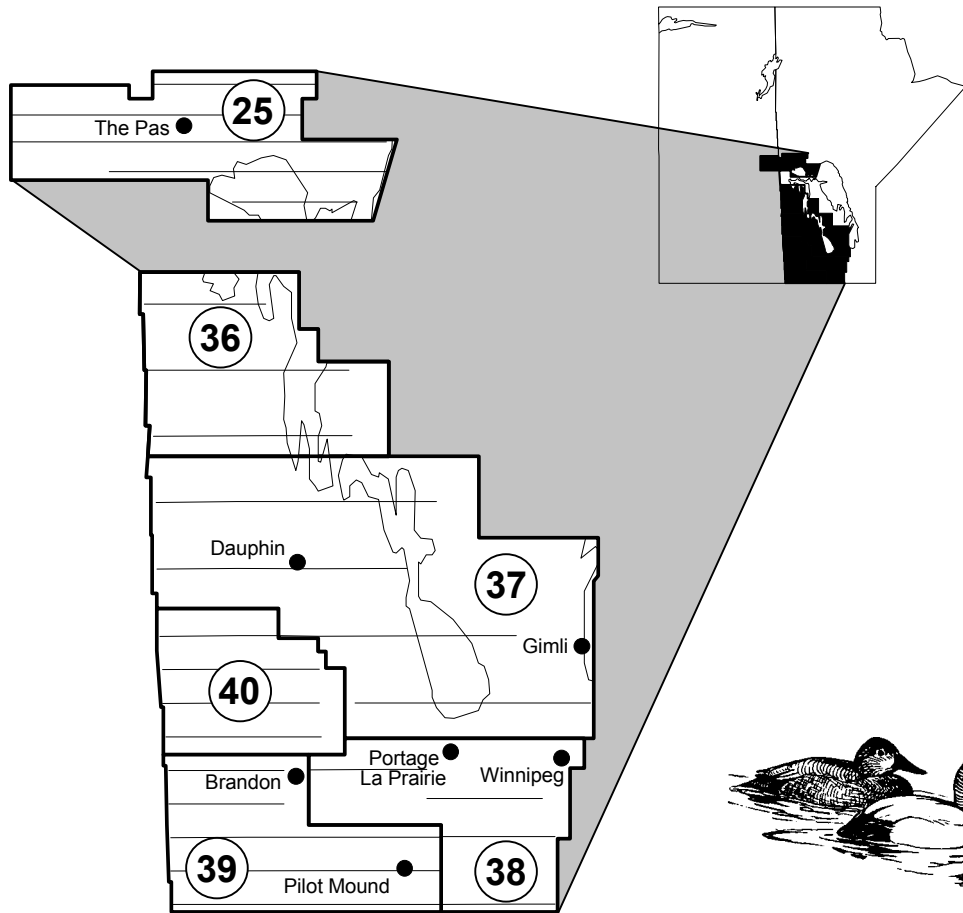


# Waterfowl Breeding Population Survey

MAY 2004

Southern Manitoba and Saskatchewan River Delta



UNITED STATES DEPARTMENT OF THE INTERIOR  
FISH AND WILDLIFE SERVICE

AND

ENVIRONMENT CANADA  
CANADIAN WILDLIFE SERVICE



TITLE: Waterfowl Breeding Population Survey for Southern Manitoba and the Saskatchewan River Delta

STRATA SURVEYED: 25, and 36 - 40

DATES: May 9 – June 3, 2004

DATA SUPPLIED BY: United States Fish & Wildlife Service (USFWS)  
Canadian Wildlife Service (CWS)  
Manitoba Conservation (MC)  
Ducks Unlimited, Canada (DUC)

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## ABSTRACT:

The 2004 survey began with an area reconnaissance on May 6 and 7. Conditions for the survey appeared near normal in reference to dabbling distribution. The ground crew was not able to begin until the 10<sup>th</sup>, therefore the aerial crew began on May 9. Waterfowl population estimates for strata 25, and 36 – 40 were 5.9% lower than 2003, 7.2% lower than the 10 year mean, and 16.1% lower than the Long Term Mean (LTM) of 1955 to 2003 (Table 1). Dabblers were 17.2% lower, 13.8% lower, and 23.6% lower than 2003, the 10 year mean, and the LTM, respectively. Diving ducks, on the other hand were 27.7% higher, 12.8% higher and 5.7% higher than the 2003, 10 year mean, and LTM, respectively. The dabbling species of mallard, wigeon and blue-winged teal, seemed to be most impacted from the 14 inches of snow which fell in mid-May. Overall pond numbers (strata 36 – 40) were estimated 10.1% higher than 2003, but still 14.6% lower than the 10 year mean and 20% lower than the LTM (Table 2).

## METHODS:

Methods used in this survey are described in the Standard Operating Procedures for Aerial Waterfowl Breeding Ground Population and Habitat Surveys in North America, Section III, revised in 1987. Waterfowl and wetland data were collected using laptop computers and transcribed into a program developed by Jack Hodges MBM-AK (Migratory Bird Management – Alaska).

This is the fourth year that the summary data from Stratum 25 has been included in these survey results. The MBM-PAS (Populations and Assessment Section) calculated all data from previous Stratum 25 summaries and it is included in Table 1, Appendix 1, and Figure 1. Pond data is not collected in Stratum 25.

This was the sixth year King was Pilot/Observer for the Manitoba strata and the first year for Reign as an Observer for MBM. A Cessna 206 amphibious aircraft (N728) was used for the survey. More than 99.5 flight hours were needed to complete the 2004 survey including round trip from Napa, CA. Survey time in strata 36- 40 was just over 50 hours. Survey data for strata 34-35 was collected in approximately 18 hours and as in the past was transferred to the Southern Saskatchewan air crew via DMBM - MAS. Non-flight days included: 8 days due to inclement weather; 5 days due to inability of ground crew to keep up to air crew (including the 2 days lost due to the lack of coordination by the ground crew to continue the survey in non-snow impacted areas); and 2 days due to aircraft maintenance.

All segments in the survey design were flown (Table 3.) and some were flown twice to meet SOP requirements.

## WEATHER AND HABITAT:

### **Weather**

The Prairie Farm Rehabilitation Administration (PFRA) and Drought Watch – Environment Canada monitors drought conditions throughout Canada and make estimates of conditions during the year. A general water deficit existed going into the fall months of 2003. Due to substantial accumulations of snow in several areas across southern Manitoba drought risk was lowered in that area. By the end of March most areas of Manitoba received above average to “well above average precipitation. No spring soil moisture shortages were expected in Manitoba and forage production was expected to be above average across the area.

The Canadian prairies experienced the 4<sup>th</sup> driest year for 2003. Records for the past 57 years revealed that the prairies were – 21.8 % drier than average. Along with drier conditions temperatures were +0.6 degrees C warmer for 2003 and ranked 22<sup>nd</sup> of 57 years of data. As we moved into winter of 2004 (Dec '03, Jan., Feb.) the prairies averaged 2.0 degrees C **above** average and – 3.6% below average precipitation.

Spring 2004 (Mar., Apr., May) began a new trend as the area was 0.2 degrees C below average and + 22.7% wetter than average. When reviewing several reporting station records located in the Manitoba Strata precipitation amounts varied from +145% above average in the southeast (stratum 39) to +30% above average in the northern portion of stratum 37, but only +15% above average in stratum 25.

May, 2004 was cooler and wetter than past years. Upon arrival on the survey area May 6, vegetation appeared to be slightly retarded from average and wetland numbers varied. During a general reconnaissance and waterfowl I.D. training over the next two days it was observed that drier than normal areas existed in the southwest and western Manitoba and near normal conditions prevailed in the central portion of the survey area. This soon changed when we experienced a 14 inch snowfall during May 11 and 12, followed by -12 degrees C (10 degrees F) on the morning of May 14. During the month of May at Brandon, MB (central portion of the survey area) precipitation totaled 145.6 mm ( 5.7 inches) which was 176 % above average. All of the central Manitoba stations recorded well above average amounts of precipitation for May. However, in examining records for June the drought returned as all stations were reporting approximately 50 % **below** average precipitation for the month.

