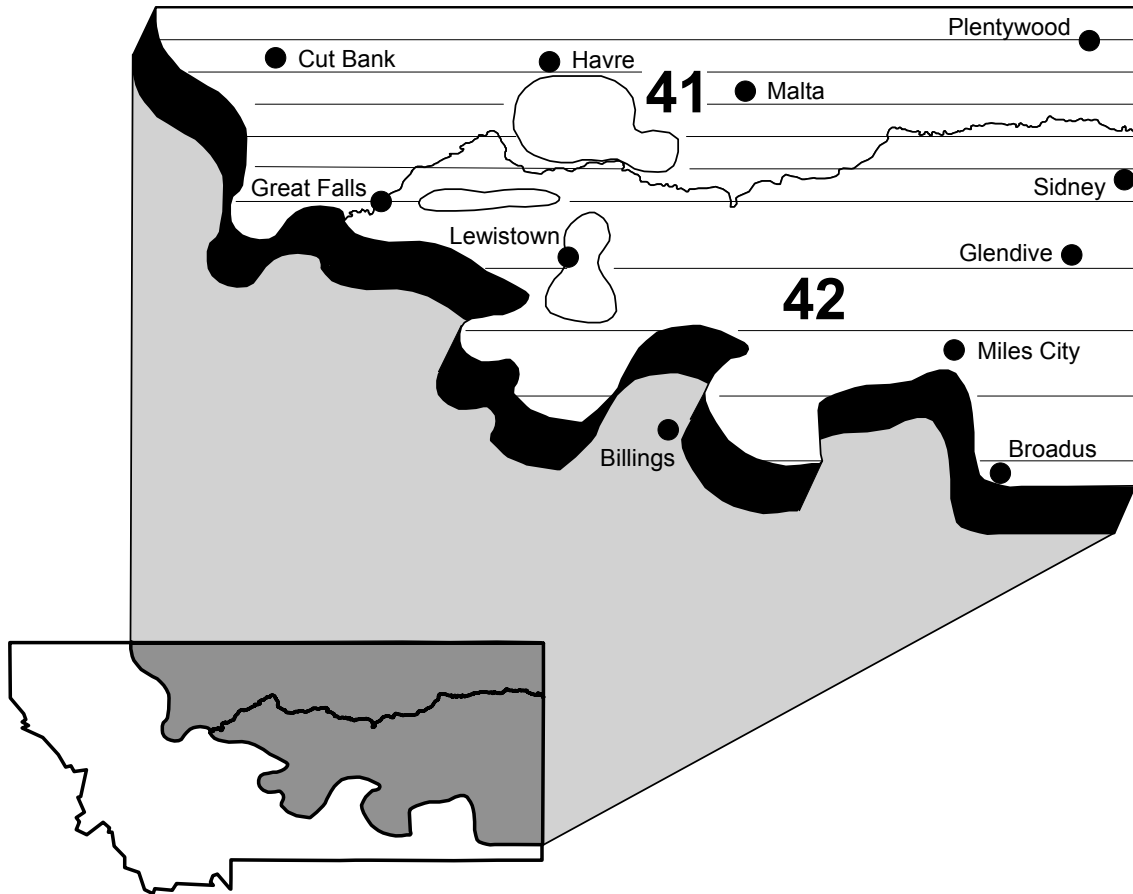


Waterfowl Breeding Population Survey  
for

# MONTANA



2008

**Title:** Waterfowl Breeding Population Survey for Montana

**Strata Surveyed:** 41 and 42

**Dates:** May 1 – 19 2008

**Data Supplied by:** U.S. Fish and Wildlife Service (USFWS)  
Division of Migratory Bird Management(WPS)

**Aerial Crew:**

Pilot/Observer: Ray Bentley  
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Leader: Kathy Fleming  
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Assistants: Jenny Hoskins  
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**Abstract:**

The 2008 waterfowl breeding population survey for Montana was completed on May 19 with all transects and segments covered as outlined in the survey design. Initially the region was observed to be under the influence of a moderate drought with a general decline in habitat quality from 2007. Abundant snow fed run-off along the Front Range and isolated precipitation events in the southeast served to offset dry conditions observed along the northeast high line bordering Saskatchewan. Pond numbers for combined strata were 42% below 2007 but comparable to 10-year and long term means. Upland vegetation as well as aquatic emergents appeared delayed in development while residual cover remained relatively good from 2007. Overall waterfowl numbers reflect a general downturn from 2007 as well as 10-year and long term reference points. Total duck numbers were 42% below 2007, and 39% below the long term mean. Mallard as well as all dabbling species combined display similar negative trends and proportions. Northern pintail were 80% below historic references while gadwall matched the long term mean. More variability was observed in estimates for diving species with declines in scaup (-60%) and redhead (-48%) from historic reference points and slight increases in canvasback (30%) and ring-necked duck (26%). Canada goose populations while reduced from 2007 remain 43% above the long term mean. Post survey precipitation is expected to partially mitigate the effects of relatively dry conditions for late nesting and re-nesting pairs however the breeding potential for eastern Montana remains diminished from 2007 and slightly below average overall.

### **Methods:**

Procedures followed in conducting this survey are described in the Standard Operating Procedures for Aerial Breeding Ground Surveys in North America, Section III, revised 2003. The survey design for Montana included 13 air/ground comparison segments comprising 5.3% of the total 193 segments flown. All segments specified in the survey design were counted (Table 3).

Air crew members arrived in Pierre SD on April 29 followed by ground crew members on April 30. Initial ground reconnaissance for waterfowl breeding phenology was conducted on April 30 north of Pierre and continued through May 2 west of Pierre. Aerial observer orientation and training also began on April 30 and continued through May 1 and included wetland classification assessment, waterfowl ID and social grouping determination, recording system orientation, and aircraft safety procedures. Aerial surveys were initiated on May 4 and continued through May 19. Flights were canceled on May 8, 9, 12 and 16 due to adverse weather conditions. Data files and habitat summaries for stratum 43 and 44 (Western Dakotas) were submitted to John Solberg for inclusion in the overall Dakotas report.

A single engine Cessna 182R (N702) was used to conduct the survey over approximately 76 flight hours. Survey personnel included Ray Bentley as pilot/observer, Dan Yparraguirre as observer, Kathy Fleming as ground crew leader, Jenny Hoskins as ground crew assistant. 2008 was Ray's 8th season flying Montana surveys and Dan's 4th season as observer on BPOP surveys. Kathy Fleming served as ground crew assistant in 2007 in Montana while Jenny Hoskins served as assistant to the eastern Dakota ground crew in 2007.

