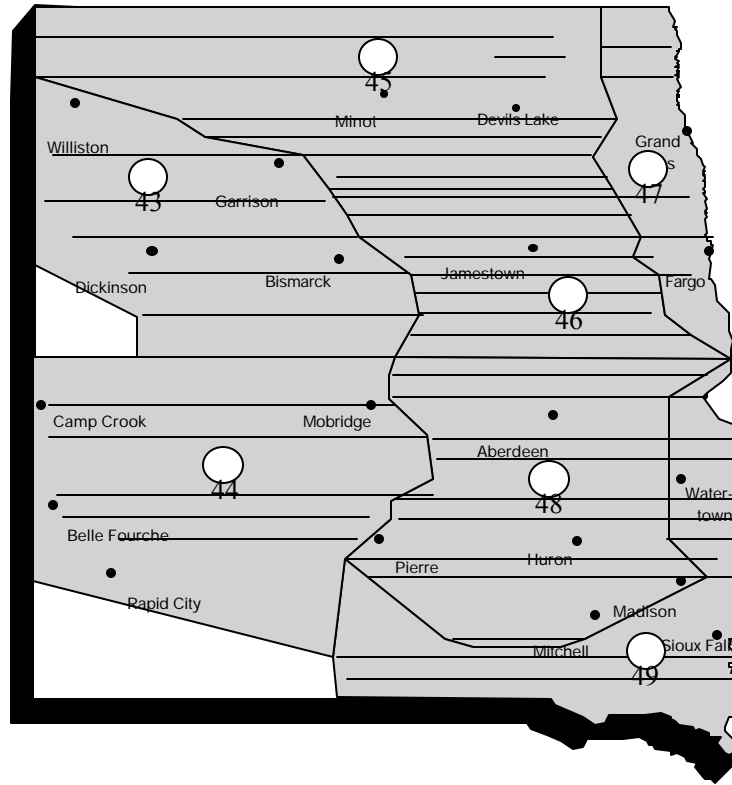


2008

**WATERFOWL BREEDING POPULATION SURVEY  
FOR  
SOUTH DAKOTA AND NORTH DAKOTA**



TITLE: Waterfowl Breeding Population and Habitat Survey for South and North Dakota

STRATA SURVEYED: 44, 48, 49 (South Dakota)  
43, 45, 46, 47 (North Dakota)

DATES: 4 – 8 May 2008 (43 and 44)  
8 - 27 May 2008 (45, 46, 47, 48, and 49)

DATA SUPPLIED BY: United States Fish and Wildlife Service  
California Department of Fish and Game

Strata 45, 46, 47, 48, 49

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Strata 43 and 44

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**ABSTRACT:** The 2008 Waterfowl Breeding Ground and Habitat Survey for Eastern South and North Dakota was conducted 8 - 27 May using standard coverage. Personnel changes in the eastern Dakotas occurred in both air and ground crews. Wetland counts were unchanged compared to 2007 in South Dakota (-8%) and declined significantly (-43%) in North Dakota. Compared to long-term averages, wetland indices were above average in South Dakota (27%) and below the long term mean in North Dakota (-42%). Habitat conditions in the majority of the crew area were poor to fair and generally, have deteriorated since last year. The estimated waterfowl breeding population in South Dakota (3.361 million) was 9% below the 2007 index, near the recent ten-year average (11%), and 54% above the long-term mean. In North Dakota, the waterfowl breeding population (3.769 million) decreased 22% since last year, was below the ten-year average (-25%), and yet was above the long-term mean by 25%. Although waterfowl breeding populations in the crew area remain above long-term levels, due to depressed habitat conditions, generally in North Dakota and the north western half of South Dakota, we anticipate combined waterfowl production to be less this year than in 2007.

Selected information for 2008 is presented below:

#### South Dakota

	2008 Indices (thousands)	Percent Change From		
		2007	1998-2007 mean	1959-2007 mean
Mallard	701.4	-20%	-13%	43%
Gadwall	302.5	-28%	-29%	26%
Blue-winged Teal	1620.0	NC	40%	92%
Northern Pintail	159.7	-41%	NC	-24%
Redhead	37.4	-30%	-13%	-18%
Canvasback	4.5	-48%	-21%	-29%
Total Ducks	3360.6	NC	11%	54%
May Ponds	671.7	NC	NC	27%

#### North Dakota

	2008 Indices (thousands)	Percent Change From		
		2007	1998-2007 mean	1959-2007 mean
Mallard	1010.5	-28%	-22%	54%
Gadwall	642.3	-27%	-19%	61%
Blue-winged Teal	1049.0	NC	-31%	17%
Northern Pintail	147.1	-54%	-46%	-56%
Redhead	135.7	-31%	-30%	NC
Canvasback	21.4	-55%	-42%	-29%
Total Ducks	3768.9	-22%	-25%	25%
May Ponds	430.8	-43%	-51%	-42%

**METHODS:** The procedures followed in conducting the survey are described in the Standard

Operating Procedures for Aerial Breeding Ground and Habitat Surveys in North America, Section III, revised 1987. There were no changes in survey coverage and all transects were flown (Tables 3 and 6).

Personnel changes in 2008 occurred in both the air and ground crews. From the USFWS, Suzanne Beauchaine (R-6) and Kammie Kruse (DMBM) returned in 2008 to assist leader Pam Garrettson with ground operations. Pam, absent from our crew area in 2007 while conducting ground operations in Montana, returned to the east side of the Missouri River to complete this year's ground crew. Terry Liddick, a Flyway Biologist Trainee from Laurel, MD, was a first time participant in the May waterfowl survey. Terry joined our crew in 2008 with experience in aviation, aerial surveys, waterfowl parts collection surveys, and waterfowl banding. This survey season marked Solberg's 23<sup>rd</sup> and his 21<sup>st</sup> in the Eastern Dakotas. All crewmembers participated in pre-survey training/review sessions relating to air and ground procedures.

Visibility Correction Factors (VCF's) in the crew area were calculated using observations collected from 17 air/ground comparison segments. All comparison segments in the crew area are co-located with operational segments. The VCF for wetlands, established by comparison of air and ground observations, was 1.0. Wetland counts and all other data were considered comparable to all years when VCF's were determined.

Aerial sampling was accomplished from a wheeled Cessna 185. The survey required about 70 hours of flight time including training and reconnaissance. Aerial crews continued to utilize on-board computers and the Hodges recording program to capture geo-referenced waterfowl and wetland observations. Surveying commenced 8 May in the eastern Dakotas and was completed on the 27th. Once the survey was initiated, 4 days were forfeited to adverse weather. Information from strata 43 and 44 was collected 4 - 8 May by the Montana survey crew led by Flyway Biologist Ray Bentley. Our appreciation is extended to that crew for their efforts and contributions of data and habitat information from the Western Dakotas.

WEATHER AND HABITAT CONDITIONS: September ended with the U. S. Drought Indicator maps showing South Dakota in average condition across all but the southwest corner of the state. The southwest corner ranged from abnormally dry to severe drought. Temperatures across the state generally averaged above normal from 1 – 7 degrees. The southeast part of the state experienced a few good rain storms at the end of September, contributing nearly 2 inches of rain to that region of the state.

The first week of October saw the region from Pierre to Sioux Falls receive more than 2 inches of rain with many other locations receiving over an inch, while the western half remained fairly dry. Many other locations received over an inch. Much of the western part of the state and locations in the northeast received less than a quarter inch or no precipitation. Temperatures were above average with several stations in the eastern half of the state more than 10° F above average. The US Drought Monitor during the last week increased the area under abnormally dry in the northwest part of the state because of continuing dryness over the last 30 to 60 days.

During the second week, a slow moving area of low pressure produced widespread rainfall for the second weekend in a row across much of the southeast part of the state. Some precipitation

amounts reached over 2 inches for the week at Vermillion and Centerville. Many other locations received well above an inch. Some of these areas were in the southwest part of the state, helping with the continuing moisture issues in these locations.

The third week saw another slow-moving storm system produce rainfall across the entire region. Some locations in the west received only trace amounts but most stations received at least one half of an inch. The heaviest rains were in the southeastern portion of the state and this was the third such storm in as many weeks. The month of October provided more than 4 inches of precipitation in an area east of the Missouri River and south of highway 34. Another band with amounts from 3 to 4 inches surrounds this area. These totals are 2 to 4 times above average for the month. Temperatures remained warmer-than-average.

After several weeks of rainfall throughout much of October, conditions improved significantly, according to the State Climate Office of South Dakota. The previous week produced very light rain in a few places over the eastern quarter of the state. Places that did receive rain received precipitation totals below a quarter inch. The month closed with the drought monitor showing only a small area in the extreme southwest experiencing extreme drought and most of the state moving from severe to moderate drought. The extreme southeast corner of the state was showing normal.

Despite the recent dryness, October overall resulted in 150 to 300 percent of average precipitation over an area south of US Highway 12 and east of a Gettysburg to Martin line. Much of the state outside of this area was below average for the month of October. At least two stations (Centerville and Yankton) unofficially have set record October precipitation totals. Temperatures were 1° to 5° F above average for the month.

November began with only a few light showers north and east of the Black Hills and in the Aberdeen area. Reported totals were less than 0.2 of an inch. Temperatures were above-average. The far western part of the state experienced some light snow during the weekend. The most precipitation reported was Newell's 0.08 of an inch, while nearly all locations remained dry. All locations were above average in temperature for the week, ranging from a few degrees above average in the east to ten degrees above in the far west. The northwest part of the state continues to be the driest location, as deviations from average precipitation since October 1 have reached over an inch in Timber Lake, Bison, and Faith.

The third week brought of more of the same, limited precipitation and warmer temperatures ruled the state. A handful of stations reported very light precipitation for the week. The highest total was Spearfish, at 0.13 of an inch. More than half of the stations recorded no precipitation. After a wet period in September and early October, precipitation has been very limited. Temperatures for the week were well above average throughout South Dakota, ranging from 7° to 14° F above average for the week.

The string of warmer weeks ended for the northwestern area and Black Hills as weekly average temperatures fell below average for the first time since October. The week was as much as three degrees below average in Spearfish and Custer. Some of this same area did receive a little snow for the week, accompanying the colder conditions. Spearfish, Custer, Buffalo and Bison recorded over a 0.1 of an inch of liquid mostly in the form of snow. The rest of the state continued to be

warmer than average, overall, with stations in the northeast the warmest, at 4° to 6° F above average. Isolate, light precipitation amounts were reported in a few other places across the state, all less than 0.1 of an inch.

In December snowfall and temperature conditions were intricately linked. Parts of the southwest and most of the eastern third of the state received snowfall during the month. Snow cover remained over most of these areas except for some locations along the boundary with Minnesota and some of the locations west of the river where snow cover was marginal. The areas that retained snow cover through most of the month had below average temperatures for the period. Locations in western and south central South Dakota lacking snow cover experienced near to above average temperatures. The wettest area was in the far southeast from Yankton to Sioux Falls, where several storms deposited well over an inch of liquid equivalent. By months end, the drought monitor indicated the western half of the state in moderate to severe drought while the eastern half was normal to abnormally dry. The southeast corner is still indicating normal soil moisture.

January was a month of extremes in temperature across the state. All of the state experienced very cold temperatures for several days with the majority of the state dipping below -10° F and many areas dropping below -20° F. In contrast, much of the state also experienced temperatures above 50° F. Average temperatures during January were within 2° F of normal overall, with the eastern quarter and areas in and adjacent to the Black Hills below average. Remaining areas in the state were above average. Snow cover was similar to December with heaviest coverage in the east, far west, and some along the southern border with Nebraska. Overall precipitation totals were relatively modest, but a few locations reported more than half of an inch for the month. While above average for January, this light moisture will do little to change ongoing drought conditions. The drought monitor showed the eastern half of the state remaining the same as December while the western half of the state moved to mostly severe drought. Two counties in the north central region moved to extreme drought.

Lack of precipitation and cold temperatures were the two big stories for February over most of the state. Several cold air masses traversed the region during February bringing all locations well below zero. Temperatures fell into the -20s °F northeast of a line from Roscoe to Madison at the most extreme. These cold air masses held temperatures for the month well below average over the entire state with the most extreme being 9° -10° F below average in the far southeast. Temperatures were less extreme in the west, with parts of the far southwest from Philip toward Oral actually slightly above average for the month. Remaining snow cover in the far northeast counties and Sioux Falls and surrounding areas was also eroding quickly. While all stations received precipitation during the month, nearly all the state was below average precipitation. The only locations above average were the northern Black Hills, a few stations in the northwest, and locations in the southeast along the Missouri River. This pattern has been the case throughout most of the winter over most of the state. The lack of snowfall will equate to lack of surface water this spring. In much of the southeast quarter of the state, this should not be an issue as fall precipitation recharged the soil moisture.

Late March offered two beneficial storms that hit the northeast and central to east central parts of the state. While most of the state received at least a half inch of liquid precipitation during March, monthly totals received were well below average. Exceptions were along U.S. Highway

12 from Edmunds County eastward and a couple other isolated stations. The southeast received less than 50% of average precipitation for the month. An area from north central to northwest South Dakota received less than 25% of average precipitation. Since October 1 the only areas above average precipitation are in the southeastern quarter of the state. Much of the rest of the state is 1 to 2 inches or more below average during the same time period.

Temperatures for the month were split down the middle of the state. East of an Ipswich to Lake Andes line, temperatures were below average. Some places, generally in eastern South Dakota, were more than 4°F below average for the month. Generally, areas west of the line were above average. The northwest part of the state was the warmest compared to average at 2 to 4°F above average.

Early April provided another major winter storm which focused primarily on the northern third of the state. Several locations reported over 10 inches of snowfall from this storm. This first week provided the state's first 70° F temperatures of the season but overall, temperatures for the week were below average. Moisture conditions, according to the US Drought Monitor, as a result of these recent winter storm events. The most period map indicated a reduced area of abnormally dry over parts of central to east central South Dakota and a slight reduction in the moderate drought area in Edmunds and Brown Counties.

Mid-April saw the fifth major winter storm in the last month drop heavy snow mainly in the northeast and south central parts of the state and around the Black Hills. Stations in each of these areas reported over ten inches of snow. Nearly all of the state received at least a third of an inch of precipitation with several stations reporting over an inch of liquid in combinations of rain and snow. Some wetter areas in the east are reporting standing water in some fields. Temperatures for the week were well below average, ranging from two to thirteen degrees below average. The storms have improved the short term moisture deficits listed in the most recent drought monitor map. Longer term deficits still remain in the drier areas of the west where more severe drought designations remain.

