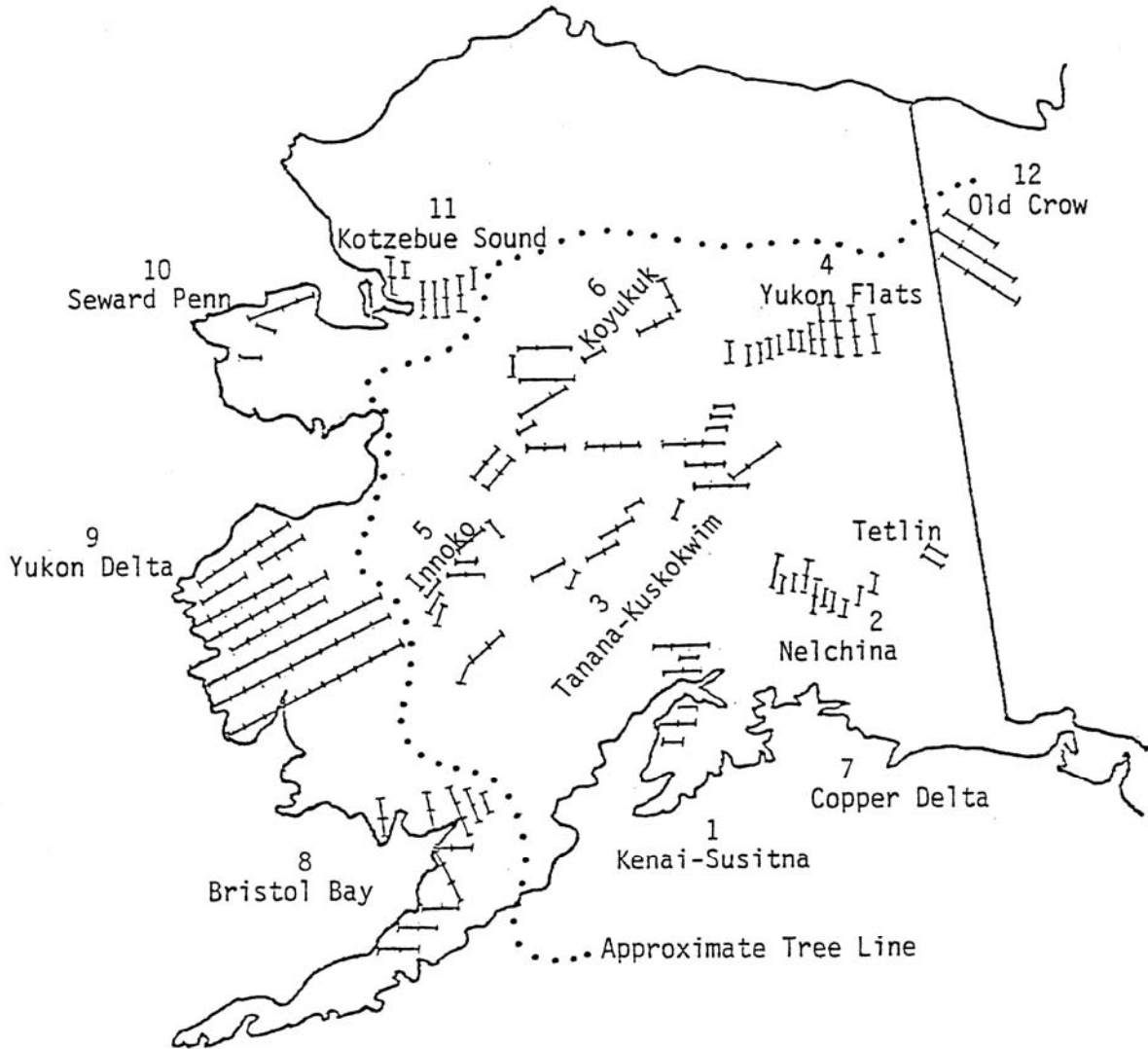


ALASKA - YUKON

WATERFOWL BREEDING POPULATION SURVEY

May 16 to June 7, 2009



By

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TITLE: Waterfowl Breeding Population Survey:
Alaska-Yukon (Crew Area 1)

STRATA COVERED: 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12

DATES: 16 May to 7 June 2009

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ABSTRACT

Waterfowl breeding conditions within the survey area depend largely on the timing of spring phenology. Spring breakup, while initially delayed, occurred normally throughout the majority of the survey area. During the time of this survey, all areas were normal with the exception of some segments on the Yukon-Kuskokwim Delta, which were slightly late. Significant flooding occurred in the interior in typical areas in strata 5 and 6 (Innoko/Iditarod and Koyukuk/Dulbi). Overall, production is expected to be fair to good with possible lower production in the flooded areas and in areas where breakup occurred later than normal.

Total duck numbers were down from the previous 10-year mean by 20%, but were up 13% from the long-term mean (1957 – 2008). Dabbler ducks decreased from the previous 10-year mean by 21%, but were up 32% from the long-term mean. Divers and “miscellaneous” species differed by -26% and -3% from their previous 10-year means, respectively, and differed from their long-term means by -15%. Duck production is expected to be fair to good.

Goose and swan (trumpeter and tundra) production should be about average throughout the survey area.

INTRODUCTION

This year the standardized waterfowl breeding pair survey in Alaska was conducted for the 53rd consecutive year. These data collected from this survey continue to increase in value and are the basis for management decisions at the state, flyway, and continental level.

The survey was flown in the specially modified de Havilland Turbine Beaver (N754). This aircraft has been used on this survey since 1977 and provides extremely high visibility and reliability. Continued use of N754 for this survey (and others) is highly recommended.

METHODS

Survey methods followed “Standard Operating Procedures for Aerial Waterfowl Breeding Ground Population and Habitat Surveys in North America” (USFWS and CWS 1987). We used two panel-mounted computers (Sony VAIO VGN-UX490N) that ran survey software developed

by John I. Hodges, USFWS-Alaska (retired). The software provided a moving map for situational awareness and recorded observations through a microphone (sound files) that were linked to coordinates from the aircraft GPS (latitude and longitude). We then used a second computer program on the ground to transcribe the linked sound files and produce a text file. The text files contained all relevant data for each observation and were used for analyses and production of stratum summaries and tables. All data and summaries were provided to the Division of Migratory Bird Management (DMBM) upon completion of the survey.

The survey design consisted of 12 strata and a total of 232 segments. The Alaska portion of the survey consisted of 214 segments each 16 miles in length and 10 segments each 8 miles in length. The Yukon portion of the survey (Old Crow Flats) consisted of 8 segments each 18 miles in length. All segments were flown in 2009 although a small portion of one segment (between McGrath and King Salmon) was skipped due to a wildfire occurring on the transect.

We incorporated visibility correction factors (VCFs) in the estimates of ducks. The VCFs were obtained from a six-year (1986-1991) helicopter/fixed-wing comparison study in Alaska (Conant et al. 1991). The VCFs were species and habitat specific: boreal forest (strata 1-7), tundra (strata 8-11), and Old Crow Flats in Canada (stratum 12). These VCFs have been used since 1992 and all data previous to 1992 have been corrected as well.

In 2002, the Waterfowl Management Branch in Alaska (following DMBM) decided to double all observations of single geese when calculating indicated total geese. The rationale for this decision was based on the premise that a single goose indicates a pair of geese with the unobserved goose on a nest. All historical data have been updated to reflect this change in analyses. Furthermore, we do not apply a VCF to Canada geese while the DMBM does apply a VCF of 2.89 for Canada geese. Finally, starting in 2002, the DMBM started deleting all flock sightings greater than 45 from the calculations of continental population indices while the results reported here include all flocked observations regardless of size.

WEATHER AND HABITAT CONDITIONS

Good conditions were present throughout Alaska in 2009, though spring was slightly late in some coastal areas. Spring arrived later than average on the Copper River Delta (stratum 7) and in some areas of the outer coast of the Yukon-Kuskokwim Delta (stratum 9). Spring breakup in interior Alaska and south central Alaska (strata 1-6) started slowly but was normal by the time breeding pair survey occurred. There was extensive flooding within the Innoko River drainage (stratum 5) and in parts of the Koyukuk River drainage (stratum 6). The flooding in these areas may cause reduced production. Bristol Bay (stratum 8), Seward Peninsula (stratum 10), and Kotzebue Sound (stratum 11) seemed to have normal breakup timing and conditions. The Old Crow Flats (stratum 12) was average and slightly further along in breakup compared to more recent years

BREEDING POPULATION ESTIMATES

Caution should be used when interpreting the graphs that include data previous to 1977. The specially modified turbine beaver (N754) has been used on this survey from 1977 to present.

This aircraft has increased visibility when compared to aircraft used prior to 1977 on this survey. This suggests that any long-term declines may be more significant than depicted on the graphs and any long-term increases may be less significant than depicted on the graphs (depending on the span of years in question). Likewise, long-term averages that include pre-1977 could be somewhat misleading. Historical data from this survey (1957-1994) have been analyzed and are available in a report (Hodges et al 1996).

Ducks

Estimates of ducks are provided in Tables 1, 2 and 9-20 and Figures 1-3.