As in other years aerial crews utilized on-board laptop computers, interfaced with the aircraft's GPS for data recording, Geo-referenced data files were generated after daily transcription followed by compilation and summaries using software developed by Jack Hodges (Ret) USFWS/DMBM, Juneau, AK. Processed data files were submitted to Emily Silverman and Nathan Zimpfer, FWS Population and Habitat Assessment Section (PHAS) in Laurel MD for application of visibility correction factors and table generation.

### **Weather and Habitat Conditions:**

Eastern Montana experienced a relatively mild winter 2007/2008 with generally below average precipitation levels. Current indicators show the region under the influence of moderate drought with Palmer indices at 55-70% of normal precipitation for May. Contacts with Jim Hansen of Montana Fish, Wildlife, and Parks (Billings, MT) also indicate an overall dry and somewhat delayed spring. Aerial and ground observations showed upland vegetation to be lagging in development with the normally expected early growth seemingly non-existent until after May 17. Residual cover was adequate given the robust growth of 2007 while emergents had yet to appear by May 20. As is often the case in eastern Montana habitat conditions varied widely on both temporal and landscape scales. Largely dependant on early spring precipitation resulting from relatively isolated and localized storm systems, waterfowl habitat quality rating becomes a diverse mosaic ranging from poor to favorable. The region southeast of Miles City benefited from an early May storm event in western South Dakota which deposited nearly a meter of snow at its center. When surveyed the area showed nearly 100% of available basins containing class III water with additional sheet water and ephemeral stream systems full. In contrast the highline border with Saskatchewan and Alberta suffered from more severe drought conditions with the eastern portions of this region displaying less than 10% of basins containing water and greatly fragmented stream systems. Snow accumulation in the Hayes Mountains exceeded 140% by mid May and was over 110% along the Front Range. Consequently habitat conditions immediately adjacent to these upland regions appeared more favorable given the influence of run-off on stream/beaver pond complexes. Conversion of CRP uplands to cereal grain crops was evident

particularly in the southeast portion of the survey area. When associated with embedded wetlands, in this case most often stock dams, this conversion results in a further degradation of available nesting habitat. In regions where 80% of basins were dry the remaining filled basins displayed crowding with waterfowl pair densities above what would be considered normal or functional. The overall conditions in eastern Montana vary from only average to below average with regards to waterfowl nesting and subsequent brood habitat. The arrival of late spring precipitation was reported after May 25 and into June and should somewhat mitigate the negative effects of a relatively dry April and early May with a hoped for late nesting effort and improvement of brood habitat. At best however the region is expected to only be average or slightly below average with regards to waterfowl production.

#### Stratum 41 (North of the Missouri River)

This region showed adjusted pond estimates at 100,600 a 55% decrease from 2007 (Table 2). This value also represents a nearly 31% decline from the 10-year mean, and a 24.7% decrease from the region's long term mean. By mid May the greatest negative departure from established mean values for pond densities occurred along the eastern high line and south toward Glasgow and Sidney. The western high line border with Alberta displayed a more normal level of pond densities, wetland development, and upland nest cover. Benefiting from early May precipitation as well as abundant snow fed run-off, the western margin of the strata near the front range contained full stream beds and the usual complex of beaver and oxbow pond types. Upland vegetation was relatively robust in the northwest quarter of stratum 41. Throughout the region in areas where CRP or native prairie remains intact the robust residual cover from 2007, even in the relatively dry northeast quarter should provide more or less normal upland nest cover in both quantity and quality. The addition of late May precipitation as reported by ground personnel and weekly USDA drought indicators should also help to improve conditions at least for late nesting/re-nesting pairs and also partially maintain or slightly improve brood habitat. The less than favorable habitat observed in the eastern portion of the strata combined with the more favorable conditions recorded in the western portion are expected to provide an overall nest success and production of average to slightly below average.

#### Stratum 42 (South of the Missouri River)

The portion of eastern Montana south of the Missouri river showed adjusted pond estimates 31% below 2007 at 173,500. This value however is 20.7% above the 10-year mean and 27.7% over the long term mean. While this area also experienced a relatively dry winter and early spring as found to the north, several smaller precipitation events occurred in May as well as a larger system which affected northwestern South Dakota and south eastern Montana. Pond densities in the region south of Miles City and near Baker displayed full stream systems and a high percentage of basins containing class III water and numerous lowlands containing sheet water. The western portion of the strata near the front range was similar to stratum 41 in that abundant snow pack is providing high run-off affecting the associated stream complex pond systems. Although isolated regions of stratum 42 showed signs of moderate drought when combined with the relatively good conditions along the southeastern border the overall outlook from a habitat standpoint is for average production potential.

#### **Breeding Population Estimates**

Initial ground reconnaissance and pre-survey aerial observation indicated a somewhat delayed breeding phenology with evidence of migrant flocks still present on larger water impoundments.

Survey reconnaissance was continued until normal pairing was observed on smaller wetlands and all expected species were present. Even with the delay in survey initiation crowding was observed throughout the survey period and is discussed below.

Population estimates for combined dabbling species was 524,500 (Table 1) after application of survey expansion and visibility correction factors. This represents a 43% decrease from 2007, a 39% decline from the 10-year mean, and 38% decline from the long term mean. All dabbling species showed negative trends from one year, ten year, and long term mean reference points. Mallard population estimates mirrored the combined dabbling species' departures from reference points with a 40% decrease from 2007, a 36% decline from the 10-year mean, and 33% decline from the long term mean. The degree of decline from the three reference points was more or less repeated for all species with similar values. Northern Pintail a species of continued concern showed an 80% decline from the long term mean.

Population estimates for diving species followed a similar trend as dabblers with a 24% reduction from 2007 and 34% and 46% declines from 10-year and long term means. Not all species showed negative departures with Canvasback, Goldeneye, and Ring-necked Duck estimates similar or slightly higher than 10-year means. Diving species however are infrequently encountered in this survey area thus slight variance from year to year in observed bird numbers can result in large percentage departures from reference points. Scaup showed a slight increase from 2007 however remain below both 10-year and long term means.

Canada Goose population estimates were slightly below 2007, are similar to the 10-year mean, and remain above the long term mean by 43%.

American Coot population estimates were well above reference points at 136,600 and a 200% increase from the 10-year mean.

As in previous waterfowl population surveys of this region population estimates were greater in stratum 41 than 42 across nearly all species. The difference is greater than would be expected from simple expansion of stratum area particularly for Northern Pintail, scaup, and American wigeon. Canada Goose estimates were slightly greater in stratum 42 as was pond density.

Graphs #1 through #26 provide visual depiction of trends in waterfowl population estimates over long term.