### **Habitat**

In general habitat conditions appeared better than in 2003. Many wetland areas that survived last fall had good accumulations of residual vegetation and it appeared that there were not substantial areas of wetland drainage or destruction of nesting vegetation around wetland basins. Farming practices appeared to be on schedule in the first part of the month. After the snow storm

pummeled the area new wetlands appeared from the run off, but of what value to waterfowl remains to be seen.

In early May many birds were concentrated on the receding permanent wetlands of the southwest and western portion of the area. After the runoff accumulation into previously dry wetland basins from the snow melt birds did not appear on these areas as we thought they would. This may have been because prior to the snow storm breeding territories were already established near the more permanent wetlands and nesting was well under way. When the 14 inches of snow fell and the ensuing -12 degrees C morning froze all, but the largest water bodies, many if not all dabblers abandoned nesting and moved to large open water areas. It was several days later when birds returned for what appeared to be renesting (early nesting species) and initial nesting attempts for the late nesters. It is believed that birds moved back to territories (wetlands) previously occupied and had not yet considered the value for nesting of the “new” wetlands. Therefore we “observed” a vacancy by birds on these water bodies. Considering all the disadvantages of a snow storm of this caliber in mid- May the resultant runoff should benefit waterfowl in 2005.

### **Pond Estimates**

The 2004 pond estimate was 540,600 which is 10.1 % more than in 2003 (Table 2). Although significant precipitation was received during the survey most ponds appeared temporary and were recorded as sheet water. It was unclear as to the value this increase in water will have to breeding waterfowl in 2004. There should be significant value to the “recharge” of water to existing permanent and semi-permanent wetlands for the future. In some of the southern strata new pond “longevity” was difficult to judge because of the almost daily increase in water depth from precipitation and run off.

Pond estimates were still -14.6% less and - 20 % less than the 10-year mean and the LTM, respectively.

### **BREEDING POPULATION ESTIMATES:**

The 2004 breeding waterfowl population data are listed by strata and species in Table 1. Total duck populations for southern Manitoba were -5.9% lower than 2003, - 7.2% below the 10-year mean, and – 16.1 % below the LTM. A comparison of duck populations for each stratum and each species is, also found in Table 1 and Long Term trend in duck population estimates are found in Appendix 1.

### **Dabbling Ducks**

Dabbling duck populations were - 17.2 % lower than 2003, - 13.8 % lower than the 10-year mean and - 23.6 % less than the LTM. Dabbling ducks made up 65.2% of all ducks in the survey area. Of the 1.7 million ducks estimated in Southern Manitoba, mallard comprised 24.9%, blue-winged teal 17.9%, shoveler 9.1%, and gadwall 8.9% of the total. Dabbling species with positive gains over 2003 were gadwall (48.8%), shoveler (20.1%), and pintail (1.8%). Species with population

estimates above the LTM were gadwall (104.1%), and shoveler at 25.2%. Those species that were lower than 2003 estimates were wigeon (- 60.4%), green-winged teal (- 43.9%), blue-winged teal (- 32.1%), and mallard (- 23.6%). Wigeon indicated the greatest decline over the LTM at - 93.2 %.

### **Diving Ducks**

Diving ducks were 27.7 % higher than in 2003, 12.8% higher than the 10-year mean, and 5.8% higher than the LTM. This category made up 34.8% of all ducks in the survey area. Again in consideration of all ducks counted, ruddy duck made up 10% of the total, redhead 7.4%, canvasback 5.2%, bufflehead (3.4%), scaup (3.1%), ring-necked duck and goldeneyes each (2%). Ruddy duck (+ 226.9%), canvasback (+ 77.7%), and redhead (+54%) indicated the largest increases over the 2003 estimates. Goldeneyes (- 52 %), ring-necked duck (- 34.2%) and scaups (- 32.1%) indicated lower numbers than 2003. Scaups (- 73.8%) and ring-necked duck (- 10.7%) were the only diver species to be lower than the LTM. Ruddy ducks indicated the largest increase over the LTM of + 167.3%.

### **CONCLUSIONS AND OBSERVATIONS:**

The continued Prairie wide drought was evident in early May, 2004. The strata in southern Manitoba probably changed more over the next 30 days than any other Prairie Province. It is estimated that more than 90% of early dabbling nests were lost during the mid-May snowstorm. It is unclear if dabblers will be able to add significant production from re-nesting in the central portion of the area. In the strata north of Brandon (25, 36, 37 and 40) the increased precipitation should benefit many diver species. The mid May snowstorm was not as devastating in these strata (just a few inches and quickly melted) and it should prove to have a positive impact during brood rearing. It is expected that there will be substantial increases in vegetative growth surrounding wetlands. Many of these basins should not succumb to farming practices with the increased water levels.

### **ACKNOWLEDGMENTS:**

We would like to thank Dave and Jim Wall of Maple Leaf Aviation, Brandon, Manitoba, for their continued maintenance of our aircraft, their friendship and advice.

Submitted by: Rodney J. King, Flyway Biologist, DMBM, Mare Island, CA

Table 1. Status of waterfowl breeding population estimates (thousands, adjusted for visibility bias) by species and stratum with comparisons against the previous year, the previous 10-year mean, and the long-term mean for Southern Manitoba.

Species/Ponds	Stratum						% Change From						
	25	36	37	38	39	40	2004 Total	2003 Total	10-Year Mean	Long- Term Mean	2003	10-Year Mean	Long- Term Mean
<b>Ducks</b>													
<b>Dabblers</b>													
Mallard	29.9	15.0	138.0	38.0	93.8	108.7	423.4	554.2	497.1	494.4	-23.6%	-14.8%	-14.4%
Am. black duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.5	0.4	-100.0%	-100.0%	-100.0%
Gadwall	4.1	5.6	27.8	2.4	64.1	47.7	151.7	101.9	103.2	74.3	48.8%	47.0%	104.1%
Am. wigeon	3.1	0.3	0.4	0.6	0.5	1.6	6.6	16.6	39.2	96.3	-60.4%	-83.2%	-93.2%
Am. green-winged teal	0.8	2.6	10.2	1.5	1.5	11.2	27.8	49.6	58.3	63.3	-43.9%	-52.3%	-56.1%
Blue-winged teal	21.7	2.3	77.6	34.9	79.5	88.0	304.0	447.5	367.4	467.9	-32.1%	-17.3%	-35.0%
N. shoveler	12.6	3.2	44.9	6.0	50.0	38.7	155.5	129.4	153.5	124.2	20.1%	1.3%	25.2%
N. pintail	0.7	1.2	6.0	2.1	22.1	8.2	40.4	39.6	67.4	130.2	1.8%	-40.1%	-69.0%
Subtotal	72.9	30.1	304.9	85.5	311.6	304.3	1109.3	1339.4	1286.6	1451.1	-17.2%	-13.8%	-23.6%
<b>Divers</b>													
Redhead	24.4	3.6	41.5	0.0	22.8	34.0	126.4	82.1	102.4	87.0	54.0%	23.5%	45.4%
Canvasback	18.9	1.1	11.9	1.3	31.6	24.2	89.0	50.1	91.1	81.3	77.7%	-2.3%	9.4%
Scaups	21.7	2.5	12.4	0.3	6.8	9.4	53.2	78.3	118.6	202.9	-32.1%	-55.2%	-73.8%
Ring-necked duck	21.6	1.3	9.9	0.5	3.7	4.3	41.5	63.1	55.5	46.5	-34.2%	-25.2%	-10.7%
Goldeneyes	20.0	8.5	5.7	0.0	0.4	5.8	40.4	84.2	47.3	34.8	-52.0%	-14.6%	16.1%
Bufflehead	8.2	4.1	23.7	0.5	4.4	17.7	58.7	44.0	48.6	32.1	33.3%	20.8%	82.9%
Ruddy Duck	27.0	0.9	42.3	0.0	48.5	51.6	170.3	52.1	50.3	63.7	226.9%	238.9%	167.3%
Subtotal	142.0	22.0	147.5	2.6	118.2	147.1	579.5	453.8	513.7	548.3	27.7%	12.8%	5.7%
<b>Miscellaneous</b>													
Long-tailed duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	--	-100.0%	-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	0.9	0.0	0.4	0.0	1.3	1.0	1.4	3.6	33.2%	-1.1%	-62.3%
Mergansers	4.5	4.3	1.4	0.0	0.4	0.0	10.6	13.4	30.9	23.1	-21.2%	-65.8%	-54.3%
Subtotal	4.5	4.3	2.3	0.0	0.8	0.0	11.9	14.4	32.5	26.7	-17.4%	-63.4%	-55.4%
<b>Total Ducks</b>	<b>219.4</b>	<b>56.4</b>	<b>454.7</b>	<b>88.1</b>	<b>430.6</b>	<b>451.5</b>	<b>1700.6</b>	<b>1807.6</b>	<b>1832.8</b>	<b>2026.1</b>	<b>-5.9%</b>	<b>-7.2%</b>	<b>-16.1%</b>
Canada Goose	16.0	7.9	76.1	3.2	9.8	27.1	140.2	85.5	66.2	36.6	63.9%	111.9%	282.9%
Am. coot	31.0	0.0	21.4	0.5	42.7	19.1	114.8	113.7	284.7	214.7	1.0%	-59.7%	-46.6%
<b>Ponds</b>	<b>47.0</b>	<b>219.9</b>	<b>32.3</b>	<b>126.8</b>	<b>114.5</b>	<b>540.6</b>	<b>490.9</b>	<b>632.9</b>	<b>675.9</b>	<b>10.1%</b>	<b>-14.6%</b>	<b>-20.0%</b>	

