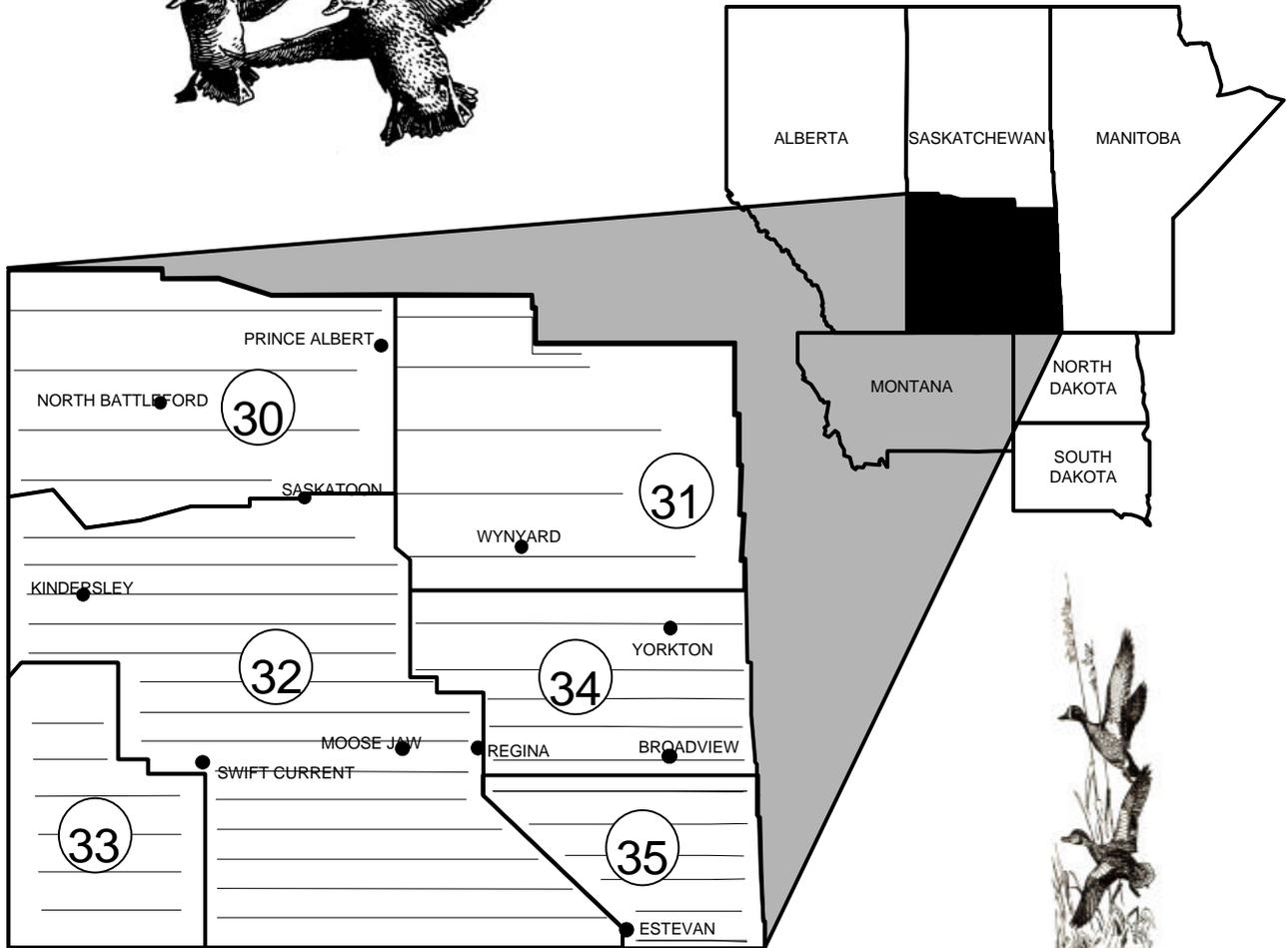
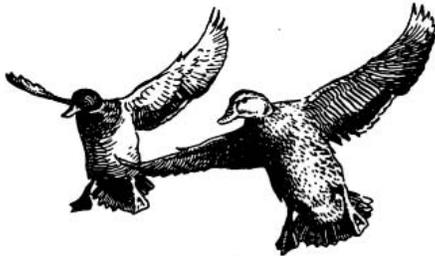


WATERFOWL BREEDING POPULATION SURVEY

SOUTHERN SASKATCHEWAN

2006



UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

AND

ENVIRONMENT CANADA
CANADIAN WILDLIFE SERVICE



TITLE: Waterfowl Breeding Population Survey for Southern Saskatchewan
STRATA SURVEYED: 30, 31, 32, 33, 34, and 35
DATES: May 5 – May 25, 2006
DATA SUPPLIED BY: United States Fish and Wildlife Service (USFWS)
Canadian Wildlife Service (CWS)

Strata 30, 31, 32, and 33

Aerial Crew

Pilot/Observer
Observer

Philip Thorpe, Flyway Biologist, USFWS
Thomas Lewis, Wildlife Biologist, USFWS

Ground Crew

Crew Leaders:

Dan Nieman, Wildlife Biologist, CWS
Jack Smith, Wildlife Technician, CWS
Keith Warner, Wildlife Technician, CWS

Assistants:

Blake Bartzen, Student Technician, CWS
Kevin Dufour, Wildlife Biologist, CWS
Chris Downie, Student Technician, CWS
Phyllis Nieman, Volunteer, CWS
Logan Sitter, Student Technician, CWS
Rae Lynn Spencer, Student Technician, CWS
Amanda Williams, Contractor, Ducks Unlimited Canada

Strata 34 and 35

Aerial Crew

Pilot/Observer:
Observer:

Rod King, Flyway Biologist, USFWS
Scott Frazer, Wildlife Biologist, USFWS

Ground Crew

Crew Leaders:

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Jim Leafloor, Wildlife Biologist, CWS
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ABSTRACT: The 2006 Waterfowl Breeding Population and Habitat Survey of Southern Saskatchewan was conducted 5-25 May and was consistent in design and coverage to previous surveys. Wetland and upland habitat conditions were variable across Southern Saskatchewan during the 2006 survey. Drier conditions existed in the south and west, while the northern grasslands and Parklands had flooded wetlands and good to excellent upland conditions for waterfowl nesting and brood rearing. The May pond estimate was 12.6%, 36.9%, and 38.5% higher than the 2005 estimate, the 10-year mean, and the long-term mean, respectively. The total duck population estimate (10,099,000) was 26.7%, 28.5%, and 37.3% higher than the 2005 estimate, the 10-year mean, and the long-term mean, respectively. Percent changes for selected species compared to 2005, the 10-year mean, and the long-term mean are as follows: mallards, 5.9%, -9.1%, -11.6%; blue-winged teal, 39.5%, 39.7%, 82.9%; northern pintail, 19.4%, 46.1%, -16.0%; canvasbacks, 76.5%, 37.9%, 57.2%; scaup (greater and lesser), 2.6%, 26.1%, -6.1%. Poor to fair production is expected from the south and west portions of stratum 32 and 33 due to poor wetland habitat conditions. Good to excellent production is expected from most of the northern grasslands and the Parkland region because wetlands were in good condition prior to waterfowl arrival and uplands had good nesting cover.

METHODS: The procedures used during the 2006 survey are described in the Standard Operating Procedures for Aerial Waterfowl Breeding Population and Habitat Surveys in North America, Section III (A), (USFWS and CWS 1987). No changes were made this year in survey methodology or aerial coverage (Table 1).

A survey program written by John I. Hodges, USFWS-Alaska, provided the basis for recording observations and transcribing data into electronic format. This software integrates point locations (from the aircraft Global Positioning System) with each bird or pond observation (Thorpe 2000).

Air-ground comparison transects (34 in strata 30-33; 16 in strata 34-35) were used to provide visibility correction factors for waterfowl, American coots, and pond numbers. Similar to 2005, 10 air-grounds were not completed and 3 were shortened (Thorpe 2005). All air-grounds were completed in strata 34 and 35.

The aircrews in strata 30-35 remained unchanged from 2005. The ground crews had 3 new crew members in strata 30-33 and 1 new crew member in strata 34-35. Crew leaders remained the same in all strata. All new personnel were provided training in duck identification, pond classification, and survey procedures and were closely monitored for accuracy in identification and compliance with established procedures throughout the survey.

The survey was initiated 5 May and was completed 25 May. Two Cessna 206s (1 on amphibian floats in strata 34-35) were used as survey aircraft in all strata. Approximately 75 and 20 hours of flight time were required to complete the survey within strata 30-33 and strata 34-35, respectively. Weather and ground crew related delays amounted to 2 days and 1 day in strata 30-33 and strata 34-35, respectively.