### **Conclusions:**

Observation in 2008 reveal conditions in eastern Montana that reflect reduced winter/spring precipitation yet retained much of the residual cover from 2007. Initial aerial observations showed very dry conditions in northeast Montana particularly north of Glasgow and along the border with Saskatchewan. An artifact of aerial wetland delineation often occurs during dry periods in areas of abundant stream systems were partially dry and thus fragmented streams inflate the overall pond count. Even with this factor in place total pond numbers were down from short and long term reference points despite more-less normal habitat conditions in the western half of the survey area. Another occurrence would have served to mitigate the negative effects of a dry spring would have been the presence of a significant though localized storm system occurring in SE Montana in early May. Conditions in the immediate area following this system appeared quite good as were conditions found along the immediate front range due to substantial run-off however the degree of positive influence from these areas failed to offset the remainder of the region which showed very dry conditions with an associated decrease in habitat quality and

quantity. Observed waterfowl populations appear to have responded to the drier condition as expected with fewer pairs noted and pair crowding observed of larger water bodies. Much of waterfowl breeding/production habitat in eastern Montana is represented by artificial impoundments which often lack the robust adjacent nest cover and emergent vegetation associated with natural seasonal and semi-permanent wetlands. However a benefit of these man-made ponds is the increased stability in water availability during dry periods. Since much of the region is dominated by semi-arid upland habitat with relatively stable yet widely dispersed water impoundments, crowding is often observed. During wet cycles with the addition of natural wetlands complimenting the stock dam and dugout component breeding potential is elevated. When the limited natural wetland type is reduced due to limited precipitation or by habitat modification the breeding population tends to collect on the remaining more stable impoundments with a reduction in overall breeding potential. When large water bodies are encountered in this region some degree of “ pair accumulation” is observed even during wet cycles. This area has experienced two successive years of ample moisture and relatively favorable waterfowl breeding habitat . While overall 2008 appears to be a reduction in habitat quality and breeding effort the effects of a short term drought cycle may not be entirely negative. Given that periodic desiccation of natural wetlands tend to increase future productivity the addition of late spring precipitation combined with a late nesting/re-nesting effort can improve overall breeding potential during a dry period. However another factor is the availability of suitable habitat in terms of wetlands and associated upland nesting cover when moisture is added back into the system. The observed increased conversion of native prairie and CRP lands to agricultural production limits the rebounding capability of these impoundment dominated landscapes following a dry period and likely will have an overall negative affect on waterfowl production. Given current conditions overall waterfowl breeding potential for the region is expected to remain below average.

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 Montana.

Species/Ponds	Stratum 2008				% Change From				
	41	42	2008		2007 Total	10-Year		Long-term	
			Total	Mean		Mean	Mean		
Ducks									
Dabblers									
Mallard	98.7	92.3	191.0	319.7	298.6	288.0	-40.3	-36.0	-33.7
American Black Duck	0.0	0.0	0.0	0.0	0.0	0.0	--	--	--
Gadwall	79.2	37.0	116.2	165.5	141.2	116.3	-29.8	-17.7	-0.0
American wigeon	23.0	7.7	30.6	96.1	56.7	79.4	-68.1	-46.1	-61.5
American Green-winged teal	11.3	7.7	19.0	28.7	30.2	23.6	-33.9	-37.2	-19.8
Blue-winged teal	51.2	39.5	90.7	141.7	141.8	103.8	-36.0	-36.0	-12.6
Northern shoveler	34.0	14.3	48.4	96.7	110.3	93.5	-50.0	-56.1	-48.2
Northern pintail	20.9	7.7	28.6	76.2	90.3	149.3	-62.5	-68.3	-80.8
Subtotal	318.3	206.2	524.5	924.7	869.1	853.9	-43.3	-39.7	-38.6
Divers									
Redhead	3.2	0.0	3.2	3.0	6.7	6.1	6.4	-52.6	-48.5
Canvasback	3.7	4.1	7.7	15.4	7.1	6.0	-49.8	9.3	30.1
Scaups	11.5	2.1	13.6	11.4	20.3	34.3	18.7	-33.3	-60.5
Ring-necked duck	1.1	2.2	3.3	9.7	3.2	2.6	-66.1	3.8	26.2
Goldeneye's	0.6	0.0	0.6	0.0	0.5	0.7	--	16.7	-22.5
Bufflehead	0.9	0.0	0.9	0.6	1.2	1.4	67.6	-22.6	-32.8
Ruddy Duck	2.9	0.0	2.9	2.4	9.7	8.1	17.0	-70.6	-65.0
Subtotal	23.8	8.3	32.1	42.5	48.6	59.3	-24.5	-34.0	-45.8
Miscellaneous									
Mergansers	1.1	0.0	1.1	0.3	4.2	2.4	324.6	-74.4	-55.1
Long-tailed duck	0.0	0.0	0.0	0.0	0.1	0.0	--	-100.0	-100.0
Eiders	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	--	-100.0	-100.0
Subtotal	1.1	0.0	1.1	0.3	4.3	2.5	324.6	-75.0	-56.1
Total Ducks	343.1	214.5	557.7	967.5	922.1	915.6	-42.4	-39.5	-39.1
Canada Goose	38.4	43.8	82.3	97.3	80.4	57.2	-15.4	2.3	43.8
American coot	100.6	36.0	136.6	60.4	45.3	59.5	126.1	201.6	129.8
Ponds	100.6	173.5	274.1	474.7	289.1	269.5	-42.3	-5.2	1.7

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

Year	Stratum 2008		
	41	42	Total
1974	142.4	66.9	209.2
1975	150.6	128.8	279.4
1976	109.3	126.3	235.5
1977	70.4	88.2	158.6
1978	145.7	156.2	301.9
1979	135.0	106.2	241.2
1980	77.9	74.4	152.3
1981	103.3	73.0	176.3
1982	147.1	126.5	273.5
1983	85.2	88.7	173.9
1984	88.6	117.5	206.2
1985	127.3	160.0	287.3
1986	190.4	206.3	396.7
1987	102.2	127.1	229.3
1988	78.3	92.0	170.3
1989	160.5	177.3	337.8
1990	121.7	124.3	246.0
1991	111.6	130.1	241.6
1992	95.6	140.0	235.5
1993	94.3	100.5	194.8
1994	227.4	251.1	478.5
1995	164.1	184.7	348.8
1996	209.4	174.7	384.1
1997	154.3	160.2	314.5
1998	149.4	176.0	325.4
1999	227.6	149.8	377.3
2000	74.6	88.0	162.6
2001	74.2	79.7	154.0
2002	71.3	93.4	164.7
2003	136.4	124.4	260.8
2004	161.5	135.8	297.3
2005	187.9	185.1	373.0
2006	148.1	153.3	301.4
2007	223.5	251.2	474.7
2008	100.6	173.5	274.1
10-year Mean	145.4	143.7	289.1
Long-term Mean	133.7	135.8	269.5
Percent Change:			
From 2007	-55.0	-30.9	-42.3
From 10-year Mean	-30.8	20.7	-5.2
From Long-term Mean	-24.7	27.7	1.7