Dabbler populations decreased from last year by 12%, were 21% below the previous 10-year mean, and were up 32% from the long-term mean (1957-2008). The northern pintail population was 15% below the previous 10-year mean and 1% above the long-term mean. The northern pintail has traditionally been the most numerous dabbler in Alaska and in recent years the Alaska population has accounted for a significant portion of the Pacific Flyway total for that species. Results from this survey (2009, which does not include the Arctic Coastal Plain of Alaska) accounted for approximately 29% of the continental pintail population. American wigeon were down 19% from the previous 10-year mean and were up 44% from the long-term mean. The American green-winged teal population was down 20% from the previous 10-year mean, and up 65% from the long-term mean. Mallard and northern shoveler populations were down 27 and 26% from their previous 10-year means, respectively, and were up 32 and 1% from their long-term means.

Scaup, which account for the vast majority of divers observed on this survey, were down 20% from the previous 10-year mean, and down 11% from the long-term mean. The canvasback population was down 64% and 55% from the previous 10-year mean and long-term mean, respectively. Ring-necked duck and goldeneye populations were both down 56% from their previous 10-year means, and were up 24% and down 55% from their long-term means, respectively. The bufflehead population was up 22% and 32% from the previous 10-year mean and long-term mean, respectively. The long-tailed duck population was down 29% from the previous 10-year mean and was also down 52% from the long-term mean. Eider and scoter populations were down 1% and up 5%, respectively, from their previous 10-year means and were down 45 and 2% from their long-term means. Mergansers were down 9% from the previous 10-year mean, but were up 82% from the long-term mean.

Geese

Figure 3 includes the trend of all geese recorded on 5 segments of this survey within the coastal zone of the Yukon-Kuskokwim Delta (actual geese seen on transect only). Data from 1964 was excluded because of extreme weather conditions experienced that year. Two lines were fit to these data (1957-1984 and 1985-2009) due to restricted harvest regulations that were first applied in 1984 (and in subsequent years) based on the Yukon-Kuskokwim Delta Goose Management Plan. The general upward trend since 1984 suggests a response in goose populations (primarily white-fronted geese and cackling Canada geese) to the management plan.

Swans

Estimates of swans are provided in Tables 3, 9-20 and Figure 3.

Trumpeter Swans – Trumpeter swan observations from this survey in boreal forest strata (1-4, 6, and 7) estimate the population at 15,400 adults and sub-adults, which is 15% below the previous 10-year mean, but is 66% above the long-term mean (1964 – 2008). Overall, good production is expected this year for trumpeter swans in Alaska.

Tundra Swans – The population index from tundra strata (8-11), not including the Arctic Coastal Plain of Alaska, was 111,100, which is 22% below the previous 10-year mean, and 13% above the long-term mean. The breeding index (singles and pairs) was 90,200, which is 10% above the previous 10-year mean. Overall, good production is expected this year for tundra swans in western Alaska.

Cranes

Estimates for sandhill cranes are available in Tables 4, 9-20 and Figure 4.

The sandhill crane index for Alaska in 2009 was 57,600, which is 30% above the previous 10-year mean, and 41% above the long-term mean.

Loons

Estimates for loons are available in Tables 5-7 and Figure 4.

The 2009 red-throated loon index for the Alaska portion of this survey (excludes Old Crow Flats) was 14,100, up 29% from the previous 10-year mean.

The 2009 Pacific loon index for Alaska was 49,300, down 7% from the previous 10-year mean.

The 2009 common loon index for Alaska was 8,000, down 21% from the previous 10-year mean.

CONCLUSION

Most waterfowl species experienced a decrease in 2009 when compared to previous ten-year means. However, total duck numbers were 13% above the long-term mean. Overall waterfowl production within the survey area is expected to be fair to good.

TELEMETRY

A Telonics telemetry receiver-scanner is incorporated in the panel of the survey aircraft. This year we scanned for sandhill cranes (our only request) and did not positively locate any transmitted cranes.

ACKNOWLEDGMENTS

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LITERATURE CITED

Conant, B., C.P. Dau, and W.W. Larned. 1991. Yukon Delta Alaska helicopter/fixed wing comparative waterfowl breeding population survey – progress report III. Unpubl. Rep., U.S. Fish and Wildl. Ser., Juneau, AK 11pp.

Hodges, J.I., J.G. King, B. Conant, and H.A. Hanson. 1996. Aerial Surveys of Waterbirds in Alaska 1957-94: Population Trends and Observer Variability. Information and Technology Report 4. U.S. Dept. of the Interior-National Biological Service. 24pp.

U.S. Fish and Wildlife Service and Canadian Wildlife Service. 1987. Standard operating procedures for aerial breeding ground population and habitat surveys in North America. U.S. Fish and Wildl. Ser. And Can. Wildl. Ser., Laurel, MD 103 pp.

Table 1. Alaska-Yukon. Ten year trend in adjusted waterfowl breeding population estimates by species, 2000 - 2009 (estimates in thousands).

Species	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Ducks:										
Dabblers:										
Mallard	770.2	718.3	667.2	843.5	811.1	703.3	515.4	575.6	526.0	496.4
Am. black duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gadwall	2.7	6.5	1.0	4.6	1.9	2.7	1.8	3.2	3.9	2.0
Am. wigeon	1141.3	1106.0	1036.5	1019.5	897.1	873.2	821.4	1102.9	910.2	795.0
Am. green-winged teal	946.4	1029.0	631.1	1035.4	818.6	713.1	779.7	814.6	646.1	649.6
Blue-winged teal	0.0	0.0	0.0	2.9	2.2	2.8	0.0	9.2	0.0	0.0
N. shoveler	846.5	666.2	580.7	671.0	642.5	666.2	408.4	573.1	459.7	457.0
N. pintail	1452.4	1426.4	942.0	848.3	927.4	905.5	1040.3	1120.2	1259.1	932.5
SUBTOTAL	5159.5	4952.4	3858.5	4425.2	4100.8	3866.8	3567.0	4198.8	3805.0	3332.5
Divers:										
Redhead	0.6	0.0	4.6	3.0	2.4	0.2	10.1	1.6	2.0	0.8
Canvasback	186.7	89.0	142.4	88.9	210.6	95.1	73.2	90.8	85.0	41.0
Scaups	1219.1	1148.1	815.4	1027.2	1001.0	960.8	883.0	1178.0	1069.1	822.0
Ring-necked duck	65.3	86.4	51.9	96.2	71.5	78.6	83.4	61.0	40.5	28.7
Goldeneyes	55.6	95.7	104.7	75.8	92.5	61.0	88.2	38.0	52.2	31.9
Bufflehead	39.7	54.3	38.3	46.7	43.9	51.7	46.2	60.6	56.1	58.3
SUBTOTAL	1567.0	1473.5	1157.3	1337.8	1421.9	1247.4	1184.1	1430.0	1304.9	982.7
Miscellaneous:										
Long-tailed duck	105.2	99.8	84.1	83.2	83.3	66.3	103.0	127.8	101.0	65.8
Eiders	13.0	6.2	24.1	17.5	17.4	7.9	13.7	16.0	17.5	14.8
Scoters	327.1	242.5	319.7	399.0	367.3	350.2	400.6	396.2	347.1	366.4
Ruddy duck	0.0	1.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0
Mergansers	32.9	27.2	22.9	20.6	22.0	36.3	27.0	36.3	26.9	24.2
SUBTOTAL	478.2	376.7	450.8	520.3	490.8	460.7	544.3	576.3	492.5	471.2
TOTAL DUCKS	7204.7	6802.6	5466.6	6283.3	6013.5	5574.9	5295.4	6205.1	5602.4	4786.4

Table 2. Status of Alaska-Yukon waterfowl breeding population estimates (thousands, adjusted for visibility bias) by species and strata in 2009, with comparisons to 2008, the previous 10-year mean, and the long-term mean.

Species	Strata*			2009 Total	2008 Total	10-Year Mean	Long-Term Mean	% Change From		
	1-7	8-11	12					2008	10-Year Mean	Long-Term Mean
Ducks:										
Dabblers:										
Mallard	254.9	221.4	20.1	496.4	526.0	684.3	375.9	-6	-27	+32
Am. black duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	--	--
Gadwall	0.0	2.0	0.0	2.0	3.9	3.3	2.0	-49	-40	0
Am. wigeon	440.0	272.4	82.6	795.0	910.2	984.1	550.4	-13	-19	+44
Am. green-winged teal	274.9	359.3	15.4	649.6	646.1	809.4	394.5	+1	-20	+65
Blue-winged teal	0.0	0.0	0.0	0.0	0.0	1.7	1.3	--	-100	-100
N. shoveler	150.5	292.4	14.1	457.0	459.7	617.3	288.7	-1	-26	+58
N. pintail	202.0	699.9	30.6	932.5	1259.1	1094.4	919.9	-26	-15	+1
Subtotal	1322.3	1847.4	162.8	3332.5	3805.0	4194.4	2532.5	-12	-21	+32
Divers:										
Redhead	0.8	0.0	0.0	0.8	2.0	2.4	1.6	-60	-67	-50
Canvasback	36.9	3.5	0.6	41.0	85.0	115.1	90.9	-52	-64	-55
Scaups	274.8	449.7	97.5	822.0	1069.1	1025.8	924.6	-23	-20	-11
Ring-necked duck	21.2	5.3	2.2	28.7	40.5	65.4	23.2	-29	-56	+24
Goldeneyes	24.2	5.3	2.4	31.9	52.2	73.3	70.5	-39	-56	-55
Bufflehead	57.1	1.2	0.0	58.3	56.1	47.9	44.3	+4	22	+32
Subtotal	415.0	465.0	102.7	982.7	1304.9	1329.8	1155.2	-25	-26	-15
Miscellaneous:										
Long-tailed duck	3.7	56.9	5.2	65.8	101.0	92.6	136.4	-35	-29	-52
Eiders	0.0	14.8	0.0	14.8	17.5	14.9	26.8	-15	-1	-45
Scoters	67.4	217.5	81.5	366.4	347.1	349.6	375.6	+6	5	-2
Ruddy duck	0.0	0.0	0.0	0.0	0.0	0.2	0.1	--	-100	-100
Mergansers	9.3	13.4	1.5	24.2	26.9	26.7	13.3	-10	-9	+82
Subtotal	80.4	302.6	88.2	471.2	492.5	483.9	552.2	-4	-3	-15
Total Ducks	1817.7	2615.0	353.7	4786.4	5602.4	6008.2	4239.9	-15	-20	+13

* 1-7 Interior Alaska Taiga; 8-11 Coastal Alaska Tundra; 12 Old Crow Flats, Yukon Territory, Canada

Table 3. Alaska. Ten year trend in tundra swan breeding population observations, 2000 - 2009 (estimates in thousands).

