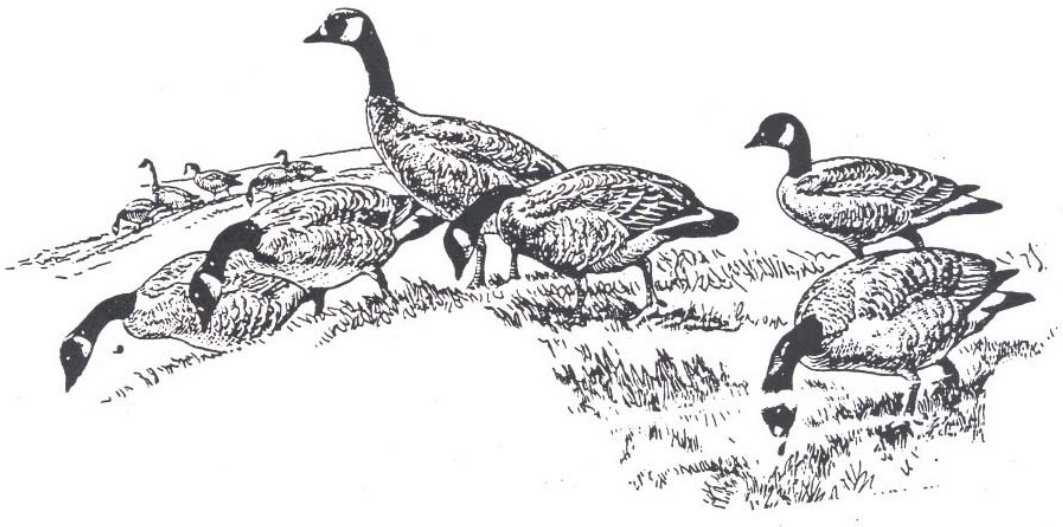

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TABLE OF CONTENTS

	Page
Table of Contents……..……	ii
List of Tables…….	iii
List of Charts……..	iv
List of Appendices…….	v
Introduction……	1
Public Involvement…….	2
Goal & Objectives……..……	3
Objective A (Spring Population Index)…….	4
Discussion……..	4
Accomplishments……	5
Objective B (Hunting Opportunity)……	7
Discussion……	8
Accomplishments……	8
Banding……...	9
Objective C (Crop Damage & Nuisance Problems)……	11
Discussion……	11
Accomplishments…….	13
Special Canada Goose Permit……..	14
Management Take……	14
Urban Canada Goose Management Plan…….	14
Objective D (Public Viewing Opportunity)…….	15
Discussion……	15
Accomplishments……	15
Resident Canada Goose Research……..	16
Appendix…….	21

LIST OF TABLES

Table		Page
A	SD resident Canada goose spring population index estimate, 1998-2009……..	5
B	Early fall Canada goose hunting seasons, 1996-2009……...	9
C	Special Canada goose permit activities, 2000-2009…….	14

LIST OF CHARTS

Chart		Page
A	SD resident Canada goose spring population index estimate, 1998-2009……..	6
B	Derivation of harvest of September hunter shot Canada geese in SD, 1998-2008……	10
C	Derivation of harvest of all hunter shot Canada geese in SD, 1926-2008……..	10
D	Region specific Canada goose damage management activities, fiscal years 2000-2009……...	13

LIST OF APPENDICIES

Appendix		Page
A	Giant Canada goose restoration releases by county, 1967-1998……	22
B	Giant Canada goose WDM trap/relocation program by county, 2006-2009……...	23
C	Giant Canada goose surplus releases by county, 1999-2009…...	24
D	Waterfowl breeding population survey—strata and transect lines……	25
E	Breeding survey methodology…….	26
F	Special Canada goose permit……	28
G.	County specific Canada goose damage management activities, fiscal years 2000-2009……..	29

SOUTH DAKOTA RESIDENT CANADA GOOSE MANAGEMENT PLAN

INTRODUCTION

The original South Dakota Resident Canada Goose Management Plan (Plan) was compiled by the Game Staff in September, 1998. An updated version (January, 2005) served to guide management of resident Canada geese through 2009. The latest version (May, 2010) will guide management through 2014 and should be updated in 2015.

Giant Canada geese historically nested over a wide area of the Great Plains, with South Dakota located in the heart of this range. Settlers hunted giant Canada geese year-round and in spring gathered their eggs. The largest race of Canada geese - *Branta canadensis maxima* - was 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 NWR areas of northeast South Dakota. Dr. Harold Hanson, in his book "The Giant Canada Goose" considered the birds in the Waubay area to be the "gold standard" of giant Canada geese.

Giant Canada goose restoration efforts by the South Dakota Department of Game, Fish, and Parks (Department) 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. Captive goose flocks at Sand Lake NWR, Shadehill Reservoir, and cooperating landowners provided birds for release into selected areas of suitable wetland habitat. The first release was completed in 1967 in Mellette County, when 32 giant Canada geese found homes in West River stock pond country. Additional releases took place from 1967-77 in other West River counties. Restoration efforts switched to East River counties in 1978. 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 the Department involved the release of 7-8 week old goslings (on occasion yearling or two year old birds) into suitable wetland habitat and, at a minimum, a 5-year closure on Canada goose hunting in the release area. Because most Canada geese do not nest until three years of age, it was important that they were protected on the release areas. At the end of the 5-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 and, if the birds appeared to prosper in spite of 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 3 Canada geese. In 2007, the federal framework was increased to 107 days, the maximum number of days allowed for hunting under the Migratory Bird Treaty Act (Act). This is vivid testimony to the success of the restoration program.

As resident Canada goose populations increased during the 1980's and 1990's, conflicts with agriculture began to appear. Damage to agricultural crops, particularly soybeans, corn, and wheat increased significantly in 1995 and 1996 in 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 5 from September 1-15. A post-season harvest survey conducted by the Department estimated 12,866 resident giant Canada geese were harvested during the inaugural season. A similar harvest survey for the 1997 early September season estimated a harvest of 11,281. In 2000, a 3-year experimental Late-September Canada goose hunting season was allowed by the USFWS for portions of eastern SD. This allowed 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. Harvest increased substantially and the 9-year average annual harvest from 2000-2008 during early fall seasons was 32,677. However, since 2004 hunter participation has declined and the harvest has stabilized at a lower level (2004-08 average of 25,597).

Additionally, in 1996, the Department 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, food plots, vegetation barriers, buffer strips, and hazing. Also, opening of shoreline feeding and loafing sites on Game Production Areas (GPA's) and Waterfowl Production Areas (WPA's), as well as supplemental feeding at strategic sites are methods used to attract and hold geese on public land.

PUBLIC INVOLVEMENT

In December, 2009, the Wildlife Division created a Canada Goose Management and Depredation Working Group (WG) as a public involvement mechanism to bring together a diverse group of citizen representatives to assist the Wildlife Division in the development of recommendations for the management of resident Canada geese. The WG was comprised of sportsmen, landowners, and citizens who have an interest in South Dakota's wildlife. The primary objectives for this eight member WG were to:

- foster communication between the Division of Wildlife, agricultural producers and sportsmen;
- identify specific ideas, opportunities and potential solutions to address Canada goose management and depredation challenges;
- develop recommendations to the Division of Wildlife on strategies that may be employed to address Canada goose depredation to crops on private land; and,
- Identify specific harvest management options that may help improve the Division of Wildlife's efforts to manage resident Canada goose populations.

A series of four public meetings were held (Watertown, Webster, Brookings and Madison) in December, 2009 and January, 2010 to gather input from landowners, sportsmen, and people interested in resident Canada goose management.

In addition to the input gathered from these WG meetings, the Wildlife Division solicited public input on the May, 2010 update of the "South Dakota Resident Canada Goose Management Plan". The updated draft plan was posted on the Department's website for

public comment. As expected, there were differences in opinion from the WG meetings and the management plan update on how to reduce resident Canada goose populations in order to reduce crop damage and to meet the population objective of 80,000 – 90,000 resident Canada geese. There was a general consensus that increasing the daily bag limit during the early fall (September) Canada goose hunting season, increasing access for hunters, using fencing and feeding stations on public land to alleviate goose depredation, and buffer strips around wetlands are quality and viable options and should be implemented or continued. On the other hand, there was no consensus reached on whether South Dakota should implement an August Management Take, whether the Department should allow landowners to be sub-permitted under the Special Canada Goose Permit and allow them to take a limited number of resident Canada geese, or whether to allow nonresidents to hunt in 13 counties in southeastern South Dakota where they are currently not allowed to hunt during the September season.

A detailed summary of these public meetings is available from South Dakota Game, Fish and Parks' Human Dimensions Specialist; Dr. Larry Gigliotti entitled "Summary of Public Meetings".

GOAL

The management goal for the resident population of giant Canada geese in South Dakota is maximum recreational opportunity consistent with the welfare of the population, habitat constraints, and landowner/public tolerances.

OBJECTIVES

The following objectives have been identified to successfully implement the goal of this management plan:

Objective A: Maintain a giant Canada goose spring population index in South Dakota of of 80,000-90,000 birds (3-year average).

Objective B: Provide maximum hunting opportunity consistent with population objectives, based on 3-year average, and a quality hunting experience.

Objective C: Reduce crop damage and nuisance problems caused by locally-breeding Canada geese.

Objective D: Provide Canada goose viewing and photographic opportunities for the public.