Table 3. Montana Stratum Data 2008

	strata	
Survey Design	41	42
Square miles in the stratum	32,902	40,755
Square miles in sample	504	365
Linear miles in sample	2,016	1.458
Number of transects in sample	7	7
Number of segments in sample	112	81
Expansion factor	65.2817	111.8107

	strata	
Current Year Design	41	42
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Square miles in sample	504	365
Linear miles in sample	2,016	1.458
Number of transects in sample	7	7
Number of segments in sample	112	81
Expansion factor	65.2817	111.8107

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

Species/Ponds	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
Ducks										
Dabblers										
Mallard	363.3	489.4	320.9	198.5	291.3	311.5	273.9	374.2	261.3	198.2
American Black Duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gadwall	147.9	130.5	100.0	93.7	94.3	53.3	49.1	15.5	11.8	69.6
American wigeon	36.8	43.2	63.6	68.6	85.8	92.6	58.3	129.8	99.2	76.8
American Green-winged teal	22.5	18.4	29.9	20.5	8.6	28.2	11.5	31.7	51.5	21.9
Blue-winged teal	137.5	133.3	82.9	53.2	149.9	99.3	87.1	17.0	8.5	77.7
Northern shoveler	65.7	83.1	98.6	78.0	109.6	64.9	65.5	61.1	47.2	58.1
Northern pintail	287.4	262.9	277.3	72.2	156.4	191.2	124.3	240.6	167.7	116.8
Subtotal	1061.2	1160.7	973.1	584.9	895.9	840.9	669.7	870.0	647.3	619.2
Divers										
Redhead	2.6	4.2	12.4	1.4	2.6	2.0	2.4	0.0	2.4	1.0
Canvasback	3.1	0.5	1.6	3.5	5.5	3.6	5.6	6.7	9.6	1.3
Scaups	27.8	44.7	43.0	27.0	50.0	33.2	15.6	39.5	49.2	35.8
Ring-necked duck	3.3	0.9	7.4	2.9	0.2	0.0	0.0	0.0	0.0	2.1
Goldeneye's	0.0	1.3	0.0	0.0	0.6	0.0	0.0	8.8	2.4	0.0
Bufflehead	1.3	1.3	0.4	2.0	1.4	0.4	0.0	1.7	0.6	1.7
Ruddy Duck	0.0	2.7	1.7	1.5	22.3	0.6	1.3	5.7	3.1	1.8
Subtotal	38.1	55.7	66.4	38.3	82.7	39.9	25.0	62.4	67.4	43.8
Miscellaneous										
Mergansers	1.4	0.0	7.7	0.7	0.0	0.0	0.0	0.7	0.8	3.5
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	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	1.4	0.0	7.8	0.7	0.0	0.0	0.0	0.7	0.8	3.5
Total Ducks	1100.7	1216.4	1047.3	623.9	978.6	880.8	694.6	933.1	715.5	666.6
Canada Goose	19.0	0.0	44.9	42.2	42.2	50.4	61.2	31.6	14.0	22.1
American coot	13.9	19.4	23.4	58.1	31.0	22.3	9.6	17.5	38.0	22.2
Ponds	232.4	204.4	167.8	116.1	254.1	259.0	254.1	283.3	233.4	209.2

Species/Ponds	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Ducks										
Dabblers										
Mallard	478.4	168.0	171.0	282.5	258.3	256.2	245.8	323.5	230.1	189.8
American Black Duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gadwall	72.9	55.3	19.7	174.8	78.6	83.5	119.9	95.1	71.0	38.3
American wigeon	110.6	99.7	77.0	157.0	87.9	148.9	65.2	89.4	77.9	73.0
American Green-winged teal	53.1	13.6	3.9	18.2	40.1	9.9	9.1	13.4	18.9	10.6
Blue-winged teal	98.3	207.1	93.8	93.9	117.5	103.4	81.8	211.0	79.9	52.1
Northern shoveler	100.2	102.2	31.1	179.2	189.6	52.2	121.8	160.7	61.8	65.0
Northern pintail	259.2	226.0	118.5	348.9	324.8	146.6	157.3	306.9	88.3	99.8
Subtotal	1172.8	871.9	514.9	1254.7	1096.7	800.7	801.0	1200.0	627.9	528.6
Divers										
Redhead	0.7	2.7	3.2	7.0	14.7	4.4	25.0	15.0	10.5	19.2
Canvasback	2.1	16.2	3.2	6.4	10.4	4.8	5.4	12.5	5.0	3.5
Scaups	26.4	29.9	34.4	72.1	88.6	36.8	35.8	61.0	47.1	53.3
Ring-necked duck	0.0	1.4	0.2	0.8	0.0	0.9	0.9	2.4	16.3	3.0
Goldeneye's	0.0	0.0	0.6	0.0	1.1	1.6	0.0	0.0	0.0	0.6
Bufflehead	0.4	0.6	0.0	1.3	3.6	1.0	2.4	5.6	0.4	1.8
Ruddy Duck	2.6	1.9	1.2	14.1	12.4	0.7	17.1	17.8	9.1	11.8
Subtotal	32.2	52.7	42.8	101.7	130.8	50.1	86.6	114.2	88.3	93.1
Miscellaneous										
Mergansers	1.4	0.8	2.7	1.9	4.1	0.0	8.5	1.8	0.0	1.4
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	0.2	0.0
Subtotal	1.4	0.8	2.7	1.9	4.1	0.0	8.5	1.8	0.2	1.4
Total Ducks	1206.4	925.4	560.3	1358.3	1231.5	850.8	896.0	1316.0	716.5	623.1
Canada Goose	23.1	27.0	26.3	27.9	41.6	36.6	31.3	37.1	34.6	51.1
American coot	13.8	59.5	16.4	83.1	319.4	104.2	197.7	53.3	42.9	103.5
Ponds	279.4	235.5	158.6	301.9	241.2	152.3	176.3	273.5	173.9	206.2