Little precipitation occurred during the third week across the state. A large portion of south central to northeast South Dakota received no precipitation during the week. Nearly the whole state is below average precipitation for April. Longer term deficits continue throughout much of the western part of the state, particularly the northwest, where deficits range to over two inches since October 1. Another spring snow storm hit much of the eastern third of the state at the end of the month. Most of the storm area received at least a few inches of snowfall. A swath of heavier snow extended from Charles Mix County to the northeast corner of the state with more than a foot of wet snow deposited in the core of this area. This storm established many daily and monthly records for total snow and lateness of major snow accumulation. As is usual with late spring storms, the snow cover quickly disappeared. Overall temperatures ended the week at 3° to 12°F below average. Most of the state received some precipitation, but outside the major snow area, precipitation totals were light: generally less than 0.5". This, again, left the very dry western areas with little relief from drought conditions.

May began wet with a major winter storm hitting the western part of the state. The snow was confined to an area generally southwest of a Buffalo to Martin line. Snow reports of three to four feet were recorded in and north of the Black Hills. Amounts over a foot were more

widespread. Areas east of the snow received significant amounts of rainfall in most places west of the river. Widespread amounts of one to two inches fell in some places in the north central to northwest parts of the state. Timber Lake had the largest amount reported, at 3.55 inches, for the first week of the month. Areas of the southeast part of the state also received rainfall amounts over an inch. Temperatures ran much colder than average again ranging from 2 to 10 degrees F below average for the week.

Another spring storm brought more significant rainfall across portions of the state. Little precipitation fell as snow with this storm, but several locations received over 2 inches of precipitation during the week. East central South Dakota and areas north of the Black Hills received the heaviest precipitation. The areas of lightest precipitation were along the North Dakota and Nebraska borders. Temperatures were well below average again for the week, ranging from 1 to 7°F below average. Some severe weather occurred in the southeast part of the state following along the Nebraska border on Tuesday, May 6. Temperatures also fell well below freezing in the north central, central, and western parts of the state on Sunday morning. Some stations reached the mid 20s for lows.

South Dakota experienced a very quiet weather the third week with no severe weather and generally very light rainfall. Most of the state received less than a third of an inch of precipitation. The most precipitation was reported in the northern Black Hills in the Spearfish-Lead-Sturgis area, which received around 0.75 inch for the week. While temperatures were warmer, they continued to lag behind average.

South Dakota witnessed severe weather the last week that also brought heavy rain in several parts of the state. Rapid City recorded over 4 inches of rain and several locations in the southwest and northwest accumulated over 2 inches. While many parts of the state accumulated 1 inch of precipitation or more, the southeast region received less than 0.25 inch and Webster, in the north east, only 0.03 inch. Many west river locations, with below-average accumulation since April, saw improvement from the precipitation last week. The southeast corner of the state continued to be more than 1.5 inch below average precipitation since April. Temperatures continued to be up to 5° F below average. Overnight low temperatures in Redfield, Watertown and Aberdeen were below freezing.

**SOUTH DAKOTA:** (St. 44: 4 – 6 May, St. 48, 49: 8 -16 May)

State wide, wetland counts in South Dakota decreased slightly (8%) since 2007. The 2008 index (671,700) is similar to the ten-year average (10%) and is 27% above the long-term average (Table 2). Although pond counts in stratum 44 and 49 increased since last year, the magnitude of decrease in stratum 48 was enough to off-set increases from the other two strata. Cooler than normal temperatures in the latter part of April and early May, retarded vegetation development, probably improved visibility around wetlands, and delayed the start of surveying for a day or two.

Stratum 44 – Wetland counts in west river South Dakota increased 37% since last year, 22% compared to the 10-year and 13% compared to the long term mean. An early May storm, which deposited up to 3 feet of snow in localized areas of western portions, filled most basins with



runoff and will have a positive affect on vegetation development. . Although variable throughout the stratum, overall habitat conditions were rated by the Montana crew as fair.

Stratum 48 – Wetland counts decreased significantly (38%) in Stratum 48 since 2007. The majority of the stratum was considered fair or poor with only a small portion of the extreme south eastern part rated as good. Winter/spring storm tracks provided limited benefit to the south eastern half of the stratum but did nothing to improve conditions in the north western half. Unfortunately, areas offering the best nesting cover in the stratum (e.g., Leola Hills northwest of Aberdeen) occur in this very dry region and subsequently, will not produce ducklings to full potential. The dry conditions throughout much of this stratum will continue to encourage destruction of cover by tilling through basins. Stratum 48 was the only area of the state posting wetland counts below the ten year average (-21%) yet remained equal to the long term mean.

Stratum 49 – In Stratum 49, the wetland index increased 24% since last year. Numerous beneficial winter and spring storms tracked along the South Dakota/Nebraska border causing vast improvements in wetland conditions in this area. Also benefitting from precipitation was the extreme eastern edge of the state, east of the prairie coteau on the Sioux drift. Here, particularly from mid-state north to the North Dakota border, we observed the only significant amounts of temporary/seasonal/sheetwater in the entire survey unit. Stratum 49 probably offered the only overall improvement in wetland conditions in our crew area and the 2008 index was above both the ten year (57%) and long term (94%) averages. We considered habitat conditions overall, fair to good in this stratum.

According to the U. S. Drought Monitor, North Dakota ended with September indicating above normal in temperature and the half of the state running from the southwest to the northeast corner indicating drought ranging from abnormally dry to moderate drought.

October began with the first week showing above normal temperatures but the rest of the month, temperatures were indicating closer to normal. There were several rain showers scattered throughout the state during the month, but no significant rain events or storms were recorded anywhere in the state. The U. S. Drought indicator maps showed most of the state exhibiting some degree of drought. A portion of the north central region indicated severe drought. Most of the remainder of the western half of the state was considered as moderate drought with the northeast corner of the state indicating abnormally dry. The southeast corner of the state indicated near normal.

November was again dry with a few scattered rain and light snow showers appearing scattered around the state. Temperatures for the month were again mostly above normal. There were no significant rain or snow events recorded anywhere in the state. The U. S. Drought Indicator maps showed the western half of the state in moderate to severe drought and now most of the eastern half of the state indicating abnormally dry. A few counties in the southeastern part of the state had soil moisture levels near normal.

December and early January had above to near normal temperatures, but received below normal precipitation. This was particularly the case for the western half of the state. December started off cold with temperatures around -20 in the northern regions. Two major storm systems moved through the state, the first one occurring on December 4. It brought significant snowfall to the

eastern half of the state, with the eastern central region benefitting most (up to 9 inches). The western half of the state saw little or no precipitation from this storm system. The second storm, on December 21, brought mixed precipitation to the south central regions of the state. Amounts were not as significant as December 4, but delivered needed precipitation to the southern regions of the state. Moderate to severe drought conditions were still present in the western half of the state where little precipitation fell during December.

January offered near normal temperatures but below normal precipitation. The month began with above normal temperatures for the first three weeks, but dropped to below normal the last week of the month due to an arctic blast. Resulting from this "cold snap," -20 to -30 degree temperatures settled into the state. Generally, only minor storms occurred during the remainder of the month, none producing more than a couple of inches of snow. Although small amounts, these systems still brought much needed precipitation, especially to the western half of the state. Most of the precipitation in January occurred in the western and central regions of the state but moderate to severe drought conditions persisted in the west.

February had below normal temperatures, but near normal precipitation due mainly to two major storm systems which passed through. The month started colder than normal with light precipitation falling in central and eastern regions. The second week brought a major system on February 9-10 that included snow and severe blowing snow conditions. The central and eastern regions of the state received most of the precipitation from this storm. Another system gave most of the state precipitation and blowing snow on February 13. The third week was fairly dry with below normal temperatures throughout the state. The final week of February ended with near normal temperatures and only light precipitation falling mainly in the northern regions of the state. Moderate to severe drought conditions remained in the western half.

March provided near normal temperatures in the western half of the state and below normal temperatures occurring in the eastern half. March precipitation was below normal statewide with the central region receiving the least amounts. March began with temperatures in the negative teens and twenties nearly statewide and ended with highs in the 40s to 60s which melted most of winter's accumulation of snow and ice. The most significant March storms occurred on 21- 22 and March 29. The system on March 21-22 brought moisture to the southern and eastern regions of the state, and the storm on March 29 brought a wintry mix to the western half of the state. Moderate to severe drought conditions were still present in the eastern half of the state.

The first week of April brought the western side of the state cooler than normal temperatures while the eastern side had warmer than normal temperatures. April began with a weather system delivering precipitation and high temperatures in the 30s to lower 40s, to the southwest part of the state. Isolated showers fell in the central and eastern regions of North Dakota. The first week ended with a narrow system stalled in the southeastern and south central region, which deposited three to five inches of snow to areas affected by the storm. Temperatures during the second week were below normal except in the northern part of the state where near normal temperatures occurred. A storm system moved through the state bringing precipitation statewide. Scattered showers moved mainly through the southern part of the state. During the third week, normal temperatures arrived to the state. Some light scattered showers moved through the southern and western portions along with high temperatures in the upper 60s to lower 80s. The state cooled by mid-week offering highs in the 50s to lower 60s and some

scattered showers in the eastern half and southwest corner of the state. Later in the week, a system of showers and thunderstorms moved through the central region. April ended with below normal temperatures and most areas received at least some precipitation (including 9 inches of snow at Fargo). For the month, April finished cooler and drier than normal. Moisture levels placed the western third of the state in extreme drought, the central third in severe to moderate drought and the eastern third in moderate drought to abnormally dry at the end of April. Only the extreme southeast corner of the state had experienced normal precipitation.

The first week of May was relatively dry and cooler than normal for most areas of the state. The second week of May was fairly wet for most areas, especially the western half of the state. Temperatures remained below normal temperature. During the third week, temperatures warmed and reached normal to above normal levels. Light scattered showers occurred over much of the state during the week with temperatures running in the 50s to the 70s. May ended averaging below normal in both the precipitation and temperature departments. The Drought Index revealed the western third of the state continuing in extreme drought and the middle third of the state ongoing in moderate to severe drought. Meanwhile, the eastern third of the state is now mostly moved from abnormally dry to moderate drought. Again, all but the extreme southeast portion of the state is experiencing some form of drought.

NORTH DAKOTA (St. 43: 6 - 8 May, St. 45, 46, 47: 17 - 27 May)

In North Dakota, the 2008 wetland total is 430,800. The 2008 index falls well short of last year's figure (-43%), the ten-year mean (-51%), and the long-term average (-42%). In North Dakota, wetland indices were below all time comparisons in all strata (Table 5).

Stratum 43 – Water counts in Stratum 43 decreased 37% compared to 2007, were 31% below the ten-year mean and 24% below the long-term average. Conditions in early May were classified by PDI ranking as severe drought and were reported overall by the west river survey crew as “somewhat dismal.”

Stratum 45 – The wetland index in Stratum 45 decreased 45% since last year and was below the ten-year average (-60%) and the long-term average (-53%). One small triangle in the eastern portion of the stratum (Langdon, Tolna, Devils Lake) was considered fair with the remainder of the stratum being poor. The disappearance of about 150,000 wetlands since last year has provided ample opportunity to till through wetland basins. This was most prevalent on the drift plain. Here, evidence of drought persisted and essentially all temporary and seasonal basins were dry. Many of the semi-permanent and permanent basins were in advanced stages of recession. Again this year the Missouri Coteau, where supplies of upland cover are better than those on the drift, offered wetlands in depressed conditions.

Stratum 46 – As in stratum 45, wetland counts in stratum 46 decreased 44% (110,000 wetlands) since 2007. The 2008 index was below the ten-year average (-44%) and the long-term mean (-31%) as well. An extension of the narrow sliver of fair/good habitat conditions from South Dakota occurred in the extreme south eastern portion of the stratum. We also classed that portion of the Missouri Coteau which occurs in stratum 46 as fair, which may have been generous. The remainder of the stratum was in poor condition for breeding waterfowl.

Stratum 47 – Wetland counts in Stratum 47 in 2008 decreased 52% since last year. The 2008 index was well below the ten-year average (-55%) and the long-term average (-40%). Conditions in the southern 1/5 of this stratum were considered fair. Luckily, this portion of 47 probably has the best nesting cover in the stratum and was influenced by the same weather patterns as was northeastern South Dakota and extreme south eastern stratum 46 in North Dakota. The paucity of wetland basins, moisture, and available nesting cover in the remainder of the stratum earned a habitat rating of poor.

BREEDING POPULATION ESTIMATES: The 2008 total breeding waterfowl estimate for South Dakota was 3.361 million birds. The estimate was unchanged compared to last year (-9%), near the ten-year mean (11%), and 54% above the long-term average (Table 1).

Dabbling ducks exhibited a trend nearly identical to total ducks with the 2008 slightly below last year (-11%), similar to the ten-year average (10%), and 55% above the long-term mean. Mallards fell compared to last year (-20%) and the ten-year average (-13%) but remained 43% above the long-term average. Northern pintails were unchanged compared to the ten-year average (-3%) but lagged behind the 2007 index (-41%) and the long-term mean (-24%). Blue-winged teal and northern shovelers were recorded at levels similar to last year and both species remained above ten-year and long-term time periods. Gadwall and green-winged teal posted similar declines compared to 2007 (-28%).

The total estimate for diving ducks in 2008 increased 53% since last year and was primarily a function of the Ruddy Duck index. Although not a primary breeding area for scaup, the 2008 index increased since last year (15%) but remained below the ten-year (-40%) and long-term (-38%) averages.

The 2008 breeding population estimate for American coot increased since last year (33%), the ten-year average (102%), and the long-term average (+119%). The Canada goose estimate decreased compared to last year (-31%) and the ten-year average (-20%) but remained well above the long term mean (+148%).

In North Dakota, the 2008 total breeding population estimate was 3.769 million birds. The 2008 estimate was 22% below the 2007 level, 25% lower than the ten-year average, and 25% above the long term mean (Table 4).

Dabbling duck estimates for North Dakota in 2008 were -22%, -25%, and +25% compared to last year, the ten-year mean, and long-term mean. Mallards decreased compared to last year (28%) and the ten-year average (-22%), but were well above (53%) the long-term average. Northern pintails decreased in comparison to all three time periods (-53%, -46%, -56%).

North Dakota diving ducks decreased 20% since 2007. Only Ruddy ducks increased since last year (30%). Most divers were below their respective ten-year averages (exceptions: Goldeneye's and Ruddy Ducks). All diving duck species equaled or exceeded their long-term averages except Canvasback (-29%) and Ring-necked Ducks (-24%). Scaup in North Dakota were 35% below the 2007 figure, 30% below the ten-year average, but 32% above the long-term average.