Stratum	Status	2000	2001	2002	2003	Y E A R					2009	1999 - 2008 Average	% Change from 2008	% Change from Avg
						2004	2005	2006	2007	2008				
8	Singles & pairs	10.9	11.2	12.7	13.7	10.9	8.5	12.4	8.4	9.3	9.9	10.9	+6	-9
Bristol Bay	Flocks	5.4	3.2	5.1	1.2	2.4	15.6	5.4	7.5	3.6	3.6	5.3	+0	-32
	Total	16.3	14.4	17.8	14.9	13.3	24.1	17.8	15.9	12.9	13.5	16.2	+5	-17
9	Singles & pairs	52.6	49.8	50.7	51.6	49.8	53.2	52.9	66.2	73.4	60.6	56.3	-17	+8
Yukon Delta	Flocks	15.1	32.7	26.6	6.8	143.1	52.2	58.2	67.6	46.7	17.0	48.4	-64	-65
	Total	67.7	82.5	77.3	58.4	192.9	105.4	111.1	133.8	120.1	77.6	104.7	-35	-26
10	Singles & pairs	7.3	6.2	8.1	7.4	8.3	5.5	4.1	7.3	7.2	7.8	7.0	+8	+11
Seward Pen.	Flocks	0.0	4.0	0.0	0.8	0.6	0.0	0.0	4.5	0.0	0.0	1.0	-	-100
	Total	7.3	10.2	8.1	8.2	8.9	5.5	4.1	11.8	7.2	7.8	7.9	+8	-1
11	Singles & pairs	8.5	6.8	8.9	7.8	5.6	6.7	7.2	11.4	10.9	11.9	8.2	+9	+45
Kotzebue So.	Flocks	1.7	1.1	3.0	0.8	6.1	0.0	1.4	6.0	24.9	0.3	4.5	-99	-93
	Total	10.2	7.9	11.9	8.6	11.7	6.7	8.6	17.4	35.8	12.2	12.7	-66	-4
Total	Singles & pairs	79.3	74.0	80.4	80.5	74.6	73.9	76.6	93.3	100.8	90.2	82.3	-11	+10
	Flocks	22.2	41.0	34.7	9.6	152.2	67.8	65.0	85.6	75.2	20.9	59.3	-72	-65
	Total	101.5	115.0	115.1	90.1	226.8	141.7	141.6	178.9	176.0	111.1	141.6	-37	-22

Note: There are additional tundra swans nesting in Alaska outside of these strata.
Actual swans observed are expanded for area only.

Table 4. Alaska-Yukon. Ten year trend in sandhill crane breeding population observations, 2000 - 2009 (estimates in thousands).

Stratum	2000	2001	2002	2003	2004	Y E A R		2007	2008	2009	1999 - 2008	% Change	% Change
						Average	from 2008				from Avg.		
1. Kenai-Susitna	0.7	0.1	0.3	0.0	0.4	0.2	0.2	0.1	0.1	0.1	0.2	+0	-50
2. Nelchina	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-
3. Tanana-Kusko.	1.3	1.3	0.7	1.3	1.0	0.6	0.4	0.6	1.1	0.9	0.9	-18	+0
4. Yukon Flats	1.8	0.5	1.4	1.5	1.5	1.1	0.4	0.9	1.4	1.2	1.1	-14	+9
5. Innoko	0.5	0.7	0.4	0.2	0.4	0.5	0.2	0.2	1.1	0.9	0.6	-18	+50
6. Koyukuk	1.4	1.4	0.6	0.8	2.3	0.6	0.8	0.9	1.2	1.7	1.1	+42	+55
7. Copper Delta	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-
Subtotal - Interior	5.7	4.0	3.4	3.8	5.6	3.0	2.0	2.7	4.9	4.8	3.8	-2	+26
8. Bristol Bay	5.1	6.1	5.9	3.8	2.4	2.5	4.5	5.1	7.7	5.6	4.6	-27	+22
9. Yukon Delta	18.2	34.6	19.5	23.2	22.5	22.3	36.3	27.7	33.9	38.0	26.0	+12	+46
10. Seward Pen.	5.2	6.3	7.6	5.1	9.2	2.2	4.7	6.0	5.2	4.1	5.6	-21	-27
11. Kotzebue So.	7.2	5.8	2.3	3.6	2.6	3.1	6.1	2.5	4.1	5.1	4.2	+24	+21
Subtotal - Tundra	35.7	52.8	35.3	35.7	36.7	30.1	51.6	41.3	50.9	52.8	40.4	+4	+31
TOTAL - ALASKA	41.4	56.8	38.7	39.5	42.3	33.1	53.6	44.0	55.8	57.6	44.2	+3	+30
12. Old Crow Flats Yukon	0.1	0.0	0.1	0.0	0.0	0.3	0.1	0.1	0.1	0.1	0.1	+0	+0

Note: There are additional sandhill cranes nesting in Alaska - Yukon outside of these strata.
Actual sandhill cranes observed are expanded for area only.

Table 5. Alaska-Yukon. Ten year trend in red-throated loon breeding population observations, 2000 - 2009 (estimates in thousands).

Stratum	2000	2001	2002	2003	2004	Y E A R		2007	2008	2009	1999 - 2008 Average	% Change from 2008	% Change from Avg.
						2005	2006						
1. Kenai-Susitna	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	-	-
2. Nelchina	0.0	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.3	0.0	0.1	-100	-100
3. Tanana-Kusko.	0.1	0.2	0.3	0.1	0.1	0.1	0.2	0.4	0.5	0.3	0.2	-40	+50
4. Yukon Flats	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	-100	-
5. Innoko	0.3	0.0	0.3	0.9	1.0	0.5	0.2	0.5	0.8	0.3	0.5	-63	-40
6. Koyukuk	0.2	0.1	0.2	0.3	0.1	0.2	0.2	0.3	0.3	0.4	0.2	+33	+100
7. Copper Delta	0.1	0.3	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	-	-100
Subtotal - Interior	0.8	0.7	1.0	1.4	1.3	1.0	0.6	1.2	2.0	1.0	1.1	-50	-9
8. Bristol Bay	1.2	0.9	0.6	1.3	1.3	1.2	0.8	2.0	0.6	1.4	1.1	+133	+27
9. Yukon Delta	2.6	4.9	3.9	3.6	5.4	4.4	5.7	5.9	7.6	4.8	4.8	-37	+0
10. Seward Pen.	2.6	0.3	1.9	3.4	2.9	3.2	5.2	6.6	4.7	6.9	3.3	+47	+109
11. Kotzebue So.	0.6	0.3	0.3	0.9	0.3	0.2	1.0	0.9	1.3	0.0	0.6	-100	-100
Subtotal - Tundra	7.0	6.4	6.7	9.2	9.9	9.0	12.7	15.4	14.2	13.1	9.8	-8	+34
TOTAL - ALASKA	7.8	7.1	7.7	10.6	11.2	10.0	13.3	16.6	16.2	14.1	10.9	-13	+29
12. Old Crow Flats Yukon	0.1	0.0	0.1	0.2	0.2	0.4	0.4	0.3	0.4	0.5	0.2	+25	+150

Note: There are additional red-throated loons nesting in Alaska - Yukon outside of these strata.
Actual red-throated loons observed are expanded for area only.

Table 6. Alaska-Yukon. Ten year trend in Pacific loon breeding population observations, 2000 - 2009 (estimates in thousands).