## Appendix. 1: Continued.

Species/Ponds	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Ducks										
Dabblers										
Mallard	152.0	156.9	240.9	218.0	282.8	148.4	222.7	239.9	288.6	368.7
American Black Duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gadwall	40.8	33.8	32.6	30.7	128.5	56.7	96.9	154.4	181.5	182.9
American wigeon	58.7	52.0	64.9	44.0	58.8	126.2	70.3	88.2	65.5	137.7
American Green-winged teal	6.4	6.2	6.0	12.0	17.0	15.7	12.4	16.3	8.4	34.0
Blue-winged teal	38.6	21.6	40.2	83.5	65.9	76.3	77.7	89.0	60.3	186.4
Northern shoveler	34.1	69.3	73.2	33.7	58.6	86.3	51.5	27.1	92.7	194.3
Northern pintail	56.5	95.9	146.0	61.6	58.0	131.2	43.1	75.5	130.4	244.5
Subtotal	387.0	435.6	603.8	483.6	669.6	640.6	574.7	690.4	827.4	1348.5
Divers										
Redhead	2.7	3.6	3.4	2.7	7.0	7.8	6.4	5.5	5.3	3.4
Canvasback	2.1	2.8	1.0	2.1	5.1	10.8	1.0	5.6	9.3	12.5
Scaups	20.0	33.4	44.7	55.9	46.9	33.1	25.2	14.0	28.3	28.6
Ring-necked duck	4.3	7.1	0.4	1.2	3.8	0.4	0.5	3.9	4.0	5.0
Goldeneye's	1.3	2.5	0.0	0.0	1.1	0.6	0.7	0.0	1.5	0.0
Bufflehead	1.0	0.4	0.0	4.1	1.7	6.0	2.2	1.3	0.4	0.3
Ruddy Duck	8.0	4.6	0.6	25.1	5.8	9.2	38.0	9.2	1.8	4.7
Subtotal	39.3	54.5	50.2	91.2	71.4	67.9	73.9	39.6	50.6	54.5
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	0.7	2.8	1.9	1.4	2.1	0.0	4.2	1.3	1.0	0.8
Total Ducks	427.1	492.9	656.0	576.2	743.1	708.6	652.8	731.3	879.0	1403.8
Canada Goose	49.4	32.9	39.4	67.1	79.3	97.7	70.8	90.5	103.3	76.3
American coot	145.2	32.1	27.2	95.5	65.9	153.4	52.9	15.3	58.3	56.8
Ponds	287.3	396.7	229.3	170.3	337.8	246.0	241.6	235.5	194.8	478.5

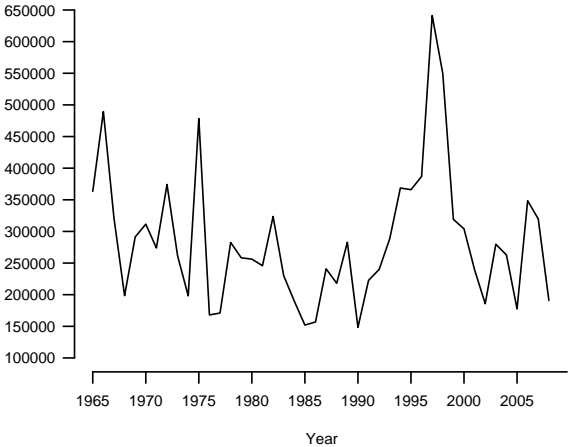
Species/Ponds	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Ducks										
Dabblers										
Mallard	366.0	386.9	641.2	549.5	319.0	304.1	239.1	185.8	279.7	262.8
American Black Duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gadwall	359.3	201.7	513.5	232.7	205.3	125.9	179.0	87.3	109.1	101.3
American wigeon	116.9	100.2	122.4	92.9	63.1	57.6	41.6	28.6	30.7	42.8
American Green-winged teal	30.3	56.1	58.1	13.3	27.2	16.5	18.1	40.6	50.2	56.4
Blue-winged teal	94.4	89.3	138.1	225.5	241.5	50.0	72.8	73.3	171.2	145.9
Northern shoveler	81.4	109.3	209.1	90.5	235.6	60.3	86.1	76.2	158.5	125.6
Northern pintail	154.5	135.6	209.3	110.9	131.8	58.7	79.0	47.0	95.0	77.9
Subtotal	1202.8	1079.1	1891.7	1315.4	1223.5	673.1	715.7	538.7	894.3	812.7
Divers										
Redhead	3.4	8.1	4.3	6.1	6.3	1.8	4.8	9.5	14.2	11.2
Canvasback	8.0	4.6	9.6	6.1	4.9	3.5	4.5	1.2	10.9	10.4
Scaups	21.4	35.9	32.7	14.1	28.0	30.7	31.5	20.6	24.6	16.3
Ring-necked duck	7.0	0.4	0.0	2.1	2.4	0.0	2.9	1.1	0.4	3.0
Goldeneye's	0.4	0.0	0.9	0.7	1.4	0.5	0.0	1.6	0.0	0.5
Bufflehead	0.5	0.0	2.2	1.5	1.1	1.7	0.6	0.5	0.7	0.6
Ruddy Duck	7.0	1.2	8.9	11.8	8.3	2.3	24.9	14.9	17.1	10.2
Subtotal	47.7	50.1	58.6	42.4	52.5	40.6	69.3	49.5	67.8	52.2
Miscellaneous										
Mergansers										
Long-tailed duck	0.0	0.0	0.0	0.0	0.5	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	0.3	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.0
Subtotal	2.6	3.4	2.4	3.0	11.8	6.7	4.8	8.6	3.5	1.3
Total Ducks	1253.1	1132.6	1952.7	1360.8	1287.9	720.4	789.8	596.8	965.6	866.3
Canada Goose	98.6	106.6	78.5	84.9	84.2	94.9	88.2	82.8	56.9	70.9
American coot	33.2	38.8	80.1	12.8	174.7	69.1	21.6	36.3	17.7	43.4
Ponds	348.8	384.1	314.5	325.4	377.3	162.6	154.0	164.7	260.8	297.3

Appendix. 1: Continued.

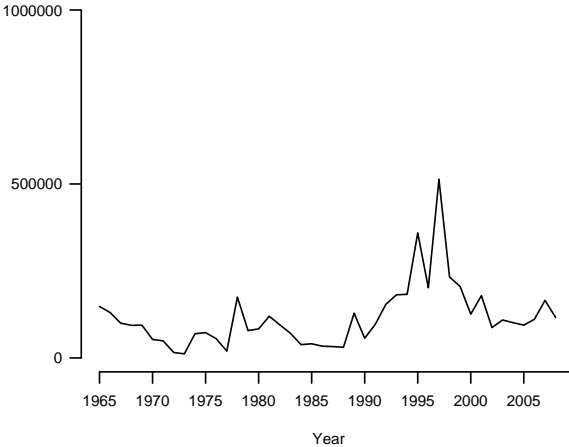
Species/Ponds	2005	2006	2007	2008
Ducks				
Dabblers				
Mallard	177.5	348.5	319.7	191.0
American Black Duck	0.0	0.0	0.0	0.0
Gadwall	94.3	111.2	165.5	116.2
American wigeon	43.6	70.4	96.1	30.6
American Green-winged teal	34.5	16.9	28.7	19.0
Blue-winged teal	144.1	151.9	141.7	90.7
Northern shoveler	82.7	90.3	96.7	48.4
Northern pintail	45.6	181.3	76.2	28.6
Subtotal	622.4	970.5	924.7	524.5
Divers				
Redhead	1.2	8.5	3.0	3.2
Canvasback	3.4	10.5	15.4	7.7
Scaups	12.8	12.9	11.4	13.6
Ring-necked duck	1.8	8.4	9.7	3.3
Goldeneye's	0.0	0.0	0.0	0.6
Bufflehead	3.0	1.7	0.6	0.9
Ruddy Duck	0.3	4.8	2.4	2.9
Subtotal	22.6	46.8	42.5	32.1
Miscellaneous				
Mergansers	1.8	1.5	0.3	1.1
Long-tailed duck	0.0	0.0	0.0	0.0
Eiders	0.0	0.0	0.0	0.0
Scoters	0.0	0.0	0.0	0.0
Subtotal	1.8	1.5	0.3	1.1
Total Ducks	646.8	1018.9	967.5	557.7
Canada Goose	73.9	70.3	97.3	82.3
American coot	5.1	11.9	60.4	136.6
Ponds	373.0	301.4	474.7	274.1