WEATHER AND HABITAT CONDITIONS: During the 2006 survey, Southern Saskatchewan generally had poor to fair waterfowl habitat in the southern grasslands and good to excellent waterfowl habitat in the northern grasslands and Parkland region. Spring runoff was below average in the southwest, southeast, and northwest and above average in the northeast and central regions of the grainbelt (Saskatchewan Watershed Authority 2006). Flooding of fields, roads, and houses was occurring in May and early June in this region.

The grasslands strata of 32 and 33 received below average to average winter precipitation except in the Cypress Hills, where precipitation was above average (Agriculture and Agri-food Canada 2006). Spring precipitation increased across the southern grasslands, but not to the extent necessary to fill seasonal and semi-permanent wetlands or create ephemeral or temporary wetlands for waterfowl. Upland habitat conditions throughout the southern grasslands appeared to be in fair to good condition for nesting ducks. Wetland conditions in the south (along the border and north to Regina) were in poor to fair condition. Many basins were dry in the southern Missouri Coteau. Conditions improved in the central and northern parts of the Coteau. Sheetwater was only observed north of Regina. The northern grasslands had water present in fields and wetland basins were overflowing. Wetlands in the native grasslands, managed areas, pastures, and haylands had excellent waterfowl nesting and brood rearing habitat.

The Parklands (stratum 30-31) received average to above average precipitation during the winter and spring and both upland nesting cover and wetlands were in good to excellent condition (Agriculture and Agri-food Canada 2006). Many of the wetlands had flooded beyond their normal basins and into the surrounding uplands. There was also an increase in flooded emergent vegetation and woodland, which should benefit overwater and cavity nesting species.

Overall, temperatures for the fall, winter, and spring in Southern Saskatchewan were above average (Agriculture and Agri-food Canada 2006). August 2005 had below average temperatures, but for the remainder of the fall and through January temperatures ranged from 1-2° C above average to >5° C above average. December and January were both characterized by well-above average temperatures (>5° C). February also had above average temperatures (1-3° C) in the western half of the grainbelt, but the eastern half had average to below average temperatures (1-2° C). March was the only month during the winter and spring that had temperatures below average (1-2° C) across the Province. Temperatures were above average again in April and May.

On average across the Province, planting of spring crops was 88% complete (Saskatchewan Agriculture, Food, and Rural Revitalization 2006). However, in the northeast and northwest Parklands and in the west-central grasslands seeding was delayed because of field flooding and in some areas was less than 50% complete as of early June. In the Lloydminster area, some farmers have resorted to aerial seeding of canola because of the excessive topsoil moisture. Precipitation in late-May and early June further delayed seeding of crops and caused widespread field flooding in the Parklands and the west-central grasslands. Farmers in the central grasslands estimated that 10-15% of the spring crop will not be planted because of field flooding (Saskatchewan Agriculture, Food, and Rural Revitalization 2006). Hay and pasture land was reported to be good to excellent in most of the Parklands and in the west-central grasslands. Both hay and pasture land were reported poor in the southeast and southwest grasslands. In these areas, farmers reported that both hay and pasture were already turning brown and they expected below average hay yields. Some hauling of water for livestock was already occurring in the southeast grainbelt.

The May pond estimate (2,719,000) was 12.6% higher than the 2005 estimate (2,414,900), 36.9% higher than the 10-year mean, and 38.5% higher than the long-term mean (Table 2, Fig. 1). The 2006 May pond estimate was the 8th highest (wettest) on record and the improved conditions were evident in all strata except strata 33 and 35.

BREEDING POPULATION ESTIMATES: The 2006 total duck population estimate for Southern Saskatchewan was 26.7%, 28.5%, and 37.3% higher than the 2005 estimate, the 10-

year mean, and the long-term mean, respectively (Table 3). The 2006 total duck estimate was the 10th highest estimate on record for the 52-year survey and the first time the estimate has been over 10 million since 1997. Prior to 1997, the total duck estimate for Southern Saskatchewan has only been over 10 million in the 1970's and in the 1950's (Appendix 1)

The 2006 total dabbling duck population estimate increased 24.8% from the 2005 estimate and was the 10th highest estimate on record (Table 3, Appendix 1). Except for American wigeon, all dabbling duck estimates were higher than their 2005 estimates. Both the gadwall and northern shoveler estimates were the 2nd highest estimates on record and the blue-winged teal estimate was the 3rd highest on record (Appendix 1). Although not a record, the northern pintail estimate was over a million birds for the first time since 1997 and was above the 2005 estimate and the 10-year mean. The mallard estimate was 5.9% higher than the 2005 estimate, but remained below the 10-year and long-term means (Table 3).

The total diving duck population estimate was 38.5% higher than the 2005 estimate and was the 4th highest estimate on record (Table 3). Diving duck (*Aythya spp.*) estimates were all higher than their 2005 estimates and their 10-year means (Table 3). The redhead estimate was the 2nd highest estimate on record and the canvasback estimate was the 4th highest estimate on record.

The 2006 Canada goose estimate was the 3rd highest on record and remained well-above the long-term mean. Their population estimates continue to show a strong upward trend in Southern Saskatchewan (Fig. 1). The American coot estimate was the 3rd highest on record and 47.3% higher than the 2005 estimate (Table 3). It also remains well-above the long-term mean for the species.

CONCLUSIONS: Good production in 2005 and good habitat conditions in the northern grasslands and Parkland region this year likely contributed to the near record high estimates observed for some species during the 2006 survey. The Parkland region of Saskatchewan historically has had high densities of diving ducks due to the high density of semi-permanent wetlands in the region. At the height of the drought in 2002, the pond estimate was the 2nd lowest (driest) on record. Many of these semi-permanent wetlands became dry and diving ducks redistributed to better habitat, which also may have been in more marginal or less preferred breeding habitat. Now that conditions have improved, divers have returned to the center of their breeding range and ground reports indicate that they are experiencing good production. Many of the dabbling duck estimates are also higher in the Parkland region indicating that the improved habitat conditions have also attracted these birds back to higher quality and more productive habitat. Surprisingly, our estimate for mallards has not been as quick to respond to the improved habitat in the Parklands. Mallards typically prefer the Parkland region and in previous wet years we have seen big increases in the population estimates over a short period of time. For example, between 1995 and 1996 there was a 16% increase in the mallard estimate and between 2002 and 2003 we had a 43% increase in the estimate (Appendix 1). Since 2004, the mallard estimate has increased 6-7%. Too many variables are involved to make any conclusions about the slower response to improved habitat in Southern Saskatchewan mallards this year versus previous years.

The pond estimate in stratum 30, located in the northwest Parklands, was only 10.8% higher than the 2005 estimate, but was 85.9% higher than the 10-year mean and ranked as the 3rd highest (wettest) estimate on record (Table 2). The increase in pond numbers may finally represent an end to the long-term drought that has existed in this stratum since the late 1990s. We expect good to excellent production and recruitment from this stratum.

Pond numbers also increased (18.3%) in the northeast Parklands (stratum 31) and the estimate is the highest pond count in the stratum since 1996. Many basins were overflowing into adjacent basins and both flooding and sheetwater were present during the survey. The area continued to receive above-average rainfall during the month of June. Upland conditions appeared good for nesting and production and recruitment is also expected to be good to excellent from this stratum. The northeast part of the stratum was drier and rated as only fair for production, but we hope to see improvement during our July habitat appraisal because the area has received above average precipitation in June. Although, increased precipitation this late in the nesting season could result in flooded nests for some species.

In the grasslands, stratum 32 had variable habitat conditions from poor in the south to excellent in the north. The effect of habitat condition on duck abundance was evident when we compared raw observed duck counts (before expansion or correction factors were applied) to 2005 raw observed duck counts for the same areas. Raw duck counts for transects 1-4 in stratum 32 (southern grasslands) were 32% lower than 2005 raw counts and ponds were at least 15% lower than 2005 counts. In contrast, raw duck counts on transects 11-14 in the northern part of the stratum were about 73% higher than 2005 raw duck counts and raw wetland counts were about 47% higher than 2005 raw counts. In the southwest grasslands (stratum 33), the Cypress Hills had good habitat conditions, but fair to poor conditions existed around the Hills.

The potential for production and recruitment was mixed in strata 34 and 35 this year. Stratum 34 had the 6th highest wetland estimate on record, while the estimate for stratum 35 ranked slightly below the 10-year average. Good to excellent production is expected from stratum 34, but the drier conditions observed in 35 will likely result in lower production potential.