Stratum	2000	2001	2002	2003	2004	Y E A R				2009	1999 - 2008	% Change	% Change
						2005	2006	2007	2008		Average	from 2008	from Avg.
1. Kenai-Susitna	0.4	0.6	0.4	0.3	0.3	0.6	0.2	0.4	0.3	0.1	0.4	-67	-75
2. Nelchina	0.4	0.1	0.7	0.1	0.1	0.0	0.1	0.0	0.6	0.6	0.2	+0	+200
3. Tanana-Kusko.	0.7	1.0	0.6	1.1	0.7	0.6	0.8	0.7	1.3	1.1	0.8	-15	+38
4. Yukon Flats	3.8	2.7	3.5	4.9	4.2	4.0	2.8	4.0	4.3	4.3	3.7	+0	+16
5. Innoko	0.5	0.6	0.2	0.6	0.5	0.3	0.2	0.5	0.3	0.1	0.4	-67	-75
6. Koyukuk	0.3	1.0	1.0	0.8	0.9	0.3	0.1	0.8	0.5	0.7	0.6	+40	+17
7. Copper Delta	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-
Subtotal - Interior	6.1	6.0	6.4	7.8	6.7	5.8	4.2	6.4	7.3	6.9	6.2	-5	+11
8. Bristol Bay	2.2	1.4	4.2	1.1	2.9	0.3	2.3	0.6	1.7	1.0	2.1	-41	-52
9. Yukon Delta	41.1	33.9	45.1	40.2	39.1	29.7	36.6	52.0	44.3	34.4	38.7	-22	-11
10. Seward Pen.	6.3	2.5	5.2	1.4	2.6	4.3	1.9	2.5	1.9	4.5	3.1	+137	+45
11. Kotzebue So.	4.7	2.2	2.9	3.0	2.0	3.1	2.5	4.9	5.3	2.5	3.1	-53	-19
Subtotal - Tundra	54.3	40.0	57.4	45.7	46.6	37.4	43.3	60.0	53.2	42.4	47.0	-20	-10
TOTAL - ALASKA	60.4	46.0	63.8	53.5	53.3	43.2	47.5	66.4	60.5	49.3	53.2	-19	-7
12. Old Crow Flats Yukon	1.7	3.3	3.9	3.0	3.4	3.6	2.8	2.1	3.0	2.4	2.9	-20	-17

Note: There are additional Pacific loons nesting in Alaska - Yukon outside of these strata.
Actual Pacific loons observed are expanded for area only.

Table 7. Alaska-Yukon. Ten year trend in common loon breeding population observations, 2000 - 2009 (estimates in thousands).

Stratum	2000	2001	2002	2003	2004	Y E A R		2007	2008	2009	1999 - 2008	% Change	% Change
						2005	2006				Average	from 2008	from Avg.
1. Kenai-Susitna	2.0	2.6	1.9	1.7	1.6	2.0	1.8	1.3	1.6	0.7	1.8	-56	-61
2. Nelchina	0.1	0.5	0.1	0.3	0.5	0.0	0.5	0.2	0.1	0.2	0.3	+100	-33
3. Tanana-Kusko.	2.5	0.4	2.0	2.4	1.3	1.2	0.9	0.4	1.8	1.6	1.5	-11	+7
4. Yukon Flats	0.9	0.3	1.8	3.1	1.9	1.1	2.3	1.4	1.1	1.1	1.5	+0	-27
5. Innoko	0.2	0.2	0.2	0.5	0.0	0.5	0.2	0.3	0.6	0.2	0.3	-67	-33
6. Koyukuk	0.5	1.2	0.8	0.8	1.3	0.6	0.2	0.3	0.3	1.0	0.7	+233	+43
7. Copper Delta	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-
Subtotal - Interior	6.2	5.2	6.8	8.8	6.6	5.4	5.9	3.9	5.5	4.8	6.1	-13	-21
8. Bristol Bay	0.8	0.1	1.2	1.4	1.5	1.1	1.1	2.6	1.2	0.8	1.2	-33	-33
9. Yukon Delta	2.4	1.6	2.6	2.3	2.9	3.3	4.1	2.3	2.6	2.4	2.6	-8	-8
10. Seward Pen.	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	-	-
11. Kotzebue So.	0.3	0.1	0.1	0.2	0.2	0.6	0.2	0.0	0.0	0.0	0.2	-	-100
Subtotal - Tundra	3.5	1.8	3.9	3.9	4.7	5.1	5.4	4.9	3.8	3.2	4.0	-16	-20
TOTAL - ALASKA	9.7	7.0	10.7	12.7	11.3	10.5	11.3	8.8	9.3	8.0	10.1	-14	-21
12. Old Crow Flats Yukon	0.1	0.3	0.2	0.5	0.1	0.2	0.3	0.2	0.2	0.2	0.2	+0	+0

Note: There are additional common loons nesting in Alaska - Yukon outside of these strata.
Actual common loons observed are expanded for area only.

Table 8. Alaska-Yukon. Stratum data sheet, 2009 , strata 1 through 12.

Survey Design	S t r a t u m												Total
	1	2	3	4	5	6	7	8	9	10	11	12	
Square miles in stratum	2200	3900	9300	10800	3400	4100	400	9900	26600	3850	5350	1970	81,770
Square miles in sample	40	52	132	80	44	80	20	92	260	28	48	36	912
Linear miles in sample	160	208	528	320	176	320	80	368	1040	112	192	144	3,648
No. of transects in sample	6	10	18	12	7	10	7	11	8	4	7	3	103
No. of segments in sample	10	13	33	20	11	20	10	23	65	7	12	8	232
Expansion factor	55.000	75.000	70.455	135.000	77.273	51.250	20.000	107.609	102.308	137.500	111.458	54.722	-

Current Year Design	S t r a t u m												Total
	1	2	3	4	5	6	7	8	9	10	11	12	
Square miles in sample	40	52	132	80	44	80	20	92	260	28	48	36	912
Linear miles in sample	160	208	528	320	176	320	80	368	1040	112	192	144	3,648
No. of transects in sample	6	10	18	12	7	10	7	11	8	4	7	3	103
No. of segments in sample	10	13	33	20	11	20	10	23	65	7	12	8	232
Expansion factor	55.000	75.000	70.455	135.000	77.273	51.250	20.000	107.609	102.308	137.500	111.458	54.722	-

Note: Stratum 7 has 8 mile segments; stratum 12 has 18 mile segments.

TABLE 9.

WATERFOWL BREEDING POPULATION SURVEY

STRATUM: 1

KENAI-SUSITNA

DATES: 5 / 16 / 2009 THRU 5 / 16 / 2009

SPECIES	DRAKES	PAIRS	GROUPED BIRDS	INDICATED TOTAL BIRDS (T)	VISIBILITY RATIO (V)	POPULATION INDEX (P)
MALLARD	14	5		38	3.57	7461
BLACK DUCK					1.57	
GADWALL					3.04	
AMERICAN WIGEON	13	9		44	3.65	8833
GREEN-WINGED TEAL	2	4		12	8.88	5861
BLUE-WINGED TEAL					10.31	
SHOVELER	3	2		10	3.35	1843
PINTAIL	8	3		22	2.51	3037
REDHEAD a					3.11	
CANVASBACK					2.43	
SCAUP a	7	7	44	65	1.82	6507
RING-NECKED DUCK a	1	1		3	4.02	663
GOLDENEYE	2	7		18	3.61	3574
BUFFLEHEAD	5	3		16	1.86	1637
LONG-TAILED DUCK		1		2	1.99	219
EIDER					3.58	
SCOTER	6	6	19	43	1.08	2554
RUDDY DUCK					5.94	
MERGANSE	10	7		34	1.27	2375
SUB - TOTAL	71	55	63	307		44563
CANADA GOOSE	1		9	11	1.00	605
SWAN	1	5		11	1.00	605
CRANE		1		2	1.00	110

COMPUTATION OF THE POPULATION INDEX	NUMBER OF OBSERVED PONDS (x2)	0
P = POPULATION INDEX	POND INDEX	0
A = SQUARE MILES IN THE STRATUM	SQUARE MILES IN THE STRATUM (A)	2200
T = INDICATED TOTAL BIRDS	SQUARE MILES IN THE SAMPLE (S)	40
S = SQUARE MILES IN THE SAMPLE	NUMBER OF SEGMENTS	10
V = VISIBILITY RATIO	EXPANSION FACTOR	55.000
$P = A * (T/S) * V$		

a Drakes not doubled in arriving at indicated total birds (T).

Table 10.

WATERFOWL BREEDING POPULATION SURVEY

STRATUM: 2

NELCHINA

DATES: 6 / 7 / 2009 THRU 6 / 7 / 2009

SPECIES	DRAKES	PAIRS	GROUPED BIRDS	INDICATED TOTAL BIRDS (T)	VISIBILITY RATIO (V)	POPULATION INDEX (P)
MALLARD	18	13	10	72	3.57	19278
BLACK DUCK					1.57	
GADWALL					3.04	
AMERICAN WIGEON	26	9		70	3.65	19163
GREEN-WINGED TEAL	8	3		22	8.88	14652
BLUE-WINGED TEAL					10.31	
SHOVELER	3			6	3.35	1508
PINTAIL	13	2		30	2.51	5648
REDHEAD a					3.11	
CANVASBACK	3			6	2.43	1094
SCAUP a	62	64	43	233	1.82	31805
RING-NECKED DUCK a		3		6	4.02	1809
GOLDENEYE	1	2		6	3.61	1625
BUFFLEHEAD	30	23		106	1.86	14787
LONG-TAILED DUCK	2			4	1.99	597
EIDER					3.58	
SCOTER	19	29		96	1.08	7776
RUDDY DUCK					5.94	
MERGANSE	1			2	1.27	191
SUB - TOTAL	186	148	53	659		119930
CANADA GOOSE					1.00	
SWAN	14	14		42	1.00	3150
CRANE					1.00	

COMPUTATION OF THE POPULATION INDEX	NUMBER OF OBSERVED PONDS (x2)	0
P = POPULATION INDEX	POND INDEX	0
A = SQUARE MILES IN THE STRATUM	SQUARE MILES IN THE STRATUM (A)	3900
T = INDICATED TOTAL BIRDS	SQUARE MILES IN THE SAMPLE (S)	52
S = SQUARE MILES IN THE SAMPLE	NUMBER OF SEGMENTS	13
V = VISIBILITY RATIO	EXPANSION FACTOR	75.000
P = A * (T/S) * V		

a Drakes not doubled in arriving at indicated total birds (T).

