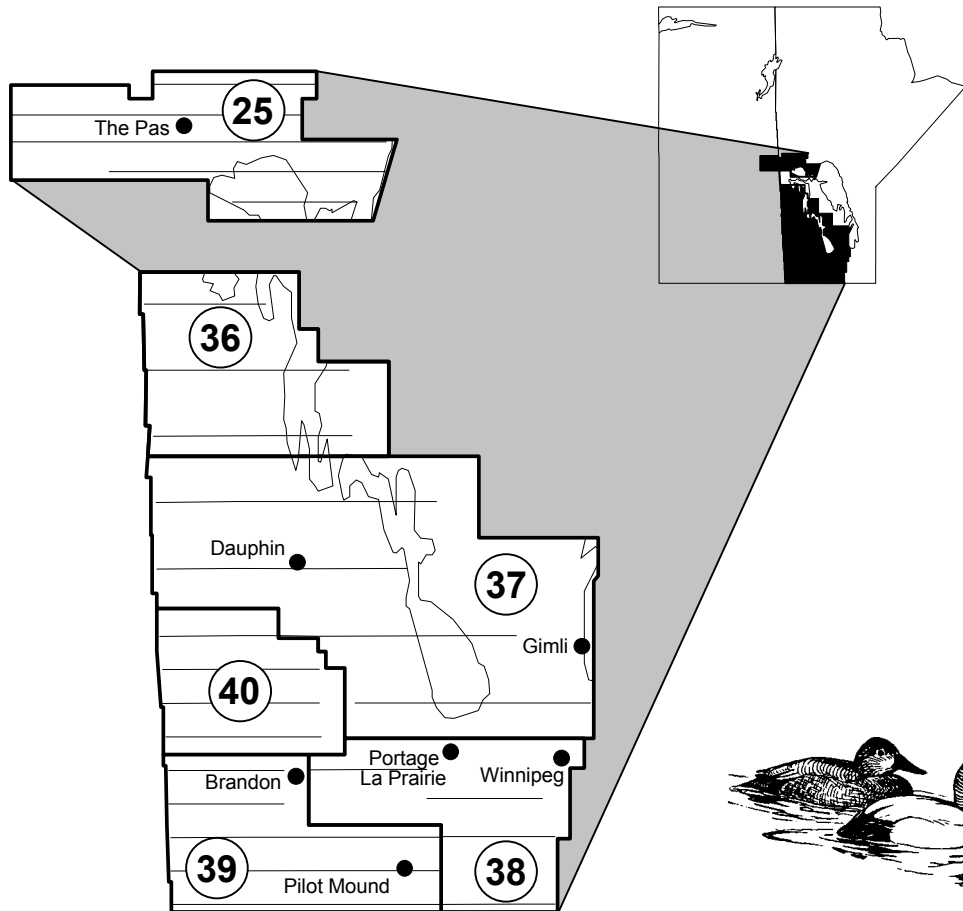


# Waterfowl Breeding Population Survey

MAY 2001

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 through 40

DATES: May 8 - 26, 2001

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

Aerial Crew:

Pilot/Observer Rod King, Flyway Biologist, USFWS  
Observer Herb Bell, Wildlife Biologist USFWS

Ground Crew:

Crew Leaders: Dale Caswell, Wildlife Biologist, CWS  
Pat Rakowski, Wildlife Biologist, CWS  
Marc Schuster, Wildlife Technician, CWS  
Darcy Pisiak, Wildlife Technician, CWS  
Martin Van Osch, Wildlife Technician, DUC  
Garth Ball, Habitat Biologist, MC (Strata 36-40 only)

Assistants:

James Galbraith, Student Technician, CWS  
Frank Baldwin, Jr., Student Technician, CWS  
Mark Blanchard, Student Technician, CWS  
Alain Dupuis, Student Technician, CWS  
Dr. George Hochbaum, Wildlife Biologist (Retired), CWS (Strata 36-40 only)  
Bob Carles, General Manager, SWCC (Strata 34-35 only)

ABSTRACT: The Manitoba Air Crew again collected and reported the data from the Saskatchewan River Delta in this report. The process simplified the reporting procedure. The Saskatchewan River Delta has been flown by the Manitoba Air Crew for several years and therefore seemed logical to eliminate the extra step of transferring the data to the northern Manitoba crew. All tables have been updated to include long term averages that reflect the inclusion of this data.

The 2001 survey was conducted from May 8 -26, and was consistent with the designed survey. Two segments on the eastern edge of Stratum 37 were not flown. These two segments are insignificant in waterfowl habitat and duck numbers. Delays from weather and the position of the two segments left after other lines were flown eliminated their significance to be included in the survey for 2001.

Winter began early for most parts of the survey area with significant amounts of snowfall and cold temperatures through January. After that time temps and precipitation waned until early spring. Above average temperatures and above average precipitation in the central part of the survey area set the stage for a banner year for waterfowl. The high amounts of precipitation during winter and spring, resulted in 68.7% more ponds than in 2000, 26.9% more than the 10-year mean, and 14.8% more than the Long-term mean. The 2.04 million estimated ducks is the highest number since 1982 and the 785.8 thousand ponds is the highest since the “wet” years of 1995-97 and then not until 1975 were there more ponds counted.

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 habitat data were collected using laptop computers and transcribed into a program developed by Jack Hodges MBM-AK.

This is the second year that the summary data from Stratum 25 has been included in these survey results. The MBM-PAS calculated all data from previous Stratum 25 summaries and has been included in Table 1, Appendix 1, and Figure 1. Pond data summaries from Table 2., remained unchanged because wetlands are not enumerated in Stratum 25. All transects, segments and historic air/ground comparisons were flown as outlined in the survey design except as noted above. The design includes 24 air/ground comparison segments (Stratum 36 - 40). These air/ground comparisons are “ground truthed” by the Manitoba crew identified on page 1.