Table 2. Long-term trend in adjusted May pond estimates (thousands) by stratum with comparisons against the previous year, the previous 10-year mean, and the long-term mean for Southern Manitoba. Note that ponds are not counted in stratum 25.

Year	Stratum						Total
	25	36	37	38	39	40	
1961		33.1	289.8	36.3	117.7	109.6	586.6
1962		25.2	313.5	31.9	74.8	88.2	533.6
1963		47.8	247.7	53.2	162.5	168.8	679.9
1964		77.4	289.6	38.6	253.2	250.3	909.1
1965		141.8	443.8	72.6	246.0	218.4	1122.6
1966		115.8	433.2	62.8	242.0	212.4	1066.3
1967		129.0	503.3	70.1	182.7	234.9	1120.0
1968		39.8	153.9	27.4	46.3	67.9	335.3
1969		59.6	153.1	36.8	126.3	87.3	463.1
1970		79.4	368.2	63.1	262.2	262.2	1035.2
1971		69.9	239.9	60.5	200.7	183.5	754.6
1972		103.8	431.5	48.1	180.4	250.0	1013.7
1973		82.6	137.6	33.6	97.7	82.4	433.9
1974		141.7	559.5	67.2	324.6	356.2	1449.1
1975		59.7	264.2	53.3	296.2	264.1	937.6
1976		75.5	444.0	61.7	376.4	231.0	1188.7
1977		35.6	208.2	39.2	67.0	90.0	439.9
1978		129.9	312.5	31.7	114.9	191.3	780.3
1979		67.6	268.5	42.1	202.5	211.7	792.4
1980		32.4	103.2	31.6	58.5	60.9	286.7
1981		30.4	107.8	23.1	47.5	54.0	262.8
1982		27.0	131.1	25.3	88.2	87.4	359.0
1983		89.2	271.7	34.3	163.3	153.9	712.4
1984		69.3	159.1	36.5	86.3	58.2	409.4
1985		45.4	234.6	29.0	83.7	103.6	496.3
1986		94.3	383.8	70.2	197.1	202.2	947.5
1987		42.1	165.2	37.6	119.4	133.8	498.1
1988		108.2	318.5	43.4	48.8	113.6	632.5
1989		36.6	99.1	38.2	63.5	46.8	284.2
1990		80.7	348.5	35.7	52.4	145.2	662.4
1991		28.8	147.1	32.4	70.8	114.0	393.1
1992		61.9	261.9	54.0	150.3	136.6	664.8
1993		48.3	216.8	55.7	63.4	99.2	483.4
1994		45.8	157.9	37.0	89.4	65.6	395.7
1995		79.7	332.1	65.2	239.5	172.9	889.4
1996		76.9	371.2	54.5	177.2	150.1	829.8
1997		99.9	467.5	84.5	157.4	159.2	968.5
1998		43.0	194.9	44.3	124.1	85.7	492.1
1999		36.8	185.6	32.6	204.6	151.1	610.7
2000		45.6	184.0	27.5	91.3	117.3	465.7
2001		31.1	324.7	122.9	144.0	163.1	785.8
2002		64.4	77.8	45.8	52.0	87.2	327.2
2003		44.0	143.1	59.6	140.3	103.9	490.9
2004		47.0	219.9	32.3	126.8	114.5	540.6
10-year Mean		56.7	243.9	57.4	142	125.6	632.9
Long-term Mean		66.9	266.3	47.7	146.2	147.1	675.9
Percent Change:							
From 2003		6.90%	53.70%	-45.80%	-9.60%	10.20%	10.10%
From 10-year Mean		-17.10%	-9.80%	-43.70%	-10.70%	-8.80%	-14.60%
From Long-term Mean		-29.70%	-17.40%	-32.20%	-13.20%	-22.20%	-20.00%



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

Species/Ponds	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
Ducks										
Dabblers										
Mallard	549.9	811.4	852.4	1116.6	702.5	647.2	442.6	292.5	428.6	534.7
Am. black duck	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.5	2.1	0.5
Gadwall	31.4	18.9	23.6	34.1	35.5	28.0	62.2	41.2	84.3	70.7
Am. wigeon	162.3	140.2	120.8	392.7	292.2	106.4	130.4	100.1	118.4	166.3
Am. green-winged teal	36.9	17.8	29.6	74.7	57.1	21.7	67.3	21.0	69.3	10.7
Blue-winged teal	514.8	313.3	399.1	1198.2	1302.2	729.2	543.5	439.2	538.4	490.9
N. shoveler	57.4	66.5	93.4	84.3	198.3	158.0	138.1	75.9	159.9	167.8
N. pintail	335.1	296.2	210.4	208.6	149.0	256.7	115.3	122.5	196.4	141.6
Subtotal	1687.9	1665.1	1729.1	3109.1	2736.7	1947.1	1499.4	1093.0	1597.3	1583.2
Divers										
Redhead	66.3	69.9	55.2	99.1	123.7	88.6	77.7	50.6	105.7	117.9
Canvasback	80.5	79.6	54.4	138.3	109.0	131.3	123.1	58.3	100.6	101.3
Scaups	225.3	235.3	281.6	598.0	416.6	289.1	271.1	184.3	269.5	218.6
Ring-necked duck	27.2	25.3	7.0	18.4	55.7	13.0	17.7	21.2	46.2	24.1
Goldeneyes	17.8	13.3	17.5	34.6	87.7	53.9	25.4	29.0	16.4	10.6
Bufflehead	16.3	7.5	2.9	10.9	14.7	9.6	23.1	7.8	20.6	14.3
Ruddy Duck	28.9	28.6	24.9	24.6	81.3	62.5	95.3	55.0	106.2	74.9
Subtotal	462.3	459.7	443.4	923.9	888.8	648.0	633.4	406.2	665.3	561.7
Miscellaneous										
Oldsquaw	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	3.4	7.5	0.9	10.3	10.1	0.0	1.6	0.5	1.4	2.2
Mergansers	14.2	2.6	0.6	1.2	1.6	5.0	1.9	4.7	8.7	19.3
Subtotal	17.6	10.1	1.6	11.4	11.7	5.0	3.5	5.3	10.1	21.6
Total Ducks	2167.8	2134.9	2174.1	4044.4	3637.1	2600.2	2136.3	1504.5	2272.7	2166.4
Canada Goose	5.6	31.5	0.0	8.8	3.5	9.5	7.4	11.0	9.0	8.4
Am. coot	18.8	45.7	27.8	77.0	286.6	121.5	239.7	52.0	112.5	117.2
Ponds							586.6	533.6	679.9	909.1
Species/Ponds	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
Ducks										
Dabblers										
Mallard	372.0	431.5	468.3	435.1	659.7	757.2	458.3	576.6	370.1	421.0
Am. black duck	0.1	0.4	1.1	1.6	0.2	0.2	0.3	0.0	0.0	0.0
Gadwall	54.5	86.6	98.0	71.0	58.5	59.8	51.8	86.5	86.9	58.1
Am. wigeon	177.0	130.4	96.3	144.5	173.5	155.3	112.6	150.9	163.6	108.3
Am. green-winged teal	39.4	60.9	83.2	58.5	174.8	92.3	135.1	125.7	134.1	112.9
Blue-winged teal	360.5	285.1	679.3	496.9	575.5	819.4	450.0	533.6	478.7	703.6
N. shoveler	141.0	135.7	202.1	99.1	172.7	147.0	93.1	146.3	76.8	106.1
N. pintail	145.5	110.0	180.5	82.5	311.3	276.2	169.0	227.8	95.6	310.5
Subtotal	1290.0	1240.6	1808.8	1389.2	2126.2	2307.4	1470.1	1847.4	1405.8	1820.5
Divers										
Redhead	175.4	106.2	113.2	72.9	85.9	101.0	82.7	75.8	76.7	91.8
Canvasback	126.7	93.3	109.4	80.2	73.8	71.2	80.2	42.8	68.4	40.7
Scaups	205.4	183.1	246.9	188.3	158.9	227.1	188.2	191.3	138.2	348.4
Ring-necked duck	31.6	35.8	53.9	97.3	35.5	53.5	72.3	47.4	29.8	54.6
Goldeneyes	16.9	7.6	19.6	9.5	17.5	23.6	39.2	16.0	15.6	34.7
Bufflehead	21.3	19.2	49.1	25.7	34.5	21.4	31.2	28.6	11.3	27.6
Ruddy Duck	76.2	102.3	82.5	131.2	58.0	69.5	59.8	34.5	49.7	62.8
Subtotal	653.4	547.5	674.6	605.1	464.2	567.4	553.5	436.4	389.7	660.6
Miscellaneous										
Oldsquaw	0.0	0.0	0.0	0.1	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	2.2	5.7	3.0	9.1	1.3	5.3	6.1	1.7	5.6	17.4
Mergansers	15.0	22.9	7.0	12.4	15.0	11.2	7.4	16.6	13.0	27.3
Subtotal	17.2	28.7	10.0	21.7	16.4	16.5	13.5	18.3	18.5	44.7
Total Ducks	1960.6	1816.7	2493.4	2016.0	2606.7	2891.4	2037.1	2302.0	1814.1	2525.7
Canada Goose	8.1	9.7	4.4	21.0	17.1	21.0	25.1	22.2	30.4	22.3
Am. coot	121.0	62.5	150.3	433.8	139.3	184.2	148.0	172.8	127.3	242.4
Ponds	1122.6	1066.3	1120.0	335.3	463.1	1035.2	754.6	1013.7	433.9	1449.1