American coots rebounded 80% since last year but remained below the ten-year (-28%) and

long-term (-19%) averages. Canada geese in 2008 were below last year's index (-31%) but above their ten-year (36%) and long-term average (440%).

**CONCLUSIONS:** Below average temperatures in April and early May caused minor delays in the activities of breeding waterfowl in 2008. Following reconnaissance flights, we opted not to initiate our survey operations until 8 May in eastern South Dakota. At this time, drake:pair ratios of early nesting mallards and pintails were acceptable and all species were present. Other than a few isolated cases (e.g. Lake Andes area in South Dakota and localized portions of the Missouri Coteau in northern North Dakota), breeding waterfowl were well distributed and seemly settled on available wetlands. Visibility correction factors, determined on the air/ground comparison segments, may have been somewhat low this year resulting from the lack of obstructing vegetation and the condition of recession that we commonly encountered in those basins containing water. Overall, we feel that our survey timing was acceptable.

Wetland counts have been discussed earlier in the text. The brightest spot in the crew area in 2008 was Stratum 49 in South Dakota. Winter/spring precipitation, along with residual upland/basin cover in the areas of the Prairie Coteau and west of the Missouri River, have this region in fair to good shape overall. Generally though, most of the glacial drift plain in the remainder of the crew area was void of temporary and seasonal water and in poor condition. Some dugouts and semi-permanent basins were dry. The majority of dugouts, semi-permanent and permanent basins with water were in various stages of recession and offered less than optimal quality nesting habitat. The dry conditions, coupled with high commodity prices, are encouraging the tilling/planting of many of these basins and the conversion of surrounding grasslands to crop. Add to this scenario, the loss of roughly 500,000 acres of CRP since 2007 and the attractiveness of the area to nesting waterfowl diminishes further. We believe that at least one response to the dry conditions was an overflight of birds in search of higher quality nesting habitat. The coot index compared to 2007, particularly in North Dakota, is somewhat puzzling. In South Dakota, a portion of the coot figure might be explained by the relatively better conditions again, in Stratum 49. More likely though, and as we think was the case for Ruddy Ducks this year, we probably encountered some of those birds in the process of migrating.

Total waterfowl breeding populations were similar to (SD -9%) or decreased (ND -22%) compared to last year. Mallards fell in both states compared to last year and ten-year levels but remain well above long-term averages. Numerous species from both states recorded levels below long-term averages in 2008. Although strong breeding populations have developed in the Dakotas over the past ten to fifteen years, dry conditions and pressures to convert wetlands and grass to crop acres may quickly change the propensity to nest here. For this year, considering only poor to fair conditions over much of the drift plain, nest success and brood survival will certainly decrease. Additionally, with wetland counts near or significantly below 2007 levels and a similar trend for total breeding waterfowl, we predict waterfowl production to be less from the Dakotas this year than in 2007.

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July 2008

Table 1: Status of waterfowl population estimates (thousands, adjusted for visibility bias), by species and stratum with comparison for the previous year, the previous 10-year mean, and the long-term mean for South Dakota.

Species/Ponds	Stratum 2008										% Change From			
	44	48	49	2008	2007	10-Year	Long-term	2007	10-Year	Long-term	2007	10-Year	Long-term	
	Total	Total	Total	Total	Total	Mean	Mean	Total	Mean	Mean	Total	Mean	Mean	
<b>Ducks</b>														
Dabblers														
Mallard	82.5	385.5	233.4	701.4	882.5	808.2	491.6	-20.5	-13.2	42.7				
American Black Duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	--	-100.0				
Gadwall	42.6	203.3	56.6	302.5	419.1	428.6	239.2	-27.8	-29.4	26.4				
American wigeon	22.5	4.9	0.8	28.2	41.3	45.2	39.0	-31.7	-37.6	-27.7				
Green-winged teal	18.8	0.0	0.0	18.8	26.0	38.2	29.9	-27.8	-50.7	-37.2				
Blue-winged teal	75.5	884.1	660.4	1620.0	1614.5	1158.8	843.5	0.3	39.8	92.1				
Northern shoveler	29.8	191.4	111.2	332.4	303.1	224.3	187.6	9.7	48.2	77.1				
Northern pintail	11.3	114.0	34.4	159.7	268.7	165.0	209.8	-40.6	-3.2	-23.9				
Subtotal	283.0	1783.3	1096.8	3163.1	3555.2	2868.2	2040.8	-11.0	10.3	55.0				
<b>Divers</b>														
Redhead	0.0	28.4	9.0	37.4	53.4	42.8	45.8	-30.0	-12.6	-18.4				
Canvasback	0.5	2.5	1.5	4.5	8.6	5.8	6.3	-47.6	-21.2	-28.6				
Scaups	0.4	16.6	9.4	26.4	22.9	44.2	42.4	14.9	-40.4	-37.9				
Ring-necked duck	0.4	1.3	0.6	2.3	2.9	9.5	8.0	-19.2	-75.4	-71.0				
Goldeneye's	0.0	0.0	0.0	0.0	0.0	0.0	0.3	--	--	-100.0				
Bufflehead	0.6	2.2	0.4	3.3	0.8	1.0	1.5	288.2	220.0	125.2				
Ruddy Duck	0.0	89.0	34.6	123.6	40.2	42.6	31.6	207.1	189.9	290.6				
Subtotal	1.9	140.1	55.5	197.5	129.0	145.9	136.0	53.2	35.3	45.2				
<b>Miscellaneous</b>														
Mergansers	0.0	0.0	0.0	0.0	0.0	1.8	1.5	--	-100.0	-100.0				
Long-tailed duck	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	--	--	--				
Scoters	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	--	-100.0				
Subtotal	0.0	0.0	0.0	0.0	0.0	1.8	1.5	--	-100.0	-100.0				
Total Ducks	284.9	1923.4	1152.3	3360.6	3684.1	3016.0	2178.4	-8.8	11.4	54.3				
Canada Goose	15.4	57.5	26.9	99.8	144.9	124.8	40.2	-31.1	-20.1	148.0				
American coot	26.2	176.6	214.8	417.5	312.9	206.5	190.9	33.4	102.1	118.8				
Ponds	167.5	245.0	259.2	671.7	726.5	613.4	529.8	-7.5	9.5	26.8				

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 South Dakota. Estimates Prior to 1974 were not adjusted for visibility bias, if applicable.

Year	Stratum 2008			Total
	44	48	49	
1961	33.1	48.1	34.2	115.4
1962	69.5	152.3	95.7	317.4
1963	80.2	133.9	100.7	314.7
1964	62.0	185.3	132.7	380.0
1965	84.5	196.6	103.9	385.0
1966	94.5	151.4	84.0	329.9
1967	90.2	200.5	100.7	391.4
1968	71.8	196.8	82.4	350.9
1969	156.5	313.4	132.8	602.6
1970	161.3	218.5	70.2	450.0
1971	146.4	158.7	102.1	407.2
1972	205.5	291.9	119.6	617.0
1973	153.4	121.6	79.4	354.5
1974	68.0	186.0	125.4	379.4
1975	151.0	236.4	108.3	495.7
1976	92.9	121.8	93.1	307.8
1977	84.7	114.5	73.0	272.3
1978	212.3	307.4	131.5	651.2
1979	82.0	214.6	148.6	445.3
1980	66.8	108.4	88.3	263.5
1981	64.3	58.8	40.0	163.0
1982	148.1	176.7	73.7	398.4
1983	104.3	189.4	142.6	436.4
1984	142.8	262.4	189.4	594.6
1985	116.7	183.8	124.4	425.0
1986	216.7	260.5	132.2	609.4
1987	194.9	216.4	105.9	517.3
1988	92.5	99.9	114.4	306.8
1989	195.4	222.0	86.7	504.1
1990	124.0	79.4	56.7	260.0
1991	106.5	113.1	69.5	289.1
1992	107.5	96.8	61.6	265.8
1993	141.1	334.7	225.0	700.7
1994	281.1	356.5	180.9	818.4
1995	279.4	458.2	195.9	933.4
1996	324.4	418.2	172.2	914.8
1997	278.8	478.8	167.5	925.1
1998	195.3	337.8	162.0	695.1
1999	157.4	618.1	249.4	1025.0
2000	161.3	324.7	141.6	627.6
2001	105.3	562.9	320.9	989.1
2002	85.9	204.1	143.8	433.9
2003	111.9	240.7	121.4	473.9
2004	140.8	100.1	64.3	305.2
2005	105.2	129.0	92.4	326.5
2006	187.9	201.2	142.5	531.5
2007	122.2	394.7	209.5	726.5
2008	167.5	245.0	259.2	671.7
10-year Mean	137.3	311.3	164.8	613.4
Long-term Mean	148.5	247.3	134.0	529.8
Percent Change:				
From 2007	37.0	-37.9	23.7	-7.5
From 10-year Mean	21.9	-21.3	57.3	9.5
From Long-term Mean	12.8	-0.9	93.5	26.8

Table 3. Survey design for South Dakota, May 2008.

	Stratum			Total
	44	48	49	
<u>Survey design</u>				
Square miles in stratum	27,299	24,587	15,830	67,716
Square miles in sample	216	315	171	702
Linear miles in sample	864	1,260	684	2,808
Number of transects in sample	5	9	11	25
Number of segments in sample	48	70	38	156
Expansion factor	126.3842	78.05396	92.57309	---
<u>Current year coverage</u>				
Square miles in sample	216	315	171	702
Linear miles in sample	864	1,260	684	2,808
Number of transects in sample	5	9	11	25
Number of segments in sample	48	70	38	156
Expansion factor	126.3842	78.05396	92.57309	---



Table 4: Status of waterfowl population estimates (thousands, adjusted for visibility bias), by species and stratum with comparison for the previous year, the previous 10-year mean, and the long-term mean for North Dakota.

Species/Ponds	Stratum 2008										% Change From			
	43	45	46	47	2008		2007	10-Year		Long-Term	2007	10-Year		Long-term
					Total	Total		Mean	Mean			Mean	Mean	
<b>Ducks</b>														
<b>Dabblers</b>														
Mallard	80.1	560.4	331.0	39.0	1010.5	1399.5	1289.5	658.4	-27.8	-21.6	53.5			
American Black Duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	-100.0	-100.0			
Gadwall	41.6	373.4	221.4	5.9	642.3	882.7	790.4	398.4	-27.2	-18.7	61.2			
American wigeon	5.2	12.2	16.0	0.0	33.5	66.4	76.0	47.2	-49.7	-56.0	-29.1			
Green-winged teal	18.6	8.2	5.1	0.0	31.9	31.6	53.2	37.5	0.7	-40.1	-15.0			
Blue-winged teal	68.4	421.8	532.7	26.1	1049.0	1129.9	1526.7	895.7	-7.2	-31.3	17.1			
Northern shoveler	56.3	189.3	160.6	4.8	410.8	450.6	450.6	285.8	-8.8	-8.8	43.8			
Northern pintail	10.3	81.4	52.8	2.6	147.1	316.5	270.6	330.9	-53.5	-45.6	-55.6			
Subtotal	280.5	1646.7	1319.5	78.4	3325.1	4277.3	4457.1	2654.0	-22.3	-25.4	25.3			
<b>Divers</b>														
Redhead	0.0	69.2	65.3	1.2	135.7	196.7	193.6	136.9	-31.0	-29.9	-0.9			
Canvasback	0.5	14.7	6.2	0.0	21.4	47.2	37.3	30.1	-54.6	-42.5	-28.7			
Scaups	2.4	43.2	57.9	0.0	103.5	159.6	147.1	78.2	-35.1	-29.6	32.4			
Ring-necked duck	0.8	1.4	4.2	0.0	6.4	13.4	11.2	8.3	-52.4	-43.0	-23.7			
Goldeneye's	0.0	0.7	0.0	0.0	0.7	0.7	0.2	0.2	-1.9	264.9	265.7			
Bufflehead	0.0	0.4	1.0	0.0	1.4	2.0	1.9	1.4	-27.9	-26.0	4.8			
Ruddy Duck	13.6	74.3	85.8	0.0	173.7	133.9	162.0	97.6	29.7	7.2	78.0			
Subtotal	17.2	204.1	220.4	1.2	442.9	553.5	553.3	352.6	-20.0	-20.0	25.6			
<b>Miscellaneous</b>														
Mergansers	0.6	0.0	0.3	0.0	0.9	0.0	1.1	0.8	--	-13.9	17.4			
Long-tailed duck	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	--	--	--			
Scoters	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	--	-100.0			
Subtotal	0.6	0.0	0.3	0.0	0.9	0.0	1.1	0.8	--	-13.9	15.9			
Total Ducks	298.4	1850.7	1540.2	79.6	3768.9	4830.7	5011.5	3007.4	-22.0	-24.8	25.3			
Canada Goose	26.7	147.3	73.7	3.5	251.3	362.8	184.4	46.6	-30.7	36.3	439.6			
American coot	81.9	76.7	147.9	1.5	308.0	171.5	429.1	380.6	79.6	-28.2	-19.1			
Ponds	89.8	185.7	138.8	16.4	430.8	761.3	872.3	739.0	-43.4	-50.6	-41.7			

Table 5: 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 North Dakota. Estimates Prior to 1974 were not adjusted for visibility bias, if applicable.