Our predictions are based on conditions that were seen during the May survey and formulated using waterfowl estimates, wetland densities, water levels, and upland habitat conditions. We expect waterfowl production to be poor in the southern grasslands, fair in the southwestern grasslands, good throughout the central survey region and along the central and northern Missouri Coteau, and excellent in the northwestern grasslands and most of the Parkland region. Precipitation is needed in the southern grasslands to help recharge wetlands that still show impacts from the recent drought. The current moist weather pattern across the central and northern parts of the Province, while detrimental to many agricultural activities, should continue to benefit waterfowl.

ACKNOWLEDGMENTS

We would be unable to complete the survey without the hard work and cooperation of the Canadian Wildlife Service ground crew - thanks. Thom Lewis and Dan Nieman provided helpful comments that improved this report.

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Submitted by: Philip Thorpe

Date: June 29, 2006

Table 1. Survey design and May 2006 coverage for Southern Saskatchewan.

	Stratum						Total
	30	31	32	33	34	35	
Survey design:							
Square miles in stratum	18,570	21,086	37,911	11,345	13,164	9,044	111,120
Square miles in sample- waterfowl	153.0	144.0	571.5	90.0	175.5	126.0	1,260.0
Square miles in sample- ponds	76.50	72.00	285.75	45.00	87.75	63.00	630.00
Linear miles in sample	612	576	2,286	360	702	504	5,040
Number of transects in sample	4	5	14	6	5	6	40
Number of segments in sample	34	32	127	20	39	28	280
Expansion factor	121.373	146.431	66.336	126.056	75.009	71.778	
May 2006 coverage:							
Square miles in sample- waterfowl	153.0	144.0	571.5	90.0	175.5	126.0	1260.0
Square miles in sample- ponds	76.50	72.00	285.75	45.00	87.75	63.00	630.00
Linear miles in sample	612	576	2,286	360	702	504	5,040
Number of transects in sample	4	5	14	6	5	6	40
Number of segments in sample	34	32	127	20	39	28	280
Expansion factor	121.373	146.431	66.336	126.056	75.009	71.778	

Table 2. Long-term trend in adjusted May pond estimates (thousands) by stratum with comparisons to the previous year, the previous 10-year mean, and the long-term mean for Southern Saskatchewan (1961-2006).

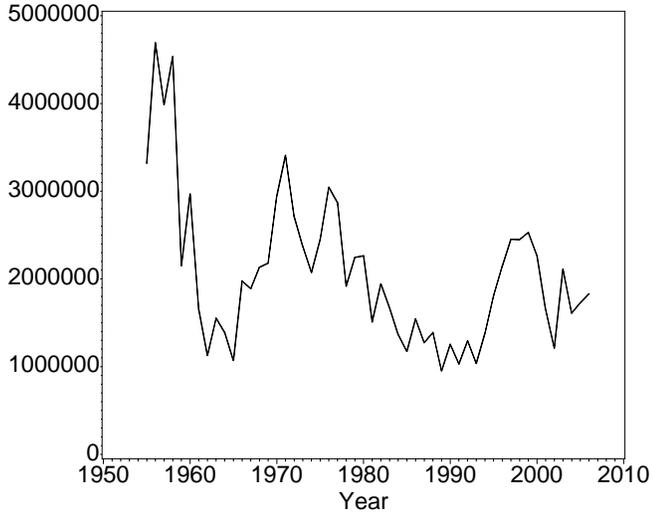
Year	Stratum						Total
	30	31	32	33	34	35	
1961	142.2	219.4	252.2	80.3	58.9	41.8	794.9
1962	160.3	383.4	311.1	45.2	269.4	59.9	1229.3
1963	145.0	198.5	268.9	43.3	239.1	129.7	1024.5
1964	196.9	357.3	322.6	64.7	481.8	394.0	1817.2
1965	327.9	439.9	610.1	112.2	435.1	332.2	2257.4
1966	350.8	587.3	595.1	133.0	569.7	388.5	2624.3
1967	282.3	642.1	688.8	194.9	545.1	299.0	2652.2
1968	231.4	329.6	404.2	65.1	123.6	58.5	1212.5
1969	386.7	469.7	781.8	140.0	267.1	179.6	2225.0
1970	278.1	603.7	733.4	102.6	721.3	518.1	2957.1
1971	294.3	407.0	495.3	120.4	608.7	391.7	2317.4
1972	349.1	646.2	357.2	63.1	546.0	302.8	2264.4
1973	266.8	466.6	326.8	85.7	227.6	117.0	1490.4
1974	427.6	836.7	755.0	122.9	943.1	460.9	3546.3
1975	395.3	806.1	785.7	192.7	763.9	480.9	3424.7
1976	201.9	399.0	553.4	96.8	656.6	670.8	2578.5
1977	176.1	254.7	265.7	44.5	338.7	170.3	1250.0
1978	274.1	393.6	566.4	161.6	545.5	280.7	2221.8
1979	433.4	697.5	660.4	130.2	667.8	480.9	3070.1
1980	265.4	311.3	358.2	48.1	273.3	137.2	1393.6
1981	145.9	160.5	126.2	28.4	97.3	52.6	611.0
1982	283.6	629.7	704.5	119.0	247.5	210.4	2194.7
1983	384.9	715.4	711.9	96.0	464.6	323.3	2696.2
1984	283.1	548.3	266.9	35.2	260.3	131.9	1525.8
1985	622.3	737.1	722.9	108.0	560.4	207.8	2958.5
1986	343.8	402.5	615.2	112.8	529.1	346.3	2349.6
1987	223.8	260.9	347.5	150.9	251.5	184.3	1418.9
1988	217.6	378.7	149.1	37.1	213.8	63.4	1059.8
1989	208.1	220.6	222.9	71.1	63.9	73.1	859.7
1990	213.0	284.9	277.1	56.8	453.6	97.4	1382.8
1991	194.8	213.2	437.3	157.1	257.8	144.8	1405.1
1992	247.9	376.4	349.8	34.5	378.3	229.1	1615.9
1993	167.7	189.6	337.3	94.0	203.0	96.3	1087.9
1994	407.3	564.7	742.9	178.0	472.3	288.0	2653.1
1995	344.9	680.9	343.5	52.7	561.0	331.4	2314.4
1996	408.3	666.9	1041.4	197.6	573.0	381.6	3268.9
1997	461.6	497.4	972.1	163.4	578.1	319.5	2992.0
1998	146.5	284.6	345.0	49.3	403.0	241.8	1470.2
1999	313.1	344.4	807.0	93.5	614.9	362.3	2535.3
2000	214.4	272.9	322.5	36.6	348.1	209.2	1403.7
2001	139.7	202.4	378.9	42.0	480.1	292.8	1535.7
2002	72.9	127.4	193.8	68.5	157.3	15.1	634.9
2003	136.8	275.5	851.1	258.7	333.6	287.2	2143.0
2004	148.2	277.8	372.2	156.8	281.6	224.8	1461.3
2005	411.5	527.6	550.9	115.7	528.0	281.2	2414.9
2006	456.1	624.2	637.0	87.6	653.9	260.2	2719.0
10-year Mean	245.3	347.7	583.5	118.2	429.8	261.5	1986.0
Long-term Mean	273.9	428.7	495.2	101.4	413.2	250.9	1963.2
Percent Change:							
From 2005	10.8%	18.3%	15.6%	-24.3%	23.8%	-7.5%	12.6%
From 10-year Mean	85.9%	79.5%	9.2%	-25.9%	52.1%	-0.5%	36.9%
From Long-term Mean	66.5%	45.6%	28.6%	-13.6%	58.2%	3.7%	38.5%

Table 3. Status of waterfowl breeding population estimates (thousands, adjusted for visibility bias) by species and stratum with comparisons to the previous year, the previous 10-year mean, and the long-term mean for Southern Saskatchewan, May 2006.