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

Species/Ponds	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Ducks										
Dabblers										
Mallard	476.5	679.8	482.8	429.9	417.1	596.2	467.5	521.2	427.7	233.4
Am. black duck	0.5	0.5	0.9	0.4	0.6	1.2	0.0	0.0	0.0	0.0
Gadwall	52.5	62.2	81.8	61.7	81.0	144.5	70.7	58.3	52.6	17.3
Am. wigeon	77.6	78.6	41.7	73.2	82.4	121.1	103.9	67.0	48.4	38.5
Am. green-winged teal	66.0	122.5	70.3	141.2	40.1	35.9	40.7	36.2	52.9	43.2
Blue-winged teal	410.2	722.5	435.8	383.6	536.8	528.0	386.0	496.2	314.3	201.6
N. shoveler	69.3	166.3	62.1	89.6	95.2	75.8	116.1	157.8	135.5	65.3
N. pintail	225.9	263.5	43.1	107.1	201.2	73.6	71.6	110.5	106.2	31.8
Subtotal	1378.5	2095.9	1218.6	1286.6	1454.5	1576.2	1256.6	1447.1	1137.7	631.1
Divers										
Redhead	82.7	86.2	108.8	80.6	76.5	65.4	150.9	94.8	60.5	20.1
Canvasback	90.9	127.4	74.3	57.7	60.9	75.9	101.1	65.5	48.0	56.2
Scaups	312.0	267.9	164.6	307.2	149.8	222.0	249.1	169.3	243.5	120.2
Ring-necked duck	59.7	21.8	14.6	35.8	44.6	88.3	87.8	47.6	50.0	17.5
Goldeneyes	43.7	42.5	14.4	78.2	39.9	33.2	85.9	41.9	42.8	7.4
Bufflehead	29.6	42.8	32.5	45.9	20.3	33.0	35.6	30.3	32.8	26.5
Ruddy Duck	52.6	45.7	40.2	56.3	23.3	104.7	117.0	161.8	60.6	38.9
Subtotal	671.2	634.3	449.4	661.6	415.4	622.6	827.3	611.0	538.2	286.8
Miscellaneous										
Oldsquaw	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	12.1	6.1	4.2	4.1	9.0	0.8	1.0	1.5	6.0	1.5
Mergansers	36.8	12.5	15.0	25.7	43.0	54.9	51.9	15.9	70.6	24.9
Subtotal	49.0	18.6	19.1	29.8	52.0	55.8	52.9	17.5	76.6	26.4
Total Ducks	2098.7	2748.8	1687.1	1978.1	1921.8	2254.5	2136.8	2075.7	1752.4	944.3
Canada Goose	20.9	9.3	24.3	27.5	25.7	39.5	35.8	31.9	47.1	40.2
Am. coot	312.5	485.5	267.4	128.0	196.3	499.7	404.2	197.7	135.2	55.6
Ponds	937.6	1188.7	439.9	780.3	792.4	286.7	262.8	359.0	712.4	409.4
Species/Ponds	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Ducks										
Dabblers										
Mallard	329.2	431.8	332.0	340.4	315.3	363.1	340.6	389.4	354.7	436.5
Am. black duck	0.6	0.8	0.7	0.2	0.2	0.2	0.4	1.1	0.0	0.3
Gadwall	64.3	105.7	71.2	70.3	69.6	120.1	79.7	111.9	94.4	57.6
Am. wigeon	53.5	63.4	39.5	43.6	56.1	58.1	55.0	52.5	31.9	47.3
Am. green-winged teal	24.2	55.4	46.2	38.3	40.4	41.2	39.3	138.5	24.5	32.1
Blue-winged teal	225.2	386.0	291.5	369.0	314.5	343.1	272.2	430.4	355.6	172.2
N. shoveler	99.9	165.5	115.6	122.8	79.2	95.2	88.9	151.3	79.5	64.8
N. pintail	45.8	124.0	77.9	36.4	19.6	57.4	26.6	100.2	40.5	52.5
Subtotal	842.6	1332.5	974.5	1021.0	894.9	1078.4	902.6	1375.3	981.1	863.3
Divers										
Redhead	51.3	38.3	52.2	53.6	33.5	85.0	99.9	116.3	44.2	51.2
Canvasback	60.4	57.1	42.5	56.0	53.4	68.5	65.3	80.0	69.5	100.2
Scaups	155.6	309.1	169.5	151.1	101.9	152.9	101.4	221.2	123.0	154.7
Ring-necked duck	42.7	34.5	55.5	57.2	33.8	49.3	47.4	113.8	52.6	42.2
Goldeneyes	66.7	22.8	33.8	34.5	21.1	40.6	15.0	36.1	24.8	6.5
Bufflehead	41.7	31.9	40.3	33.1	33.8	35.6	48.2	67.2	28.0	49.1
Ruddy Duck	44.5	69.9	81.0	68.1	57.9	72.7	80.5	60.8	74.6	15.1
Subtotal	462.8	563.7	474.8	453.7	335.4	504.6	457.6	695.5	416.5	419.0
Miscellaneous										
Oldsquaw	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.3
Eiders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Scoters	3.6	0.3	1.6	3.4	0.2	0.3	1.8	4.8	3.0	1.5
Mergansers	35.6	28.0	23.6	28.3	25.1	47.8	23.6	27.2	24.8	26.1
Subtotal	39.2	28.3	25.2	31.6	25.3	48.1	25.3	32.0	28.3	28.8
Total Ducks	1344.7	1924.5	1474.5	1506.3	1255.6	1631.2	1385.6	2102.8	1426.0	1311.1
Canada Goose	43.2	45.2	38.5	74.6	97.0	52.9	61.1	67.2	74.4	52.6
Am. coot	78.7	217.9	163.2	773.9	129.8	180.3	129.1	266.0	173.5	44.6
Ponds	496.3	947.5	498.1	632.5	284.2	662.4	393.1	664.8	483.4	395.7