Year	Stratum 2008				Total
	43	45	46	47	
1961	11.8	38.2	26.3	9.6	85.8
1962	25.5	132.6	97.1	17.4	272.6
1963	41.6	194.1	142.1	16.4	394.2
1964	29.4	250.7	96.9	24.4	401.3
1965	51.3	390.9	203.4	27.3	672.9
1966	55.7	279.9	192.8	38.5	566.8
1967	50.1	472.2	255.8	45.3	823.4
1968	54.0	190.3	148.1	15.8	408.2
1969	89.5	387.9	202.1	37.6	717.1
1970	101.5	563.9	181.7	34.8	882.0
1971	109.4	437.2	104.6	20.4	671.6
1972	130.9	374.2	163.7	39.1	707.9
1973	88.4	161.4	52.1	11.4	313.2
1974	64.7	950.9	179.3	57.3	1252.2
1975	104.9	703.4	286.0	41.4	1135.8
1976	84.0	505.1	221.8	37.4	848.2
1977	88.2	179.2	60.1	12.8	340.3
1978	123.7	304.2	195.2	14.2	637.3
1979	87.0	447.4	268.5	32.9	835.8
1980	65.4	179.5	89.4	11.1	345.5
1981	70.3	208.4	55.2	9.7	343.5
1982	140.5	443.2	183.4	19.0	786.0
1983	80.0	398.1	147.5	23.3	648.9
1984	113.9	554.6	269.2	27.7	965.4
1985	115.0	355.5	126.6	17.6	614.6
1986	120.0	381.2	201.7	25.8	728.8
1987	134.5	281.2	170.4	15.1	601.1
1988	94.7	135.4	74.8	8.7	313.6
1989	116.4	198.6	117.5	15.5	448.0
1990	72.8	64.9	39.5	8.0	185.2
1991	72.4	59.1	36.1	7.7	175.3
1992	119.6	146.7	47.9	9.4	323.6
1993	106.4	167.3	163.0	18.4	455.1
1994	203.2	412.0	275.5	27.9	918.7
1995	197.0	581.6	348.0	34.1	1160.6
1996	193.9	545.0	386.1	55.8	1180.7
1997	163.0	558.8	393.3	42.4	1157.6
1998	159.4	462.4	359.0	64.0	1044.8
1999	137.5	895.5	361.3	45.6	1439.9
2000	105.1	363.2	242.4	23.6	734.3
2001	86.2	414.9	222.1	26.9	750.2
2002	96.4	373.7	192.5	19.9	682.5
2003	107.0	499.4	277.1	49.5	933.1
2004	159.3	455.4	163.8	26.0	804.5
2005	184.7	373.2	174.9	28.2	761.1
2006	125.5	412.5	225.2	48.3	811.5
2007	142.7	336.2	248.6	33.8	761.3
2008	89.8	185.7	138.8	16.4	430.8
10-year Mean	130.4	458.6	246.7	36.6	872.3
Long-term Mean	118.7	392.6	200.1	27.6	739.0
Percent Change:					
From 2007	-37.1	-44.7	-44.2	-51.5	-43.4
From 10-year Mean	-31.1	-59.5	-43.7	-55.1	-50.6
From Long-term Mean	-24.3	-52.7	-30.6	-40.5	-41.7

Table 6. Survey design for North Dakota, May 2008.

	Stratum				Total
	43	45	46	47	
<u>Survey design</u>					
Square miles in stratum	19,835	26,625	14,238	7,821	68,519
Square miles in sample	175.5	310.5	270.0	45.0	801.0
Linear miles in sample	702	1,242	1,080	180	3,204
Number of transects in sample	5	7	8	6	26
Number of segments in sample	39	69	60	10	178
Expansion factor	113.0199	85.7487	52.7333	173.8000	---
 <u>Current year coverage</u>					
Square miles in sample	175.5	310.5	270.0	45.0	801.0
Linear miles in sample	702	1,188	1,080	180	3,204
Number of transects in sample	5	7	8	6	26
Number of segments in sample	39	69	60	10	178
Expansion factor	113.0199	85.7487	52.7333	173.8000	---

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

Species/Ponds	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968
Ducks										
Dabblers										
Mallard	108.2	176.6	212.1	367.3	535.8	261.1	314.5	216.3	248.2	450.7
American Black Duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gadwall	0.0	9.9	18.9	73.9	164.0	53.6	115.4	112.9	75.1	197.8
American wigeon	7.1	9.6	6.1	8.1	3.1	4.4	0.0	9.6	29.7	22.6
American Green-winged teal	0.0	0.0	2.7	10.0	2.7	0.0	0.0	7.7	9.6	23.5
Blue-winged teal	413.1	524.5	673.8	602.5	1201.5	686.3	703.6	623.9	313.7	466.1
Northern shoveler	38.4	156.3	96.4	335.5	225.4	95.7	90.2	108.3	82.2	150.6
Northern pintail	25.5	305.7	175.4	557.8	221.6	108.8	128.9	228.9	186.6	129.1
Subtotal	592.3	1182.5	1185.3	1955.1	2354.1	1209.9	1352.6	1307.7	945.1	1440.2
Divers										
Redhead	0.0	30.1	14.3	56.4	50.5	50.4	56.4	56.7	20.1	33.4
Canvasback	2.8	1.4	2.8	2.2	2.6	5.0	2.0	6.1	3.5	2.6
Scaups	13.6	18.3	8.1	32.9	11.0	1.4	29.2	29.7	11.2	22.3
Ring-necked duck	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.4	1.1	0.0
Goldeneye's	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bufflehead	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.9	0.0
Ruddy Duck	0.0	10.7	3.6	11.8	5.6	1.4	1.9	5.6	0.0	8.9
Subtotal	16.4	60.5	28.8	103.4	70.7	58.1	89.5	100.0	36.8	67.2
Miscellaneous										
Mergansers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0
Total Ducks	608.7	1243.0	1214.2	2058.5	2424.9	1268.1	1442.0	1409.0	982.0	1507.4
Canada Goose	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.9	0.0
American coot	31.1	40.4	29.3	61.0	21.0	53.4	19.3	33.8	28.0	75.7
Ponds	98.3	227.2	115.4	317.4	314.7	380.0	385.0	329.9	391.4	350.9

Species/Ponds	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
Ducks										
Dabblers										
Mallard	443.3	415.2	392.0	493.0	432.6	276.5	354.3	256.2	186.8	537.3
American Black Duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gadwall	243.8	214.5	162.2	192.1	149.9	85.5	126.4	44.6	31.4	233.6
American wigeon	30.7	21.4	19.0	99.1	43.7	16.3	42.7	56.6	29.2	92.7
American Green-winged teal	29.0	115.1	25.4	42.6	29.6	19.1	37.4	31.1	9.8	38.5
Blue-winged teal	742.2	706.8	654.3	1209.0	777.1	348.8	437.2	351.7	318.9	1287.3
Northern shoveler	195.7	260.3	103.2	330.9	110.6	51.1	92.8	56.5	58.6	419.1
Northern pintail	396.6	333.3	247.8	395.4	275.1	99.1	218.2	111.7	130.8	678.4
Subtotal	2081.2	2066.8	1603.9	2762.1	1818.6	896.5	1309.0	908.4	765.5	3287.0
Divers										
Redhead	87.8	53.6	60.7	48.6	34.6	20.2	27.3	4.1	10.8	144.4
Canvasback	17.9	6.1	2.8	14.2	13.1	6.4	5.6	3.1	3.0	12.3
Scaups	12.1	74.4	7.3	41.1	19.2	13.0	12.7	45.3	16.4	73.7
Ring-necked duck	0.0	1.1	0.5	0.0	0.0	0.0	0.0	0.3	0.4	1.4
Goldeneye's	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	1.0
Bufflehead	0.0	0.0	0.0	1.5	0.0	0.4	0.0	0.0	0.0	0.4
Ruddy Duck	7.0	39.3	27.7	30.1	18.6	23.2	209.7	6.2	5.8	28.7
Subtotal	124.8	174.5	99.0	136.6	85.5	63.2	255.4	59.0	36.4	261.9
Miscellaneous										
Mergansers	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0
Total Ducks	2206.0	2241.2	1702.9	2898.7	1904.9	959.7	1564.4	967.4	801.9	3548.9
Canada Goose	8.2	0.9	2.1	3.4	6.4	3.7	1.9	3.0	1.8	7.2
American coot	91.1	91.8	35.0	110.9	126.1	27.8	75.7	66.6	91.4	232.5
Ponds	602.6	450.0	407.2	617.0	354.5	379.4	495.7	307.8	272.3	651.2

Appendix. 1: Continued.

Species/Ponds	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Ducks										
Dabblers										
Mallard	441.7	338.9	186.8	291.7	314.9	334.9	310.1	532.0	556.8	374.1
American Black Duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gadwall	136.7	69.8	113.6	189.1	219.0	263.7	145.5	254.3	205.7	222.5
American wigeon	33.6	41.5	60.0	40.7	73.8	87.0	45.2	39.7	45.6	48.8
American Green-winged teal	19.3	70.2	21.1	34.9	36.6	22.0	31.6	52.1	23.4	25.5
Blue-winged teal	906.0	483.3	254.1	519.9	801.8	938.8	604.5	1433.5	777.1	617.1
Northern shoveler	341.8	59.3	66.7	152.4	200.0	236.9	113.2	379.8	226.9	84.4
Northern pintail	280.0	119.7	53.0	204.2	223.8	263.5	165.3	389.5	212.8	118.4
Subtotal	2159.0	1182.6	755.3	1432.9	1869.9	2146.9	1415.3	3080.8	2048.2	1490.9
Divers										
Redhead	50.9	28.2	22.0	45.2	82.9	111.9	35.9	64.2	34.1	19.3
Canvasback	5.6	8.0	5.9	2.2	2.3	15.8	4.6	11.5	5.7	7.6
Scaups	36.7	5.4	19.1	43.7	54.3	58.6	30.6	104.7	35.4	63.2
Ring-necked duck	0.6	1.2	2.8	7.1	59.0	17.3	1.4	18.3	14.4	5.7
Goldeneye's	0.0	0.0	0.0	1.2	2.4	0.8	0.8	0.8	0.0	0.0
Bufflehead	1.5	1.1	0.9	3.1	6.1	2.8	0.0	4.8	0.0	2.9
Ruddy Duck	16.0	21.6	67.0	84.4	88.9	48.7	23.1	69.4	28.5	3.2
Subtotal	111.3	65.5	117.8	187.0	295.9	255.8	96.5	273.6	118.1	101.8
Miscellaneous										
Mergansers										
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	2.5	0.8	0.0	7.0	5.7	6.1	0.0	0.0	0.0	2.1
Total Ducks	2272.9	1248.9	873.1	1626.9	2171.4	2408.9	1511.8	3354.5	2166.3	1594.7
Canada Goose	4.8	3.4	9.8	23.9	13.0	19.0	15.2	12.5	17.6	57.2
American coot	356.1	77.1	176.8	202.7	263.5	603.7	196.5	487.5	427.3	436.4
Ponds	445.3	263.5	163.0	398.4	436.4	594.6	425.0	609.4	517.3	306.8

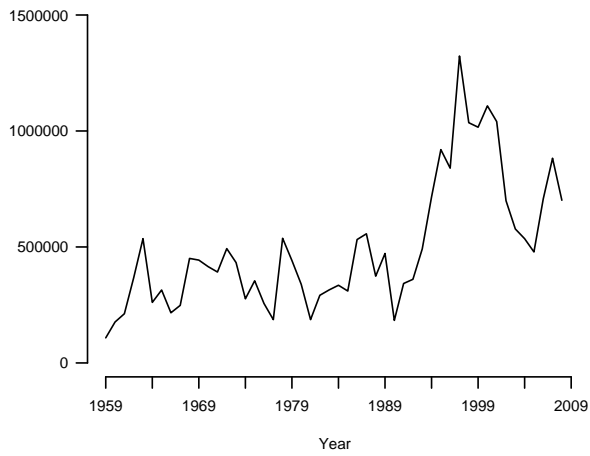
Species/Ponds	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Ducks										
Dabblers										
Mallard	472.0	183.5	342.6	360.6	491.5	715.9	919.7	839.8	1323.2	1035.6
American Black Duck	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gadwall	177.7	125.7	282.9	281.5	246.6	383.0	541.5	451.8	819.5	624.2
American wigeon	21.6	27.4	44.4	32.9	17.3	83.6	46.8	47.6	71.3	74.6
American Green-winged teal	24.4	8.5	17.0	12.6	6.6	55.2	58.4	63.0	69.4	34.3
Blue-winged teal	860.2	346.3	1075.4	626.4	679.9	1383.6	1468.4	1390.9	1535.0	1573.4
Northern shoveler	185.4	79.2	117.2	102.0	213.4	283.5	350.0	287.6	414.3	230.3
Northern pintail	148.3	63.4	69.8	65.7	166.7	230.1	364.2	187.3	349.9	205.4
Subtotal	1889.5	834.3	1949.3	1481.8	1821.9	3134.8	3749.0	3268.0	4582.7	3777.8
Divers										
Redhead	55.1	16.7	11.7	41.0	62.4	98.2	68.4	54.3	55.6	78.9
Canvasback	5.3	8.1	5.3	1.4	8.0	14.6	7.6	9.1	9.2	4.5
Scaups	80.4	43.5	66.8	47.9	7.3	155.2	120.9	94.6	75.6	87.4
Ring-necked duck	17.7	17.6	5.5	27.6	5.8	11.1	41.6	17.4	19.1	8.4
Goldeneye's	0.0	0.0	3.6	0.0	0.0	0.8	0.8	0.9	0.0	0.0
Bufflehead	5.0	0.4	1.2	7.5	0.0	12.0	5.9	1.2	1.3	0.6
Ruddy Duck	44.0	34.1	10.2	3.9	21.5	36.7	43.2	14.7	18.7	24.9
Subtotal	207.6	120.5	104.2	129.3	105.0	328.7	288.4	192.1	179.5	204.8
Miscellaneous										
Mergansers										
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	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	3.5	2.4	4.0	1.6	2.1	3.7	4.9	0.5	7.7	2.5
Total Ducks	2100.5	957.3	2057.5	1612.7	1929.1	3467.2	4042.3	3460.6	4769.9	3985.1
Canada Goose	65.4	46.2	44.2	48.6	37.7	46.5	55.9	73.5	86.8	99.8
American coot	284.7	191.5	77.4	132.8	167.2	311.0	616.9	409.9	525.7	469.0
Ponds	504.1	260.0	289.1	265.8	700.7	818.4	933.4	914.8	925.1	695.1

Appendix. 1: Continued.