When the South Dakota Resident Canada Goose Management Plan was first drafted in September, 1998, the spring population index objective was 50,000. It was modified in the January, 2005 update to 60,000 and is 80,000-90,000 for the May, 2010 Update.
The 1998 Plan also had an Objective to expand breeding populations of giant Canada geese into suitable wetland areas in the Missouri Coteau region of South Dakota by the year 2000. This Objective was deleted from the January, 2005 Update as geese pioneered into these areas on their own. We continue to release goslings and sub-adults from the WDM trap and relocate program (Appendix B) and from surplus birds obtained from the Great Plains Zoo and Wylie Park Zoo in Sioux Falls and Aberdeen, respectively

(Appendix C). The captive goose flock at Sand Lake NWR used for releases was set free in 1998. The restoration effort is complete and the Department's efforts are now focused on resident Canada goose management rather than restoration.

OBJECTIVE A

Maintain a giant Canada goose spring population index in South Dakota of 80,000-90,000 birds (3-year average) and distributed as follows:
USFWS survey Strata 44 - 13,600-15,300
USFWS survey Strata 48 - 48,000-54,000
USFWS survey Strata 49 - 18,400-20,700

Strategy A-1
Use the USFWS May Breeding Population and Habitat Survey as the monitoring method to determine spring population trends of resident giant Canada geese in South Dakota.

Strategy A-2
Restore, create, enhance, and retain wetlands throughout South Dakota to provide habitat for giant Canada geese.

Strategy A-3
Minimize other causes of mortality, particularly lead poisoning, botulism, and wounding losses.

DISCUSSION

The average annual spring population index of giant Canada geese in South Dakota for the 12-year period 1998-2009 is 126,200 and the most recent 3-year period (2007-2009) is 137,000 birds, according to data from the USFWS May Breeding Population and Habitat Survey (Table A). This survey has a long standing data base (since 1959) and uses scientific methods and procedures including statistical analysis. South Dakota is divided up into 3 Strata and numerous Transect Lines (Appendix D). Survey methodology and an example of how the population index is calculated are included in Appendix E. A statewide spring population estimate of 80,000-90,000 giant Canada geese should provide ample hunting opportunities and not lead to excessive agricultural conflicts, considering an operational Wildlife Damage Management Program is in place.

Restoring, maintaining, creating, and enhancing wetlands are vital in providing the necessary habitat to sustain populations. Eliminating the deposition of toxic lead shot on public wildlife lands and monitoring wetlands prone to botulism are important management actions that need to be taken to minimize other forms of mortality.

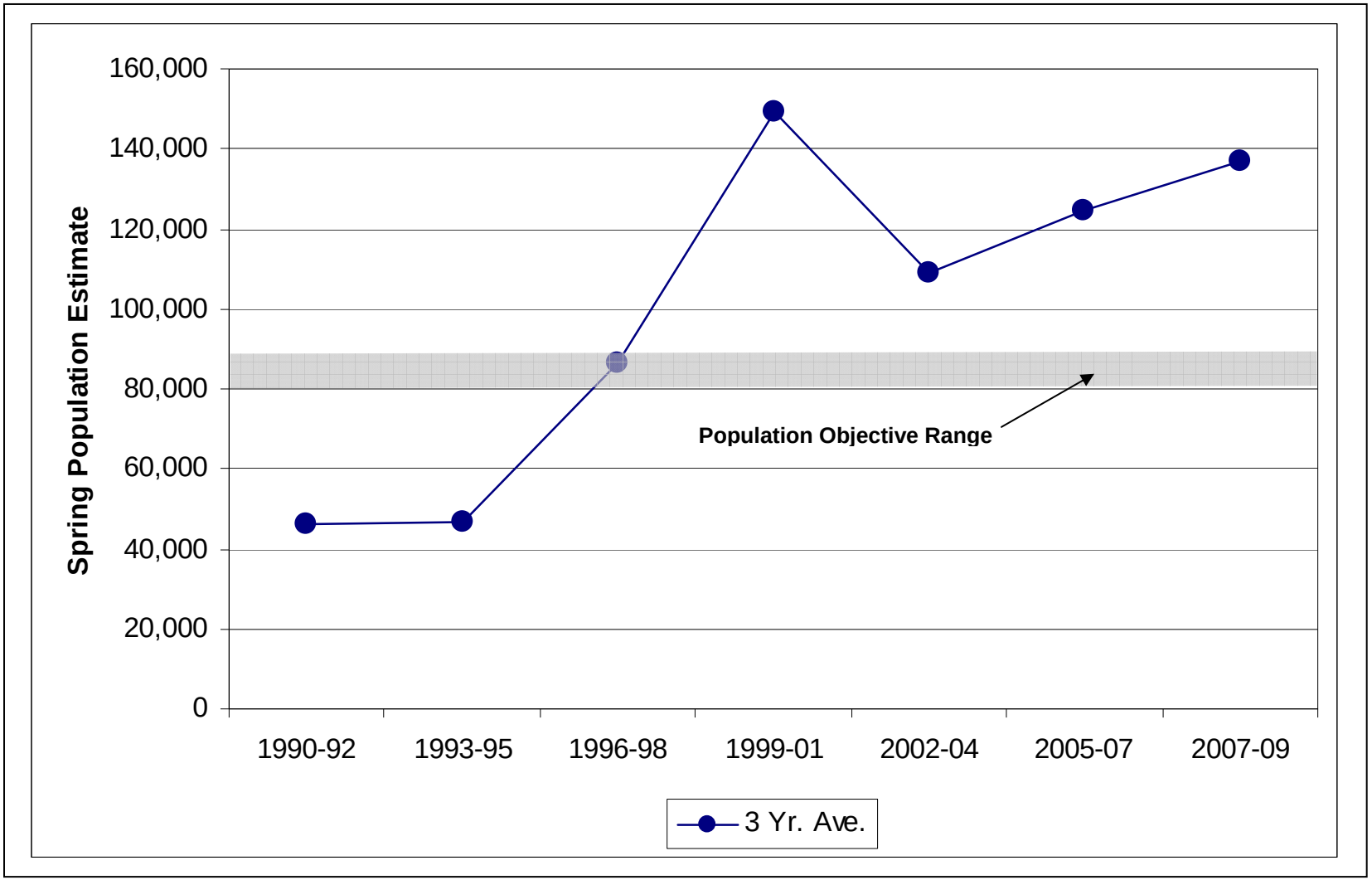
In addition, an educational effort to inform and teach hunters shooting skills and methods to reduce wounding losses is warranted.

ACCOMPLISHMENTS

Table A. SD Resident Canada Goose Spring Population Index Estimate 1998-2009.

	Strata 44	Strata 48	Strata 49	Total
1998	15,600	59,000	25,600	100,100
1999	10,700	66,800	34,300	111,800
2000	22,400	111,400	31,400	165,300
2001	24,000	110,600	35,300	169,900
2002	20,100	53,500	15,100	88,700
2003	12,000	92,100	26,300	130,400
2004	10,200	71,900	25,900	108,000
2005	17,500	63,200	27,500	108,200
2006	22,400	77,300	21,200	121,000
2007	19,100	95,400	30,400	144,900
2008	15,400	57,500	26,900	99,800
2009	20,200	94,000	52,300	166,500
Average	17,500	79,400	29,400	126,200
Latest 3-year average (2007-09)				
	18,200	82,300	36,500	137,000
Population Index Objective				
	13,600-15,300	48,000-54,000	18,400-20,700	80,000-90,000

Chart A. South Dakota resident Canada goose population status.



South Dakota has been a leader in efforts to reduce losses due to lead poisoning and wounding. Nontoxic shot has been required for all waterfowl hunting in South Dakota since 1987 and for small game hunting on most public lands since 1998. Since 1998, CONSEP consultant Tom Roster has taught many South Dakota hunters shooting skills in order to reduce wounding losses. From 1998-2004, clinics were conducted in Aberdeen, Huron, Watertown, Mitchell, Yankton, LaCreek NWR, Rosholt and Chamberlain. In 2008, the Department implemented its own shooting skills workshops. After extensive training under Tom Roster, Resource Biologist Mark Grovijahn is now our Department shooting instructor. In 2008 and 2009, Department workshops were held in Webster, Lake Poinsett, Pierre, Mobridge and Madison.

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.

OBJECTIVE B

Provide maximum hunting opportunity consistent with population objectives, based on 3-year average, and a quality hunting experience.

Strategy B-1

Use a system of limited tags in areas where hunting pressure needs to be limited for a quality hunt experience (e.g. Bennett County).

Strategy B-2

Use the full federal framework during the early fall and regular Canada goose hunting seasons with maximize bag limit and number of days allowed when the spring population index exceeds the population objective of 90,000 birds (3-year average). Consider an August Management Take in areas experiencing damage to agricultural crops.

Strategy B-3

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 spring population index is within the population index range of 80,000-90,000 birds (3-year average). Consider an August Management Take in areas experiencing severe damage to agricultural crops.

Strategy B-4

Consider reductions in bag limit and/or season length during the early fall and regular Canada goose hunting seasons when the spring population index falls below the population objective of 80,000 birds (3-year average). Consider an August Management Take in areas experiencing severe damage to agricultural crops.

Strategy B-5

Use a Department post-season hunter survey to collect and monitor harvest data for Early Fall September Canada goose hunting seasons.

Strategy B-6

Use USFWS harvest surveys to collect and monitor harvest data for regular Canada goose hunting seasons.

Strategy B-7
Continue to band all released birds and conduct a standardized banding/band analysis program throughout South Dakota, particularly in areas with little or no previous banding history.

DISCUSSION

The primary mortality factor for Canada goose populations in South Dakota is hunter harvest. Therefore, hunting remains the best method to control their numbers. When populations exceed objective levels, use of the full federal framework during the early fall and regular Canada goose hunting season is warranted. The full federal framework in 2009 allowed a maximum daily bag of five during the early fall season and three during the regular Canada goose hunting season. The maximum number of days allowed for hunting Canada geese is 107. When populations are within the objective range of 80,000-90,000 then using the full framework during the regular Canada goose hunting season and making adjustments to bag limits/season lengths during the early fall season may be warranted. If populations fall below objective levels, then season restrictions should be considered. An August Management Take should be considered in areas of South Dakota experiencing damage to agricultural crops. Some areas of the state may remain 'permit areas' in order to limit the number of hunters and improve hunt quality. Obtaining accurate harvest and banding data is vital to regulation setting and proper goose management.