This was the third year that King was Pilot/Observer and the seventh year that Bell has acted as observer in the Manitoba Stratum.

A Cessna 206 amphibious aircraft (N753) was used for the survey. A total of 25.3 hours were needed to survey strata 25, and 36-40. There were six days during the survey that the air crew was unable to fly: three days were lost due to the ground crew being unable to keep up with the air crew and three days delayed due to inclement weather. Survey data for strata 34-35 were forwarded to the Saskatchewan air crew.

WEATHER AND HABITAT: Data from Canada weather monitoring sources indicate that in spring 2001 all of the climate regions of Canada had temperatures above normal. The Prairie Region showed the greatest trend 3.0 degrees C increase over the 54-year period. The Prairie region was -21.5% below average precipitation which equaled the 13<sup>th</sup> driest spring in the 54 years. The exceptional dryness in Alberta and western Saskatchewan evidently overshadow the wetness in Manitoba and eastern Saskatchewan. Sections of southern Manitoba recorded total precipitation for the period November, 2000 through March, 2001 of 155-200% above average.

The lingering wetness in these areas from the previous two years had its toll on agriculture activities near wetland basins and resulted in many wetland basins being surrounded by residual vegetation. These conditions should improve nesting habitat for many dabbling species. Diver species should also, benefit as wetlands move into more permanent water levels and noticeably more emergent vegetation was present compared to the prior two springs.

BREEDING POPULATION ESTIMATES: The 2001, breeding waterfowl population data are listed by strata and species in Table 1. Total duck populations for southern Manitoba were +10.4% higher than 2000, +15.7% above the 10-year mean, but only +0.2% above the long-term mean. When viewing duck totals for each stratum individually (Table 1.) It is obvious where the excellent habitat/ponds were at as Stratum 38 (+109.6% higher than 2000) and Stratum 40 (+66.7% higher than 2000). These two stratum held more than one-third of the 2 million ducks in the survey area, but contain only 22% of the total habitat. Long term duck population estimates are found in Appendix 1. Dabbling duck populations were +14.4% higher than 2000, +22.7% higher than the 10-year mean and +1.7% higher than the long term mean. Dabbling ducks make up 72.7% of all ducks in the survey area. Of this total mallard made up 23% and blue-winged teal 25.5% of all ducks. Diving ducks were -0.2% lower than 2000, -0.3% lower than the 10-year mean and -5.9% lower than the long-term mean. Canvasback indicate the largest decrease of -21.5% of 2000 totals and ruddy duck indicated a +35.6% over 2000. Redhead populations remained virtually unchanged for 2000, but were +24.8% over the 10-year mean, and +44.1% higher than the long-term mean. Redhead make up 24% of the total diving duck population for 2001, canvasback 14.3%, and ruddy duck 12.7%. The significant increase in permanent wetlands is again evident in Stratum 40. Although this stratum contains only 9.8% of the total survey area habitat it boasted almost 30% of the redheads, more than 30% of the canvasbacks and 1/3 of all diving ducks.

Table 2. illustrates the comparison of pond estimates for May. Ponds are not counted in Stratum 25. May ponds were +68.7% above 2000, +26.9% more than the 10-year mean, and +14.8% higher than the long term mean.

Table 3. Summarizes the survey design of each strata with the expansion for each area. The 2001 survey sample included all but 2 segments in Stratum 37. These two segments were victims of weather delays and remoteness from the remaining segments after altering flight paths to complete the survey. Ironically these two segments are two of the areas with few and sometimes no ducks on the transect. One segment is entirely over the open water of Lake Manitoba and the other is in agriculture land with virtually no natural wetlands.

Trend graphs for all species found in Figure 1., include population estimates from 1955 through 2001, for all duck species and includes Canada geese, coot, and ponds.

CONCLUSIONS AND OBSERVATIONS: An early winter began in October, 2000 across most of the survey with 20-25 cm of snow and then submerged the area in colder than average temperatures until January. Higher than average precipitation and temperatures followed into spring. Although this provided an excellent scenario for enhanced habitat for many duck species it greatly delayed the fallowing and planting of crops across the southern portions of Manitoba. With increased water levels in natural and artificial wetlands and the delayed farm machinery activities it appears that this area would be excellent for all ducks. The residual carryover of vegetation from the previous two years and the increased water levels made this area the "place to be " if you were a duck. The only down side may have been from nest destruction to "fallow nesting ducks" after farm machinery finally got into the fields. The outcome remains to be documented in the upcoming duck production survey.

Southern Manitoba was the only survey area throughout Canada and the U. S. that documented a positive change in duck numbers over the year 2000 (USFWS Duck Trend Report, 2001). From the same report we see that of all the surveyed areas Mallard populations increased only in the southern Manitoba strata. Northern pintail populations also, showed the greatest increase in this area.

ACKNOWLEDGMENTS: We would like to thank the hospitality and friendship of the southern Manitoba/southeast Saskatchewan ground crew, and especially the very personal and professional care of our airplane at the hands of Dave and Jim Wall of Maple Leaf Aviation, Brandon, Manitoba.