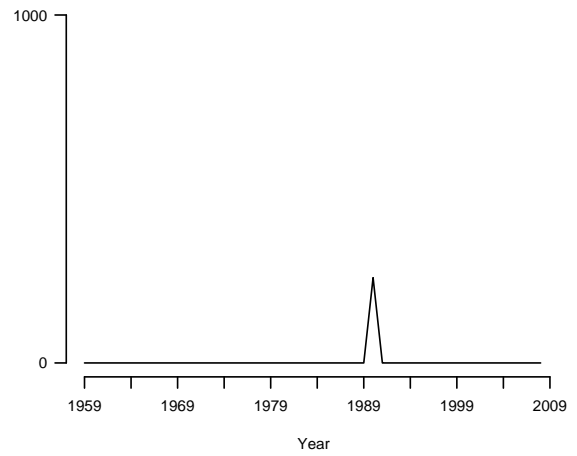
Species/Ponds	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Ducks										
Dabblers										
Mallard	1016.4	1108.4	1040.5	699.3	577.5	535.7	478.5	707.3	882.5	701.4
American Black Duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gadwall	481.6	636.2	508.9	441.6	320.2	290.4	282.3	281.7	419.1	302.5
American wigeon	49.1	69.9	53.5	33.0	27.0	23.1	31.4	48.8	41.3	28.2
American Green-winged teal	39.1	51.5	69.8	28.2	26.4	26.7	49.4	30.1	26.0	18.8
Blue-winged teal	1516.6	1576.9	1608.7	1043.1	859.9	570.4	514.2	710.5	1614.5	1620.0
Northern shoveler	364.3	226.8	461.9	188.3	131.2	100.9	99.7	136.5	303.1	332.4
Northern pintail	201.9	200.5	385.4	88.1	39.0	63.8	72.2	124.7	268.7	159.7
Subtotal	3669.0	3870.3	4128.7	2521.6	1981.3	1610.9	1527.7	2039.6	3555.2	3163.1
Divers										
Redhead	56.0	33.0	51.0	75.6	28.5	13.7	9.6	28.3	53.4	37.4
Canvasback	2.9	6.7	5.1	7.8	3.1	7.8	4.7	6.3	8.6	4.5
Scaups	40.3	59.1	44.5	66.6	37.0	30.0	30.3	24.3	22.9	26.4
Ring-necked duck	25.7	10.8	8.7	13.3	8.9	5.0	6.1	5.0	2.9	2.3
Goldeneye's	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bufflehead	2.3	0.4	0.6	1.9	1.6	1.0	1.0	0.0	0.8	3.3
Ruddy Duck	82.1	65.9	58.8	75.6	28.0	1.9	9.5	39.3	40.2	123.6
Subtotal	209.4	175.9	168.7	240.9	107.1	59.4	61.2	103.1	129.0	197.5
Miscellaneous										
Mergansers	4.0	2.9	3.7	2.4	0.5	1.4	0.0	0.9	0.0	0.0
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	4.0	2.9	3.7	2.4	0.5	1.4	0.0	0.9	0.0	0.0
Total Ducks	3882.5	4049.1	4301.1	2764.9	2088.9	1671.7	1588.9	2143.6	3684.1	3360.6
Canada Goose	111.8	165.3	169.9	88.7	130.4	108.0	108.2	121.0	144.9	99.8
American coot	458.6	300.9	141.7	235.1	22.0	32.2	32.6	60.5	312.9	417.5
Ponds	1025.0	627.6	989.1	433.9	473.9	305.2	326.5	531.5	726.5	671.7

Appendix 2: Long-term trends in adjusted waterfowl breeding population estimates for South Dakota.

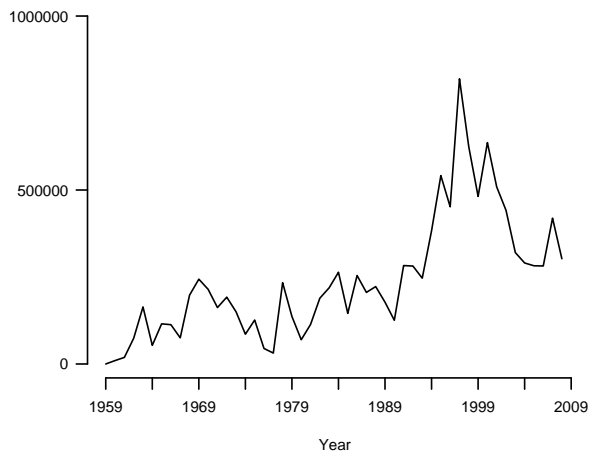
**Strata 44,48,49 Mallard**



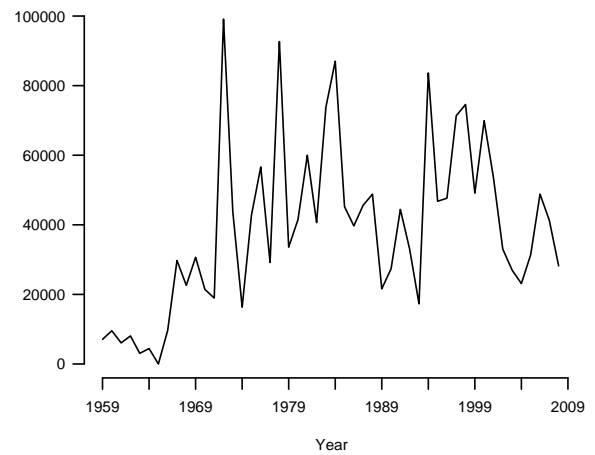
**Strata 44,48,49 American Black Duck**



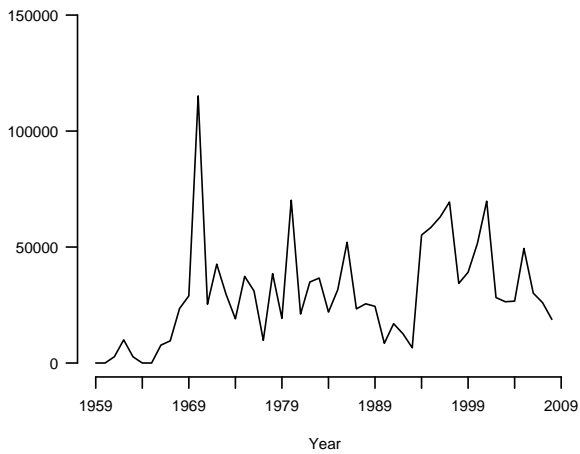
**Strata 44,48,49 Gadwall**



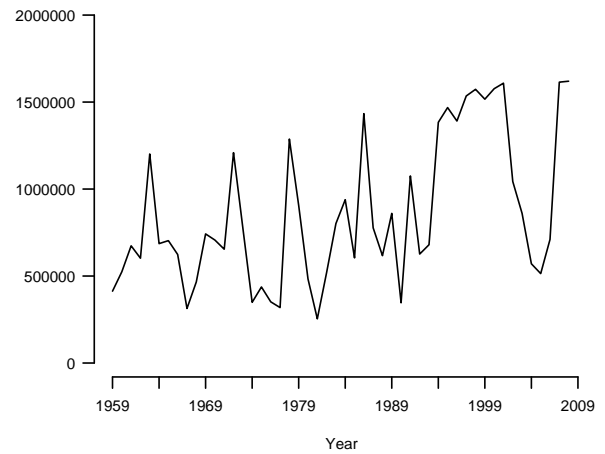
**Strata 44,48,49 American wigeon**



**Strata 44,48,49 American Green-winged teal**

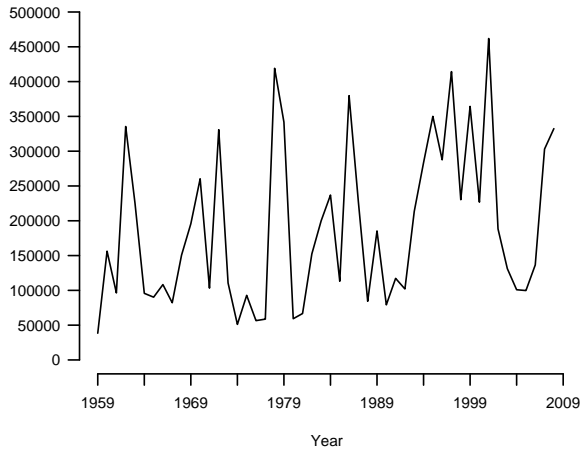


**Strata 44,48,49 Blue-winged teal**

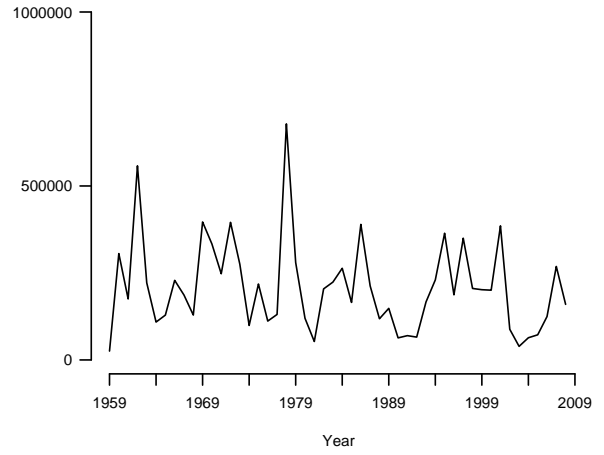


Appendix 2: Continued.

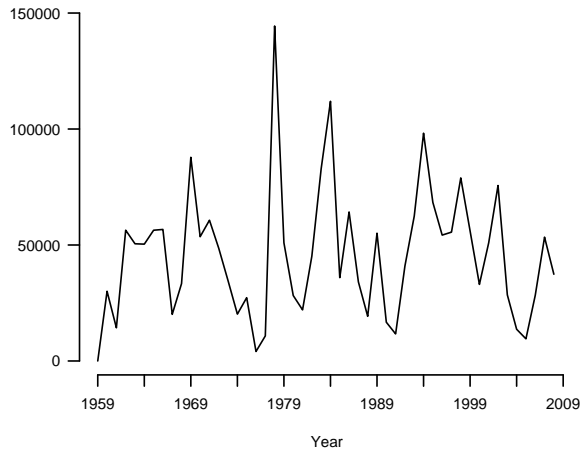
**Strata 44,48,49 Northern shoveler**



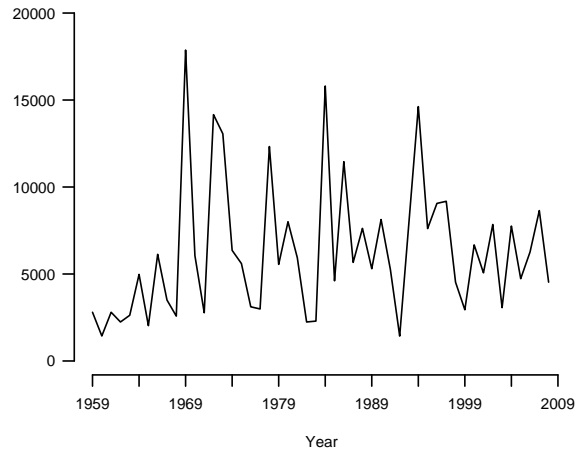
**Strata 44,48,49 Northern pintail**



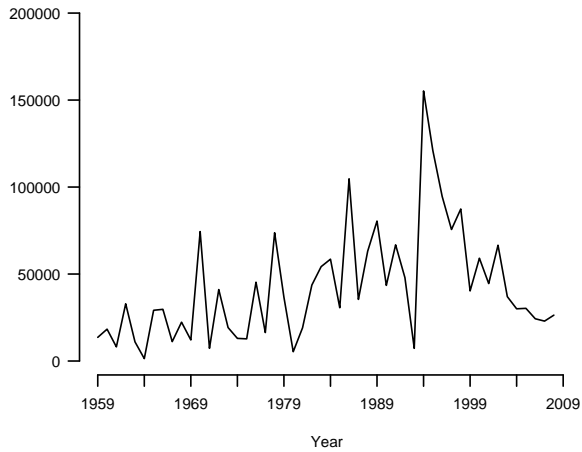
**Strata 44,48,49 Redhead**



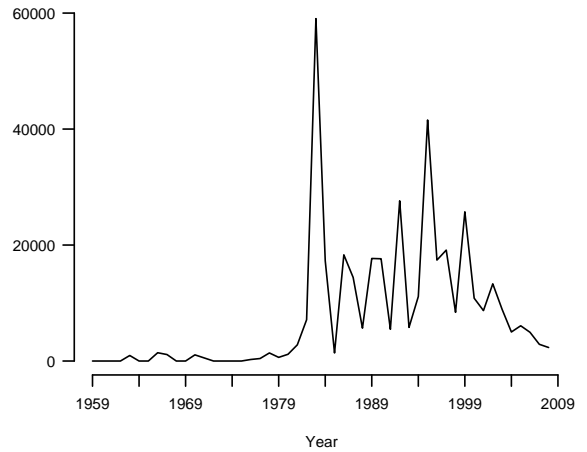
**Strata 44,48,49 Canvasback**



**Strata 44,48,49 Scaups**



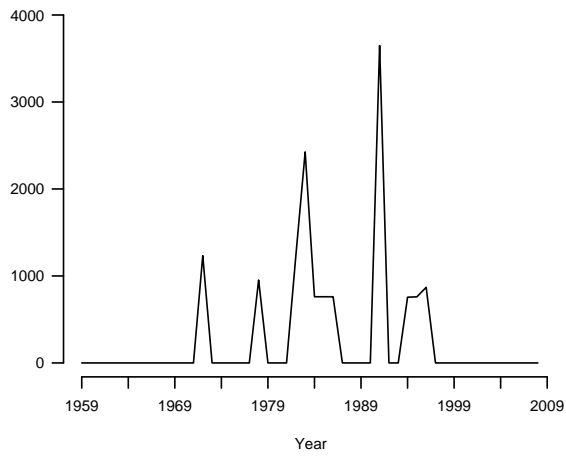
**Strata 44,48,49 Ring-necked duck**



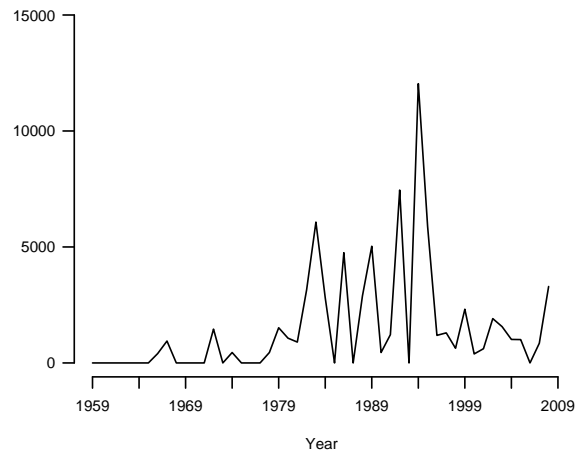


Appendix 2: Continued.