Species/Ponds	Stratum										% Change From		
	30	31	32	33	34	35	2006 Total	2005 Total	10-Year Mean	Long-Term Mean	2005	10-Year Mean	Long-Term Mean
Ducks													
Dabbling ducks													
Mallard	338.3	318.4	624.5	116.7	278.2	155.6	1831.7	1728.9	2014.9	2072.0	5.9%	-9.1%	-11.6%
Am. black duck	0.0	0.8	0.0	0.0	0.0	0.0	0.8	0.0	0.5	0.2	--	63.8%	372.0%
Gadwall	212.9	169.9	574.5	66.4	124.8	53.9	1202.4	723.0	873.3	556.0	66.3%	37.7%	116.3%
Am. wigeon	83.2	49.6	113.4	11.4	16.1	8.5	282.2	294.2	259.1	425.2	-4.1%	8.9%	-33.6%
Am. green-winged teal	137.3	146.3	56.3	1.2	34.1	25.4	400.6	359.0	276.4	229.5	11.6%	45.0%	74.5%
Blue-winged teal	439.9	420.7	826.7	50.6	269.1	221.1	2228.1	1597.0	1594.8	1217.9	39.5%	39.7%	82.9%
N. shoveler	351.7	385.2	617.6	49.9	133.7	73.6	1611.6	1313.6	1040.8	647.6	22.7%	54.8%	148.9%
N. pintail	165.3	131.1	559.4	56.6	68.3	42.9	1023.6	857.5	700.8	1218.2	19.4%	46.1%	-16.0%
Subtotal	1728.4	1622.0	3372.4	352.8	924.4	581.0	8581.0	6873.2	6760.5	6366.6	24.8%	26.9%	34.8%
Dividing ducks													
Redhead	98.5	117.9	129.0	0.0	63.0	26.5	435.0	225.6	242.9	190.1	92.8%	79.1%	128.8%
Canvasback	86.0	60.6	47.4	4.9	65.0	22.7	286.7	162.4	207.9	182.4	76.5%	37.9%	57.2%
Scaups	108.1	85.2	118.4	12.2	45.2	21.8	391.0	381.3	310.0	416.4	2.6%	26.1%	-6.1%
Ring-necked duck	20.1	12.1	4.0	0.0	18.4	4.7	59.3	6.9	41.3	27.0	756.3%	43.8%	119.5%
Goldeneyes	9.8	56.3	0.5	2.0	1.2	0.6	70.5	88.5	42.8	23.6	-20.3%	64.8%	198.8%
Bufflehead	37.9	42.7	3.3	0.0	9.2	8.4	101.4	91.8	82.0	36.3	10.5%	23.7%	179.6%
Ruddy Duck	15.8	81.5	45.0	0.0	21.3	6.9	170.6	136.9	164.1	105.8	24.6%	4.0%	61.3%
Subtotal	376.3	456.4	347.7	19.2	223.4	91.6	1514.6	1093.4	1091.0	981.6	38.5%	38.8%	54.3%
Miscellaneous													
Long-tailed duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	--	-100.0%
Eiders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	--	--
Scoters	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	3.1	--	-100.0%	-100.0%
Mergansers	1.0	0.0	1.1	0.0	1.0	0.0	3.1	4.1	6.3	4.8	-24.4%	-50.2%	-34.5%
Subtotal	1.0	0.0	1.1	0.0	1.0	0.0	3.1	4.1	6.6	7.9	-24.4%	-52.6%	-60.5%
Total Ducks	2105.8	2078.4	3721.3	371.9	1148.7	672.6	10099.0	7970.8	7858.1	7356.1	26.7%	28.5%	37.3%
Canada Goose	45.9	63.7	72.9	13.7	66.0	41.4	303.5	283.6	289.3	106.0	7.1%	4.9%	186.3%
Am. coot	314.4	303.2	338.2	60.9	140.0	31.5	1188.2	806.9	775.9	454.5	47.3%	53.1%	161.5%
Ponds	456.1	624.2	637.0	87.6	653.9	260.2	2719.0	2414.9	1986.0	1963.2	12.6%	36.9%	38.5%