Submitted by: Rodney J. King, Flyway Biologist, MBMO, Mare Island, CA  
Date: June 29,2001

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	2001 Total	2000 Total	10- Year Mean	Long- Term Mean	2000	10-Year Mean	Long-Term Mean
<b>Ducks</b>													
<b>Dabblers</b>													
Mallard	30.0	10.2	148.0	41.4	113.6	132.7	476.0	455.7	452.6	493.4	4.5%	5.2%	-3.5%
Am. black duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.6	0.4	-100.0%	-100.0%	-100.0%
Gadwall	7.9	0.5	28.9	3.8	38.8	34.4	114.1	90.9	95.7	71.4	25.5%	19.3%	59.9%
Am. wigeon	4.0	0.6	4.0	0.3	6.7	6.6	22.2	42.0	44.8	100.8	-47.2%	-50.5%	-78.0%
Am. green-winged teal	2.3	1.9	6.1	2.1	13.4	8.0	33.7	63.5	65.9	64.7	-46.9%	-48.8%	-47.9%
Blue-winged teal	36.5	3.7	113.2	46.0	167.3	154.0	520.6	401.0	342.8	470.1	29.8%	51.9%	10.7%
N. shoveler	15.9	2.7	55.4	11.1	72.9	57.1	215.2	194.0	139.0	122.2	10.9%	54.8%	76.1%
N. pintail	3.6	0.6	4.5	11.5	63.1	17.6	100.7	45.7	66.7	134.9	120.1%	50.9%	-25.3%
Subtotal	100.1	20.1	360.0	116.1	475.8	410.4	1482.5	1295.9	1208.2	1457.9	14.4%	22.7%	1.7%
<b>Divers</b>													
Redhead	7.3	1.1	55.9	1.2	22.9	36.1	124.5	125.6	99.8	86.4	-0.9%	24.8%	44.1%
Canvasback	18.1	4.2	13.9	0.4	12.0	25.8	74.4	94.8	91.4	82.0	-21.5%	-18.6%	-9.3%
Scaups	14.2	0.8	14.6	0.8	23.4	34.6	88.3	83.4	139.7	211.0	5.9%	-36.8%	-58.1%
Ring-necked duck	28.5	4.0	12.0	0.0	8.9	13.0	66.5	70.7	54.6	44.7	-5.9%	21.9%	49.0%
Goldeneyes	23.2	10.3	5.4	0.0	6.7	6.9	52.5	50.7	37.5	33.3	3.5%	40.0%	57.7%
Bufflehead	9.6	5.2	13.1	0.0	2.4	16.2	46.5	46.0	49.9	31.3	1.2%	-6.7%	48.4%
Ruddy Duck	7.5	0.0	10.5	2.1	17.9	28.1	66.2	48.8	47.9	62.7	35.6%	38.2%	5.6%
Subtotal	108.5	25.7	125.4	4.5	94.2	160.7	519.0	519.9	520.7	551.4	-0.2%	-0.3%	-5.9%
<b>Miscellaneous</b>													
Oldsquaw	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	0.0	0.0	0.0	0.0	0.0	0.7	2.1	3.7	-100.0%	-100.0%	-100.0%
Mergansers	22.6	9.5	4.6	0.0	1.0	0.9	38.7	31.8	31.6	23.1	21.5%	22.2%	67.3%
Subtotal	22.6	9.5	4.6	0.0	1.0	0.9	38.7	32.5	34.0	26.9	19.0%	13.6%	43.6%
<b>Total Ducks</b>	<b>231.2</b>	<b>55.3</b>	<b>490.1</b>	<b>120.5</b>	<b>571.1</b>	<b>572.0</b>	<b>2040.2</b>	<b>1848.3</b>	<b>1763.0</b>	<b>2036.2</b>	<b>10.4%</b>	<b>15.7%</b>	<b>0.2%</b>
Canada Goose	11.9	1.2	17.1	4.4	5.7	13.7	53.9	57.3	63.2	33.9	-5.9%	-14.7%	58.8%
Am. coot	30.7	0.6	66.3	0.6	119.7	128.1	346.1	410.2	251.6	209.2	-15.6%	37.5%	65.4%
<b>Ponds</b>	<b>0.0</b>	<b>31.1</b>	<b>324.7</b>	<b>122.9</b>	<b>144.0</b>	<b>163.1</b>	<b>785.8</b>	<b>465.7</b>	<b>619.3</b>	<b>684.7</b>	<b>68.7%</b>	<b>26.9%</b>	<b>14.8%</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
10-year Mean		56.7	251.9	48.8	136.8	125.2	619.3
Long-term Mean		68.4	272.6	45.6	148.8	149.3	684.7
Percent Change:							
From 2000		-31.8%	76.4%	346.1%	57.7%	39.1%	68.7%
From 10-year Mean		-45.2%	28.9%	151.9%	5.3%	30.3%	26.9%
From Long-term Mean		-54.6%	19.1%	169.7%	-3.2%	9.3%	14.8%

Table 3. Survey design for Southern Manitoba and the Saskatchewan River Delta, May, 2001.

Survey Design*	Stratum						Total
	25	36	37	38	39	40	
Sq. Mi. in the 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	

\*Survey design and current year design flown were identical.



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
Ducks							
Dabblers							
Mallard	514.8	439.6	502.2	507.2	585.6	455.7	476.0
Am. black duck	0.6	0.0	0.0	0.7	0.0	3.0	0.0
Gadwall	94.4	106.1	97.7	106.1	118.1	90.9	114.1
Am. wigeon	50.4	50.9	41.8	34.0	42.8	42.0	22.2
Am. green-winged teal	55.6	132.0	75.5	48.7	48.9	63.5	33.7
Blue-winged teal	328.9	340.4	326.0	303.9	497.6	401.0	520.6
N. shoveler	172.8	187.4	166.5	115.4	169.5	194.0	215.2
N. pintail	123.8	85.4	65.0	64.9	62.8	45.7	100.7
Subtotal	1341.2	1341.7	1274.7	1180.8	1525.3	1295.9	1482.5
Divers							
Redhead	133.5	89.7	79.4	170.7	87.4	125.6	124.5
Canvasback	111.3	115.6	90.7	88.9	98.1	94.8	74.4
Scaups	183.9	215.0	116.4	77.2	120.6	83.4	88.3
Ring-necked duck	46.2	45.4	49.5	41.1	37.1	70.7	66.5
Goldeneyes	41.3	64.6	40.0	51.9	44.0	50.7	52.5
Bufflehead	50.7	36.5	63.0	47.7	62.2	46.0	46.5
Ruddy Duck	47.5	40.7	39.1	15.7	56.0	48.8	66.2
Subtotal	614.4	607.6	478.2	493.1	505.5	519.9	519.0
Miscellaneous							
Oldsquaw	0.5	0.0	0.0	0.9	0.0	0.0	0.0
Eiders	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
Mergansers	14.1	32.2	67.4	18.5	50.7	31.8	38.7
Subtotal	15.2	33.6	70.8	22.4	51.5	32.5	38.7
Total Ducks	1970.9	1982.9	1823.6	1696.3	2082.3	1848.3	2040.2
Canada Goose	62.1	66.9	79.2	60.3	50.9	57.3	53.9
Am. coot	199.7	284.9	288.5	537.4	182.4	410.2	346.1
Ponds	889.4	829.8	968.5	492.1	610.7	465.7	785.8