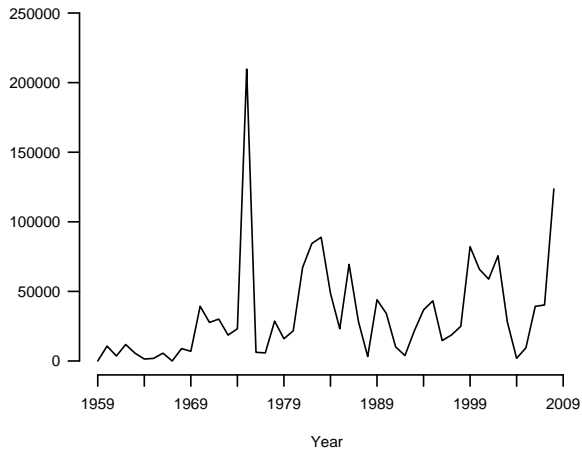
**Strata 44,48,49 Goldeneye's**



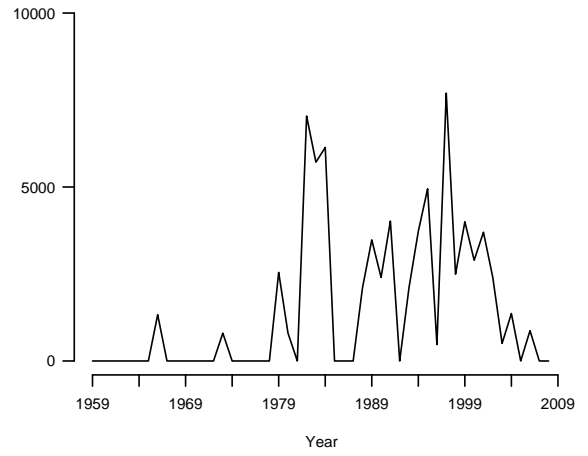
**Strata 44,48,49 Bufflehead**



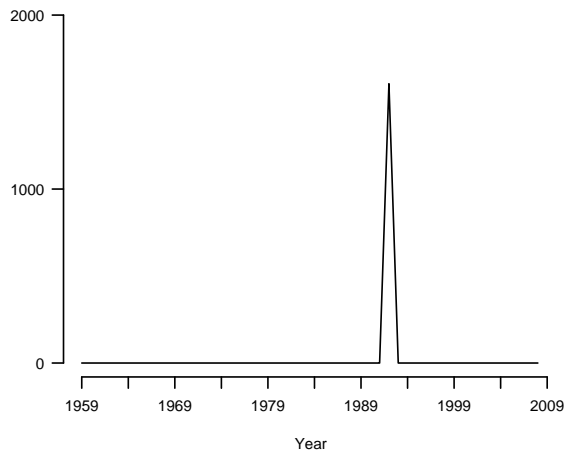
**Strata 44,48,49 Ruddy Duck**



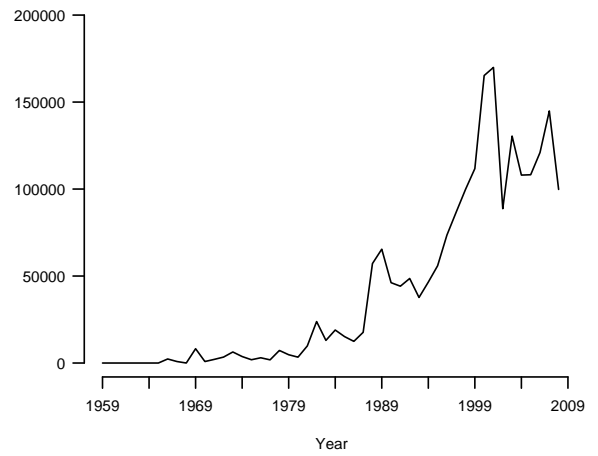
**Strata 44,48,49 Mergansers**



**Strata 44,48,49 Scoters**

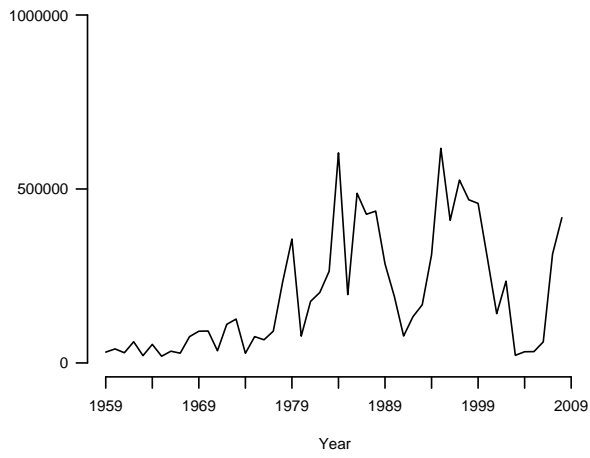


**Strata 44,48,49 Canada Goose**

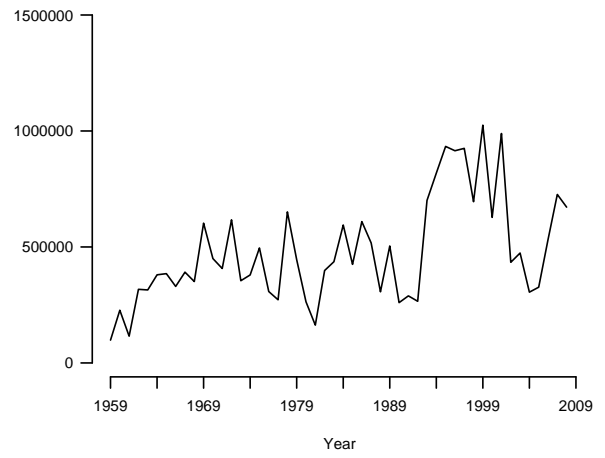


Appendix 2: Continued.

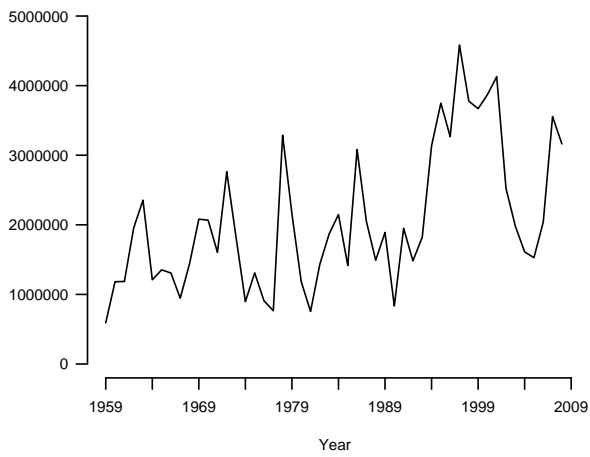
**Strata 44,48,49 American coot**



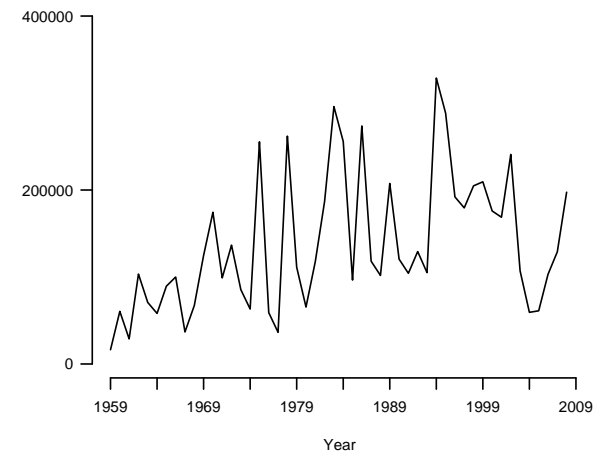
**Strata 44,48,49 Ponds**



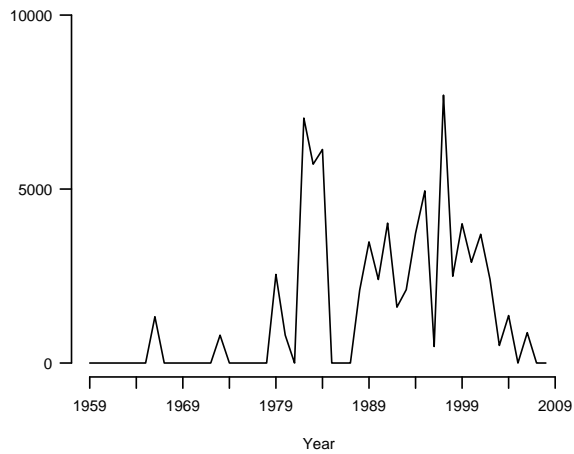
**Strata 44,48,49 Dabblers**



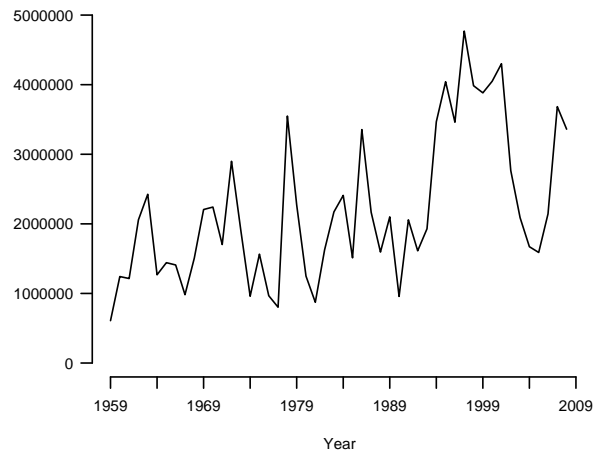
**Strata 44,48,49 Divers**



**Strata 44,48,49 Miscellaneous**



**Strata 44,48,49 Total Ducks**



Appendix. 3: Long-term trend in adjusted waterfowl breeding population estimates (thousands).

Species/Ponds	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
Ducks										
Dabblers										
Mallard	402.4	162.2	288.5	225.9	238.1	512.8	271.1	430.2	507.1	545.0
American Black Duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gadwall	44.8	13.4	85.2	56.4	156.2	213.8	86.0	226.8	269.5	216.2
American wigeon	24.7	24.9	22.8	5.0	3.8	16.4	4.6	5.9	18.6	27.9
American Green-winged teal	4.5	0.0	0.0	6.8	0.0	2.2	0.0	3.3	60.9	26.9
Blue-winged teal	528.7	316.4	519.5	295.6	755.2	686.6	584.5	913.5	1041.7	1106.1
Northern shoveler	62.9	45.3	184.8	106.8	271.5	221.0	102.8	289.4	290.4	403.8
Northern pintail	330.4	62.8	632.7	244.9	429.6	320.7	230.3	478.6	495.3	544.9
Subtotal	1398.3	625.0	1733.4	941.4	1854.5	1973.5	1279.2	2347.6	2683.5	2870.8
Divers										
Redhead	34.1	15.3	88.9	39.3	91.2	97.4	58.5	117.1	203.1	163.1
Canvasback	30.7	6.9	13.2	3.1	2.2	14.7	17.2	19.0	53.6	26.5
Scaups	11.7	22.1	40.7	18.3	77.7	15.1	3.0	14.0	15.5	22.1
Ring-necked duck	0.0	0.0	2.9	0.0	0.0	0.9	0.0	0.0	2.5	0.0
Goldeneye's	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0
Bufflehead	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.0
Ruddy Duck	1.6	23.8	44.3	23.3	27.5	18.2	5.4	9.0	33.4	41.8
Subtotal	78.1	68.1	190.0	84.0	198.6	146.3	84.1	159.3	309.4	253.6
Miscellaneous										
Mergansers	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.2	0.2	0.0
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.2	0.2	0.0
Total Ducks	1476.4	693.1	1923.4	1025.5	2053.1	2120.0	1363.3	2507.2	2993.2	3124.4
Canada Goose	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0
American coot	59.0	94.4	82.0	51.1	104.0	47.4	14.2	93.8	150.5	203.3
Ponds	263.3	123.0	367.5	85.8	272.6	394.2	401.3	672.9	566.8	823.4

Species/Ponds	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
Ducks										
Dabblers										
Mallard	434.6	462.6	736.6	769.3	674.0	547.2	458.4	566.5	368.0	292.1
American Black Duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gadwall	352.9	323.1	373.9	372.2	353.6	223.2	213.6	330.1	76.5	103.0
American wigeon	8.3	40.5	30.0	28.1	29.1	36.0	44.1	72.8	62.3	31.7
American Green-winged teal	12.4	67.0	138.6	23.4	51.0	38.0	75.0	59.4	17.4	7.4
Blue-winged teal	749.7	902.9	712.7	1238.1	780.3	588.7	1171.3	1051.4	357.0	282.1
Northern shoveler	194.8	304.0	454.9	219.4	289.9	129.7	219.5	225.2	89.7	71.2
Northern pintail	169.4	693.7	831.6	690.0	749.1	257.1	487.1	455.6	208.6	91.1
Subtotal	1922.2	2793.9	3278.5	3340.4	2926.9	1819.9	2669.0	2761.1	1179.5	878.6
Divers										
Redhead	93.3	177.1	153.5	123.7	126.9	94.6	110.7	214.8	63.6	31.9
Canvasback	17.3	58.9	24.7	14.7	30.2	28.5	63.0	39.3	15.3	10.3
Scaups	16.6	36.3	28.3	28.2	30.4	41.9	37.3	70.3	54.1	19.7
Ring-necked duck	0.0	0.6	2.8	1.1	0.7	0.0	0.6	1.2	1.1	1.4
Goldeneye's	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0
Bufflehead	0.0	0.0	1.8	0.0	2.6	0.5	0.0	0.0	0.7	0.0
Ruddy Duck	15.5	45.2	86.0	47.0	55.1	40.7	167.0	125.1	22.8	21.1
Subtotal	142.8	318.0	297.1	214.7	247.1	206.1	378.5	450.7	157.7	84.4
Miscellaneous										
Mergansers	0.0	2.9	0.0	0.0	1.4	0.7	0.7	0.0	0.0	0.0
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	0.0	2.9	0.0	0.0	1.4	0.7	0.7	0.0	0.0	0.0
Total Ducks	2065.0	3114.7	3575.6	3555.1	3175.4	2026.7	3048.2	3211.8	1337.2	963.0
Canada Goose	0.0	0.0	0.0	0.0	0.0	3.8	0.9	3.3	2.2	3.8
American coot	127.5	131.3	192.3	147.7	178.8	124.7	368.9	512.9	104.2	74.8
Ponds	408.2	717.1	882.0	671.6	707.9	313.2	1252.2	1135.8	848.2	340.3