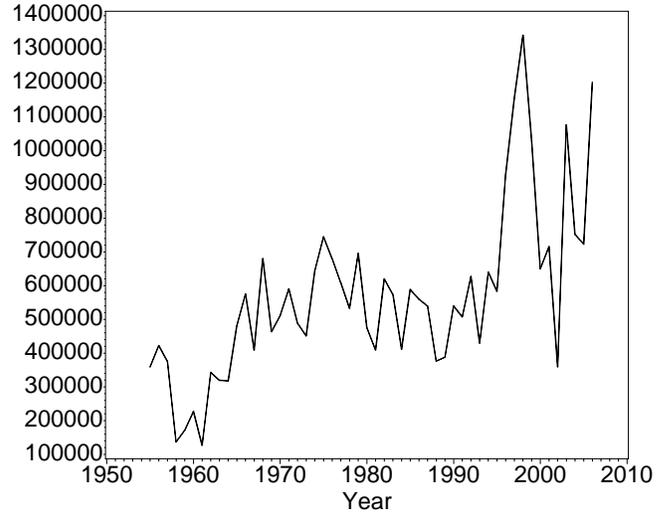
Waterfowl Breeding Population Survey

Strata 30-35 Mallard

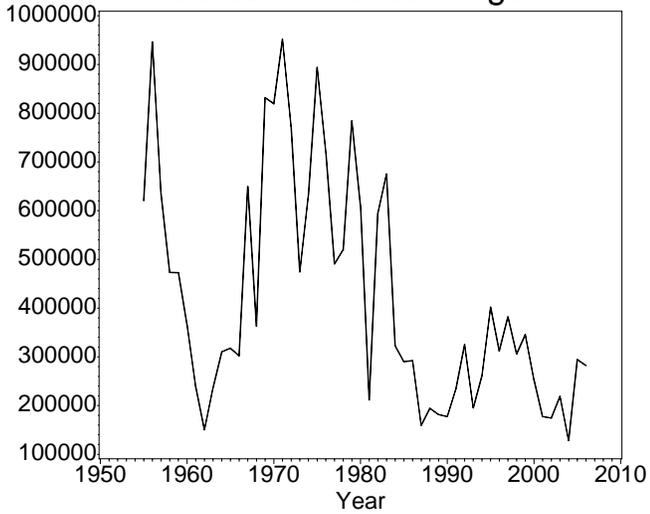


Southern Saskatchewan

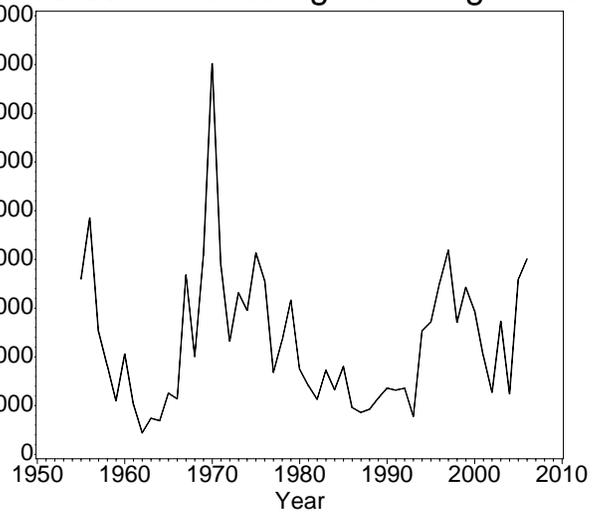
Strata 30-35 Gadwall



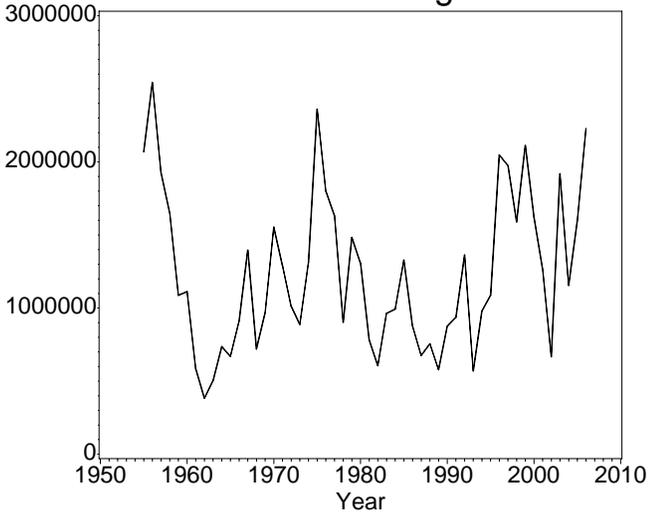
Strata 30-35 American wigeon



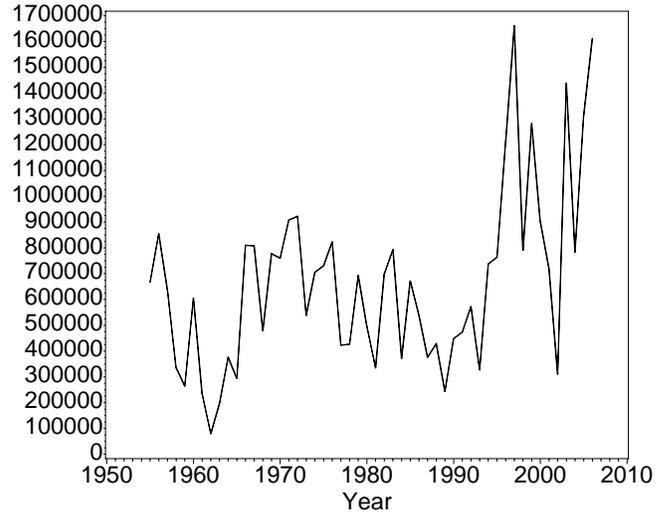
Strata 30-35 American green-winged teal



Strata 30-35 Blue-winged teal

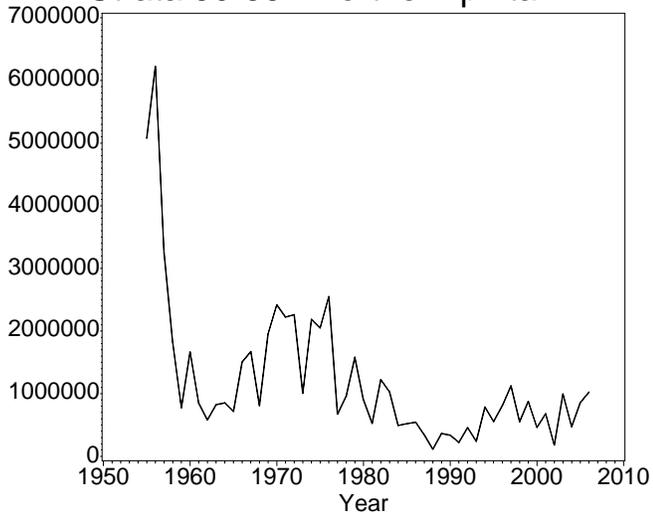


Strata 30-35 Northern shoveler



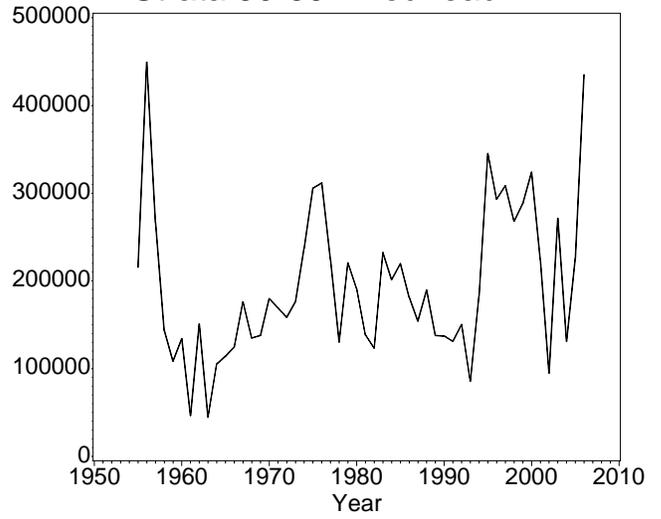
Waterfowl Breeding Population Survey

Strata 30-35 Northern pintail

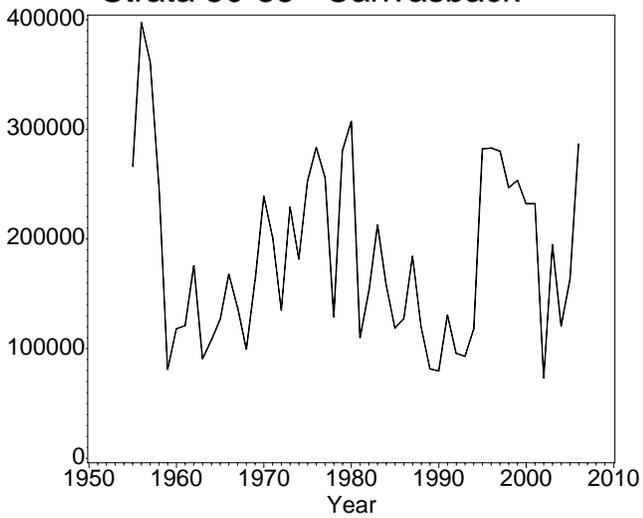


Southern Saskatchewan

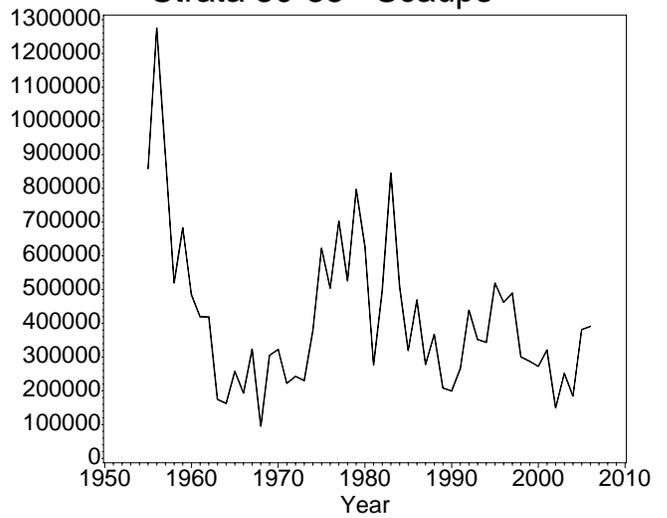
Strata 30-35 Redhead



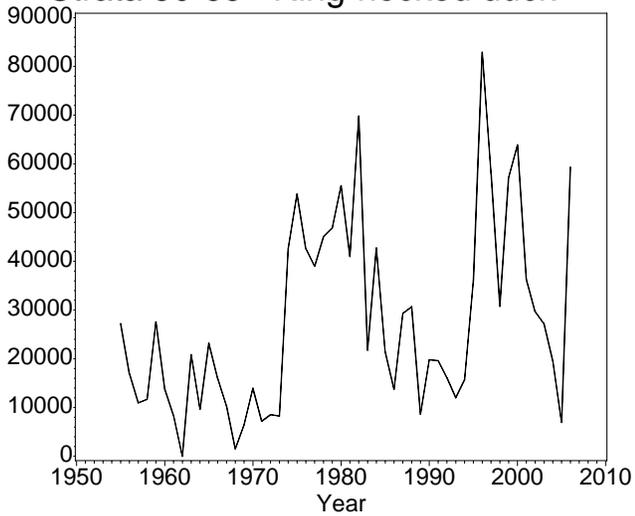
Strata 30-35 Canvasback



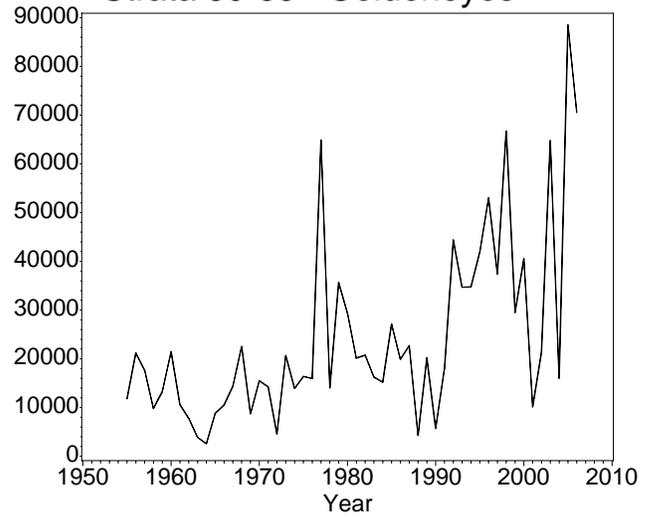
Strata 30-35 Scaups



Strata 30-35 Ring-necked duck