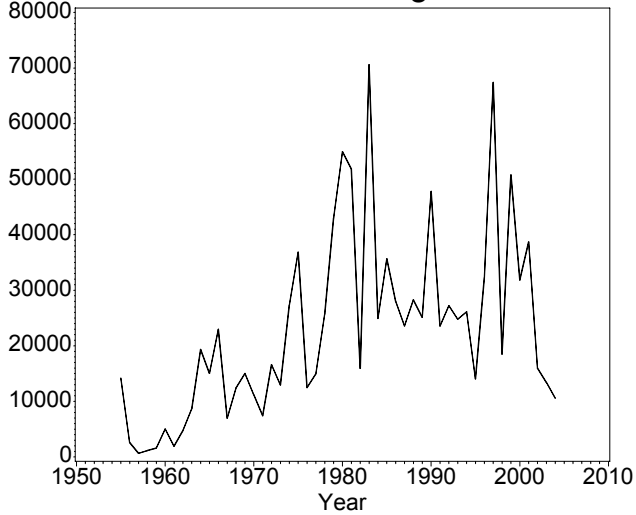
Appendix 1 (continued). Long-term trend in adjusted waterfowl breeding population estimates (thousands).

Species/Ponds	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Ducks										
Dabblers										
Mallard	514.8	439.6	502.2	507.2	585.6	455.7	476.0	499.2	554.2	423.4
Am. black duck	0.6	0.0	0.0	0.7	0.0	3.0	0.0	0.3	0.6	0.0
Gadwall	94.4	106.1	97.7	106.1	118.1	90.9	114.1	144.9	101.9	151.7
Am. wigeon	50.4	50.9	41.8	34.0	42.8	42.0	22.2	43.7	16.6	6.6
Am. green-winged teal	55.6	132.0	75.5	48.7	48.9	63.5	33.7	43.6	49.6	27.8
Blue-winged teal	328.9	340.4	326.0	303.9	497.6	401.0	520.6	335.7	447.5	304.0
N. shoveler	172.8	187.4	166.5	115.4	169.5	194.0	215.2	119.5	129.4	155.5
N. pintail	123.8	85.4	65.0	64.9	62.8	45.7	100.7	34.0	39.6	40.4
Subtotal	1341.2	1341.7	1274.7	1180.8	1525.3	1295.9	1482.5	1220.9	1339.4	1109.3
Divers										
Redhead	133.5	89.7	79.4	170.7	87.4	125.6	124.5	79.5	82.1	126.4
Canvasback	111.3	115.6	90.7	88.9	98.1	94.8	74.4	86.4	50.1	89.0
Scaups	183.9	215.0	116.4	77.2	120.6	83.4	88.3	68.6	78.3	53.2
Ring-necked duck	46.2	45.4	49.5	41.1	37.1	70.7	66.5	93.3	63.1	41.5
Goldeneyes	41.3	64.6	40.0	51.9	44.0	50.7	52.5	37.6	84.2	40.4
Bufflehead	50.7	36.5	63.0	47.7	62.2	46.0	46.5	40.0	44.0	58.7
Ruddy Duck	47.5	40.7	39.1	15.7	56.0	48.8	66.2	121.3	52.1	170.3
Subtotal	614.4	607.6	478.2	493.1	505.5	519.9	519.0	526.8	453.8	579.5
Miscellaneous										
Oldsquaw	0.5	0.0	0.0	0.9	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	0.7	1.4	3.4	3.0	0.8	0.7	0.0	1.3	1.0	1.3
Mergansers	14.1	32.2	67.4	18.5	50.7	31.8	38.7	16.0	13.4	10.6
Subtotal	15.2	33.6	70.8	22.4	51.5	32.5	38.7	17.2	14.4	11.9
Total Ducks	1970.9	1982.9	1823.6	1696.3	2082.3	1848.3	2040.2	1764.9	1807.6	1700.6
Canada Goose	62.1	66.9	79.2	60.3	50.9	57.3	53.9	92.9	85.5	140.2
Am. coot	199.7	284.9	288.5	537.4	182.4	410.2	346.1	439.8	113.7	114.8
Ponds	889.4	829.8	968.5	492.1	610.7	465.7	785.8	327.2	490.9	540.6

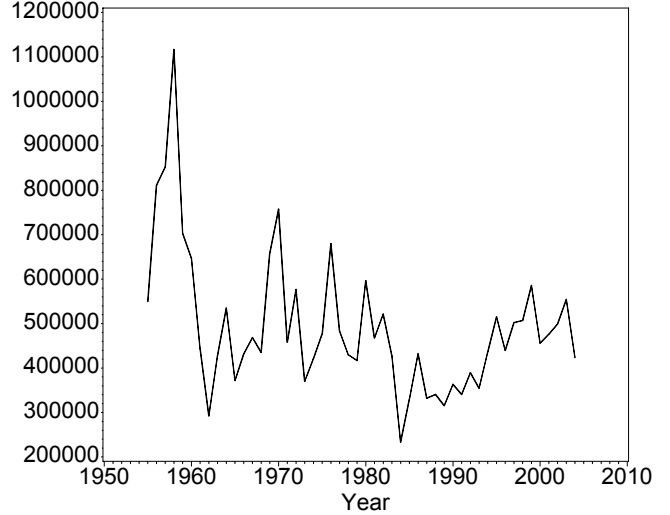
Table 3. Survey design for Southern Manitoba and the Saskatchewan River Delta, May, 2004.

Survey Design	Stratum						Total
	25	36	37	38	39	40	
Sq. Mi. in stratum	7,644	5,500	16,485	5,655	6,552	4,536	46,372
Sq. Mi. in sample	135	58.5	135.0	54.0	121.5	67.5	571.5
Linear Mi. in sample	540	234	540	216	486	270	2,286
No. of transects in sample	5	3	4	3	5	4	24
No. of segments in sample	30	13	30	12	27	15	127
Expansion factor	56.622	94.017	122.111	104.722	53.926	67.200	