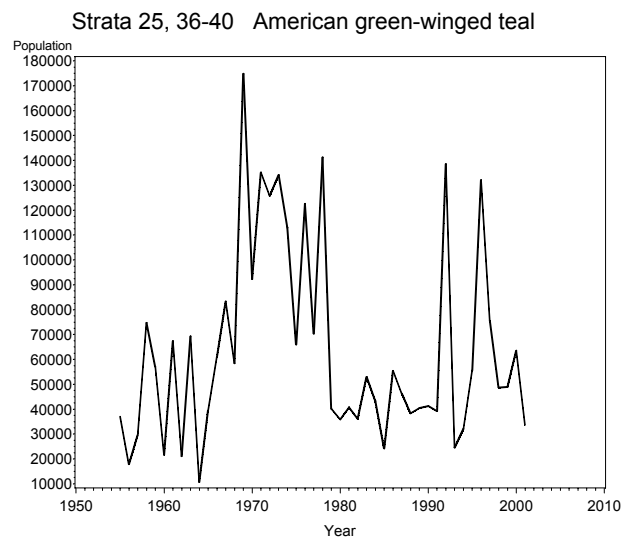
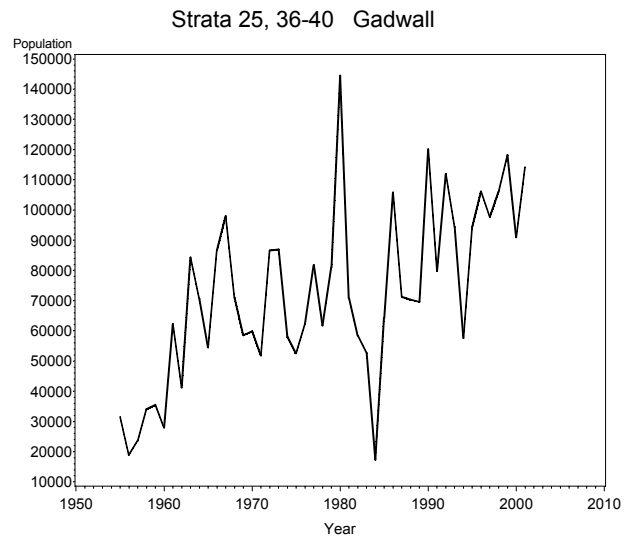
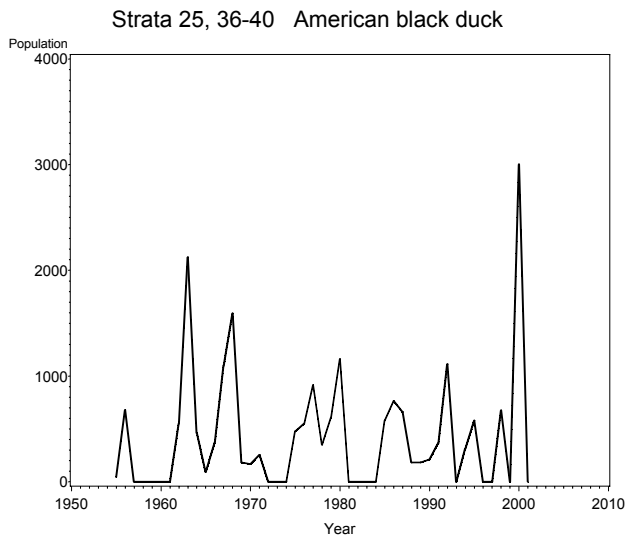
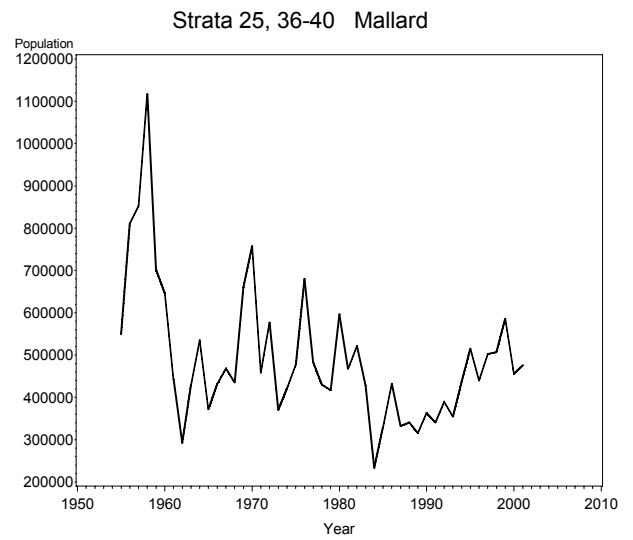
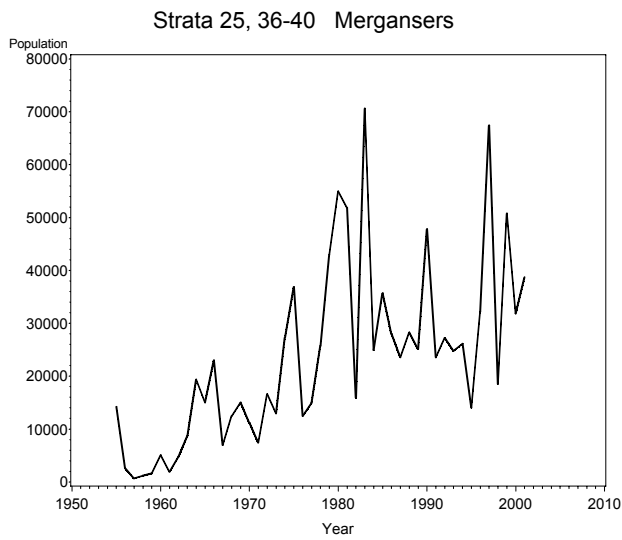
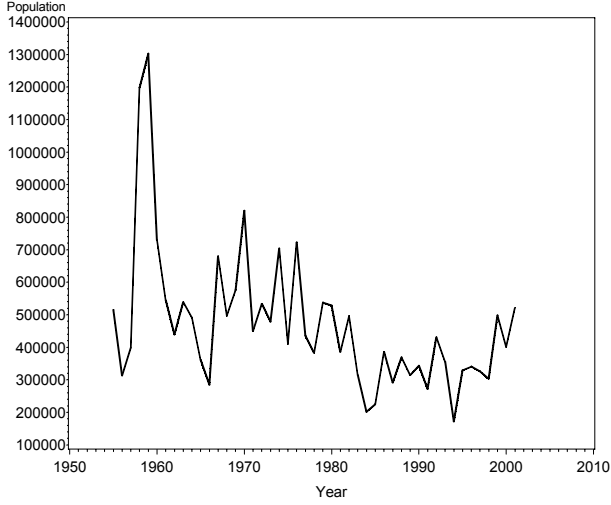
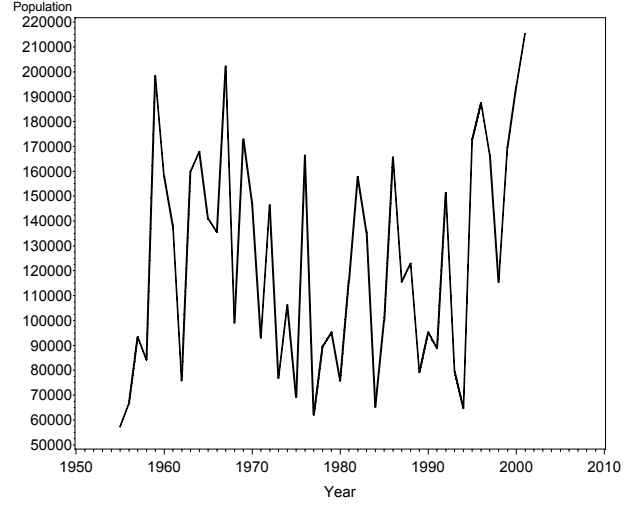