ACCOMPLISHMENTS

In 1996, South Dakota became the first Central Flyway state to implement September Canada goose hunting seasons (Table B). These are seasons that occur prior to the regular Canada goose hunting season. These 'Early Fall' seasons are designed to increase the harvest of resident 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 received permission from the USFWS to conduct a 3-year Experimental late-September Canada goose hunting season. Hunting during the experimental period was allowed in 20 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 2000-2004, the average annual harvest increased to 38,443 birds.

In order for the Experimental late-September season to become operational, South Dakota had to prove 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 (Wingbee) during 5-day periods in September from 1996-2002 indicated less than 3% of the harvest consisted of non-target small Canada geese. Therefore, all of South Dakota's 'Early Fall Canada goose hunting seasons' are now operational.

Early fall Canada goose hunter participation and harvests have declined in recent years. From 1999-2003, hunter numbers and harvest averaged 9,457 and 38,412, respectively.

From 2004-2008, hunter numbers declined to 6,118 and with an average harvest of 25,597. This decline has occurred despite increasing the area open to hunting during the early fall season from 28 to 55 counties. Hunter numbers and harvest increased in 2009 to 6,157 and 39,275, respectively.

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 changed to 107 days, the maximum allowed under the Migratory Bird Treaty Act. Therefore, goose hunting units in eastern South Dakota that utilize early fall seasons during September may need to adjust their regular season days to accommodate the Act.

Table B. Early Fall Canada Goose Hunting Seasons, 1996-2008

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

BANDING

Band recovery analysis indicates the majority (64%) of Canada geese recovered in South Dakota in September from 1998-2008 were banded in South Dakota (Chart B). Other important banding regions that contributed birds recovered in September in South Dakota from 1998-2008 were Minnesota (10%), Nebraska (10%), Iowa (6%), Kansas (4%), Oklahoma (3%), and Other states (3%). There were a total of 1,303 Canada goose hunting recoveries in South Dakota during September from 1998-2008.

Band recovery analysis indicates that 49% of Canada geese recovered in South Dakota during all Canada goose hunting seasons from 1926-2008 were banded in South Dakota (Chart C). Other important banding regions that contributed birds recovered during all Canada goose hunting seasons from 1926-2008 in South Dakota were Saskatchewan (10%), North Dakota (7%), Missouri (6%), and a number of states/provinces at 4% and 3%. There were a total of 13,486 Canada goose hunting recoveries in South Dakota during all Canada goose hunting seasons from 1926-2008.

Chart B.

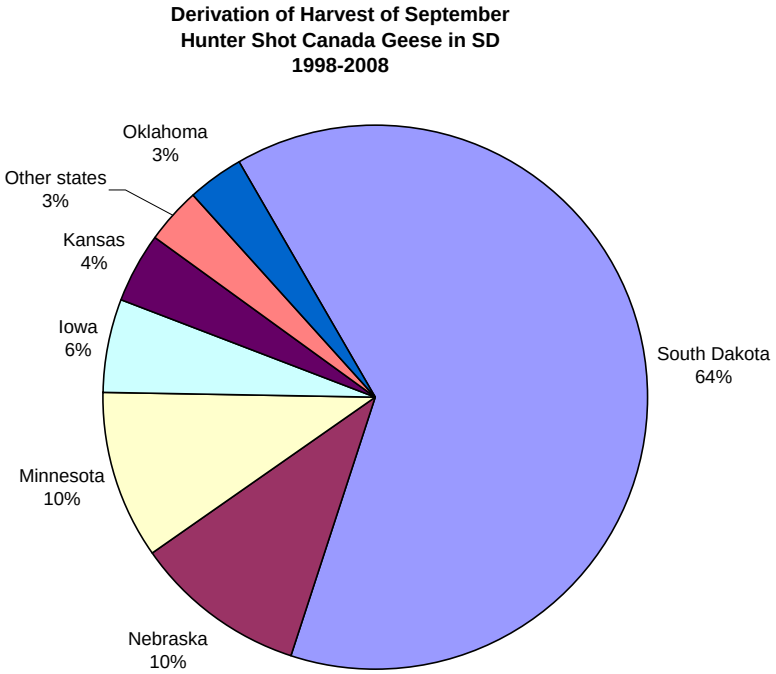


Chart provided by K.L. Kruse
USFWS, DMBM, Denver, CO

Chart C.

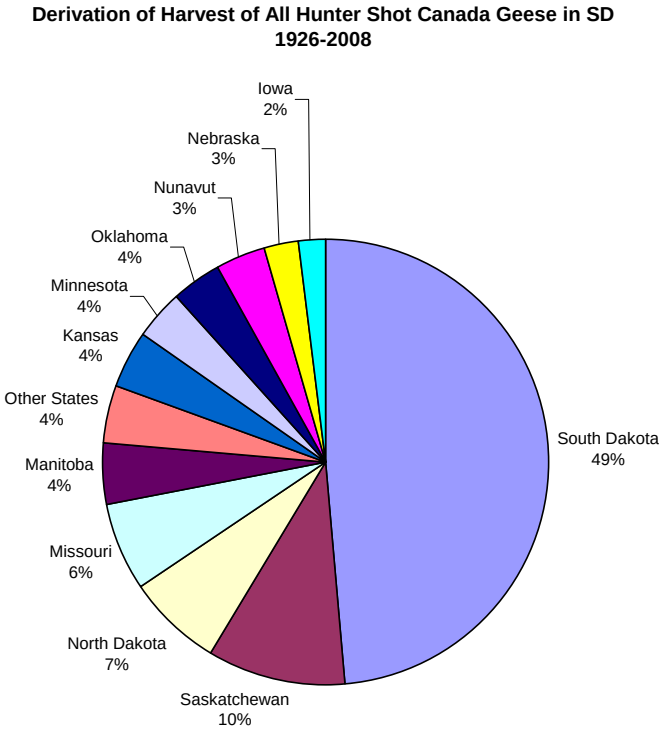


Chart provided by K.L. Kruse
USFWS, DMBM, Denver, CO

OBJECTIVE C
Reduce crop damage and nuisance problems caused by locally-breeding Canada geese.

Strategy C-1
Maintain an operational Wildlife Damage Management (WDM) program to assist producers in reducing crop damage caused by Canada geese.

Strategy C-2
Use techniques other than trap and relocation for crop depredation complaints.

Strategy C-3
Release Canada geese obtained from the WDM trap and relocation program and surplus Canada geese from zoos into suitable wetlands away from golf courses, city parks, recreational lakeshore areas, etc., where they may become a nuisance problem.

Strategy C-4
Obtain and use the USFWS Special Canada Goose Permit in areas where warranted and when other WDM program techniques are unsuccessful.

Strategy C-5
Consider using the 'Management Take' provision of the 'Final Rule for the Control of Resident Canada Goose Populations' when established hunting seasons and WDM programs are unsuccessful.

Strategy C-6
Cooperatively work with municipalities on urban Canada goose management plans and strategies.

DISCUSSION

In 1996, the South Dakota Game, Fish and Parks implemented a comprehensive Canada Goose Damage Management Program. The program goal is to prevent or reduce crop losses and maintain a healthy population of resident Canada geese. Most of the damage management activities take place from May-July and primarily involve crop depredation. Activities take place on the producer's land as well as state and federal wildlife areas. The primary techniques used in the program include:

1. Electric fences.
2. Food plots (fall seeded grains are best).
3. Vegetation barriers (Buffer/Filter Strips).
4. Management on state GPA's and federal WPA's including supplemental feeding (opening shoreline areas for loafing and feeding).
5. Hazing techniques on both land (propane cannons) and water (boating) prior to molt periods and when problems are occurring.

The program response is tailored to each individual complaint. For example, a food plot may work for one situation whereas an electric fence may be required for another. The program is designed to be preventative rather than reactive in nature. Since the primary source of funding for the Wildlife Damage Management Program is derived from hunters, using hunting as a management tool whenever possible is the primary consideration.

Trap and relocation of adults or mixed groups including adults will not be used due to man power requirements, high expense, and a general ineffectiveness of this technique when dealing with crop depredation complaints. Adults or mixed groups with adults will often simply fly back to the trap site. However, trap and relocation may be considered on groups of juvenile-only geese, surplus Canada geese from zoos, WDM trap and relocation activities, and under the Special Canada Goose Permit. To reduce the chances of locally-breeding Canada geese becoming a nuisance problem, populations should never be established near golf courses, city parks, recreational lakeshore areas or similar non-rural, predominantly grassy areas in close association with water, where the probability of human contact is high. Feeding of geese by the public should be strongly discouraged.

The Special Canada Goose Permit obtained from the USFWS is a powerful tool which allows the killing of 1,500 geese and the destruction of 1,000 nests annually for the control of overabundant resident Canada geese (Appendix F). It has been used in eastern South Dakota since 2000 at varying levels (Table C).