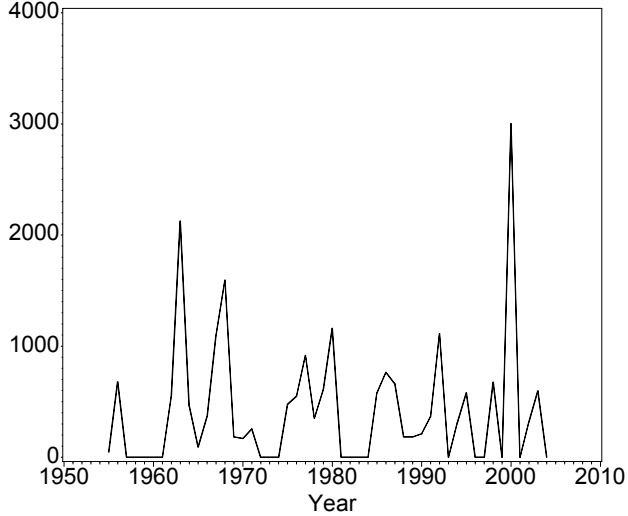
Strata 25, 36-40 Mergansers



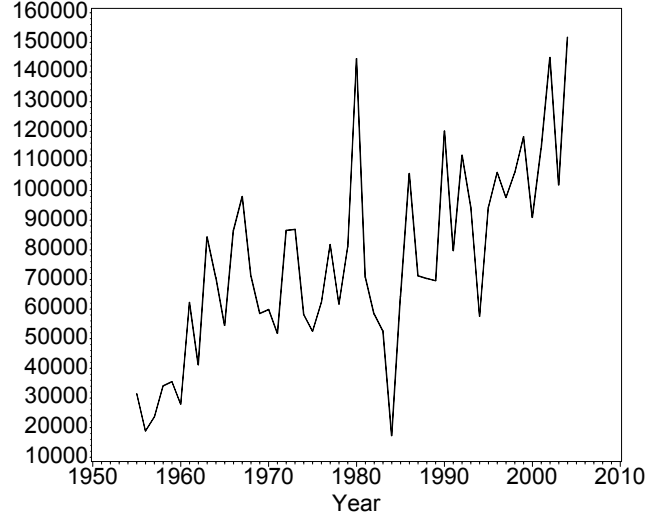
Strata 25, 36-40 Mallard



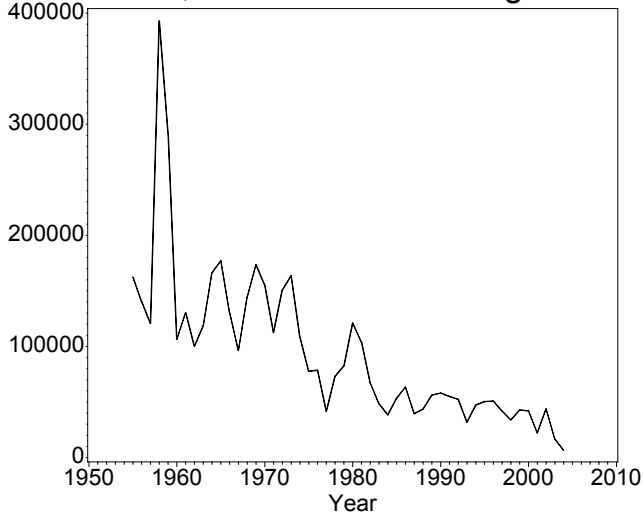
Strata 25, 36-40 American black duck



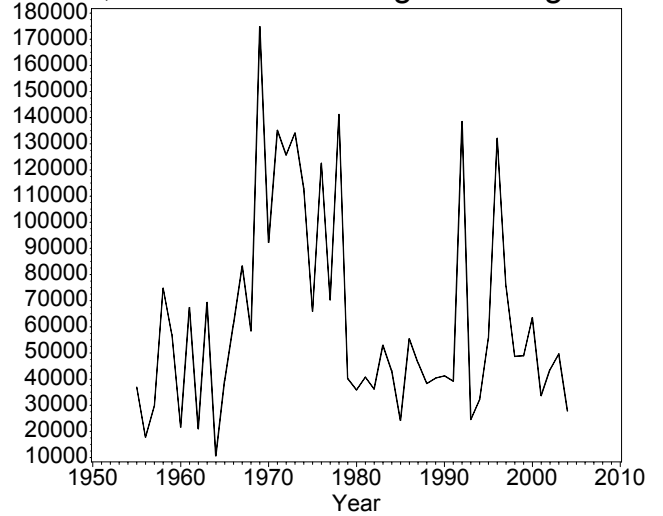
Strata 25, 36-40 Gadwall



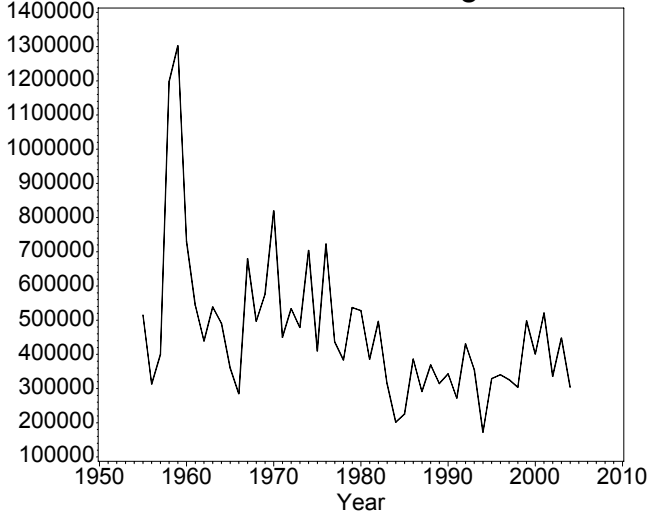
Strata 25, 36-40 American wigeon



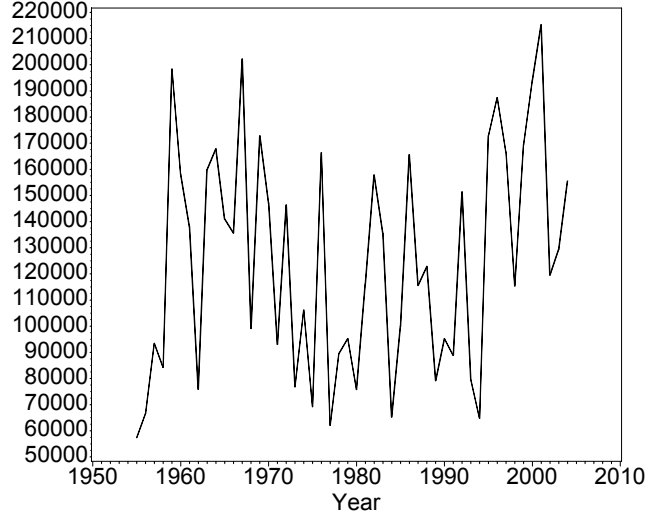
Strata 25, 36-40 American green-winged teal