TABLE 11.

WATERFOWL BREEDING POPULATION SURVEY

STRATUM: 3

TANANA-KUSKOKWIM

DATES: 5 / 18 / 2009 THRU 5 / 27 / 2009

SPECIES	DRAKES	PAIRS	GROUPED BIRDS	INDICATED TOTAL BIRDS (T)	VISIBILITY RATIO (V)	POPULATION INDEX (P)
MALLARD	104	54		316	3.57	79481
BLACK DUCK					1.57	
GADWALL					3.04	
AMERICAN WIGEON	81	116	15	409	3.65	105178
GREEN-WINGED TEAL	34	30		128	8.88	80081
BLUE-WINGED TEAL					10.31	
SHOVELER	40	49		178	3.35	42012
PINTAIL	68	34	32	236	2.51	41734
REDHEAD a					3.11	
CANVASBACK	13	5	9	45	2.43	7704
SCAUP a	43	114	89	360	1.82	46162
RING-NECKED DUCK a	4	11		26	4.02	7364
GOLDENEYE	17	5		44	3.61	11191
BUFFLEHEAD	35	34		138	1.86	18084
LONG-TAILED DUCK	4	2	6	18	1.99	2524
EIDER					3.58	
SCOTER	26	72	289	485	1.08	36904
RUDDY DUCK					5.94	
MERGANSE	5	10		30	1.27	2684
SUB - TOTAL	474	536	440	2413		481105
CANADA GOOSE	1	3		8	1.00	564
SWAN	16	35	34	120	1.00	8455
CRANE	9	2		13	1.00	916

COMPUTATION OF THE POPULATION INDEX	NUMBER OF OBSERVED PONDS (x2)	0
P = POPULATION INDEX	POND INDEX	0
A = SQUARE MILES IN THE STRATUM	SQUARE MILES IN THE STRATUM (A)	9300
T = INDICATED TOTAL BIRDS	SQUARE MILES IN THE SAMPLE (S)	132
S = SQUARE MILES IN THE SAMPLE	NUMBER OF SEGMENTS	33
V = VISIBILITY RATIO	EXPANSION FACTOR	70.455
P = A * (T/S) * V		

a Drakes not doubled in arriving at indicated total birds (T).

TABLE 12.

WATERFOWL BREEDING POPULATION SURVEY

STRATUM: 4

YUKON FLATS

DATES: 5 / 22 / 2009 THRU 5 / 22 / 2009

SPECIES	DRAKES	PAIRS	GROUPED BIRDS	INDICATED TOTAL BIRDS (T)	VISIBILITY RATIO (V)	POPULATION INDEX (P)
MALLARD	66	38		208	3.57	100246 100.2
BLACK DUCK					1.57	
GADWALL					3.04	
AMERICAN WIGEON	79	154	20	486	3.65	239477 239.5
GREEN-WINGED TEAL	15	34	6	104	8.88	124675 124.7
BLUE-WINGED TEAL					10.31	
SHOVELER	26	53	8	166	3.35	75074 75.1
PINTAIL	71	54	26	276	2.51	93523 93.5
REDHEAD a		1		2	3.11	840 0.8
CANVASBACK	15	12	20	74	2.43	24276 24.3
SCAUP a	81	168	260	677	1.82	166339 166.3
RING-NECKED DUCK a		3		6	4.02	3256 3.3
GOLDENEYE		4		8	3.61	3899 3.9
BUFFLEHEAD	26	14		80	1.86	20088 20.1
LONG-TAILED DUCK					1.99	
EIDER					3.58	
SCOTER	8	16	30	78	1.08	11372 11.4
RUDDY DUCK					5.94	
MERGANSE	1	3		8	1.27	1372 1.4
SUB - TOTAL	388	554	370	2173		864435 864.5
CANADA GOOSE	4	8	9	33	1.00	4455 4.5
SWAN	2	2		6	1.00	810 0.8
CRANE	5	2		9	1.00	1215 1.2

COMPUTATION OF THE POPULATION INDEX	NUMBER OF OBSERVED PONDS (x2)	0
P = POPULATION INDEX	POND INDEX	0
A = SQUARE MILES IN THE STRATUM	SQUARE MILES IN THE STRATUM (A)	10800
T = INDICATED TOTAL BIRDS	SQUARE MILES IN THE SAMPLE (S)	80
S = SQUARE MILES IN THE SAMPLE	NUMBER OF SEGMENTS	20
V = VISIBILITY RATIO	EXPANSION FACTOR	135.000
P = A * (T/S) * V		

a Drakes not doubled in arriving at indicated total birds (T).

TABLE 13.

WATERFOWL BREEDING POPULATION SURVEY

STRATUM: 5

INNOKO

DATES: 5 / 27 / 2009 THRU 5 / 27 / 2009

SPECIES	DRAKES	PAIRS	GROUPED BIRDS	INDICATED TOTAL BIRDS (T)	VISIBILITY RATIO (V)	POPULATION INDEX (P)
MALLARD	6	1		14	3.57	3862 3.9
BLACK DUCK					1.57	
GADWALL					3.04	
AMERICAN WIGEON	26	14		80	3.65	22564 22.6
GREEN-WINGED TEAL	5	2		14	8.88	9607 9.6
BLUE-WINGED TEAL					10.31	
SHOVELER	16	6		44	3.35	11390 11.4
PINTAIL	79	12		182	2.51	35300 35.3
REDHEAD a					3.11	
CANVASBACK			10	10	2.43	1878 1.9
SCAUP a	16	5		26	1.82	3657 3.7
RING-NECKED DUCK a					4.02	
GOLDENEYE		3		6	3.61	1674 1.7
BUFFLEHEAD	3			6	1.86	862 0.9
LONG-TAILED DUCK					1.99	
EIDER					3.58	
SCOTER	4	11		30	1.08	2504 2.5
RUDDY DUCK					5.94	
MERGANSE	5	4		18	1.27	1766 1.8
SUB - TOTAL	160	58	10	430		95062 95.3
CANADA GOOSE	4	10	3	31	1.00	2395 2.4
SWAN	2	3		8	1.00	618 0.6
CRANE	2	5		12	1.00	927 0.9

COMPUTATION OF THE POPULATION INDEX	NUMBER OF OBSERVED PONDS (x2)	0
P = POPULATION INDEX	POND INDEX	0
A = SQUARE MILES IN THE STRATUM	SQUARE MILES IN THE STRATUM (A)	3400
T = INDICATED TOTAL BIRDS	SQUARE MILES IN THE SAMPLE (S)	44
S = SQUARE MILES IN THE SAMPLE	NUMBER OF SEGMENTS	11
V = VISIBILITY RATIO	EXPANSION FACTOR	77.273
$P = A * (T/S) * V$		

a Drakes not doubled in arriving at indicated total birds (T).

TABLE 14.

WATERFOWL BREEDING POPULATION SURVEY

STRATUM: 6

KOYUKUK

DATES: 5 / 24 / 2009 THRU 5 / 24 / 2009

SPECIES	DRAKES	PAIRS	GROUPED BIRDS	INDICATED TOTAL BIRDS (T)	VISIBILITY RATIO (V)	POPULATION INDEX (P)
MALLARD	51	31		164	3.57	30006 30.0
BLACK DUCK					1.57	
GADWALL					3.04	
AMERICAN WIGEON	57	54		222	3.65	41528 41.5
GREEN-WINGED TEAL	19	17		72	8.88	32767 32.8
BLUE-WINGED TEAL					10.31	
SHOVELER	24	27		102	3.35	17512 17.5
PINTAIL	55	22	12	166	2.51	21354 21.4
REDHEAD a					3.11	
CANVASBACK	3	1		8	2.43	996 1.0
SCAUP a	28	75	22	200	1.82	18655 18.7
RING-NECKED DUCK a	5	11		27	4.02	5563 5.6
GOLDENEYE	1	4		10	3.61	1850 1.9
BUFFLEHEAD	6	2		16	1.86	1525 1.5
LONG-TAILED DUCK	1	1		4	1.99	408 0.4
EIDER					3.58	
SCOTER	18	31	8	106	1.08	5867 5.9
RUDDY DUCK					5.94	
MERGANSE		1		2	1.27	130 0.1
SUB - TOTAL	268	277	42	1099		178161 178.3
CANADA GOOSE	5	1		12	1.00	615 0.6
SWAN	14	7	6	34	1.00	1743 1.7
CRANE	16	7	3	33	1.00	1691 1.7

COMPUTATION OF THE POPULATION INDEX	NUMBER OF OBSERVED PONDS (x2)	0
P = POPULATION INDEX	POND INDEX	0
A = SQUARE MILES IN THE STRATUM	SQUARE MILES IN THE STRATUM (A)	4100
T = INDICATED TOTAL BIRDS	SQUARE MILES IN THE SAMPLE (S)	80
S = SQUARE MILES IN THE SAMPLE	NUMBER OF SEGMENTS	20
V = VISIBILITY RATIO	EXPANSION FACTOR	51.250
$P = A * (T/S) * V$		

a Drakes not doubled in arriving at indicated total birds (T).