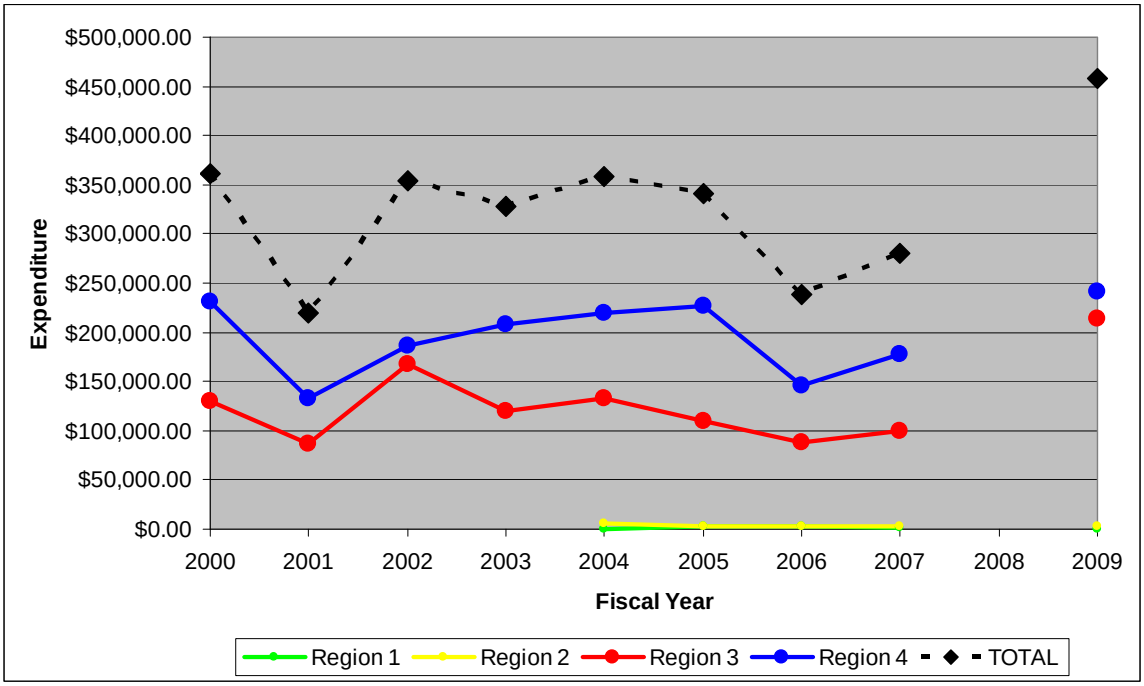
A ‘Management Take’, using hunters to harvest resident Canada geese during the month of August, is a provision that can be considered if all other traditional hunting seasons and WDM programs are unsuccessful in reducing localized populations to tolerable landowner levels. Permission from the USFWS is required including documentation of all previous management efforts and activities used to control goose numbers.

In urban and suburban areas where hunting is not a management option due to firearms restrictions and human safety concerns, population reduction techniques such as egg/nest destruction and other culling techniques may be considered along with hazing, fencing, the development of alternative feeding/loafing sites, and any new techniques not currently developed. In addition, working with individual cities on cooperative goose management plans may become a priority in the future.

ACCOMPLISHMENTS

Annual expenditures have ranged from $219,708 to $457,600 for the Canada Goose Damage Management Program during the previous ten years. Due to a computer software issue, data for fiscal year 2008 is currently not available. In 2009, depredation complaint statistics included a total of 374 landowners and included 580 complaint sites. County specific Canada goose damage management activities for respective fiscal years can be found in Appendix G.

Chart D. Region specific Canada goose damage management activities, fiscal years 2000-2009.*



*Note: Fiscal year 2008 data is currently not available.

SPECIAL CANADA GOOSE PERMIT

On March 31, 2000, the South Dakota Department of Game, Fish and Parks received a Special Canada Goose Permit from the USFWS. This permit authorized the Department to conduct resident Canada goose management and control activities through egg and nest destruction, trapping, relocating, and killing of Canada geese in order to contribute to human health and safety, protection of personal or public property, and prevention of injury to people or property in accordance with all conditions specified in 50 CFR 21.26. The permit was amended on March 13, 2002, to increase the number of nests that could be destroyed from 250 to 500. The current permit, updated April 21, 2010, allows the annual take of 1,500 resident Canada geese and up to 1,000 nests (increased from 500 to 1,000 nests in 2010), including eggs. It expires 3-31-2014. This permit is designed to be used after other methods have failed or in special situations.

Table C. Special Canada Goose Permit Activities (2000-2009).

	Capture/Translocate	Remove by Shooting	Nests Destroyed	Eggs Destroyed
2000	25	21	37	204
2001	0	63	162	906
2002	0	13	153	816
2003	0	11	179	974
2004	1	33	110	617
2005	0	49	136	709
2006	73	26	131	704
2007	82	16	103	543
2008	132	3	68	343
2009	212	79	348	1,836

MANAGEMENT TAKE

The Final Rule for Resident Canada Goose Management provides for an August 'Management Take'. In effect, this is a way for a state to use hunters to harvest resident Canada geese during the month of August. Management Take is defined by the USFWS as a special management action that is needed to reduce certain wildlife populations when traditional management programs are unsuccessful in preventing overabundance of the population.

URBAN CANADA GOOSE MANAGEMENT PLAN

Starting in late 2008 Department 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. This is the first plan of this type in the state. The plan follows several basic concepts also used in urban deer management plans: enactment of no-feeding bans, evaluation of short- and long-term management options, long-term evaluations of the plan's effectiveness and results of the management options,

and partnership with Department staff in monitoring and evaluations. In addition, the Department is working with the city of Sioux Falls on a management plan.

OBJECTIVE D
Provide Canada goose viewing and photographic opportunities for the public.

Strategy D-1
Maintain resident giant Canada geese on public lands (GPA's, WPA's, meandered lakes) that are accessible to the public whenever possible.

Strategy D-2
Provide viewing and photographic opportunities of resident Canada geese on state and federal refuge areas.

DISCUSSION

The greatest benefit of the resident Canada goose management program besides providing hunting opportunity to South Dakota sportsmen is the viewing pleasure the birds provide to South Dakota citizens. The Department should expend every effort to ensure that the public has the opportunity to observe these birds with the least amount of difficulty.

ACCOMPLISHMENTS

All public wildlife lands including Game Production and Waterfowl Production Areas and National Wildlife Refuges are open to the public for viewing and photographic opportunities. The spring snow goose migration at Sand Lake NWR featuring up to a half million snow geese can be spectacular. In the past 10-15 years, GFP and the USFWS have purchased in fee title thousands of acres of new public wildlife lands. A good example is the purchase of the 1,665 acre Mickelson Marsh Game Production Area in Hamlin County in the 1990's. This area offers exceptional viewing and photographic opportunities for the public for many wildlife species, including resident Canada geese, other waterfowl and shorebirds.

RESIDENT CANADA GOOSE RESEARCH

Band Recovery Data Analysis, Jeff Gleason, MS, 1997
Dr. Jonathan Jenks, Principal Investigator

An analysis of band recovery data consisting of 26,141 bandings and 6,837 recoveries from 1955-95 was conducted by SDSU graduate student Jeff Gleason. Important results of these analyses are listed below:

There was an increase in recovery rates over time for status 3 (normal, wild) birds banded in western SD from 3.7% (1967-76) to 5.6% (1977-86).

There was an increase in recovery rates over time for status 3 (normal, wild) birds banded in eastern SD from 2.6% (1967-78) to 5.8% (1987-95).

There was an increase in recovery rates over time for status 3 (normal, wild) birds banded in the Waubay area of SD from 5.6% (1959-66) to 7.9% (1967-76).

There was a decrease in recovery rates over time for status 2,4,6,8 (restored) birds in eastern SD from 7.4% (1977-86) to 4.0% (1987-95).

For restored birds banded in western SD there was an insufficient number of bandings that precluded analysis of a sample period by sex and age composition; however, recovery rates for restored birds banded in western SD were 6.4% for adults (1968-79) and 8.1% for sub-adults (1976-78).

The highest and lowest recovery rates, respectively, were 12% (1959-66) for sub-adults banded in the Waubay area and 0.2% (1977-95) for sub-adults banded in eastern SD.

Survival estimates (age and sex combined) for status 3 (normal, wild) birds for western SD decreased over time from 91.6% (1967-76) to 68.6% (1977-86).

Survival estimates (age and sex combined) for status 3 (normal, wild) birds for eastern SD increased over time from 74.1% (1967-78) to 81.9% (1987-95).

Survival estimates for status 2, 4, 6, 8 (restored) birds in eastern SD increased over time from 59% (1977-86) to 89.7% (1987-95).

Generally, geese banded in western SD had the highest recovery rates and the lowest survival rates.

This research generally indicates 3 goose flocks in South Dakota. The Waubay flock (normal, wild) birds tend to migrate in a southerly fashion to Nebraska and Kansas. The restored birds from eastern SD migrate in an east-southeasterly direction towards

Missouri. And, the geese in western SD migrate south and south-westerly to western Nebraska and Kansas.

The number of recoveries (both direct and indirect) by state or province from birds banded in South Dakota:

South Dakota	- 3,217	Oklahoma	- 166
Kansas	- 721	Sask	- 87
Nebraska	- 460	Iowa	- 67
Texas	- 328	ND	- 51
Missouri	- 260	Manitoba	- 43
Minnesota	- 219	Colorado	- 35

The importance of a standardized banding program with sufficient and consistent bandings from year to year cannot be overemphasized. Banding a representative sample of resident Canada geese should be a prime objective of GF&P's banding program.

<u>Canada Goose Movement Study, Bobby Anderson, PhD, 2005</u>
Dr. Charles Dieter, Principal Investigator

OBJECTIVE 1
Determine post-molt movements of nesting Canada geese in eastern SD using VHF and satellite telemetry. The study described the extent of temporal and spatial post-molt movements in relation to the September hunting season. The number of adult female Canada geese monitored with radio–collars was 186 with 148 fitted with VHF transmitters and 38 fitted with satellite transmitters. Post-molt movement data was collected for 4 years, 2000-03. VHF marked geese were monitored weekly with either a pickup or fixed winged aircraft until fall freeze-up. Satellite transmitters were monitored every 4-5 days. All geese that were captured received leg bands. A total of 3,839 geese were banded including 1,516 adults and 2,323 young geese. GIS software was used to plot all movements and band recoveries.