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

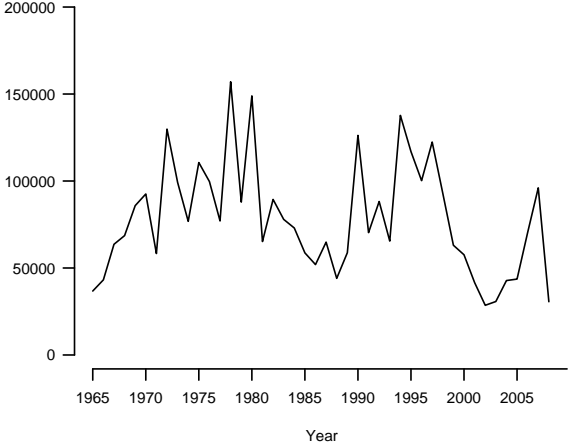
**Strata 41,42 Mallard**



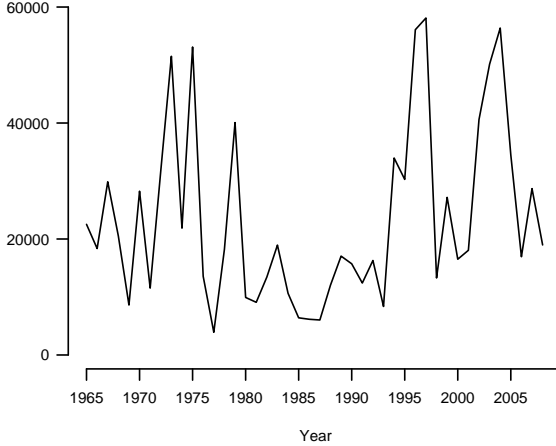
**Strata 41,42 Gadwall**



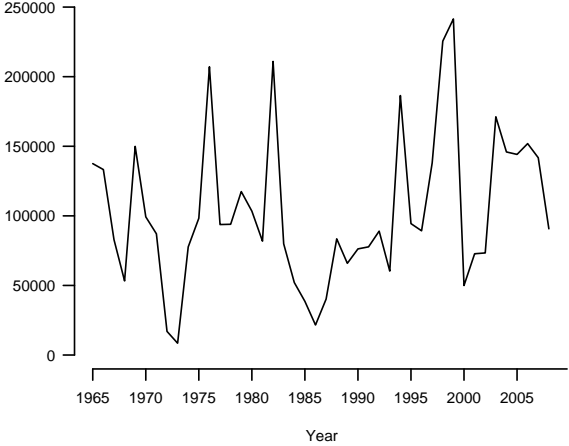
**Strata 41,42 American wigeon**



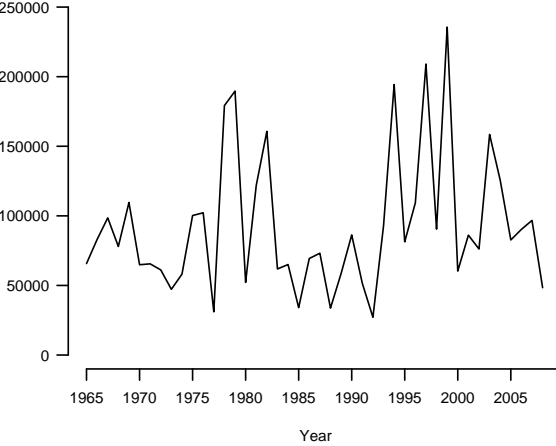
**Strata 41,42 American Green-winged teal**



**Strata 41,42 Blue-winged teal**

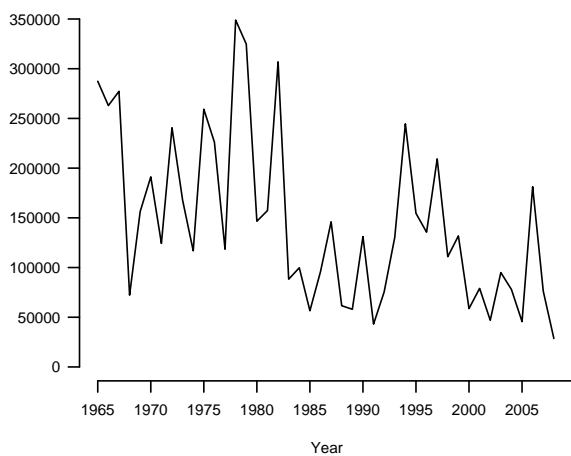


**Strata 41,42 Northern shoveler**

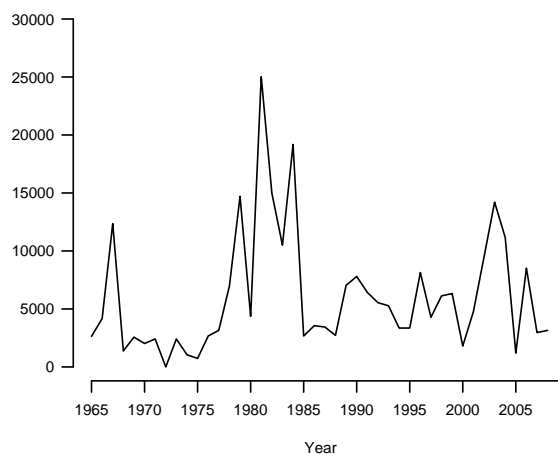


Appendix 2: Continued.