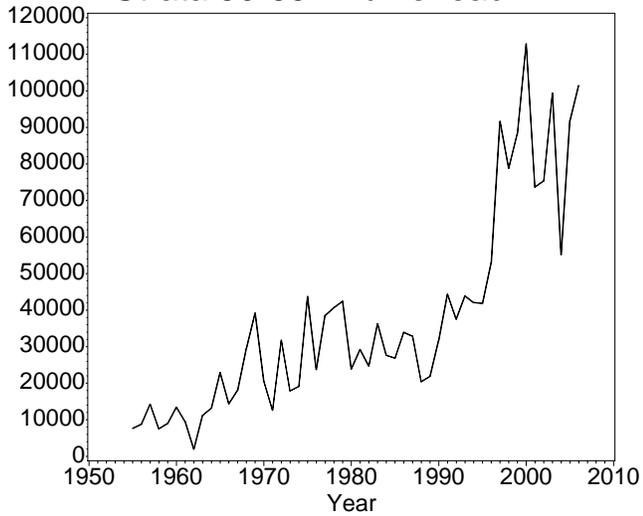
Strata 30-35 Goldeneyes



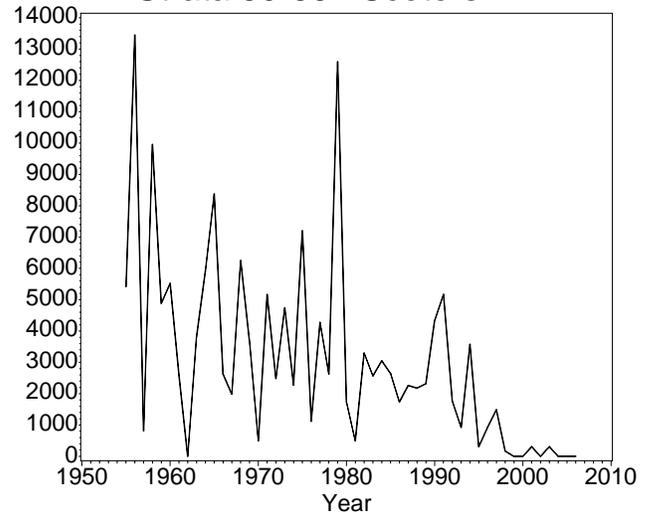
Waterfowl Breeding Population Survey

Southern Saskatchewan

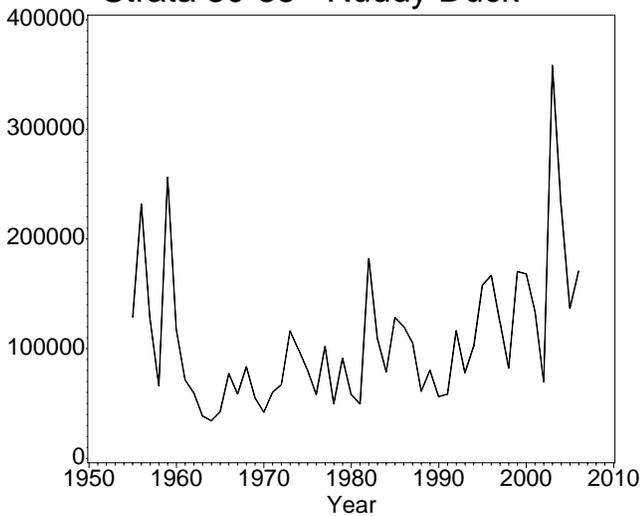
Strata 30-35 Bufflehead



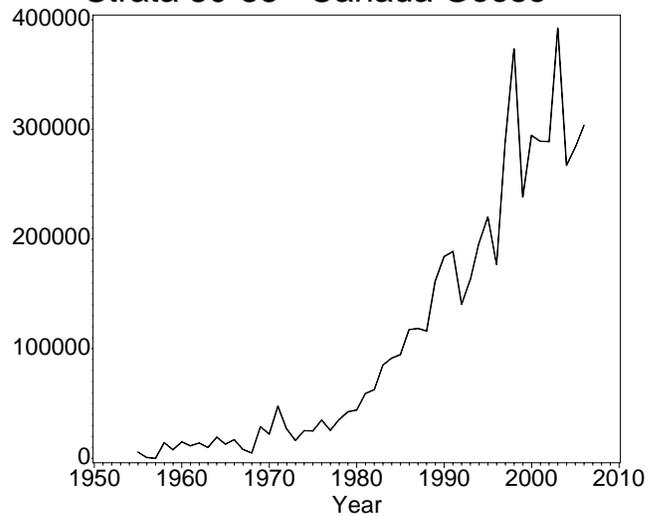
Strata 30-35 Scoters



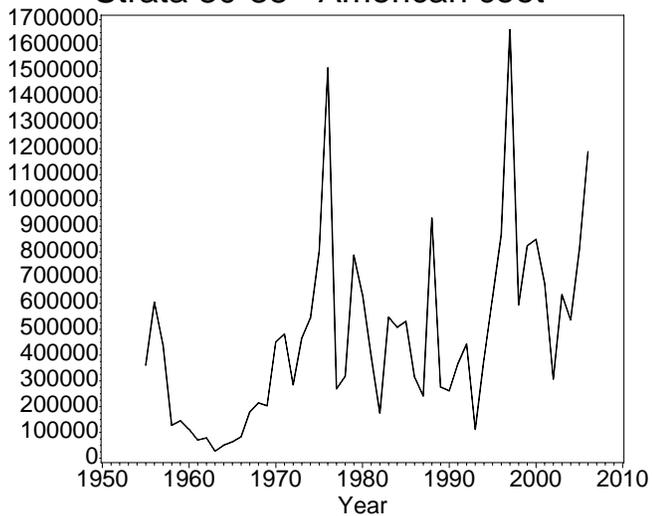
Strata 30-35 Ruddy Duck



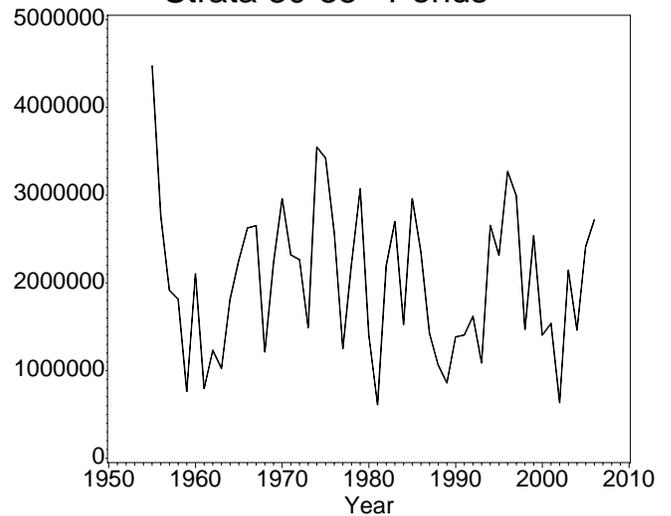
Strata 30-35 Canada Goose



Strata 30-35 American coot

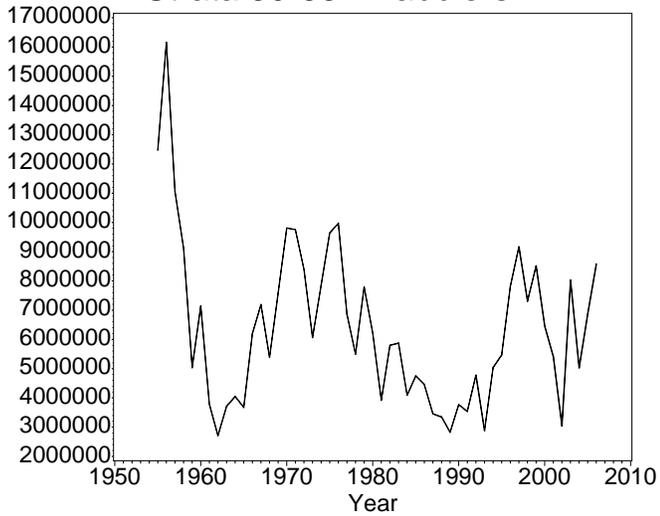


Strata 30-35 Ponds



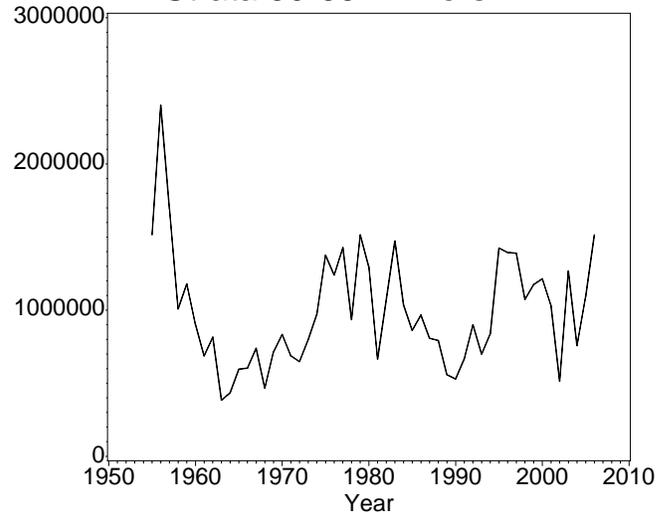
Waterfowl Breeding Population Survey

Strata 30-35 Dabblers

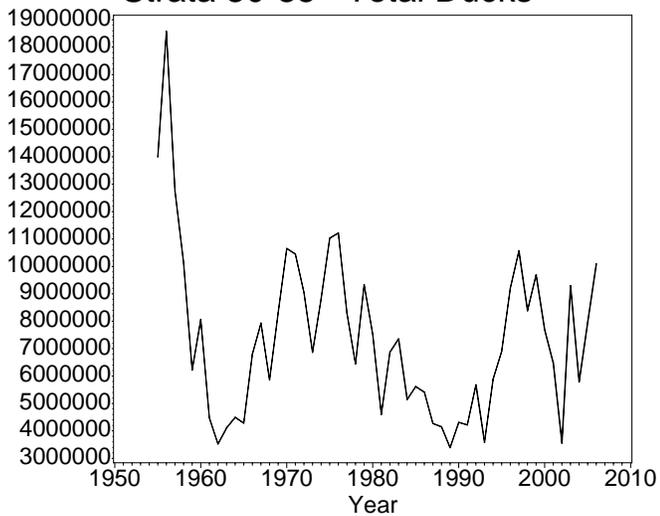


Southern Saskatchewan

Strata 30-35 Divers



Strata 30-35 Total Ducks



Appendix 1. Long-term trend in adjusted waterfowl breeding population estimates (thousands) for Southern Saskatchewan.