RESULTS
- 45.4% of geese made significant post-molt movements > 40 km

Significant movements by year
2000 – 55.3%
2001 – 48.0%
2002 – 47.6%
2003 – 30.4%

- 46.4% (39/84) moved prior to the start of the September hunting season

- 42.9% (36/84) moved during1st week of September hunting season

- 9.5% (8/84) moved after 1st week of September hunting season

- 56% of the geese moved in a northerly direction

OBJECTIVE 2
Estimate vital rates of giant Canada geese in eastern South Dakota using band analysis. Included were chronology of harvest and distribution, survival rates, recovery rates, and harvest rates.

RESULTS

- There were 1,293 total recoveries with 648 direct recoveries (during the first hunting season after banding) and 645 indirect recoveries (during any hunting season after the first season after banding). Direct recoveries were from 8 states with 77% of the returns from South Dakota. Kansas ranked 2nd with 10%. Indirect recoveries were from 12 states/provinces with 69% from South Dakota**,** North Dakota and Kansas ranked 2nd with 7%, and 13% of the recoveries were from areas north of South Dakota.

- Pooled recovery rates from 2000-2004 indicated 75% of local geese were harvested in SD, 55% of geese harvested in SD were taken in September and 46% of all geese harvested were taken in September. The September season likely reduces harvest during the regular season.

Chronology of Band Recoveries

	Sept.	Oct. 1-15	Oct. 16-31	Nov. 1-15	Nov. 16-30	Dec.	Jan. Feb.	Total
Totals	577	233	92	73	59	135	5	1,264
(%)	**(45.6)**	(18.4)	(7.3)	(5.8)	(4.7)	(10.7)	(7.5)	
SD	523	213	80	70	29	33	0	937
(%)	**(55)**	(21)	(8.4)	(7.4)	(3)	(3.2)		

- Using Program MARK, the best population model assumed constant survival rates with yearly specific recovery rates. Overall the yearly survival rate for adults was 0.52 and for young the yearly survival rate was 0.67. This is one of the lowest survival rates ever recorded for a population of giant Canada geese.

- Recovery rates were high with a rate of 0.16 for adults and 0.18 for young. This was the highest recovery rate ever recorded for a population of giant Canada geese.

- Using a 73% estimated band reporting rate, the mean harvest rate (2000-03) was 23.3%. SD giant Canadas are sustaining heavy hunting mortality, *one of the highest harvest rates recorded.*

OBJECTIVE 3
Determine the extent of molt migration by geese from eastern SD. The research described the proportion of geese that molt migrated, where they migrated, and departure and return dates.

RESULTS

- 43.6% of all monitored females made a molt migration (2001-04). For nonbreeders, 56% left on a molt migration. For unsuccessful nesters, 81% left on a molt migration and for successful nesters, 19% left on a molt migration.

- Some Canada geese are clearly making long post-molt movements. A satellite collared female from Lake Sinai, Brookings County, made a 2,080 km molt migration to the Northwest Territories and returned to SD in early November.

- Approximately 50-60% of the giant Canada goose population molt-migrates each spring in SD.

OBJECTIVE 4
Monitor and document nesting success of giant Canada geese.

RESULTS

- 72% of the collared geese attempted nesting from 2000-2003.

- 71% of the geese that initiated nests were successful

- Nest failures were caused by predation (11), flooding (7) and abandonment (2).

Crop Damage by giant Canada Geese in eastern South Dakota, Troy Radtke, MS, 2008
Dr. Charles Dieter, Principal Investigator

OBJECTIVE 1
Determine the total amount of damage done to soybean fields in selected areas of eastern SD and evaluate the effectiveness of SDGFP's operational Wildlife Damage Management Program. Abatement fields were those where SDGFP applied deterrents to stop crop damage. Control fields were those where no deterrents were applied. Damaged areas were measured using GPS and analyzed with ANOVA.

RESULTS

- Amount of damage on control fields was significantly higher than abatement fields in 2006 ($p = 0.001$) and 2007 ($p < 0.001$).

- Amount of damage differed between years.

2006		2007	
N	**Mean Damage ha (ac)**	**N**	**Mean Damage ha (ac)**
43	**0.10 (0.26)**	**47**	**0.30 (0.75)**
13	**1.00 (2.48)**	**16**	**1.55 (3.83)**

OBJECTIVE 2

Evaluate shoreline characteristics where goose damage occurs. Shoreline characteristics measured at Used and Unused (random) sites were distance from water to crops, height-density of vegetation, and slope. Data were analyzed with paired t-tests.

- Distance from water to crops was important with geese selecting fields that were closer to water ($N=15$; $t = 5.36$; $p < 0.001$).

- Height-density of vegetation was important with geese selecting fields with lower height-density of vegetation ($N=15$; $t = -3.16$; $p = 0.007$).

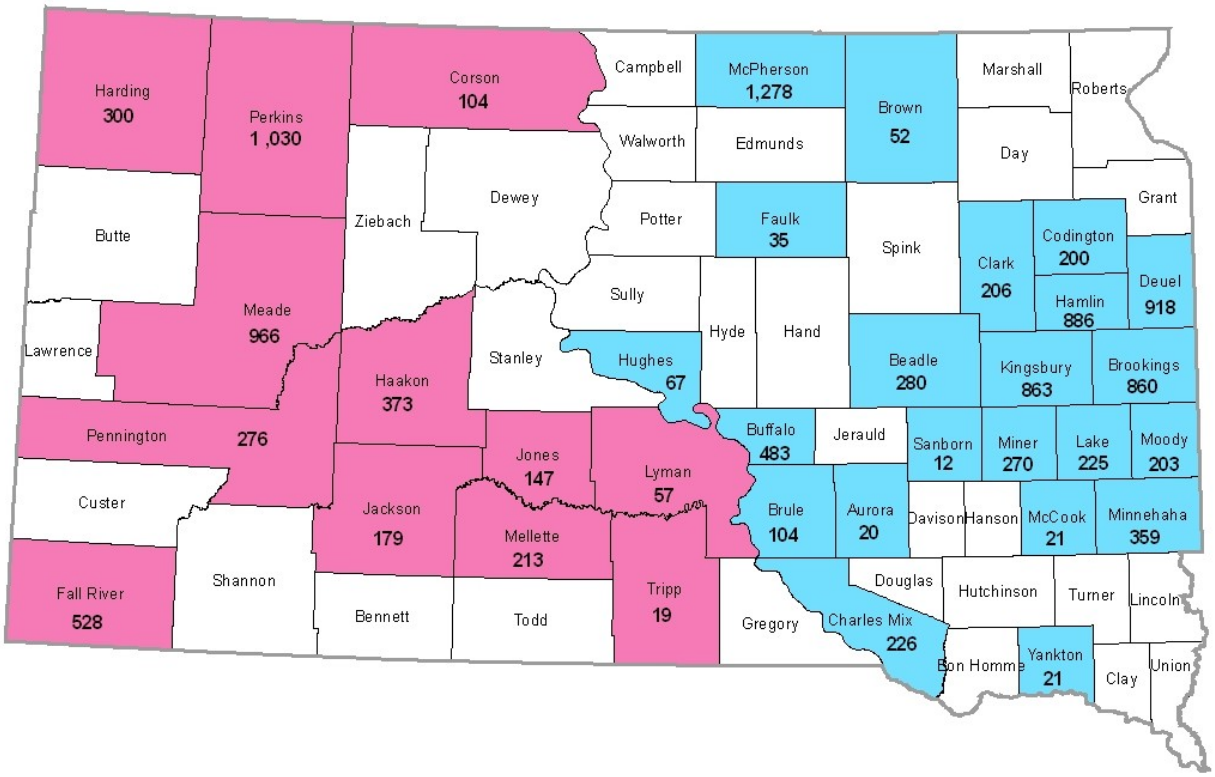
- Slope was not important ($N=15$; $t = 0.33$; $p = 0.75$).

- Goose damage can be kept to a minimum if deterrents are applied as soon as possible and properly maintained.