TABLE 15.

WATERFOWL BREEDING POPULATION SURVEY

STRATUM: 7

COPPER DELTA

DATES: 5 / 16 / 2009 THRU 5 / 16 / 2009

SPECIES	DRAKES	PAIRS	GROUPED BIRDS	INDICATED TOTAL BIRDS (T)	VISIBILITY RATIO (V)	POPULATION INDEX (P)
MALLARD	70	29	5	203	3.57	14494 14.5
BLACK DUCK					1.57	
GADWALL					3.04	
AMERICAN WIGEON	8	11	6	44	3.65	3212 3.2
GREEN-WINGED TEAL	8	9	6	40	8.88	7104 7.1
BLUE-WINGED TEAL					10.31	
SHOVELER	5	4		18	3.35	1206 1.2
PINTAIL	12	3		30	2.51	1506 1.5
REDHEAD a					3.11	
CANVASBACK			18	18	2.43	875 0.9
SCAUP a	3	8	25	44	1.82	1602 1.6
RING-NECKED DUCK a	8	11		30	4.02	2412 2.4
GOLDENEYE		2		4	3.61	289 0.3
BUFFLEHEAD	1			2	1.86	74 0.1
LONG-TAILED DUCK					1.99	
EIDER					3.58	
SCOTER					1.08	
RUDDY DUCK					5.94	
MERGANSE		1	24	26	1.27	660 0.7
SUB - TOTAL	115	78	84	459		33434 33.5
CANADA GOOSE	51	35	226	398	1.00	7960 8.0
SWAN	8	10	3	31	1.00	620 0.6
CRANE	1			1	1.00	20 0.0

COMPUTATION OF THE POPULATION INDEX	NUMBER OF OBSERVED PONDS (x2)	0
P = POPULATION INDEX	POND INDEX	0
A = SQUARE MILES IN THE STRATUM	SQUARE MILES IN THE STRATUM (A)	400
T = INDICATED TOTAL BIRDS	SQUARE MILES IN THE SAMPLE (S)	20
S = SQUARE MILES IN THE SAMPLE	NUMBER OF SEGMENTS	10
V = VISIBILITY RATIO	EXPANSION FACTOR	20.000
P = A * (T/S) * V		

a Drakes not doubled in arriving at indicated total birds (T).

Table 16.

WATERFOWL BREEDING POPULATION SURVEY

STRATUM: 8

BRISTOL BAY

DATES: 5 / 27 / 2009 THRU 5 / 29 / 2009

SPECIES	DRAKES	PAIRS	GROUPED BIRDS	INDICATED TOTAL BIRDS (T)	VISIBILITY RATIO (V)	POPULATION INDEX (P)
MALLARD	41	23		128	4.01	55233 55.2
BLACK DUCK					1.56	
GADWALL	3			6	3.04	1963 2.0
AMERICAN WIGEON	29	32	6	128	3.84	52892 52.9
GREEN-WINGED TEAL	28	12		80	8.36	71969 72.0
BLUE-WINGED TEAL					10.31	
SHOVELER	21	17		76	3.79	30996 31.0
PINTAIL	100	31	22	284	3.05	93211 93.2
REDHEAD a					3.11	
CANVASBACK					2.43	
SCAUP a	59	98	109	364	1.93	75597 75.6
RING-NECKED DUCK a					4.02	
GOLDENEYE					3.61	
BUFFLEHEAD					1.86	
LONG-TAILED DUCK	2	2		8	1.87	1610 1.6
EIDER	3			6	3.58	2311 2.3
SCOTER	46	153	131	529	1.17	66602 66.6
RUDDY DUCK					5.94	
MERGANSE	2	5		14	1.27	1913 1.9
SUB - TOTAL	334	373	268	1623		454297 454.3
CANADA GOOSE	1		20	22	1.00	2367 2.4
SWAN	38	27	33	125	1.00	13451 13.5
CRANE	28	9	6	52	1.00	5596 5.6

COMPUTATION OF THE POPULATION INDEX	NUMBER OF OBSERVED PONDS (x2)	0
P = POPULATION INDEX	POND INDEX	0
A = SQUARE MILES IN THE STRATUM	SQUARE MILES IN THE STRATUM (A)	9900
T = INDICATED TOTAL BIRDS	SQUARE MILES IN THE SAMPLE (S)	92
S = SQUARE MILES IN THE SAMPLE	NUMBER OF SEGMENTS	23
V = VISIBILITY RATIO	EXPANSION FACTOR	107.609
P = A * (T/S) * V		

a Drakes not doubled in arriving at indicated total birds (T).

TABLE 17.

WATERFOWL BREEDING POPULATION SURVEY

STRATUM: 9

YUKON DELTA

DATES: 5 / 30 / 2009 THRU 6 / 3 / 2009

SPECIES	DRAKES	PAIRS	GROUPED BIRDS	INDICATED TOTAL BIRDS (T)	VISIBILITY RATIO (V)	POPULATION INDEX (P)
MALLARD	121	35	13	325	4.01	133333
BLACK DUCK					1.56	
GADWALL					3.04	
AMERICAN WIGEON	112	43		310	3.84	121787
GREEN-WINGED TEAL	85	38		246	8.36	210402
BLUE-WINGED TEAL					10.31	
SHOVELER	139	56	15	405	3.79	157037
PINTAIL	436	94		1060	3.05	330761
REDHEAD a					3.11	
CANVASBACK	3	3		12	2.43	2983
SCAUP a	205	472	170	1319	1.93	260442
RING-NECKED DUCK a		6		12	4.02	4935
GOLDENEYE	2	3		10	3.61	3693
BUFFLEHEAD					1.86	
LONG-TAILED DUCK	60	42		204	1.87	39028
EIDER	6	7		26	3.58	9523
SCOTER	126	324	131	1031	1.17	123411
RUDDY DUCK					5.94	
MERGANSE	8	19	6	60	1.27	7796
SUB - TOTAL	1303	1142	335	5020		1405131
CANADA GOOSE	130	107	108	582	1.00	59543
SWAN	260	166	166	758	1.00	77549
CRANE	163	65	78	371	1.00	37956

COMPUTATION OF THE POPULATION INDEX	NUMBER OF OBSERVED PONDS (x2)	0
P = POPULATION INDEX	POND INDEX	0
A = SQUARE MILES IN THE STRATUM	SQUARE MILES IN THE STRATUM (A)	26600
T = INDICATED TOTAL BIRDS	SQUARE MILES IN THE SAMPLE (S)	260
S = SQUARE MILES IN THE SAMPLE	NUMBER OF SEGMENTS	65
V = VISIBILITY RATIO	EXPANSION FACTOR	102.308
$P = A * (T/S) * V$		

a Drakes not doubled in arriving at indicated total birds (T).

TABLE 18.

WATERFOWL BREEDING POPULATION SURVEY

STRATUM: 10

SEWARD PENINSULA

DATES: 6 / 3 / 2009 THRU 6 / 3 / 2009

SPECIES	DRAKES	PAIRS	GROUPED BIRDS	INDICATED TOTAL BIRDS (T)	VISIBILITY RATIO (V)	POPULATION INDEX (P)
MALLARD	4	4		16	4.01	8822 8.8
BLACK DUCK					1.56	
GADWALL					3.04	
AMERICAN WIGEON	16	6		44	3.84	23232 23.2
GREEN-WINGED TEAL	9	5		28	8.36	32186 32.2
BLUE-WINGED TEAL					10.31	
SHOVELER	30	22	12	116	3.79	60451 60.5
PINTAIL	113	18	6	268	3.05	112393 112.4
REDHEAD a					3.11	
CANVASBACK					2.43	
SCAUP a	23	71		165	1.93	43787 43.8
RING-NECKED DUCK a					4.02	
GOLDENEYE					3.61	
BUFFLEHEAD					1.86	
LONG-TAILED DUCK	9	13		44	1.87	11314 11.3
EIDER	1	2		6	3.58	2954 3.0
SCOTER	15	29		88	1.17	14157 14.2
RUDDY DUCK					5.94	
MERGANSE	5	4		18	1.27	3143 3.1
SUB - TOTAL	225	174	18	793		312437 312.5
CANADA GOOSE	1	10	14	36	1.00	4950 4.9
SWAN	23	17		57	1.00	7838 7.8
CRANE	15	6	3	30	1.00	4125 4.1

COMPUTATION OF THE POPULATION INDEX	NUMBER OF OBSERVED PONDS (x2)	0
P = POPULATION INDEX	POND INDEX	0
A = SQUARE MILES IN THE STRATUM	SQUARE MILES IN THE STRATUM (A)	3850
T = INDICATED TOTAL BIRDS	SQUARE MILES IN THE SAMPLE (S)	28
S = SQUARE MILES IN THE SAMPLE	NUMBER OF SEGMENTS	7
V = VISIBILITY RATIO	EXPANSION FACTOR	137.500
P = A * (T/S) * V		

a Drakes not doubled in arriving at indicated total birds (T).

TABLE 19.