## Appendix. 3: Continued.

Species/Ponds	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Ducks										
Dabblers										
Mallard	506.6	641.4	485.4	308.6	466.5	398.9	550.3	361.4	487.8	582.6
American Black Duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gadwall	243.9	369.2	224.3	255.6	381.2	435.0	528.8	274.0	287.7	275.9
American wigeon	69.4	47.4	84.0	119.2	41.5	45.1	38.7	58.9	30.9	44.1
American Green-winged teal	20.5	25.4	92.4	39.2	52.6	16.4	16.2	58.9	20.1	33.5
Blue-winged teal	737.4	826.5	888.4	252.8	906.3	545.7	861.0	547.0	871.8	579.4
Northern shoveler	277.5	447.3	181.9	264.1	377.4	194.3	273.3	153.2	244.7	255.5
Northern pintail	588.5	517.3	291.8	135.2	369.4	329.4	375.5	198.9	260.0	191.6
Subtotal	2443.7	2874.5	2248.2	1374.7	2594.9	1964.8	2643.7	1652.3	2202.9	1962.8
Divers										
Redhead	191.8	198.3	122.7	75.2	258.2	226.2	170.3	116.9	103.5	99.0
Canvasback	17.0	42.7	28.5	31.9	32.4	12.4	50.9	20.1	36.3	28.7
Scaups	99.8	199.2	47.7	107.5	103.9	92.6	120.8	102.1	129.4	91.4
Ring-necked duck	2.2	8.4	3.6	0.0	11.6	103.0	12.2	3.5	11.6	3.2
Goldeneye's	0.0	0.0	0.0	0.0	0.0	2.5	1.4	0.0	0.0	1.0
Bufflehead	1.0	2.4	1.4	1.0	0.7	3.7	7.1	0.5	0.8	0.0
Ruddy Duck	123.3	98.0	111.4	237.6	357.1	184.8	251.8	111.9	170.1	113.8
Subtotal	435.0	549.0	315.4	453.2	763.9	625.2	614.4	355.0	451.7	337.2
Miscellaneous										
Mergansers	0.0	0.0	0.0	0.0	0.3	6.3	2.7	0.5	0.0	0.5
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	0.0	0.0	0.0	0.0	0.3	6.3	2.7	0.5	0.0	0.5
Total Ducks	2878.7	3423.5	2563.6	1827.9	3359.1	2596.3	3260.8	2007.8	2654.6	2300.5
Canada Goose	0.9	2.7	3.7	7.4	22.4	10.5	13.7	11.3	17.0	12.3
American coot	389.6	1358.1	396.0	374.7	561.3	411.0	898.9	309.7	313.2	530.3
Ponds	637.3	835.8	345.5	343.5	786.0	648.9	965.4	614.6	728.8	601.1

Species/Ponds	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Ducks										
Dabblers										
Mallard	354.9	404.0	142.2	261.8	364.1	374.1	900.7	1063.9	1100.5	1377.7
American Black Duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gadwall	294.9	296.3	296.0	197.9	388.7	285.8	433.3	757.4	806.3	893.8
American wigeon	40.8	15.6	22.9	20.9	44.1	13.9	71.4	92.0	78.9	83.2
American Green-winged teal	28.3	9.5	26.7	9.1	14.1	9.0	60.5	45.9	90.6	79.0
Blue-winged teal	553.9	338.5	230.4	233.4	401.4	303.1	1088.8	1463.1	1764.1	1544.6
Northern shoveler	118.4	158.7	67.1	75.2	114.7	175.1	507.8	573.6	653.8	492.2
Northern pintail	149.7	109.0	61.8	49.3	112.1	126.9	375.5	424.9	351.5	418.1
Subtotal	1541.1	1331.5	847.1	847.7	1439.2	1288.0	3438.0	4420.8	4845.8	4888.7
Divers										
Redhead	55.2	133.4	17.0	14.7	78.8	102.2	155.0	218.2	257.9	216.5
Canvasback	19.2	39.2	10.1	8.6	17.3	19.8	56.1	42.0	58.6	69.2
Scaups	83.0	38.8	43.6	89.9	23.0	36.6	109.6	108.5	91.5	115.5
Ring-necked duck	10.5	10.9	9.6	5.0	10.3	0.4	15.7	44.4	12.1	11.2
Goldeneye's	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0
Bufflehead	0.5	2.1	0.5	3.2	3.3	2.5	4.7	3.6	1.8	2.0
Ruddy Duck	12.6	55.3	62.5	14.0	29.5	33.9	105.6	78.6	72.8	180.2
Subtotal	181.1	279.7	143.3	135.5	162.0	195.4	447.3	495.3	494.7	594.6
Miscellaneous										
Mergansers	0.0	0.7	4.3	3.2	0.0	0.3	0.5	1.4	0.3	0.9
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	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	0.0	0.7	4.3	3.7	0.0	0.3	0.5	1.4	0.3	0.9
Total Ducks	1722.2	1611.9	994.7	986.9	1601.3	1483.7	3885.8	4917.5	5340.8	5484.3
Canada Goose	18.0	34.9	26.6	18.0	32.1	21.2	40.9	55.5	51.8	69.5
American coot	429.1	246.8	161.7	58.1	84.1	113.9	608.0	1675.9	1241.9	1715.3
Ponds	313.6	448.0	185.2	175.3	323.6	455.1	918.7	1160.6	1180.7	1157.6

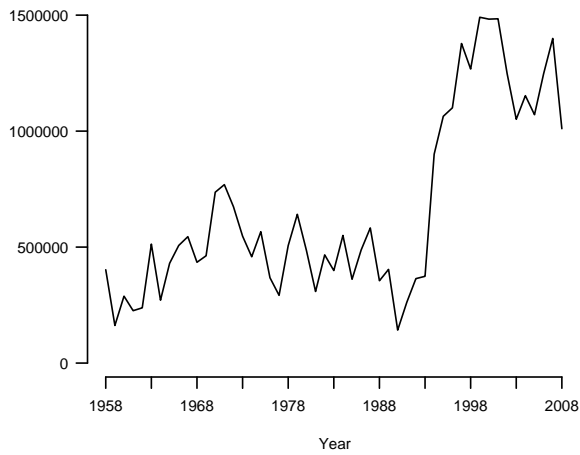
## Appendix. 3: Continued.

Species/Ponds	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Ducks										
Dabblers										
Mallard	1267.7	1490.9	1482.8	1484.3	1247.7	1051.1	1152.9	1070.8	1247.5	1399.5
American Black Duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0
Gadwall	932.9	918.4	1236.3	780.3	691.5	597.4	846.2	522.4	496.1	882.7
American wigeon	101.0	69.1	98.0	82.5	87.5	66.3	56.2	65.3	67.8	66.4
American Green-winged teal	48.4	55.5	44.4	44.7	66.3	39.1	99.6	40.6	62.0	31.6
Blue-winged teal	1734.6	2068.0	2848.5	1688.7	1338.3	1327.1	1096.3	953.0	1082.2	1129.9
Northern shoveler	360.6	535.0	647.0	682.5	378.8	321.5	350.8	429.4	350.2	450.6
Northern pintail	281.2	459.1	262.8	377.0	227.7	116.1	237.1	212.8	215.8	316.5
Subtotal	4726.4	5596.1	6619.8	5140.0	4037.9	3518.6	3839.1	3294.7	3521.5	4277.3
Divers										
Redhead	327.5	259.8	306.1	226.4	143.5	96.4	161.3	103.9	114.3	196.7
Canvasback	49.4	42.3	20.8	66.5	32.5	20.0	37.5	27.9	28.4	47.2
Scaups	148.0	120.8	178.2	130.3	136.8	140.7	232.1	105.0	119.6	159.6
Ring-necked duck	7.0	20.6	6.2	13.3	22.8	10.6	2.5	9.6	5.7	13.4
Goldeneye's	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.7
Bufflehead	1.1	0.3	3.2	5.2	2.4	2.5	0.6	0.3	1.6	2.0
Ruddy Duck	143.3	217.3	212.3	185.0	192.6	81.5	176.7	138.1	139.7	133.9
Subtotal	676.4	661.0	728.1	626.7	530.5	351.8	610.7	384.6	409.3	553.5
Miscellaneous										
Mergansers	0.5	0.7	7.5	0.7	0.0	0.0	0.3	0.9	0.0	0.0
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	0.5	0.7	7.5	0.7	0.0	0.0	0.3	0.9	0.0	0.0
Total Ducks	5403.3	6257.9	7355.4	5767.4	4568.4	3870.4	4450.1	3680.3	3930.8	4830.7
Canada Goose	76.5	104.5	161.6	184.1	122.9	175.3	183.8	239.8	232.6	362.8
American coot	767.9	889.9	912.6	319.6	437.9	77.9	525.8	84.4	103.8	171.5
Ponds	1044.8	1439.9	734.3	750.2	682.5	933.1	804.5	761.1	811.5	761.3

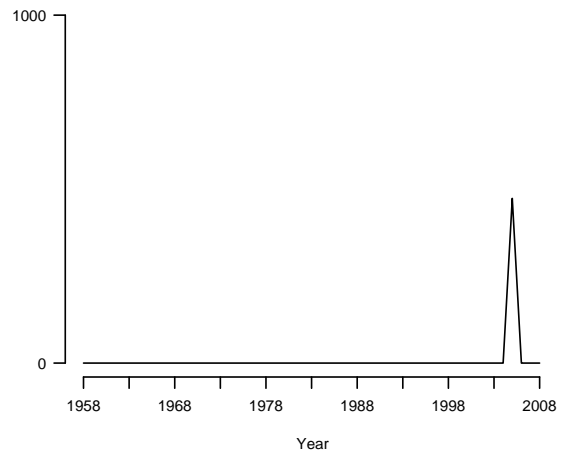
Species/Ponds	2008
Ducks	
Dabblers	
Mallard	1010.5
American Black Duck	0.0
Gadwall	642.3
American wigeon	33.5
American Green-winged teal	31.9
Blue-winged teal	1049.0
Northern shoveler	410.8
Northern pintail	147.1
Subtotal	3325.1
Divers	
Redhead	135.7
Canvasback	21.4
Scaups	103.5
Ring-necked duck	6.4
Goldeneye's	0.7
Bufflehead	1.4
Ruddy Duck	173.7
Subtotal	442.9
Miscellaneous	
Mergansers	0.9
Long-tailed duck	0.0
Eiders	0.0
Scoters	0.0
Subtotal	0.9
Total Ducks	3768.9
Canada Goose	251.3
American coot	308.0
Ponds	430.8

Appendix 4: Long-term trends in adjusted waterfowl breeding population estimates for North Dakota.

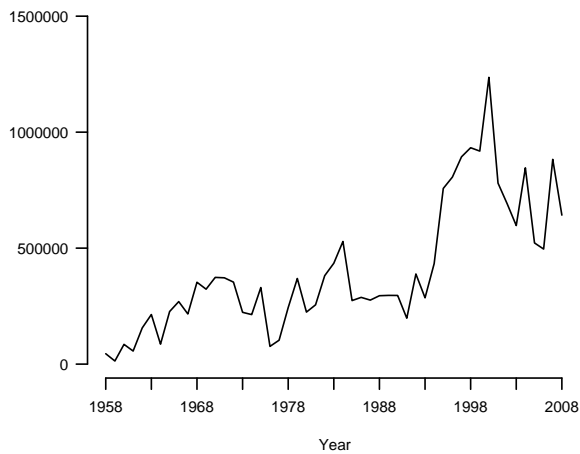
**Strata 43,45,46,47 Mallard**



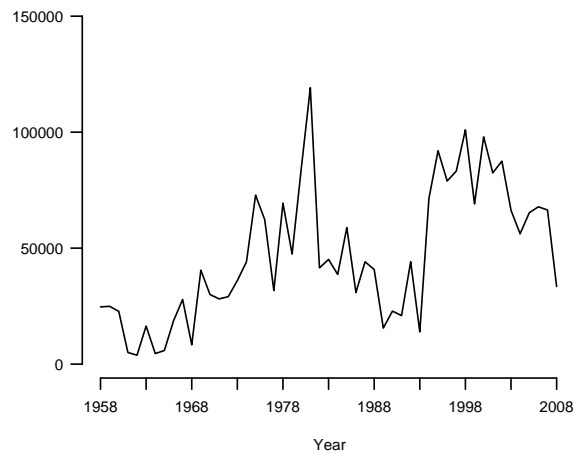
**Strata 43,45,46,47 American Black Duck**



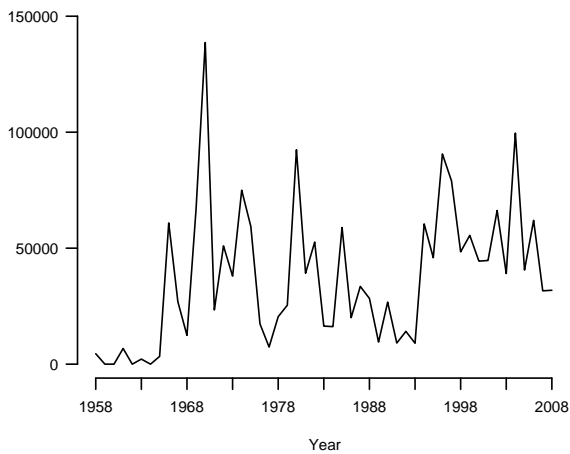
**Strata 43,45,46,47 Gadwall**



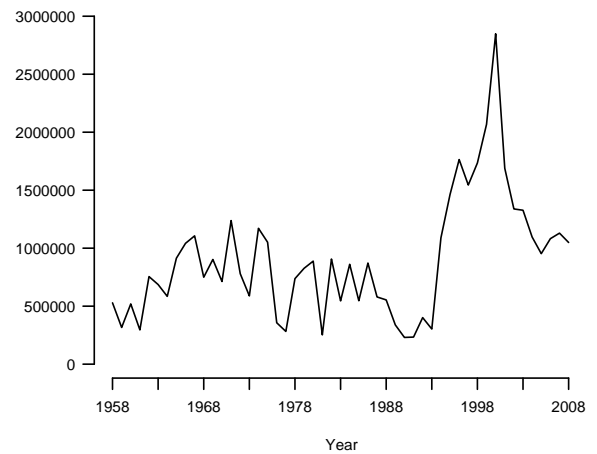
**Strata 43,45,46,47 American wigeon**



**Strata 43,45,46,47 American Green-winged teal**

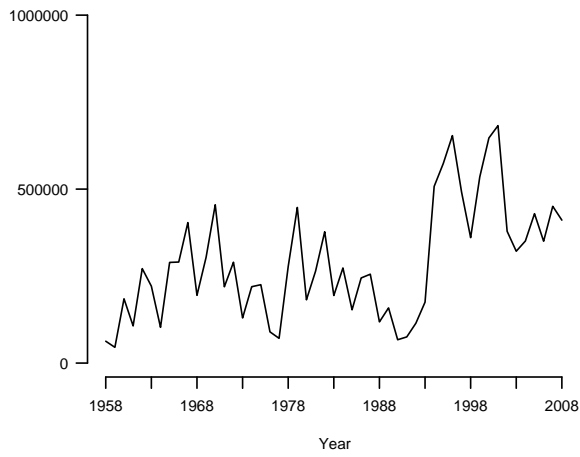


**Strata 43,45,46,47 Blue-winged teal**

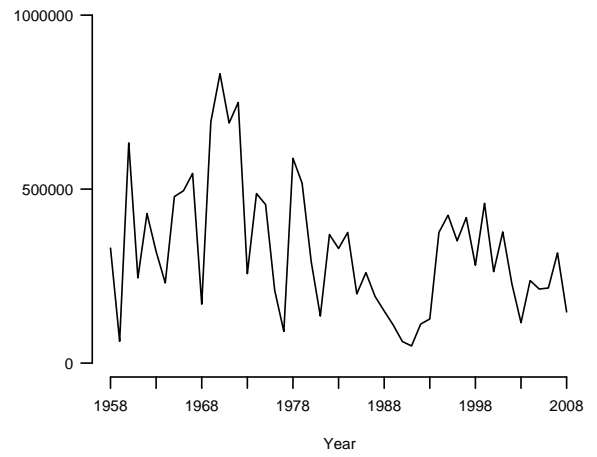


Appendix 4: Continued.