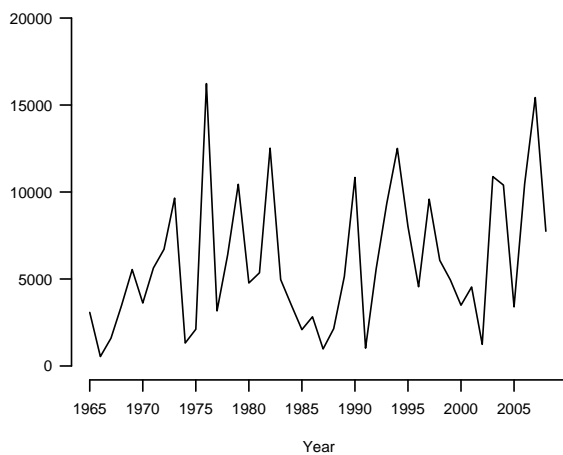
**Strata 41,42 Northern pintail**



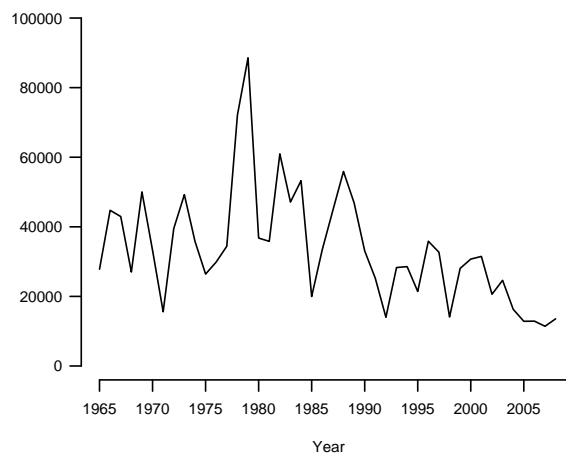
**Strata 41,42 Redhead**



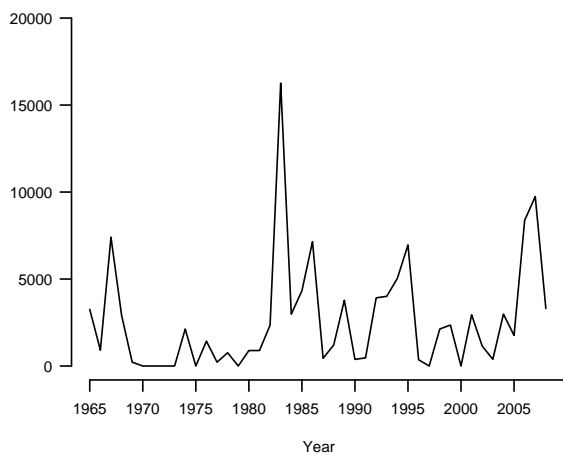
**Strata 41,42 Canvasback**



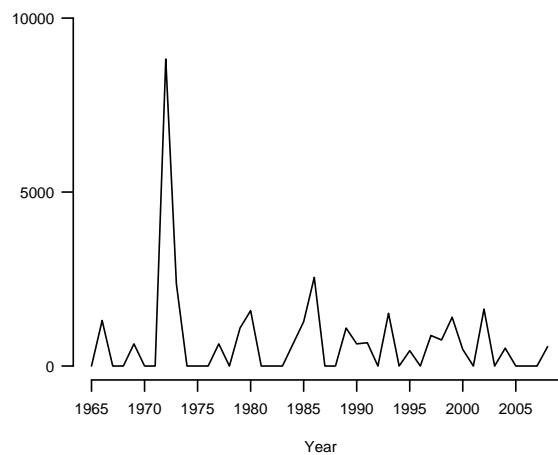
**Strata 41,42 Scaups**



**Strata 41,42 Ring-necked duck**

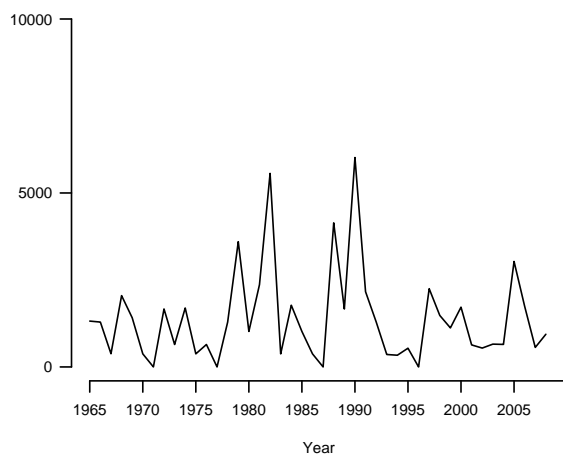


**Strata 41,42 Goldeneye's**

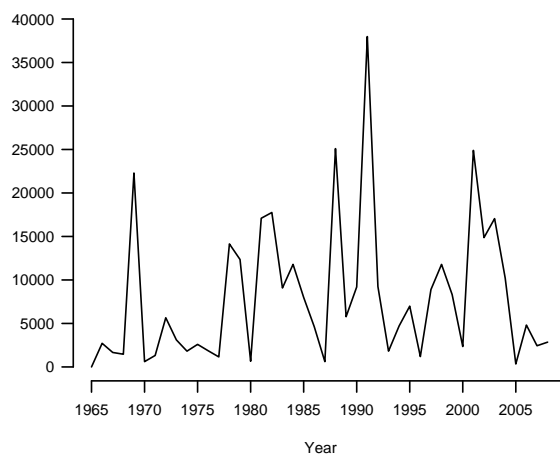


Appendix 2: Continued.