WATERFOWL BREEDING POPULATION SURVEY

STRATUM: 11

KOTZEBUE SOUND

DATES: 6 / 4 / 2009 THRU 6 / 4 / 2009

SPECIES	DRAKES	PAIRS	GROUPED BIRDS	INDICATED TOTAL BIRDS (T)	VISIBILITY RATIO (V)	POPULATION INDEX (P)
MALLARD	18	9		54	4.01	24135 24.1
BLACK DUCK					1.56	
GADWALL					3.04	
AMERICAN WIGEON	64	23		174	3.84	74472 74.5
GREEN-WINGED TEAL	17	7		48	8.36	44726 44.7
BLUE-WINGED TEAL					10.31	
SHOVELER	40	12		104	3.79	43932 43.9
PINTAIL	134	29	155	481	3.05	163515 163.5
REDHEAD a					3.11	
CANVASBACK		1		2	2.43	542 0.5
SCAUP a	42	117	49	325	1.93	69912 69.9
RING-NECKED DUCK a	1			1	4.02	448 0.4
GOLDENEYE	1	1		4	3.61	1609 1.6
BUFFLEHEAD	1	2		6	1.86	1244 1.2
LONG-TAILED DUCK	7	5		24	1.87	5002 5.0
EIDER					3.58	
SCOTER	23	25	6	102	1.17	13301 13.3
RUDDY DUCK					5.94	
MERGANSE	1	1		4	1.27	566 0.6
SUB - TOTAL	349	232	210	1329		443406 443.2
CANADA GOOSE	13	14	4	58	1.00	6465 6.5
SWAN	59	24	3	110	1.00	12260 12.3
CRANE	23	9	5	46	1.00	5127 5.1

COMPUTATION OF THE POPULATION INDEX	NUMBER OF OBSERVED PONDS (x2)	0
P = POPULATION INDEX	POND INDEX	0
A = SQUARE MILES IN THE STRATUM	SQUARE MILES IN THE STRATUM (A)	5350
T = INDICATED TOTAL BIRDS	SQUARE MILES IN THE SAMPLE (S)	48
S = SQUARE MILES IN THE SAMPLE	NUMBER OF SEGMENTS	12
V = VISIBILITY RATIO	EXPANSION FACTOR	111.458
P = A * (T/S) * V		

a Drakes not doubled in arriving at indicated total birds (T).

TABLE 20.

WATERFOWL BREEDING POPULATION SURVEY

STRATUM: 12

OLD CROW FLATS

DATES: 6 / 5 / 2009 THRU 6 / 5 / 2009

SPECIES	DRAKES	PAIRS	GROUPED BIRDS	INDICATED TOTAL BIRDS (T)	VISIBILITY RATIO (V)	POPULATION INDEX (P)
MALLARD	50	17		134	2.74	20092 20.1
BLACK DUCK					1.57	
GADWALL					3.04	
AMERICAN WIGEON	77	40	9	243	6.21	82577 82.6
GREEN-WINGED TEAL	11	7		36	7.84	15445 15.4
BLUE-WINGED TEAL					10.31	
SHOVELER	26	11		74	3.49	14133 14.1
PINTAIL	59	21	50	210	2.66	30568 30.6
REDHEAD a					3.11	
CANVASBACK	2			4	2.59	567 0.6
SCAUP a	133	198	249	778	2.29	97494 97.5
RING-NECKED DUCK a		5		10	4.02	2200 2.2
GOLDENEYE	4	2		12	3.61	2371 2.4
BUFFLEHEAD					2.21	
LONG-TAILED DUCK	14	10		48	1.99	5227 5.2
EIDER					3.58	
SCOTER	119	326	152	1042	1.43	81539 81.5
RUDDY DUCK					5.94	
MERGANSE	9	2		22	1.27	1529 1.5
SUB - TOTAL	504	639	460	2613		353741 353.7
CANADA GOOSE	4	3		14	1.00	766 0.8
SWAN	4	8		20	1.00	1094 1.1
CRANE		1		2	1.00	109 0.1

COMPUTATION OF THE POPULATION INDEX	NUMBER OF OBSERVED PONDS (x2)	0
P = POPULATION INDEX	POND INDEX	0
A = SQUARE MILES IN THE STRATUM	SQUARE MILES IN THE STRATUM (A)	1970
T = INDICATED TOTAL BIRDS	SQUARE MILES IN THE SAMPLE (S)	36
S = SQUARE MILES IN THE SAMPLE	NUMBER OF SEGMENTS	8
V = VISIBILITY RATIO	EXPANSION FACTOR	54.722
$P = A * (T/S) * V$		

a Drakes not doubled in arriving at indicated total birds (T).

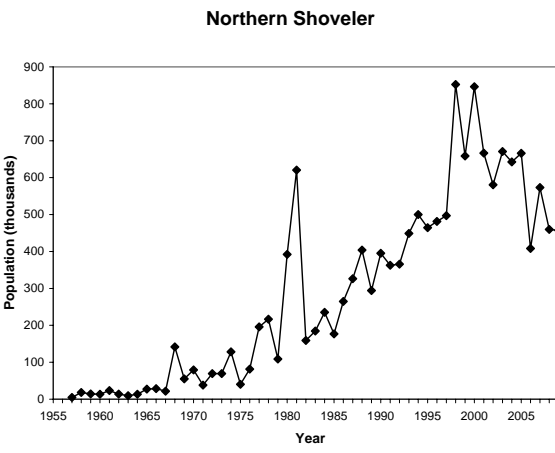
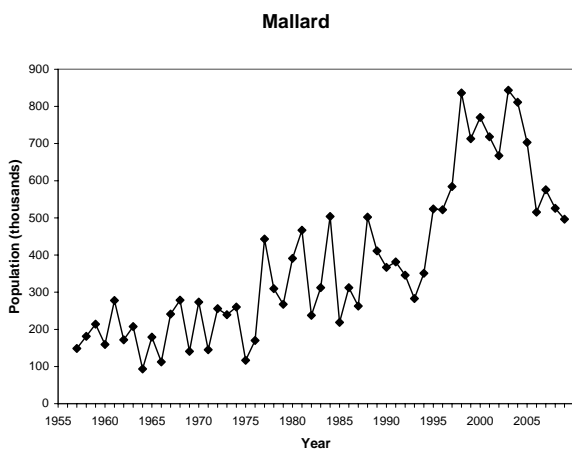
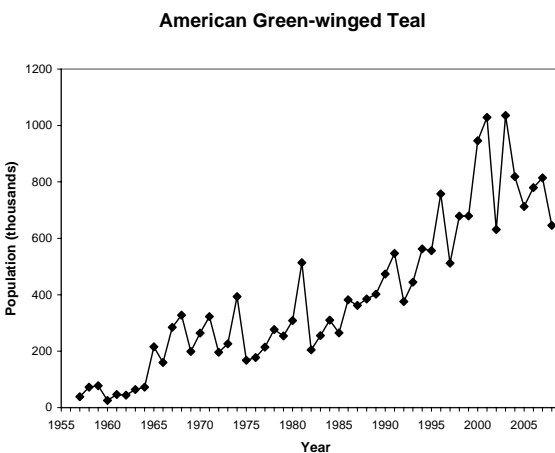
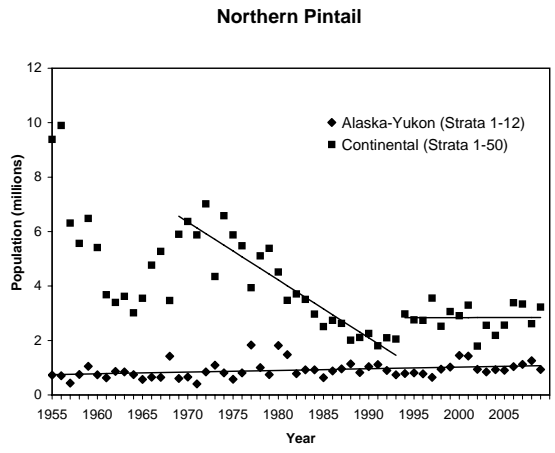
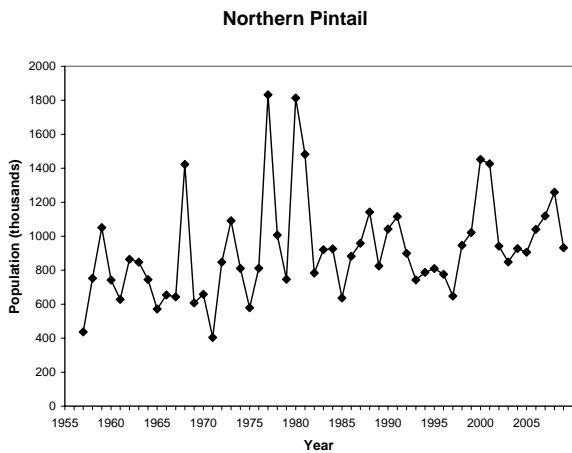


Figure 1. Trends in dabbling ducks from the Alaska-Yukon Waterfowl Breeding Population Survey.