Figure 1. Population indices for the individual waterfowl species and ponds on an annual basis.

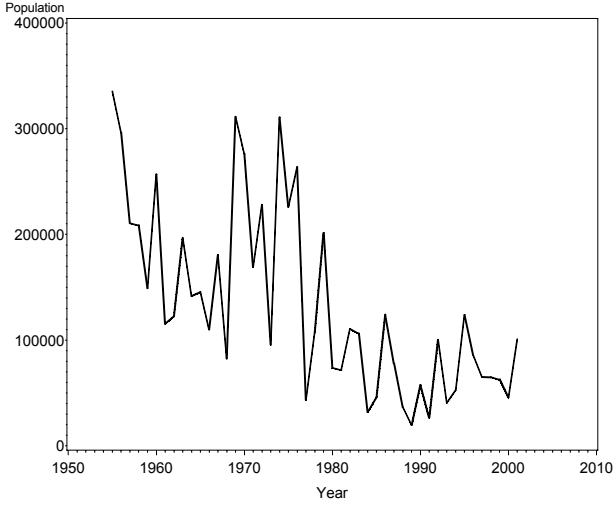
Strata 25, 36-40 Blue-winged teal



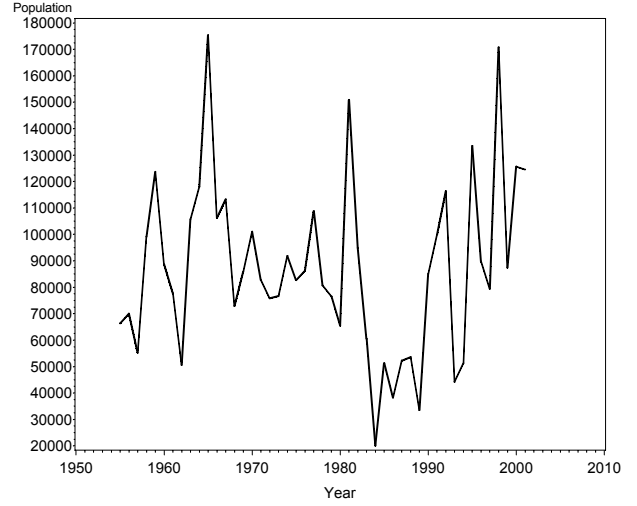
Strata 25, 36-40 Northern shoveler



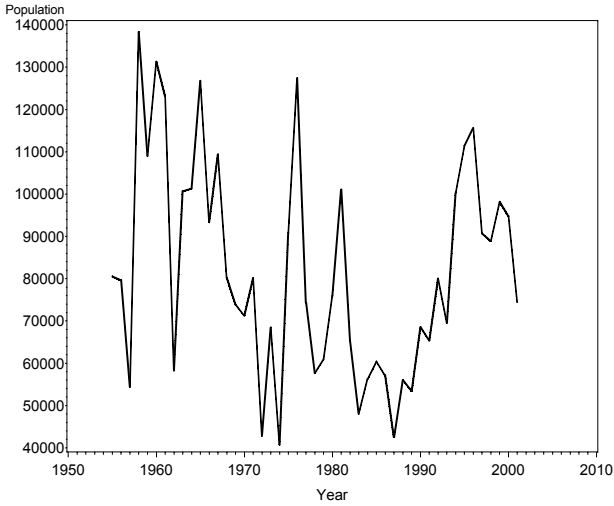
Strata 25, 36-40 Northern pintail



Strata 25, 36-40 Redhead



Strata 25, 36-40 Canvasback