Species/Ponds	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
Dabbling ducks										
Mallard	3317.2	4691.4	3987.9	4534.0	2152.2	2967.5	1649.7	1125.9	1551.4	1387.3
Am. black duck	0.3	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gadwall	359.0	422.1	375.7	136.7	171.4	227.0	126.8	342.7	319.4	317.6
Am. wigeon	620.4	946.2	634.0	473.1	472.6	365.2	238.0	150.2	237.3	310.1
Am. green-winged teal	359.6	484.3	252.0	182.3	110.0	205.5	101.7	44.2	73.8	69.1
Blue-winged teal	2068.5	2542.7	1924.3	1650.7	1087.0	1112.8	583.0	383.8	504.9	735.8
N. shoveler	667.1	854.4	637.9	335.4	264.5	604.3	233.9	79.8	196.9	375.3
N. pintail	5076.5	6222.2	3245.9	1813.0	775.0	1665.5	846.7	581.1	823.9	853.4
Subtotal	12468.6	16163.3	11058.3	9125.2	5032.7	7147.9	3779.8	2707.7	3707.6	4048.5
Diving ducks										
Redhead	215.4	449.1	266.8	143.5	108.6	134.2	46.6	150.7	44.6	105.3
Canvasback	266.2	397.4	362.0	249.7	81.2	118.1	121.0	175.7	90.9	107.7
Scaup	858.3	1274.7	898.1	520.0	683.1	484.5	419.5	418.8	174.4	162.9
Ring-necked duck	27.2	16.9	10.9	11.7	27.6	13.8	8.4	0.0	20.8	9.6
Goldeneyes	11.8	21.2	17.7	9.8	13.3	21.4	10.6	7.8	3.9	2.6
Bufflehead	7.6	8.8	14.2	7.5	9.0	13.4	9.5	2.0	11.2	13.2
Ruddy Duck	128.7	231.8	126.1	66.2	256.1	116.8	71.4	59.6	38.5	34.3
Subtotal	1515.3	2399.9	1695.9	1008.4	1178.8	902.1	686.9	814.5	384.4	435.5
Miscellaneous										
Long-tailed duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Eiders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Scoters	5.4	13.4	0.8	10.0	4.9	5.5	2.6	0.0	3.8	5.9
Mergansers	0.5	0.0	0.0	0.0	0.4	11.4	2.6	0.0	9.4	2.4
Subtotal	5.9	13.4	0.8	10.0	5.3	16.9	5.2	0.0	13.2	8.3
Total ducks	13989.9	18576.6	12755.0	10143.5	6216.9	8066.8	4471.9	3522.2	4105.2	4492.3
Canada goose	5.6	0.8	0.0	14.2	7.8	15.0	11.4	13.9	9.9	19.2
Am. coot	360.7	604.7	438.8	127.5	145.3	112.0	70.5	79.0	27.4	50.5
Ponds							794.9	1229.3	1024.5	1817.2

Species/Ponds	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
Dabbling ducks										
Mallard	1069.9	1975.6	1888.4	2132.2	2180.0	2945.5	3407.2	2711.5	2369.1	2073.8
Am. black duck	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
Gadwall	481.2	575.4	409.2	679.9	463.5	511.5	590.2	488.8	451.5	644.7
Am. wigeon	317.7	302.1	649.1	362.8	831.7	819.3	951.4	772.3	474.4	633.2
Am. green-winged teal	125.3	114.2	367.7	200.7	408.8	801.4	386.9	232.2	331.2	295.4
Blue-winged teal	669.1	909.7	1395.7	720.2	966.6	1552.6	1291.4	1012.9	887.9	1312.2
N. shoveler	293.6	809.9	807.7	479.4	777.4	760.7	907.7	921.9	538.4	705.2
N. pintail	716.6	1504.8	1671.1	809.2	1956.2	2417.2	2222.0	2261.6	1006.3	2186.0
Subtotal	3673.4	6191.7	7188.9	5384.3	7584.0	9808.1	9757.0	8401.2	6058.7	7850.5
Diving ducks										
Redhead	114.1	124.6	176.0	134.9	137.8	179.6	169.3	158.6	176.3	237.6
Canvasback	126.5	167.8	137.5	99.5	162.4	238.9	202.1	135.3	228.9	181.8
Scaup	257.3	193.5	323.4	95.6	305.0	322.8	222.4	242.6	230.4	377.9
Ring-necked duck	23.2	16.0	10.4	1.5	6.5	13.9	7.2	8.5	8.2	42.6
Goldeneyes	8.8	10.5	14.3	22.5	8.7	15.5	14.3	4.6	20.6	13.9
Bufflehead	22.9	14.4	18.1	29.5	39.2	20.5	12.6	31.7	17.9	19.1
Ruddy Duck	42.6	77.1	58.7	83.3	55.0	42.1	60.2	67.2	116.0	98.5
Subtotal	595.4	603.9	738.3	466.9	714.6	833.4	688.0	648.4	798.3	971.4
Miscellaneous										
Long-tailed duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Eiders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Scoters	8.4	2.6	2.0	6.2	3.7	0.5	5.2	2.5	4.7	2.3
Mergansers	5.2	0.0	0.0	1.0	1.4	8.8	1.3	0.0	2.2	0.5
Subtotal	13.6	2.6	2.0	7.2	5.1	9.3	6.4	2.5	6.9	2.7
Total ducks	4282.4	6798.2	7929.2	5858.5	8303.7	10650.8	10451.5	9052.1	6864.0	8824.6
Canada goose	12.8	16.9	8.0	4.9	28.6	22.1	47.3	26.7	16.4	25.2
Am. coot	63.6	83.4	179.0	214.3	203.8	450.3	481.5	284.9	465.9	544.3
Ponds	2257.4	2624.3	2652.2	1212.5	2225.0	2957.1	2317.4	2264.4	1490.4	3546.3

Appendix 1. Continued.

Species/Ponds	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Dabbling ducks										
Mallard	2449.2	3044.7	2869.3	1917.6	2244.2	2263.0	1509.8	1941.1	1670.1	1364.7
Am. black duck	0.4	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Gadwall	744.6	679.4	607.5	532.9	695.5	474.6	409.5	619.7	573.3	411.8
Am. wigeon	893.7	720.1	490.7	519.9	784.1	610.4	211.7	594.3	675.0	322.3
Am. green-winged teal	412.8	356.5	168.1	233.9	316.0	174.3	140.9	112.9	172.4	132.7
Blue-winged teal	2360.2	1799.6	1631.3	902.4	1482.8	1307.2	781.5	605.9	963.2	993.6
N. shoveler	730.3	822.9	422.7	426.7	692.4	494.7	335.3	699.0	792.8	370.9
N. pintail	2050.3	2549.6	672.5	961.8	1579.9	897.6	526.2	1222.0	1029.4	492.1
Subtotal	9641.5	9972.8	6862.2	5495.0	7795.1	6221.8	3914.8	5795.0	5876.3	4088.1
Diving ducks										
Redhead	305.7	311.7	224.3	130.3	220.5	190.9	138.4	123.4	232.2	201.6
Canvasback	252.9	283.3	256.5	129.0	280.9	307.2	110.1	151.9	212.7	157.7
Scaup	622.2	504.6	702.2	526.2	796.5	629.0	277.1	496.6	844.8	510.2
Ring-necked duck	53.8	42.6	39.0	45.1	46.8	55.5	41.0	69.8	21.8	42.7
Goldeneyes	16.4	15.9	64.8	14.0	35.7	29.4	20.1	20.8	16.2	15.2
Bufflehead	43.7	23.8	38.5	40.7	42.4	23.9	29.2	24.7	36.2	27.6
Ruddy Duck	80.3	58.4	101.8	50.0	91.1	57.9	49.7	181.9	108.5	78.9
Subtotal	1374.9	1240.3	1427.2	935.2	1514.0	1293.8	665.7	1069.1	1472.5	1033.8
Miscellaneous										
Long-tailed duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Eiders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Scoters	7.2	1.1	4.3	2.6	12.6	1.7	0.5	3.3	2.6	3.0
Mergansers	7.5	5.3	3.4	6.5	13.0	6.8	14.6	3.4	5.9	17.7
Subtotal	14.7	6.4	7.6	9.1	25.6	8.6	15.0	6.7	8.5	20.8
Total ducks	11031.1	11219.5	8297.0	6439.4	9334.7	7524.2	4595.6	6870.8	7357.3	5142.7
Canada goose	25.0	34.8	25.6	35.3	42.4	44.0	59.0	62.5	85.0	91.3
Am. coot	799.8	1513.0	269.4	317.8	787.2	634.2	395.1	175.4	546.7	507.4
Ponds	3424.7	2578.5	1250.0	2221.8	3070.1	1393.6	611.0	2194.7	2696.2	1525.8