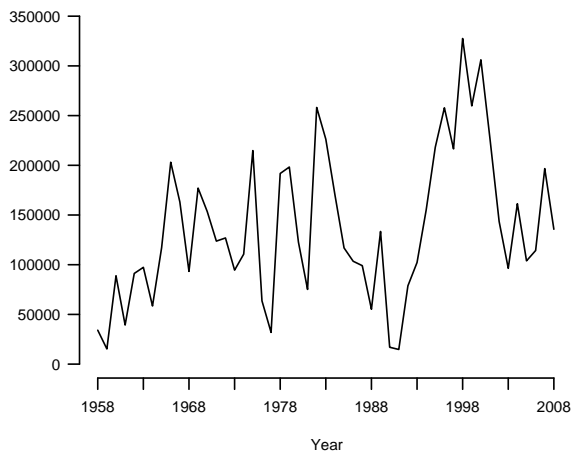
**Strata 43,45,46,47 Northern shoveler**



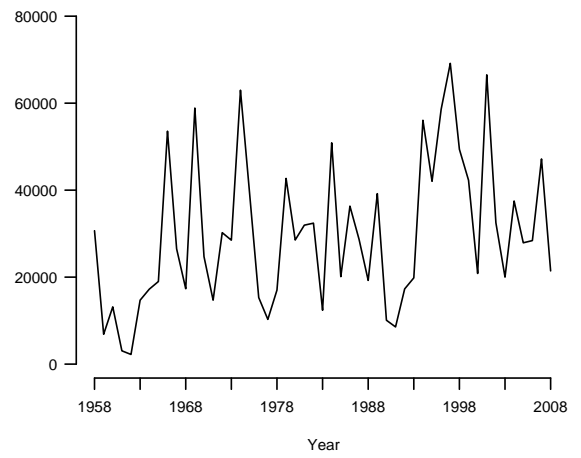
**Strata 43,45,46,47 Northern pintail**



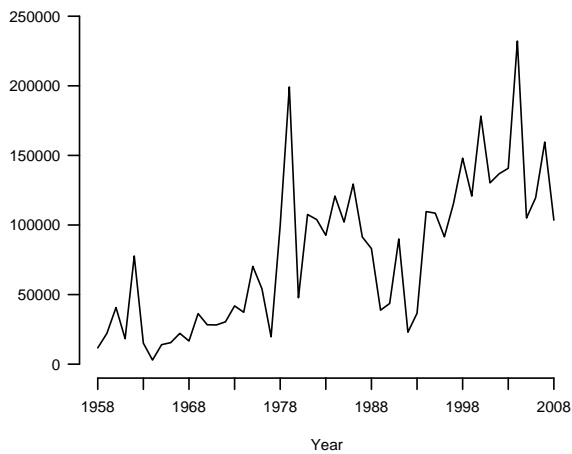
**Strata 43,45,46,47 Redhead**



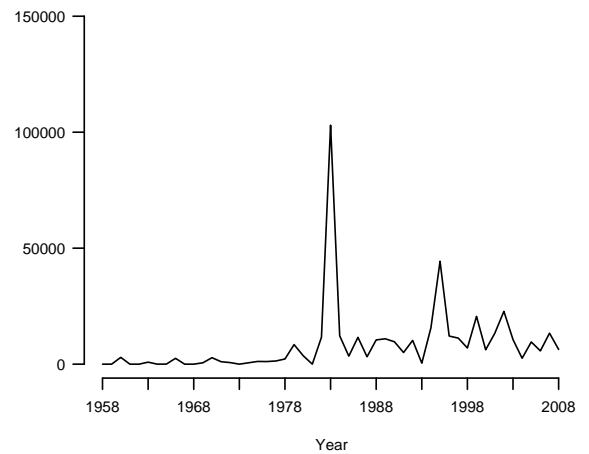
**Strata 43,45,46,47 Canvasback**



**Strata 43,45,46,47 Scaups**

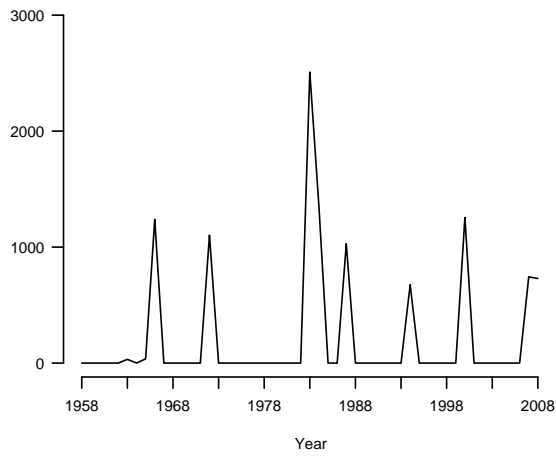


**Strata 43,45,46,47 Ring-necked duck**

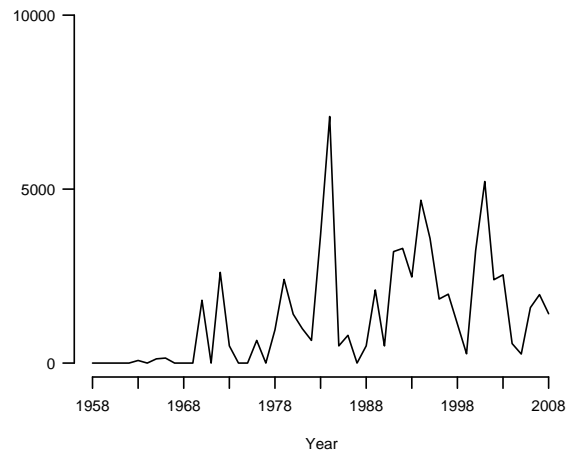


Appendix 4: Continued.

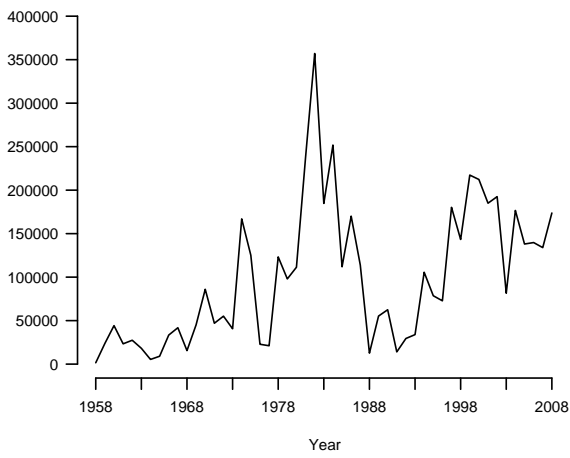
**Strata 43,45,46,47 Goldeneye's**



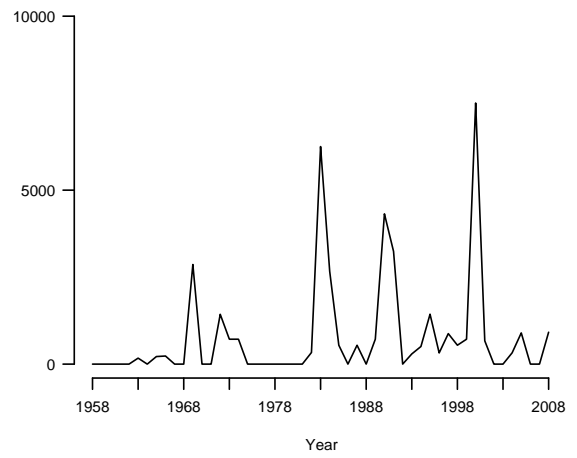
**Strata 43,45,46,47 Bufflehead**



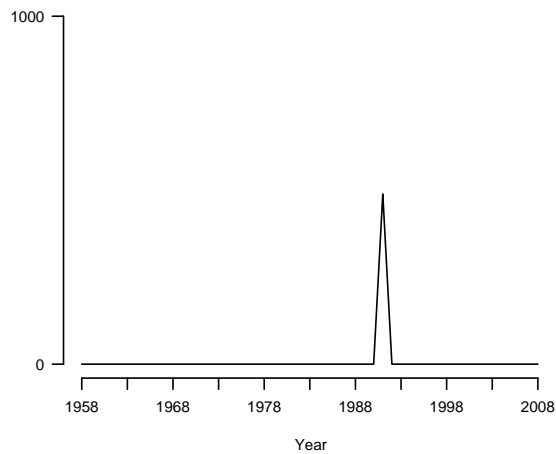
**Strata 43,45,46,47 Ruddy Duck**



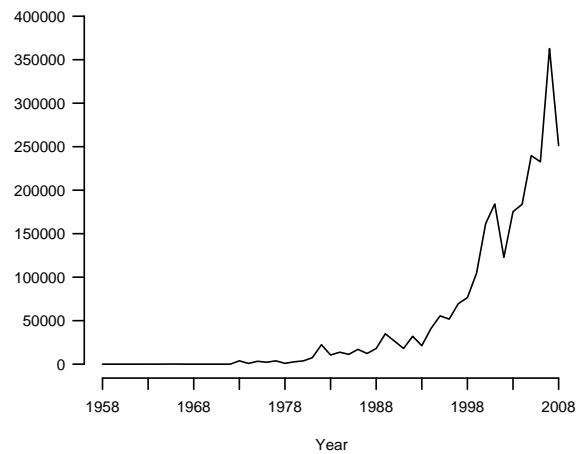
**Strata 43,45,46,47 Mergansers**



**Strata 43,45,46,47 Scoters**



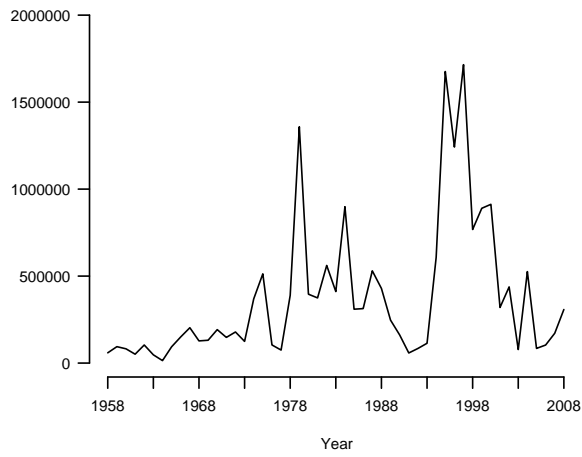
**Strata 43,45,46,47 Canada Goose**



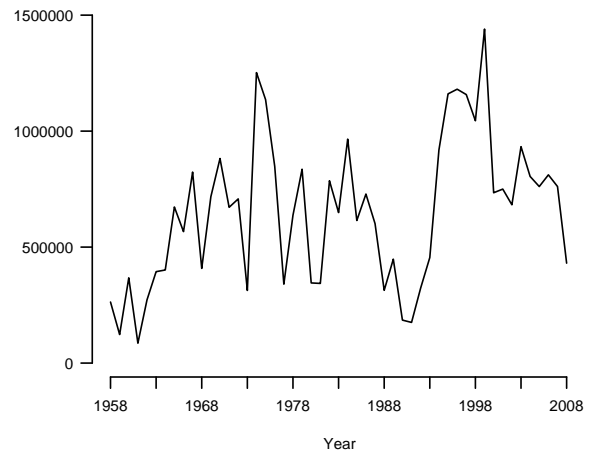


Appendix 4: Continued.

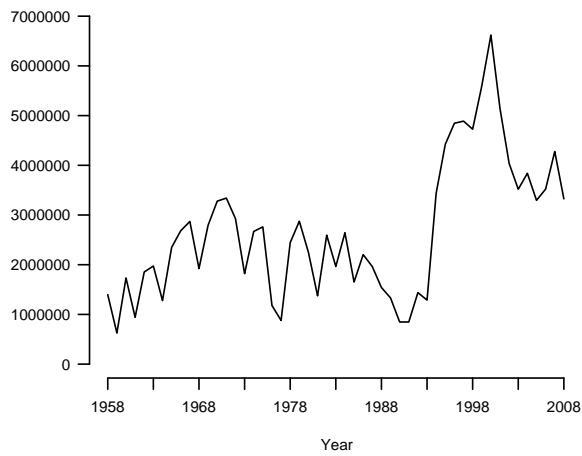
**Strata 43,45,46,47 American coot**



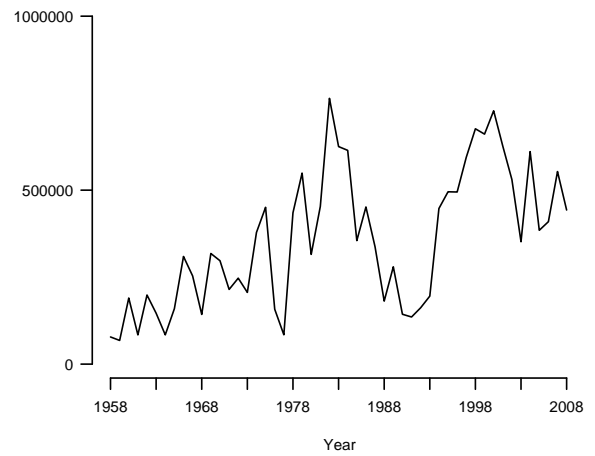
**Strata 43,45,46,47 Ponds**



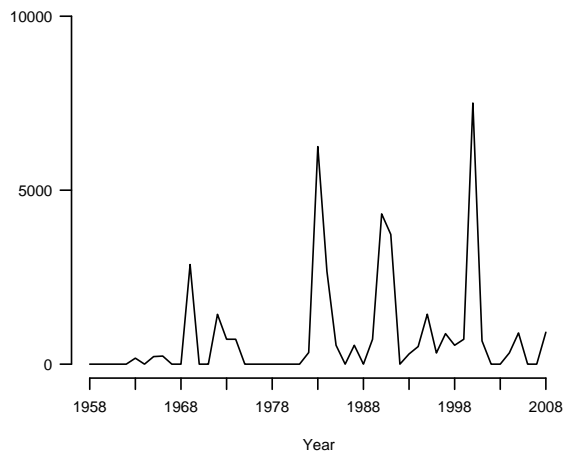
**Strata 43,45,46,47 Dabblers**



**Strata 43,45,46,47 Divers**



**Strata 43,45,46,47 Miscellaneous**



**Strata 43,45,46,47 Total Ducks**