APPENDIX

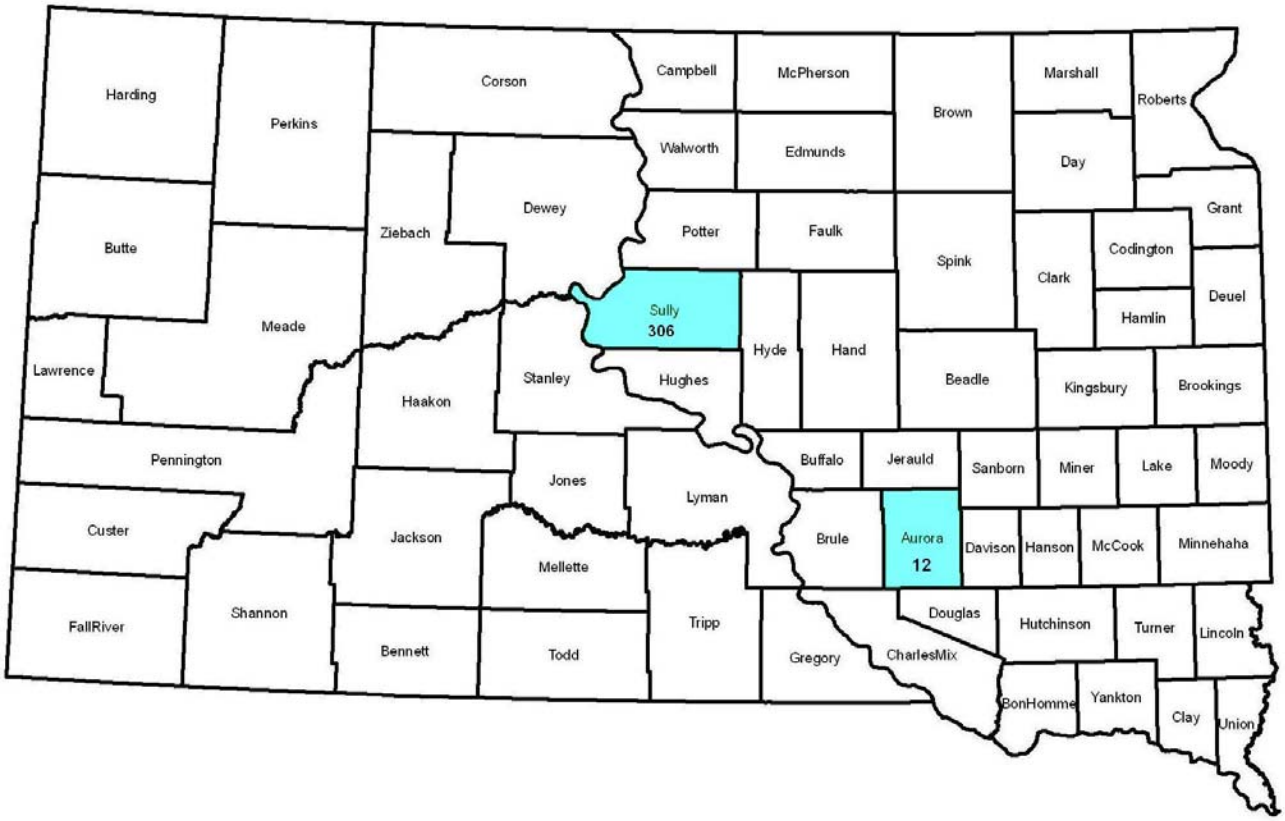
A. Giant Canada Goose Restoration Releases by County, 1967-1998
B. Giant Canada Goose WDM Trap/Relocation Program by County, 2006-2009
C. Giant Canada Goose Surplus Releases by County, 1999-2009
D. Waterfowl Breeding Population Survey – Strata & Transect Lines
E. Breeding Survey Methodology
F. Special Canada Goose Permit
G. County specific Canada goose damage management activities, fiscal years 2000-2009

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



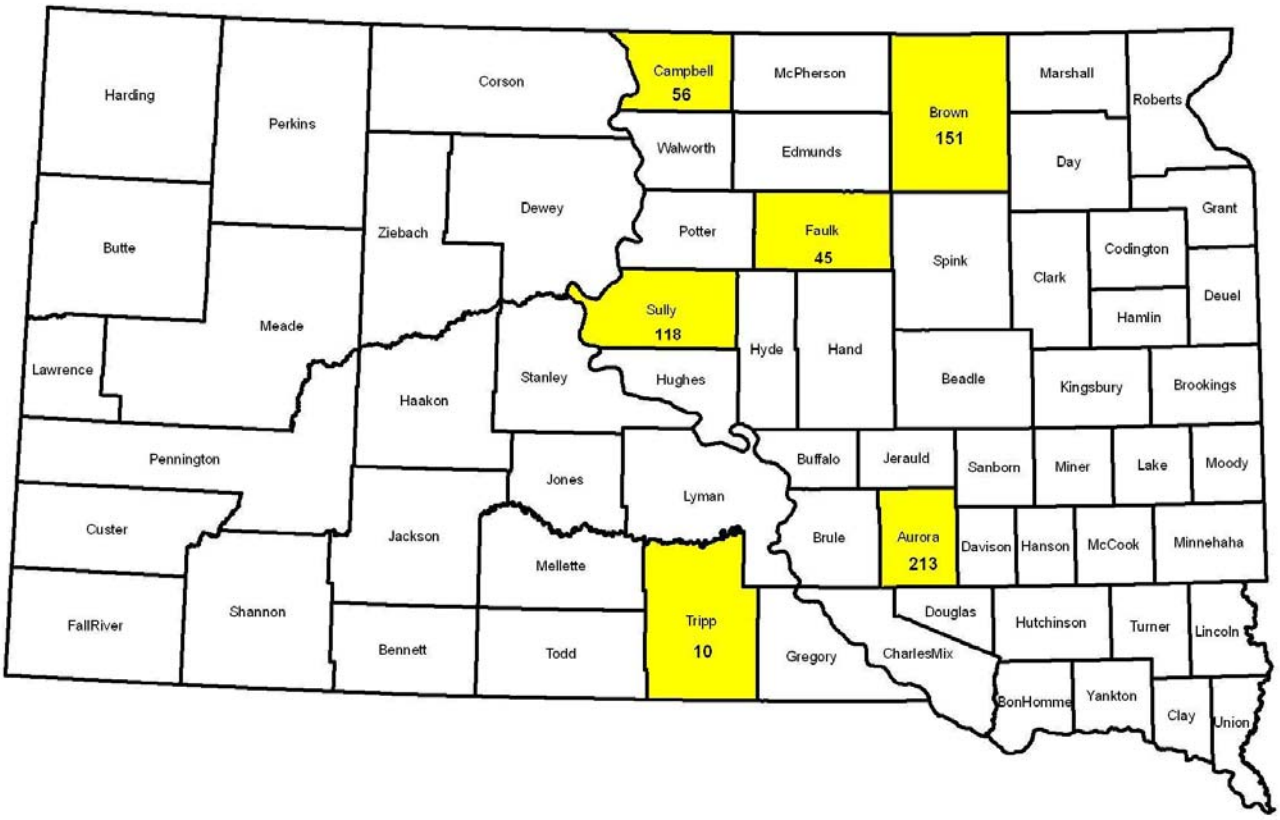
WEST RIVER TOTAL - 4,189
EAST RIVER TOTAL - 8,089
STATEWIDE TOTAL - 12,278

Appendix B. Giant Canada goose WDM trap/relocation program by county, 2006-2009.



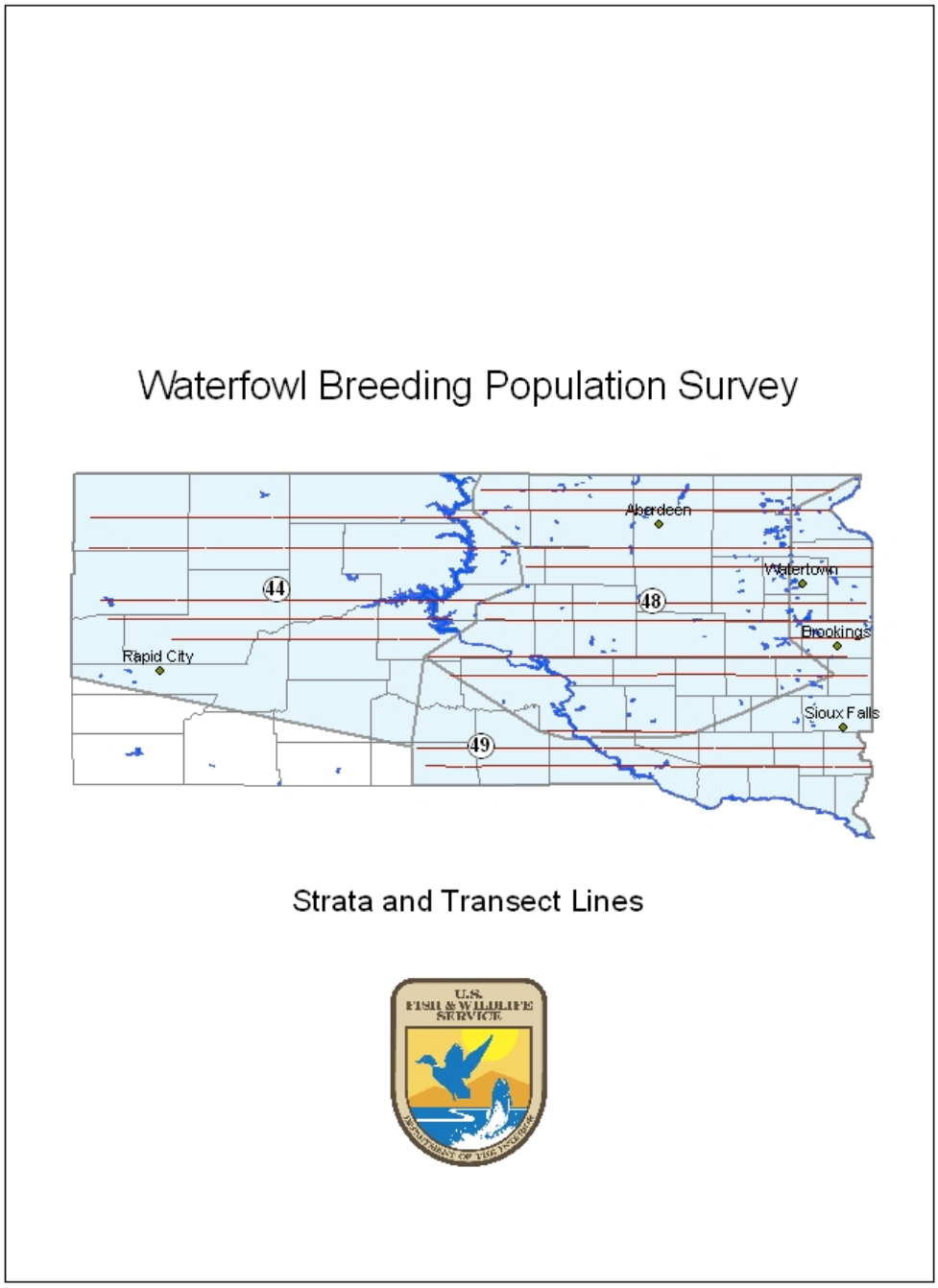
Canada geese trapped from Freeman Pond (Hutchinson County) and Dakota Dunes Pond (Union County) located in Region 3.