Strata 25, 36-40 Scaups

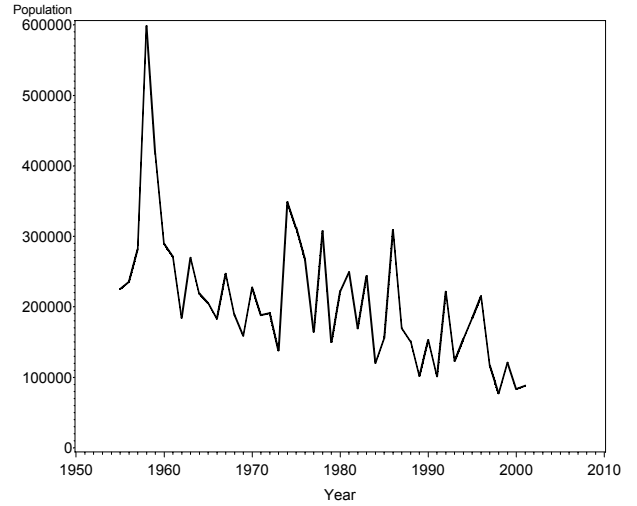


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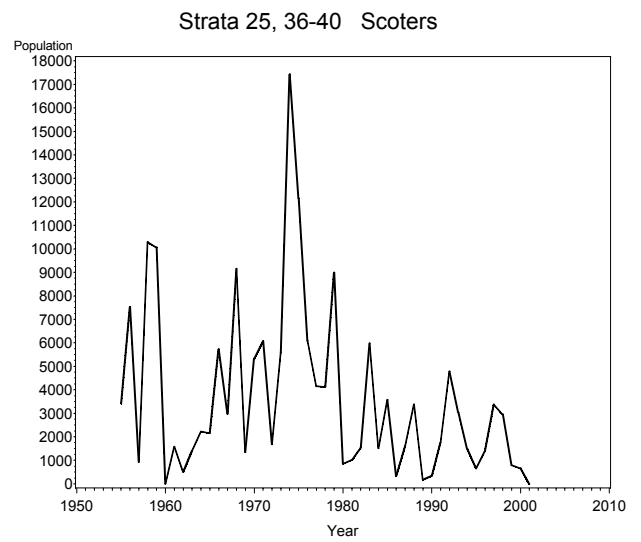
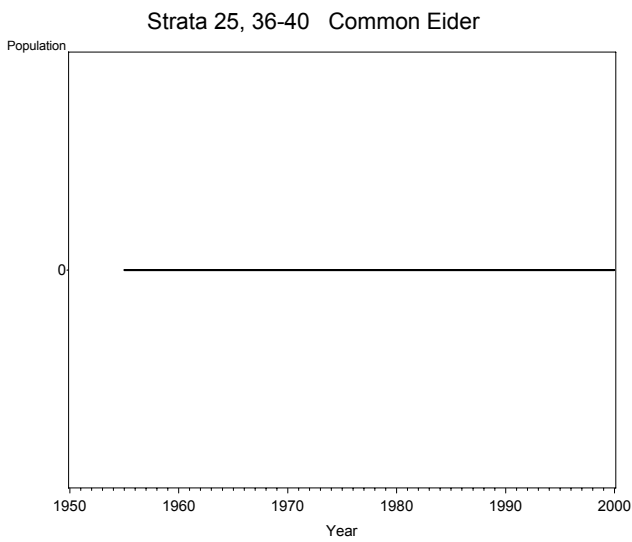
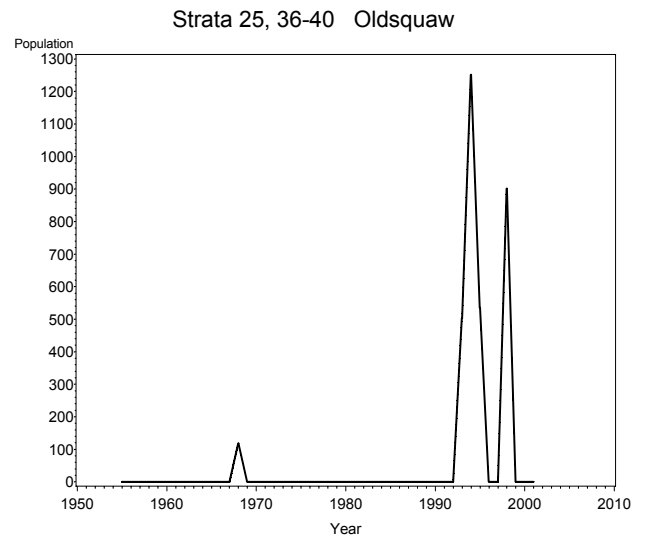
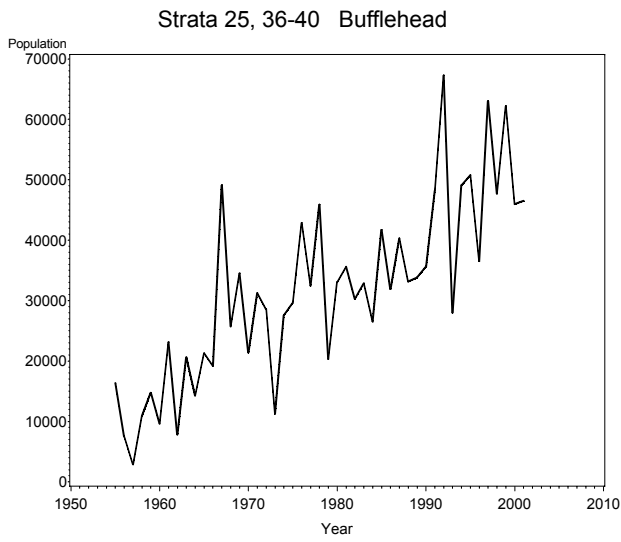
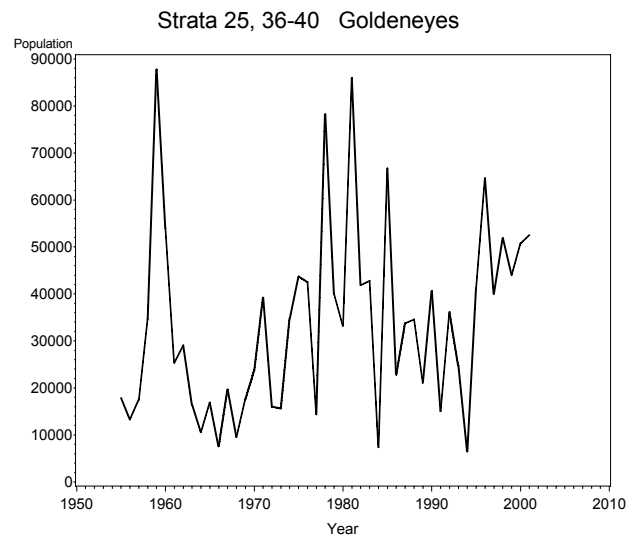
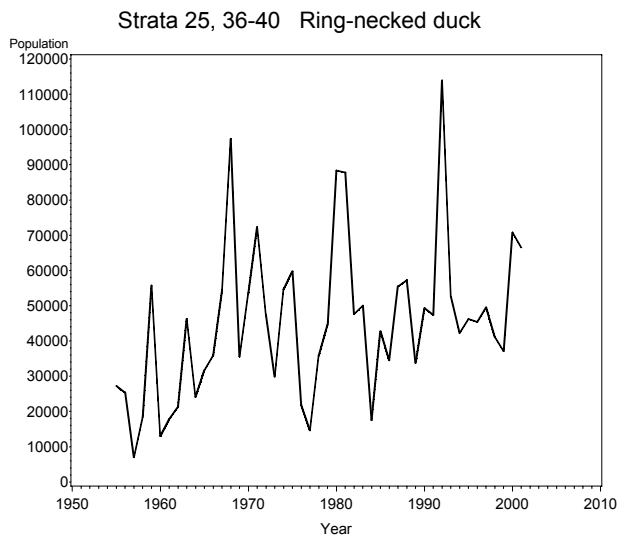