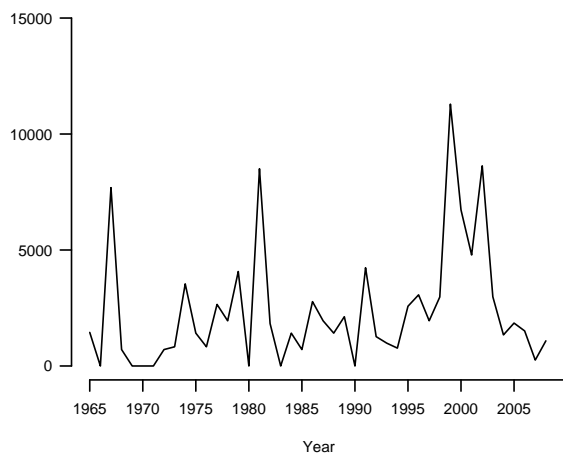
**Strata 41,42 Bufflehead**



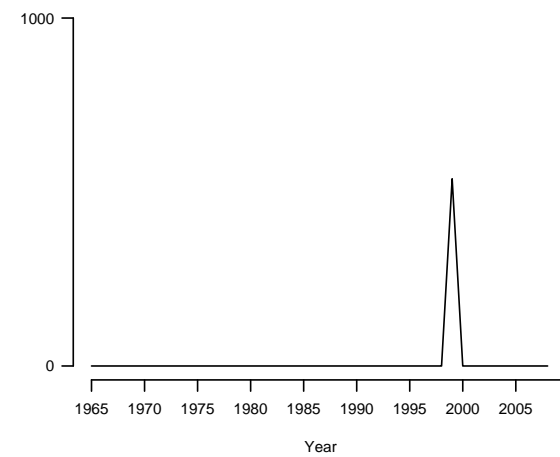
**Strata 41,42 Ruddy Duck**



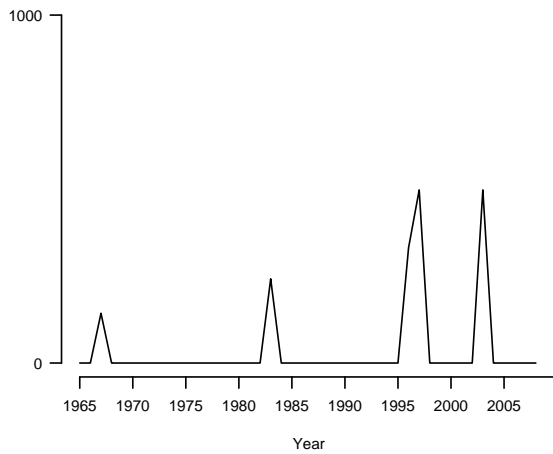
**Strata 41,42 Mergansers**



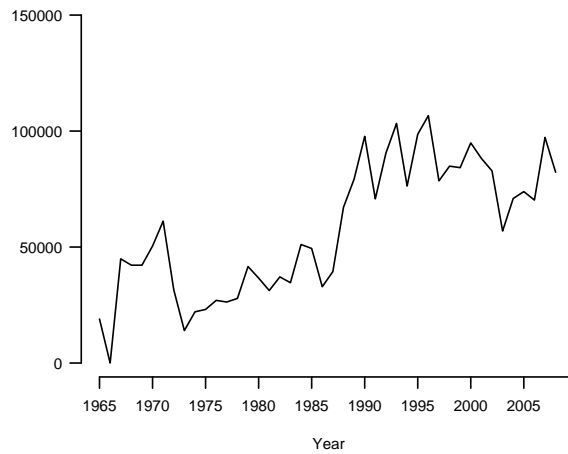
**Strata 41,42 Long-tailed duck**



**Strata 41,42 Scoters**

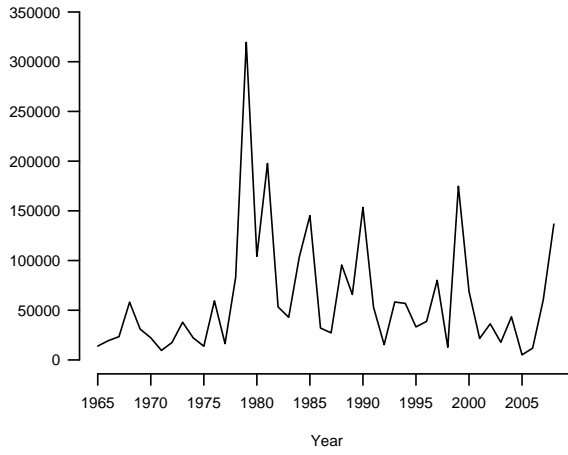


**Strata 41,42 Canada Goose**

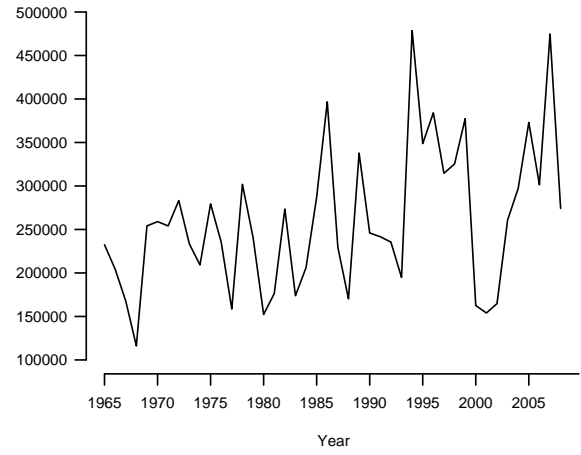


Appendix 2: Continued.

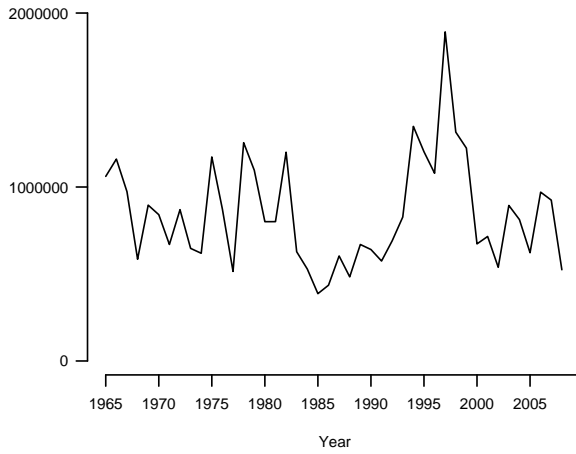
**Strata 41,42 American coot**



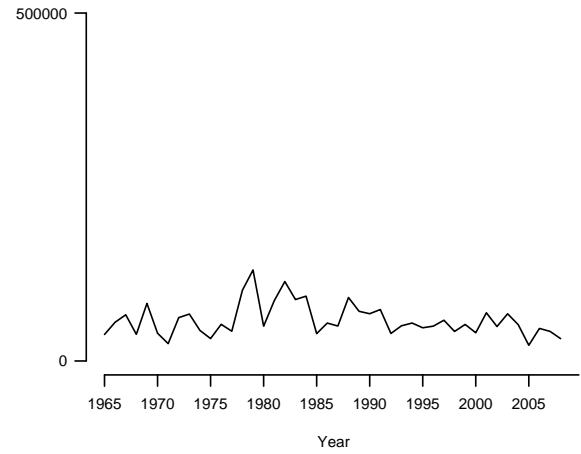
**Strata 41,42 Ponds**



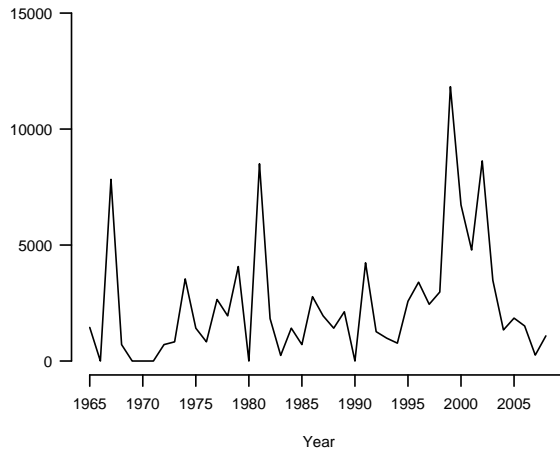
**Strata 41,42 Dabblers**



**Strata 41,42 Divers**



**Strata 41,42 Miscellaneous**



**Strata 41,42 Total Ducks**