Appendix C. Giant Canada goose surplus releases by county, 1999-2009.



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

Appendix D. Waterfowl breeding population survey—strata and transect lines.



Appendix E. Breeding survey mythology.

Waterfowl May Breeding Pair and Habitat Survey

Breeding Ground Survey Methodology

- Aircraft speed is 90-105 mph and aircraft height is 100'-150' above ground.
- Two observers, the pilot observer on left side of aircraft and the other observer is surveying out the right side of aircraft. They cover a distance of 1/8 mile (660') on each side of the aircraft.
- Each observer records observations into a laptop computer, which is interfaced with the aircraft's GPS.
- Each transect is divided into 18 mile segments. Therefore, each 18 mile segment is 4.5 square miles.
- A single Canada goose is considered a pair, or 2 birds in terms of breeding population.
- A pair is considered 2 birds.
- Any group of 3 or more (up to 45) counts as "face value". For example, a group of 6 equals 6 birds, a group of 15 equals 15 birds, etc. Any group larger than 45 are not included in the breeding population estimate.

Example

If the following were observed in a particular segment:

3 lone (single) Canada geese – 3x2=6
4 pair Canada geese – 4x2=8
A group of 7 Canada geese – 7

The total indicated birds (TIB) for this segment is (3x2) + (4x2) + 7 = 21.

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

BPOP index = TIB x VCF x EF

Appendix E (cont.).

In Strata 48, there are 70 segments so 70 segment x 4.5 square mile per segment = 315 square miles. This is the area actually sampled. There are 24,587 square miles within the boundary of Stratum 48. Dividing 24,587 by 315 = an EF of 78.05.

VCF – A pilot/observer 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 2003 was about 2.5.

So, let's use the data for 2003 for Stratum 48, our most important stratum for resident Canada geese.

BPOP index = TIB x VCF x EF

470 x 2.51 x 78.05 = 92,100

SD May Breeding Pair and Habitat Survey

2003 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

Appendix F. Special Canada goose permit.

DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE

3-201
(1/97)

FEDERAL FISH AND WILDLIFE PERMIT

U.S. Fish and Wildlife Service
Migratory Bird Permit Office
P.O. Box 25486, DFC (60154)
Denver, Colorado 80225-0486
(303) 236-8171

1. PERMITTEE

SOUTH DAKOTA DEPT. OF GAME, FISH & PARKS
ATTN: ART SMITH
523 EAST CAPITOL, FOSS BUILDING
PIERRE, SD 57501-3182
U.S.A.

2. AUTHORITY-STATUTES
16 USC 703-712

REGULATIONS
50 CFR 13
50 CFR 21.26

3. NUMBER
MB023529-1 AMENDMENT

4. RENEWABLE
☒ YES
☐ NO

5. MAY COPY
☒ YES
☐ NO

6. EFFECTIVE
04/21/2010

7. EXPIRES
03/31/2014

8. NAME AND TITLE OF PRINCIPAL OFFICER *(If #1 is a business)*
JEFFREY VONK
SECRETARY

9. TYPE OF PERMIT
SPECIAL STATE CANADA GOOSE PERMIT

10. LOCATION WHERE AUTHORIZED ACTIVITY MAY BE CONDUCTED

SOUTH DAKOTA

11. CONDITIONS AND AUTHORIZATIONS:

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.

B. THE VALIDITY OF THIS PERMIT IS ALSO CONDITIONED UPON STRICT OBSERVANCE OF ALL APPLICABLE FOREIGN, STATE, LOCAL OR OTHER FEDERAL LAW.

C. VALID FOR USE BY PERMITTEE NAMED ABOVE.

D. Permittee, and subpermittees, are authorized to conduct resident canada goose management and control activities through egg and nest manipulation, trapping, relocating, and killing of canada geese in order to contribute the human health and safety, protection of personal or public property, and prevention of injury to people or property in accordance with all conditions specified in 50 CFR 21.26.

E. Permittee, and subpermittees, are authorized to take on an annual basis up to **one thousand five hundred (1500) resident Canada geese (*Branta canadensis*).**

Authorized to translocate Canada geese within the state of South Dakota and to other states on an annual basis.

Authorized to destroy on an annual basis up to **one thousand (1,000) resident Canada goose (*Branta canadensis*) nests, including eggs.***

F. Concurrent authority is granted to agency employees, contractors, and private individuals who have written authority from the state agency and are authorized to conduct activities involving the control and management of resident Canada geese.

G. Permit amended to change Item #11E as identified by asterisk.

☒ ADDITIONAL CONDITIONS AND AUTHORIZATIONS ALSO APPLY

12. REPORTING REQUIREMENTS

ANNUAL REPORT DUE: 01/31

ISSUED BY	TITLE	DATE
Jonell Swano	CHIEF, MBPO, REGION 6	04/21/2010

Appendix G. County specific Canada goose damage management activities, fiscal years 2000-2009 (FY 08 data is currently not available).

Canada Goose Damage Management Activities – South Dakota (FY00)

County	Man Hours	Miles Driven	Equipment and Supplies	Damage Management Expenses
Beadle	2	0	$0	$33
Brookings	287	3,270	$7,683	$14,375
Clark	890	14,975	$25,658	$48,010
Codington	536	5,164	$11,728	$23,922
Day	1,434	15,695	$58,693	$91,935
Deuel	447	3,031	$11,592	$21,348
Grant	68	1,101	$2,409	$4,103
Hamlin	513	6,154	$12,452	$24,531
Hanson	0	0	$0	$0
Kingsbury	754	8,531	$18,541	$36,116
Lake	535	5,931	$18,684	$31,106
Lincoln	40	222	$1,300	$2,172
Marshall	302	6,072	$6,153	$14,080
McCook	247	1,888	$5,921	$11,393
Miner	68	537	$2,194	$3,706
Minnehaha	415	3,647	$11,322	$20,647
Moody	190	1,677	$4,589	$8,868
Roberts	61	1,472	$887	$2,580
Sanborn	0	0	$0	$0
Turner	40	178	$1,301	$2,158
Totals	6,829	79,545	$201,107	$361,083

July 1, 1999 – June 30, 2000

Canada Goose Damage Management Activities – South Dakota (FY01)

County	Man Hours	Miles Driven	Equipment and Supplies	Damage Management Expenses
Beadle	27	209	$243	$721
Brookings	377	4,349	$5,353	$12,702
Clark	992	15,893	$14,702	$36,029
Codington	293	4,039	$4,964	$10,963
Day	690	8,398	$33,678	$47,310
Deuel	131	1,766	$2,886	$5,558
Grant	89	2,554	$1,660	$4,085
Hamlin	238	5,386	$3,920	$9,746
Hanson	23	367	$243	$742
Kingsbury	688	11,110	$8,084	$22,914
Lake	632	6,001	$10,967	$22,705
Lincoln	45	535	$300	$1,182
Marshall	275	3,135	$4,169	$9,514
McCook	246	2,574	$2,293	$6,968
Miner	92	1,752	$786	$2,884
Minnehaha	349	2,769	$4,237	$10,463
Moody	192	2,630	$1,790	$5,720
Roberts	268	2,857	$4,218	$9,332
Sanborn	5	0	$7	$84
Turner	4	61	$7	$86
Totals	5,656	76,385	$104,507	$219,708

July 1, 2000 – June 30, 2001

Canada Goose Damage Management Activities – South Dakota (FY02)

County	Man Hours	Miles Driven	Equipment and Supplies	Damage Management Expenses
Beadle	0	0	$94	$94
Brookings	406	6,051	$9,192	$20,754
Clark	1,304	19,568	$14,521	$51,694
Codington	303	5,209	$3,350	$12,341
Day	1,604	9,353	$33,427	$71,215
Deuel	174	4,310	$3,152	$9,030
Grant	108	2,229	$1,245	$4,661
Hamlin	468	7,969	$4,900	$18,749
Hanson	49	908	$1,122	$2,602
Kingsbury	1,172	13,070	$22,563	$53,544
Lake	707	9,081	$17,703	$37,043
Lincoln	47	444	$1,087	$2,282
Marshall	314	1,962	$4,831	$12,299
McCook	371	3,583	$16,508	$26,019
Miner	109	847	$2,576	$5,252
Minnehaha	288	3,176	$7,432	$15,017
Moody	82	2,564	$1,150	$4,206
Roberts	127	2,607	$2,439	$6,428
Sanborn	0	640	$0	$345
Turner	13	126	$0	$341
Totals	7,646	93,697	$147,292	$353,916

July 1, 2001 – June 30, 2002

Canada Goose Damage Management Activities – South Dakota (FY03)

County	Man Hours	Miles Driven	Equipment and Supplies	Damage Management Expenses
Beadle	0	0	$0	$0
Brookings	324	4,481	$8,466	$18,303
Clark	524	10,033	$16,649	$34,064
Codington	134	3,848	$5,696	$10,851
Day	1,328	17,280	$69,167	$108,898
Deuel	239	2,508	$6,757	$13,576
Grant	38	925	$727	$2,106
Hamlin	173	5,701	$4,996	$12,032
Hanson	54	743	$601	$2,242
Kingsbury	569	9,207	$8,549	$26,555
Lake	540	5,245	$9,096	$24,293
Lincoln	90	962	$951	$3,532
Marshall	294	1,800	$5,757	$13,450
McCook	441	5,471	$6,356	$19,407
Miner	47	897	$965	$2,531
Minnehaha	427	3,233	$6,285	$17,818
Moody	124	1,176	$1,633	$5,100
Roberts	258	3,007	$5,411	$12,938
Sanborn	9	0	$7	$213
Turner	0	0	$7	$7
Totals	5,613	76,517	$158,076	$327,916