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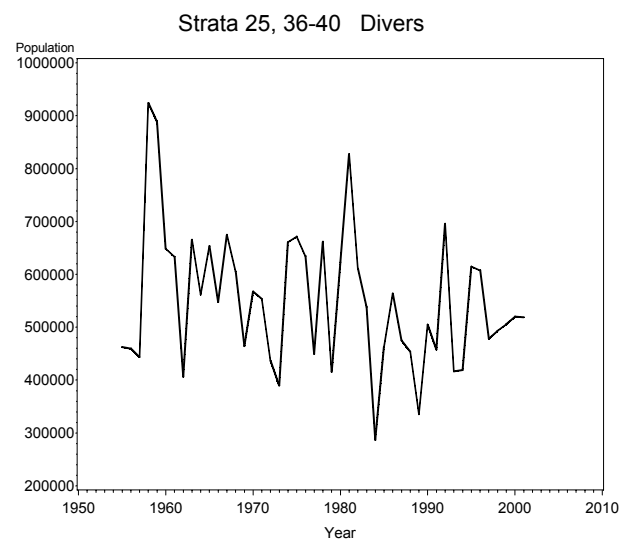
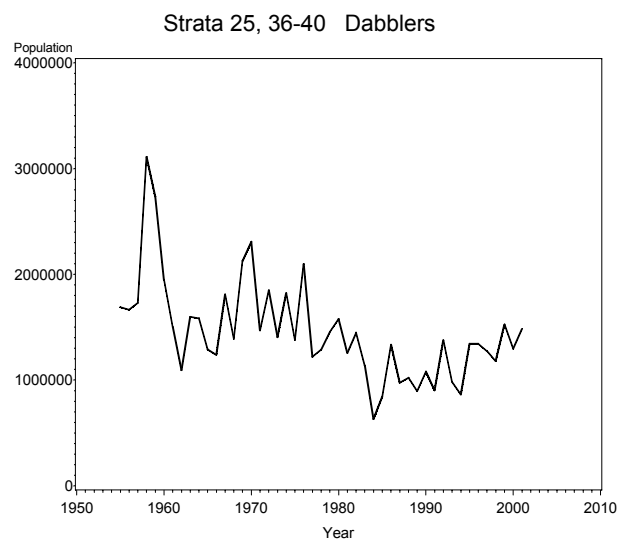
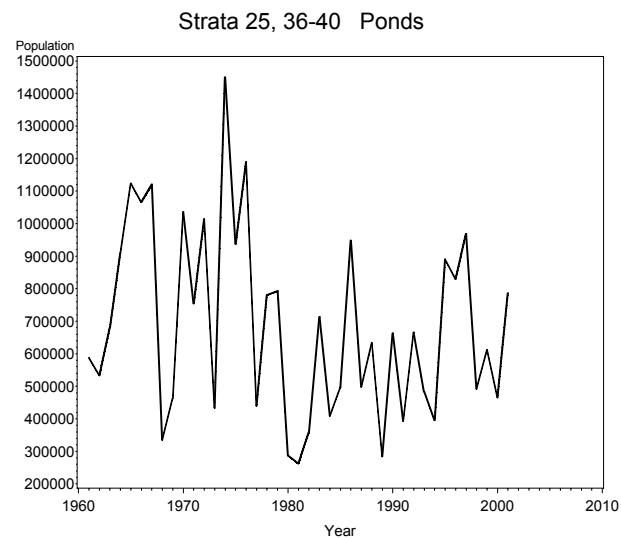
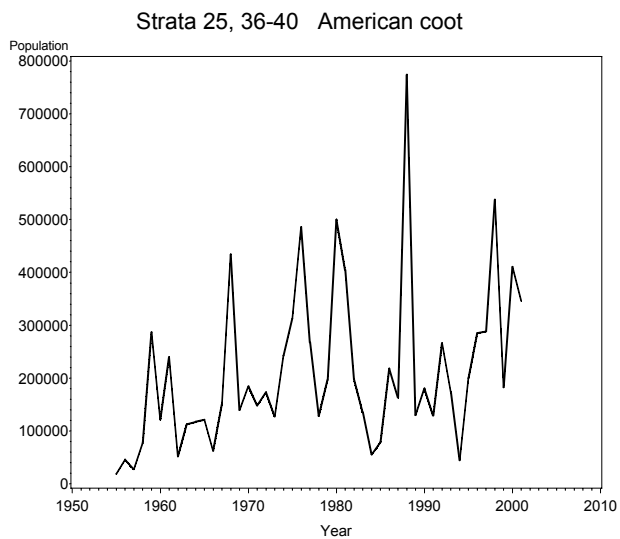
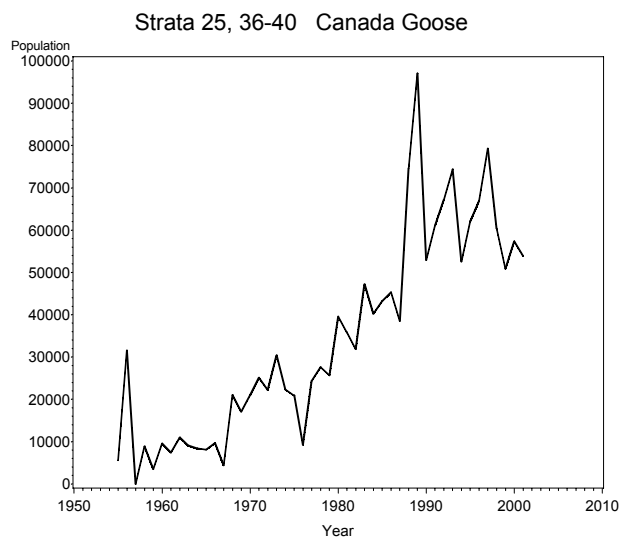
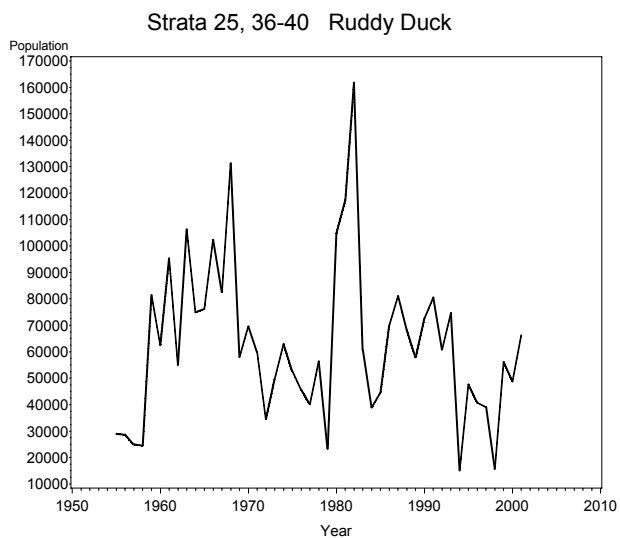