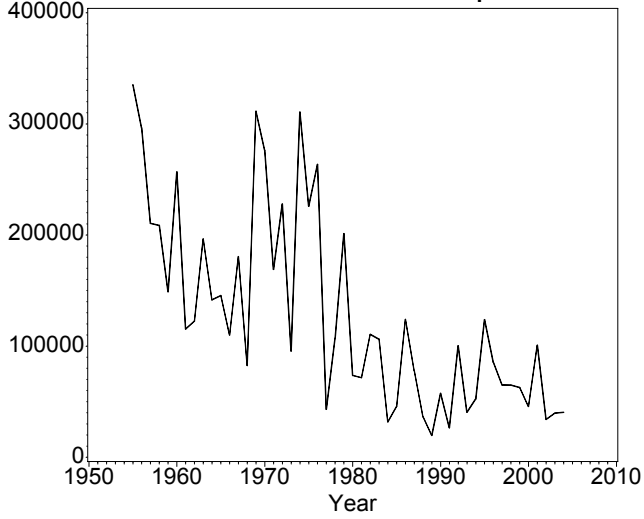
Strata 25, 36-40 Blue-winged teal



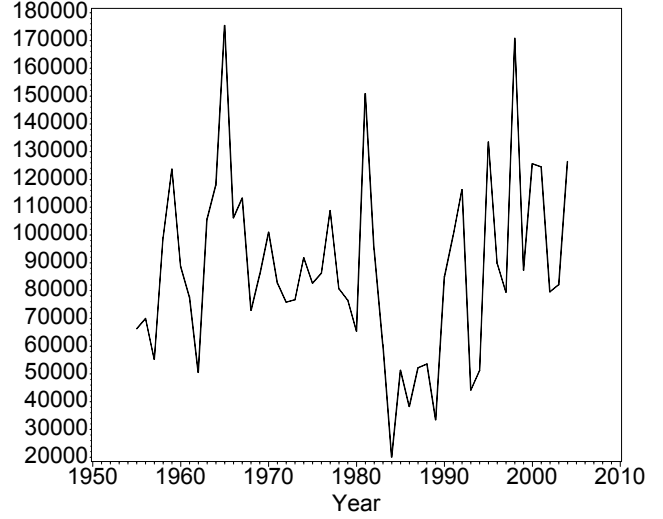
Strata 25, 36-40 Northern shoveler



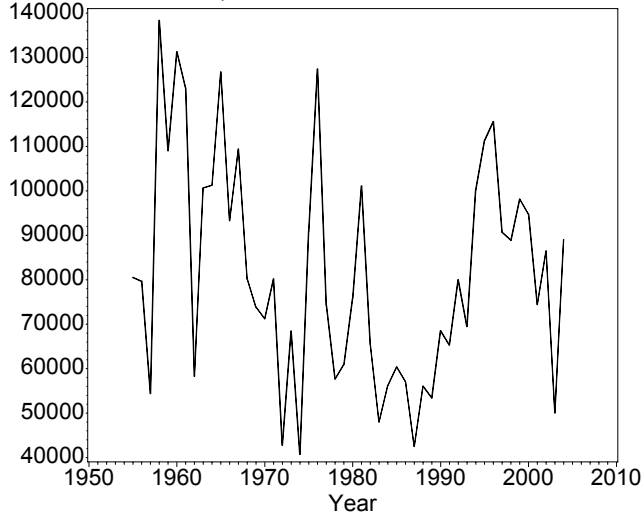
Strata 25, 36-40 Northern pintail



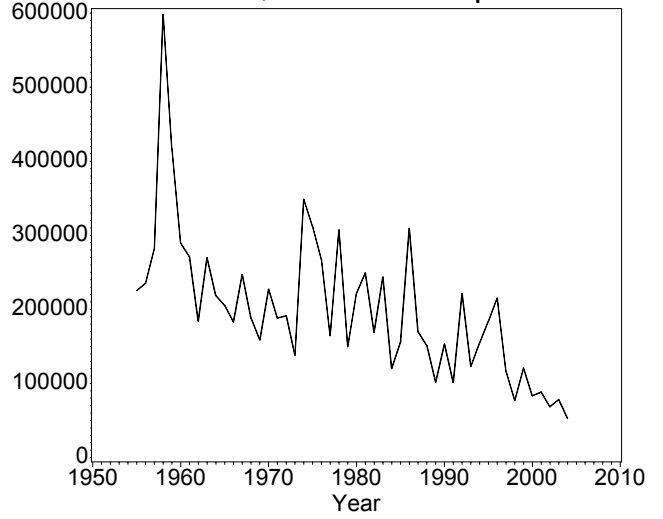
Strata 25, 36-40 Redhead



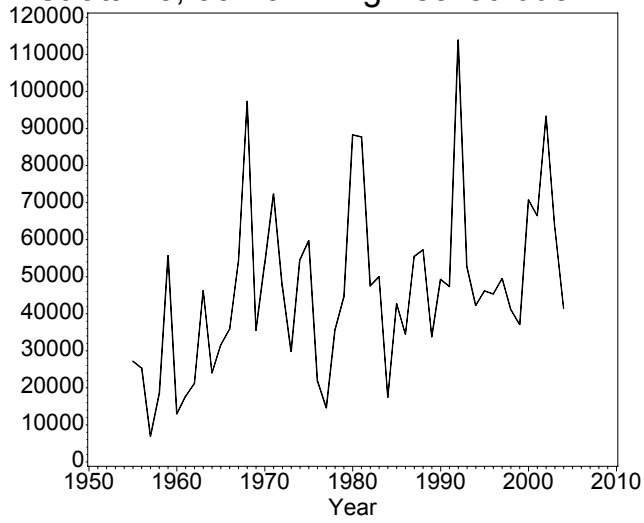
Strata 25, 36-40 Canvasback



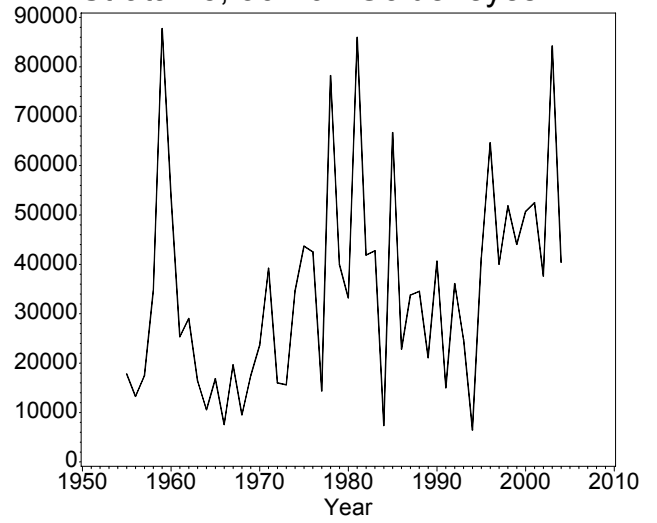
Strata 25, 36-40 Scaups



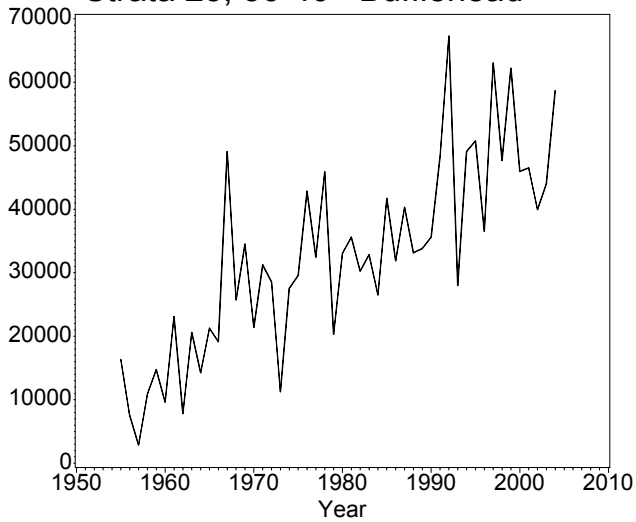
Strata 25, 36-40 Ring-necked duck



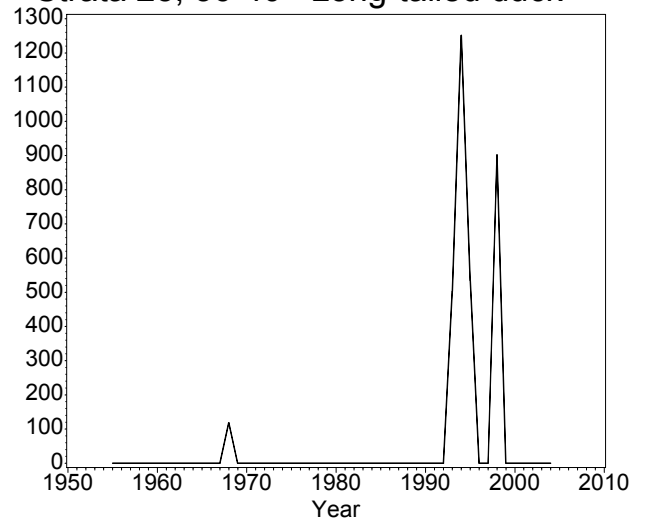
Strata 25, 36-40 Goldeneyes



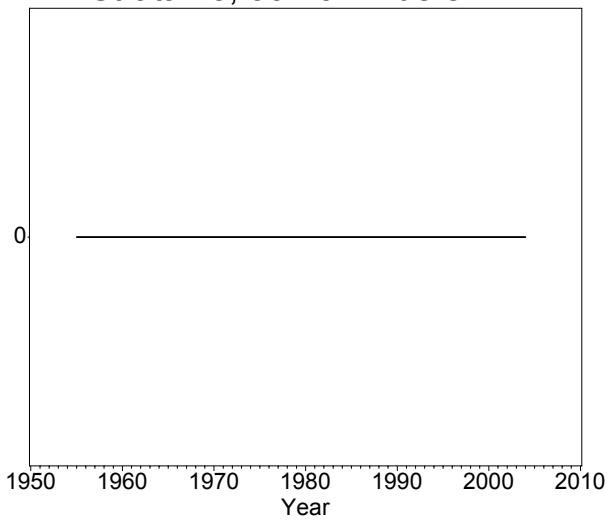
Strata 25, 36-40 Bufflehead