Species/Ponds	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Dabbling ducks										
Mallard	1173.3	1542.6	1273.3	1389.2	951.7	1253.7	1031.1	1293.4	1036.4	1380.3
Am. black duck	0.0	0.0	0.9	0.0	0.0	0.0	0.5	0.3	0.0	0.0
Gadwall	588.4	559.9	539.1	376.2	387.9	539.5	507.7	626.9	429.6	639.8
Am. wigeon	290.1	292.3	159.4	194.1	181.4	177.3	234.3	324.9	195.2	261.0
Am. green-winged teal	179.9	95.9	85.8	92.7	115.5	135.7	131.8	135.6	77.8	253.2
Blue-winged teal	1327.3	876.5	674.8	755.3	578.4	875.5	936.7	1362.4	570.1	980.2
N. shoveler	671.0	538.8	375.8	428.3	243.8	447.8	473.4	571.9	327.4	737.5
N. pintail	520.6	545.9	343.8	113.8	363.7	336.7	221.0	456.9	240.4	785.2
Subtotal	4750.7	4451.8	3453.1	3349.6	2822.5	3766.1	3536.4	4772.4	2876.8	5037.1
Diving ducks										
Redhead	219.6	181.6	154.3	189.3	137.8	137.2	131.1	150.3	85.7	183.5
Canvasback	118.8	127.2	184.2	119.0	81.5	79.7	130.5	95.7	93.0	117.7
Scaup	319.8	468.9	278.2	366.9	208.1	199.3	265.4	438.6	352.1	343.9
Ring-necked duck	21.4	13.7	29.3	30.7	8.6	19.8	19.6	16.1	12.0	15.7
Goldeneyes	27.1	19.9	22.7	4.3	20.2	5.7	18.0	44.4	34.7	34.8
Bufflehead	26.9	33.9	32.9	20.4	21.9	31.7	44.3	37.6	43.9	42.1
Ruddy Duck	128.3	120.2	105.6	61.2	80.1	56.2	58.5	116.1	78.1	102.2
Subtotal	861.8	965.5	807.1	791.9	558.2	529.7	667.4	898.7	699.5	839.8
Miscellaneous										
Long-tailed duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.6
Eiders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Scoters	2.6	1.7	2.3	2.2	2.3	4.3	5.2	1.8	0.9	3.6
Mergansers	1.9	0.0	6.9	5.8	3.7	7.9	6.5	3.8	3.5	2.3
Subtotal	4.5	1.7	9.1	8.0	6.0	12.3	11.6	5.6	4.8	6.5
Total ducks	5617.0	5419.1	4269.3	4149.5	3386.6	4308.1	4215.4	5676.7	3581.0	5883.3
Canada goose	94.7	117.3	118.4	116.2	162.2	184.0	188.7	140.5	163.1	196.6
Am. coot	530.6	315.0	241.7	930.7	276.2	261.5	366.6	442.6	111.8	383.3
Ponds	2958.5	2349.6	1418.9	1059.8	859.7	1382.8	1405.1	1615.9	1087.9	2653.1

Appendix 1. Continued.

Species/Ponds	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Dabbling ducks										
Mallard	1808.5	2142.7	2450.8	2448.7	2528.6	2266.7	1649.7	1212.5	2110.7	1609.5
Am. black duck	0.4	0.0	0.0	3.3	0.4	0.4	0.0	0.0	0.8	0.0
Gadwall	583.6	930.1	1155.3	1342.0	1028.7	650.0	715.4	359.7	1076.6	751.8
Am. wigeon	401.8	311.8	381.9	305.5	345.5	253.1	177.3	174.5	218.9	128.1
Am. green-winged teal	271.3	351.2	418.5	271.2	342.2	294.8	202.3	127.3	272.6	124.3
Blue-winged teal	1088.4	2046.6	1974.4	1589.0	2110.9	1622.4	1267.5	667.1	1918.3	1154.7
N. shoveler	763.9	1212.8	1660.7	790.5	1281.3	899.8	718.1	310.2	1437.7	783.6
N. pintail	554.2	807.4	1123.9	551.8	875.2	463.6	680.0	181.8	993.4	473.7
Subtotal	5472.2	7802.8	9165.4	7302.2	8512.9	6450.9	5410.3	3033.2	8028.8	5025.7
Diving ducks										
Redhead	345.1	293.2	308.5	268.1	288.3	323.8	224.3	94.9	271.3	131.2
Canvasback	282.3	283.0	280.1	246.9	253.4	232.2	232.2	73.3	194.8	120.9
Scaup	518.6	462.5	489.5	300.2	287.4	272.8	320.6	149.7	251.4	184.8
Ring-necked duck	36.0	82.9	58.1	30.8	57.2	63.9	36.3	29.7	27.2	19.6
Goldeneyes	41.9	53.0	37.4	66.7	29.5	40.5	10.2	21.4	64.8	16.0
Bufflehead	41.9	53.0	91.6	78.8	88.4	112.8	73.7	75.4	99.4	55.2
Ruddy Duck	158.1	166.7	124.1	82.3	170.3	168.2	134.3	70.0	358.2	229.9
Subtotal	1423.9	1394.2	1389.2	1073.7	1174.5	1214.2	1031.5	514.2	1267.0	757.7
Miscellaneous										
Long-tailed duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Eiders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Scoters	0.3	0.9	1.5	0.2	0.0	0.0	0.3	0.0	0.3	0.0
Mergansers	7.5	4.0	6.5	6.8	2.6	9.2	21.2	3.0	2.4	3.1
Subtotal	7.9	4.9	7.9	6.9	2.6	9.2	21.5	3.0	2.7	3.1
Total ducks	6903.9	9201.9	10562.5	8382.9	9690.0	7674.2	6463.3	3550.3	9298.6	5786.4
Canada goose	220.0	176.8	289.6	373.3	238.4	294.4	289.1	288.9	391.9	267.2
Am. coot	625.2	868.1	1661.1	594.3	823.7	848.5	679.2	306.8	633.9	536.3
Ponds	2314.4	3268.9	2992.0	1470.2	2535.3	1403.7	1535.7	634.9	2143.0	1461.3

Species/Ponds	2005	2006
Dabbling ducks		
Mallard	1728.9	1831.7
Am. black duck	0.0	0.8
Gadwall	723.0	1202.4
Am. wigeon	294.2	282.2
Am. green-winged teal	359.0	400.6
Blue-winged teal	1597.0	2228.1
N. shoveler	1313.6	1611.6
N. pintail	857.5	1023.6
Subtotal	6873.2	8581.0
Diving ducks		
Redhead	225.6	435.0
Canvasback	162.4	286.7
Scaup	381.3	391.0
Ring-necked duck	6.9	59.3
Goldeneyes	88.5	70.5
Bufflehead	91.8	101.4
Ruddy Duck	136.9	170.6
Subtotal	1093.4	1514.6
Miscellaneous		
Long-tailed duck	0.0	0.0
Eiders	0.0	0.0
Scoters	0.0	0.0
Mergansers	4.1	3.1
Subtotal	4.1	3.1
Total Ducks	7970.8	10098.7
Canada Goose	283.6	303.5
Am. coot	806.9	1188.2
Ponds	2414.9	2719.0