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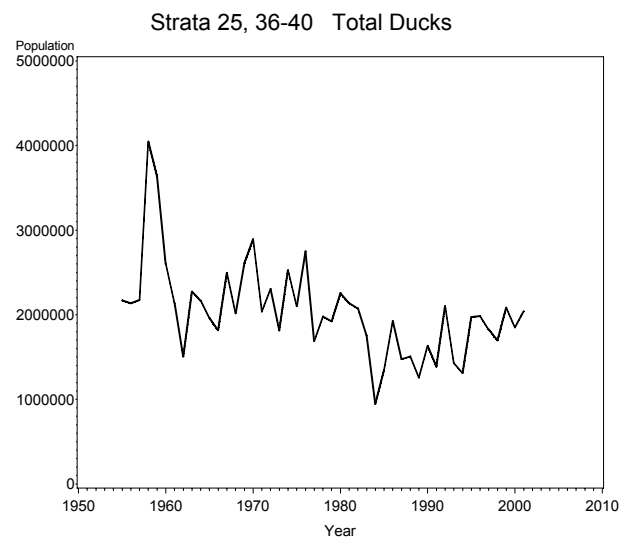
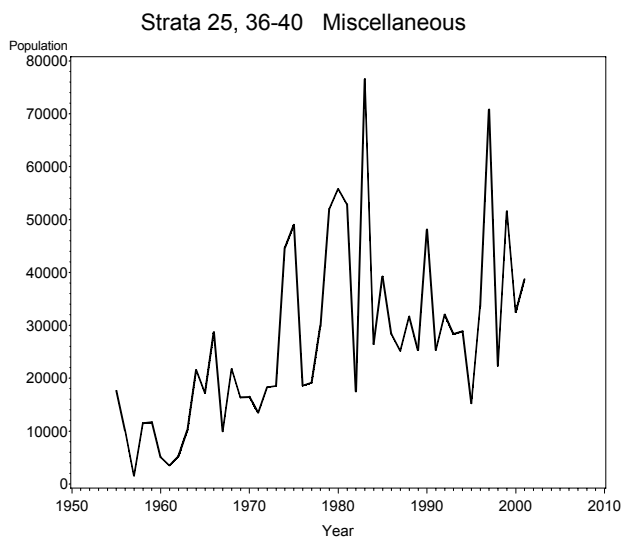


Figure 1 continued.