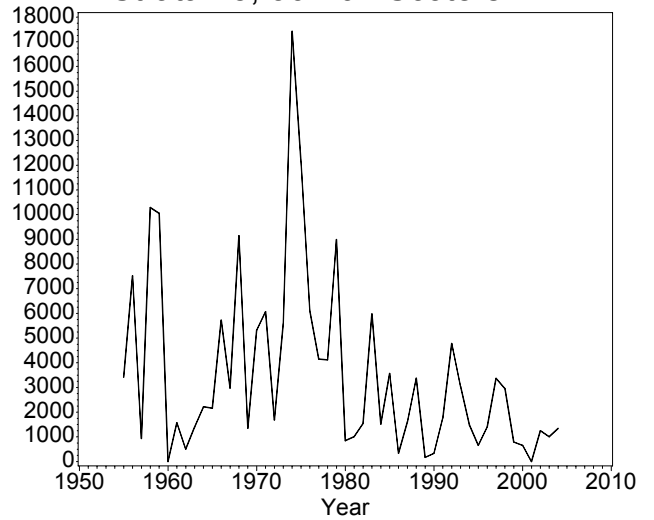
Strata 25, 36-40 Long-tailed duck



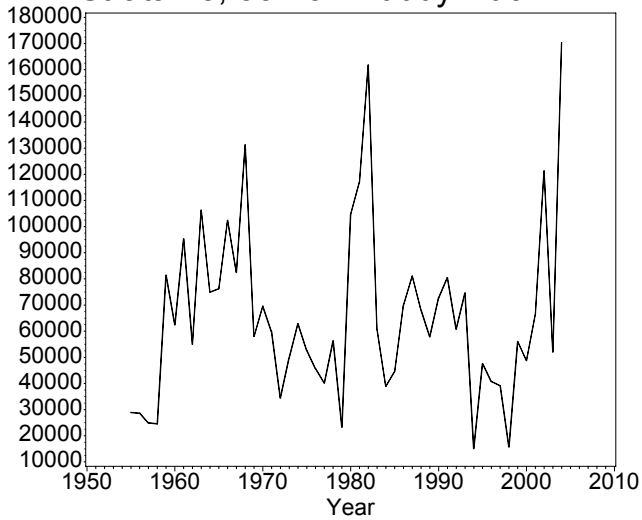
Strata 25, 36-40 Eiders



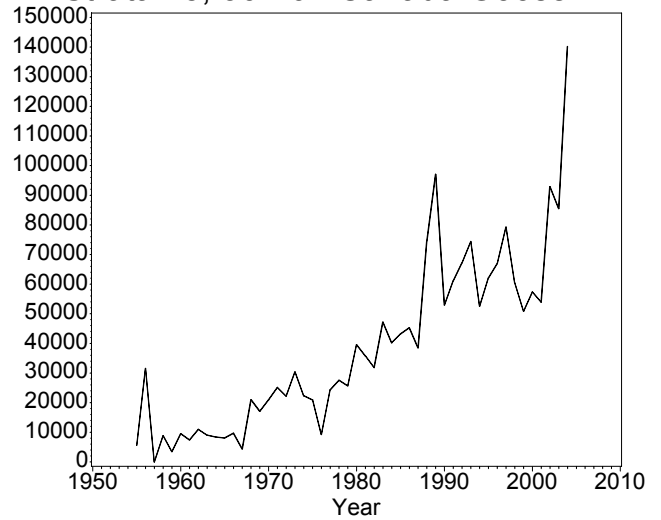
Strata 25, 36-40 Scoters



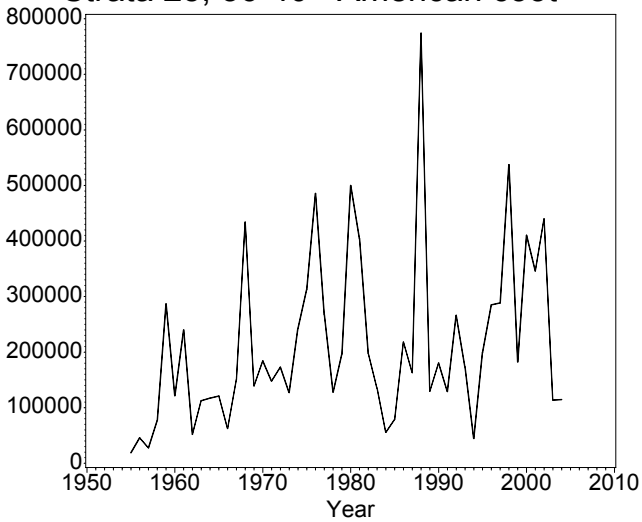
Strata 25, 36-40 Ruddy Duck



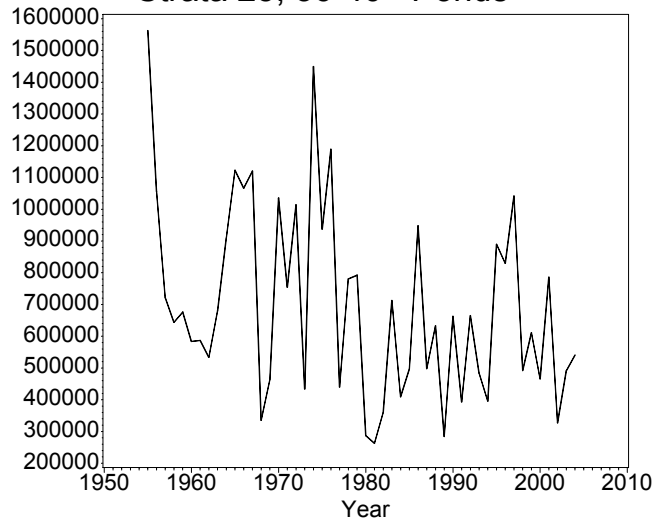
Strata 25, 36-40 Canada Goose



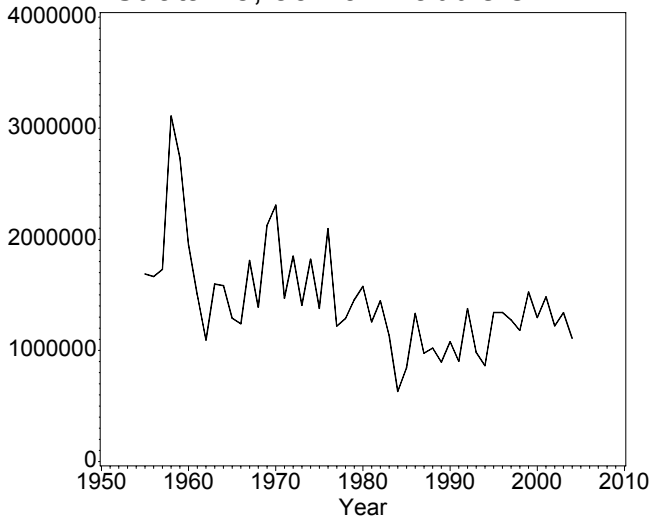
Strata 25, 36-40 American coot



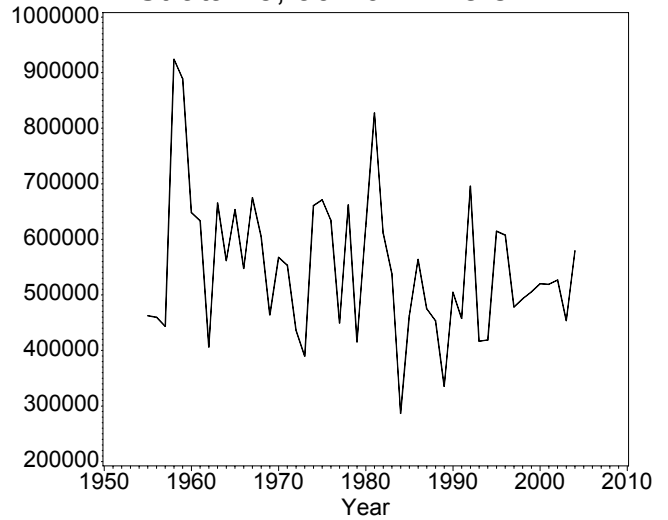
Strata 25, 36-40 Ponds



Strata 25, 36-40 Dabblers

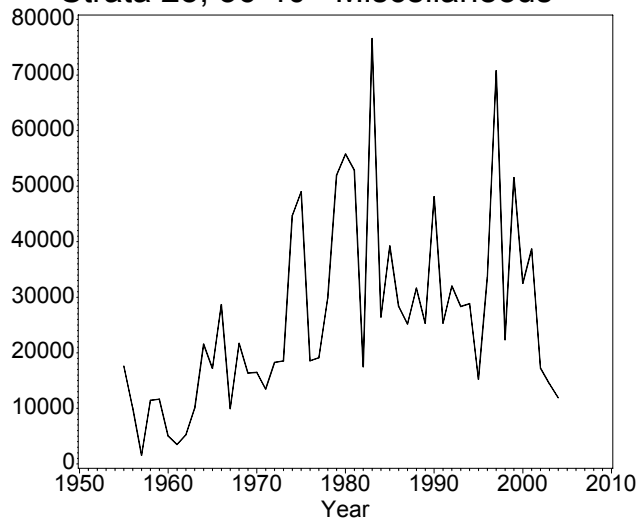


Strata 25, 36-40 Divers





Strata 25, 36-40 Miscellaneous



Strata 25, 36-40 Total Ducks