July 1, 2002 – June 30, 2003

Canada Goose Damage Management Activities – South Dakota (FY04)

County	Man Hours	Miles Driven	Equipment and Supplies	Damage Management Expenses
Aurora	0	229	0	$124
Beadle	7	0	$48	$195
Bennett	4	53	0	$109
Bon Homme	0	743	0	$401
Brookings	467	5,305	$3,872	$16,935
Brown	15	560	$131	$769
Butte	9	0	0	$203
Campbell	59	596	$2,505	$4,117
Clark	725	7,900	$13,509	$33,599
Clay	0	525	0	$283
Codington	244	1,010	$2,180	$8,050
Davison	0	87	$588	$605
Day	2,036	32,219	$50,982	$112,837
Deuel	172	1,886	$4,478	$9,258
Edmunds	7	344	$58	$393
Grant	22	560	$189	$976
Gregory	8	0	$51	$228
Hamlin	346	2,129	$4,634	$13,342
Hanson	25	142	$309	$931
Hutchinson	22	142	$171	$722
Hyde	10	0	$64	$286
Jerauld	8	0	$60	$242
Kingsbury	803	9,171	$7,443	$29,917
Lake	574	5,948	$6,430	$22,172
Lincoln	12	82	$287	$586
Lyman	16	0	$102	$458
Marshall	281	4,110	$2,947	$11,310
McCook	741	6,588	$7,402	$27,134
McPherson	484	11,043	$6,130	$22,668
Mellette	6	249	$38	$306
Miner	28	705	$875	$1,875
Minnehaha	614	5,707	$7,360	$23,847
Moody	120	1,530	$1,243	$4,691
Pennington	4	0	0	$81
Potter	6	0	$38	$171
Roberts	116	2,332	$1,600	$5,392
Spink	20	0	$196	$643
Tripp	8	0	$51	$228
Turner	15	530	$109	$722
Union	35	951	$408	$1,685
Totals	8,072	103,377	$126,467	$358,500

July 1, 2003 – June 30, 2004

Canada Goose Damage Management Activities – South Dakota (FY05)

County	Man Hours	Miles Driven	Equipment and Supplies	Damage Management Expenses
Aurora	22	287	$191	$836
Beadle	19	259	$174	$748
Bon Homme	0	0	$1,074	$1,074
Brookings	400	4,081	$11,863	$23,067
Brown	60	1,848	$421	$2,809
Brule	4	30	$1	$119
Buffalo	2	0	0	$34
Butte	25	377	$81	$858
Campbell	7	0	$1,085	$1,252
Clark	823	9,475	$12,979	$36,668
Clay	3	152	$31	$191
Codington	325	3,287	$2,868	$11,967
Davison	10	0	$92	$315
Day	1,272	27,585	$41,659	$85,642
Deuel	170	667	$2,505	$6,665
Edmunds	34	1,367	$451	$1,990
Grant	85	539	$570	$2,758
Haakon	2	0	0	$31
Hamlin	579	5,839	$4,443	$20,626
Hanson	21	302	$174	$810
Jackson	20	76	$9	$493
Kingsbury	297	5,331	$5,081	$14,717
Lake	178	2,486	$7,078	$12,442
Lawrence	7	0	0	$151
Lincoln	20	194	$299	$854
Lyman	5	166	$2	$214
Marshall	278	3,124	$3,311	$11,268
McCook	561	4,694	$14,746	$29,890
McPherson	201	6,738	$1,757	$10,075
Meade	0	0	$7	$7
Mellette	7	438	$2	$403
Miner	36	1,031	$1,271	$2,656
Minnehaha	985	5,681	$14,137	$39,261
Moody	116	1,311	$1,265	$4,588
Pennington	9	0	0	$198
Perkins	5	63	$7	$165
Potter	7	0	$2	$169
Roberts	158	3,144	$1,758	$7,057
Shannon	12	0	$7	$280
Stanley	7	0	$2	$153
Todd	0	0	$7	$7
Turner	94	1,111	$858	$3,586
Union	97	1,296	$876	$3,764
Walworth	4	575	$1	$429
Yankton	12	129	$102	$436
Totals	6,982	93,681	$133,248	$341,721

July 1, 2004 – June 30, 2005

Canada Goose Damage Management Activities – South Dakota (FY06)

County	Man Hours	Miles Driven	Equipment and Supplies	Damage Management Expenses
Beadle	30	235	$390	$1,225
Bennett	3	0	0	$69
Brookings	196	4,643	$6,139	$13,301
Brown	73	100	$1,128	$2,874
Butte	6	302	0	$310
Campbell	35	348	$1,337	$2,340
Clark	435	3,044	$12,235	$23,977
Clay	13	205	$156	$572
Codington	196	829	$3,771	$8,748
Custer	0	3,480	0	$1,984
Davison	0	120	$9	$77
Day	748	9,772	$41,858	$64,629
Deuel	71	1,033	$1,254	$3,486
Dewey	0	149	0	$85
Edmunds	12	100	$185	$529
Fall River	0	938	0	$534
Grant	56	0	$854	$2,153
Hamlin	263	1,810	$5,495	$12,570
Hanson	0	0	$9	$9
Harding	2	0	0	$46
Hutchinson	4	565	$68	$482
Kingsbury	280	7,219	$4,302	$14,851
Lake	102	3,626	$2,878	$7,289
Lincoln	4	225	$560	$792
Marshall	266	1,340	$5,010	$11,898
McCook	298	3,628	$6,903	$15,819
McPherson	119	2,835	$1,926	$6,277
Meade	0	838	0	$478
Miner	41	1,165	$658	$2,276
Minnehaha	436	4,768	$10,734	$23,471
Moody	51	1,374	$1,065	$3,031
Perkins	2	0	0	$46
Potter	5	0	$21	$135
Roberts	115	1,875	$4,588	$8,299
Sanborn	0	620	0	$353
Spink	2	0	$35	$81
Turner	5	409	$143	$503
Union	67	1,575	$940	$3,378
Yankton	0	0	$9	$9
Totals	3,948	59,170	$114,660	$239,124

July 1, 2005 – June 30, 2006

Canada Goose Damage Management Activities--South Dakota (FY07)				
County	Man Hours	Miles Driven	Equipment and Supplies	Damage Management Expenses
Aurora	0	267	$0	$152
Beadle	0	100	$0	$57
Bennett	6	34	$0	$160
Brookings	344	4,095	$4,588	$15,103
Brown	43	2,880	$621	$3,276
Campbell	31	76	$1,249	$2,018
Clark	343	3,448	$6,856	$16,981
Clay	3	111	$33	$170
Codington	542	2,371	$5,494	$19,747
Davison	19	445	$68	$769
Day	1,405	27,479	$45,879	$94,964
Deuel	51	478	$2,867	$4,351
Edmunds	0	300	$0	$171
Grant	14	0	$104	$430
Hamlin	153	1,954	$3,107	$7,868
Hanson	5	407	$12	$355
Hutchinson	82	767	$242	$2,632
Kingsbury	413	5,423	$1,670	$14,579
Lake	397	4,708	$3,644	$15,775
Lincoln	47	289	$1,324	$2,604
Lyman	11	0	$12	$284
Marshall	249	2,985	$2,756	$10,377
Mc Cook	346	2,627	$5,148	$14,865
Mc Pherson	166	7,457	$1,571	$9,778
Meade	0	239	$0	$136
Miner	43	895	$202	$1,735
Minnehaha	687	5,106	$5,097	$24,353
Moody	93	1,184	$407	$3,294
Pennington	19	40	$0	$479
Perkins	4	0	$0	$88
Roberts	124	6,411	$3,598	$10,212
Sanborn	12	0	$29	$308
Turner	16	0	$53	$424
Union	52	1,890	$162	$2,467
Yankton	3	0	$6	$80
Ziebach	1	0	$0	$17
Totals	5,722	84,465	$96,798	$281,058
July 1, 2006--June 30, 2007				

Canada Goose Damage Management Activities--South Dakota (FY09)

County	Man Hours	Miles Driven	Equipment and Supplies	Damage Management Expenses
Beadle	0	0	$9	$9
Bennett	7	0	$0	$162
Brookings	501	5,507	$9,017	$24,357
Brown	152	2,508	$2,450	$7,630
Brule	26	291	$256	$1,050
Campbell	11	265	$620	$1,056
Clark	273	2,608	$9,579	$17,679
Codington	264	1,956	$4,203	$11,701
Corson	3	0	$27	$96
Custer	0	24	$0	$15
Davison	11	274	$146	$584
Day	2,067	27,156	$68,012	$134,011
Deuel	239	1,536	$4,515	$11,160
Edmunds	3	640	$79	$542
Grant	46	189	$731	$1,931
Hamlin	201	3,149	$3,607	$10,335
Hanson	66	1,004	$875	$3,077
Hutchinson	25	139	$328	$1,002
Kingsbury	378	4,206	$6,622	$18,217
Lake	813	9,741	$12,545	$37,918
Lawrence	16	55	$0	$419
Lincoln	78	1,173	$1,314	$3,889
Marshall	241	1,824	$4,580	$11,437
Mc Cook	513	6,423	$23,776	$39,970
Mc Pherson	135	4,463	$2,241	$8,208
Miner	69	1,822	$2,411	$5,187
Minnehaha	857	8,776	$33,596	$59,430
Moody	114	681	$3,105	$6,248
Roberts	504	5,654	$11,236	$26,736
Spink	0	140	$0	$86
Turner	21	479	$292	$1,093
Union	208	3,732	$2,843	$10,095
Walworth	0	0	$23	$23
Yankton	45	968	$586	$2,245
Totals	7,886	97,381	$209,623	$457,600

July 1, 2008--June 30, 2009