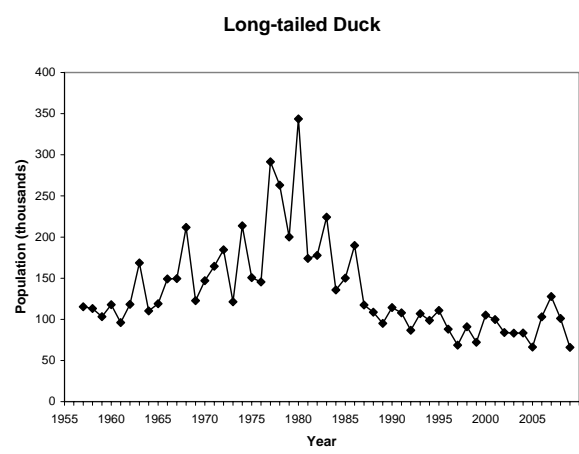
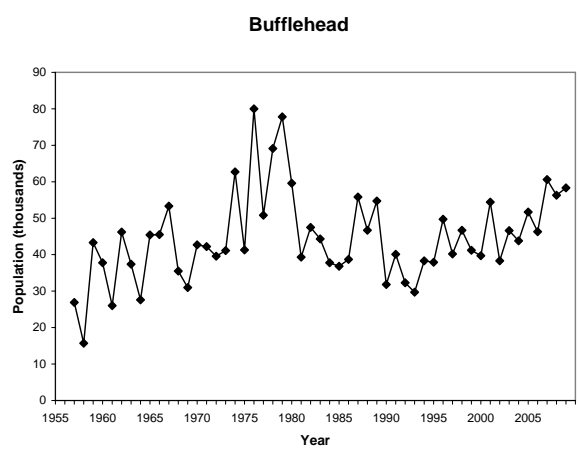
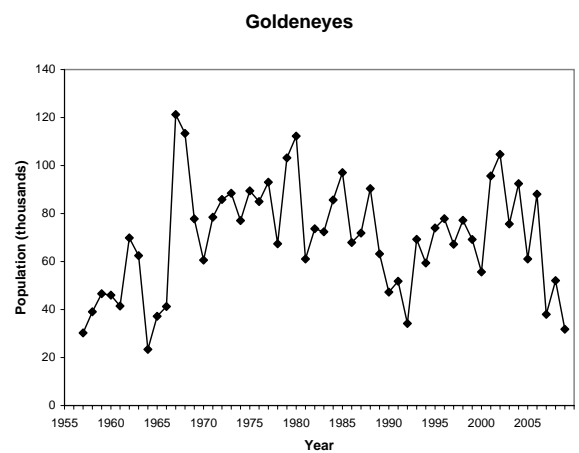
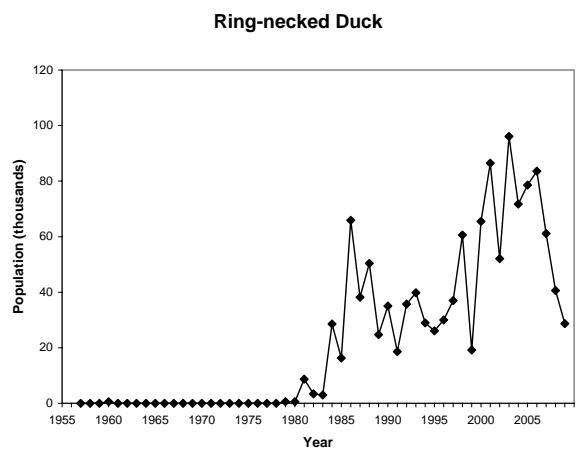
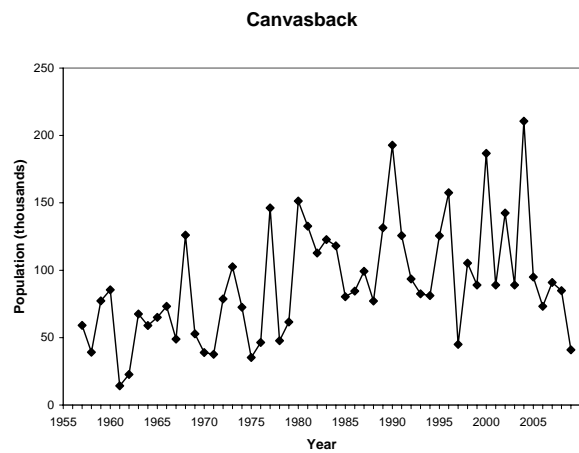
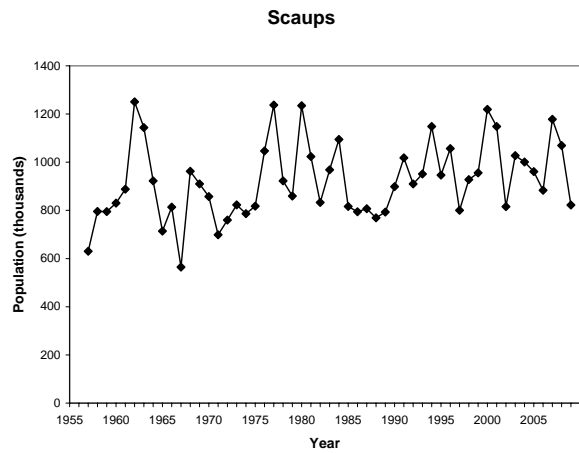


Figure 2. Trends in diver ducks from the Alaska-Yukon Waterfowl Breeding Population Survey.

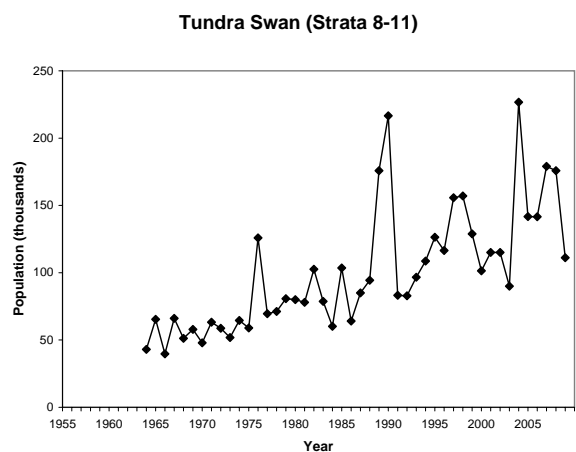
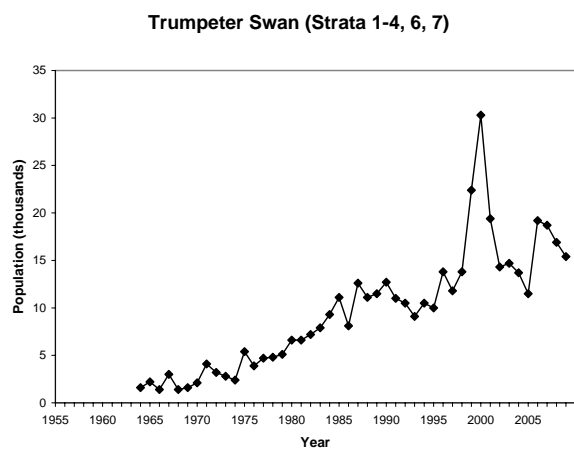
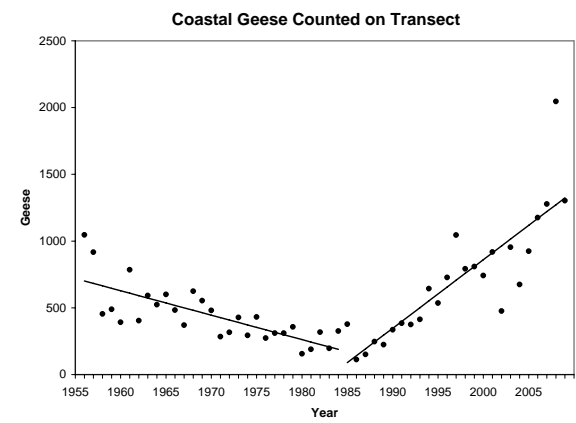
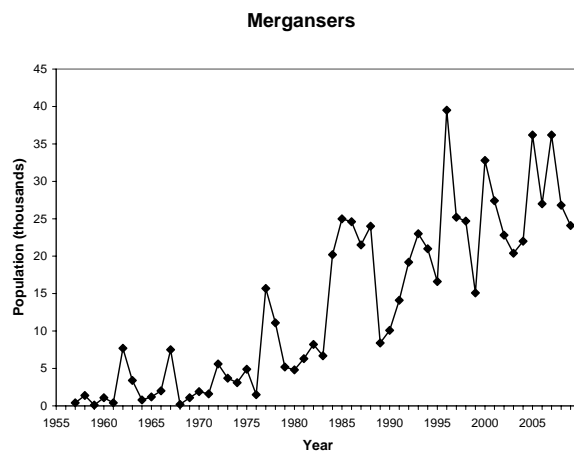
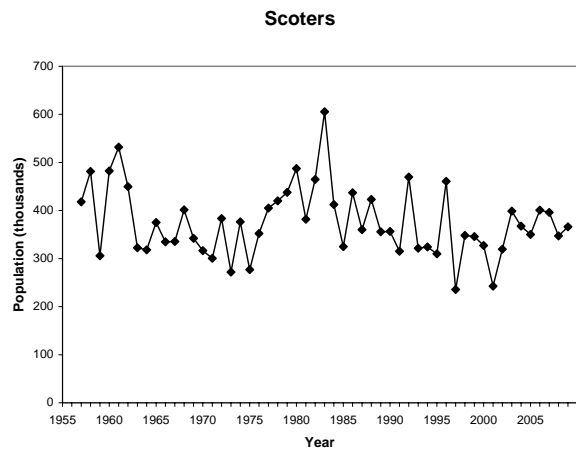


Figure 3. Trends in diver ducks, coastal geese, and swans from the Alaska-Yukon Waterfowl Breeding Population Survey.

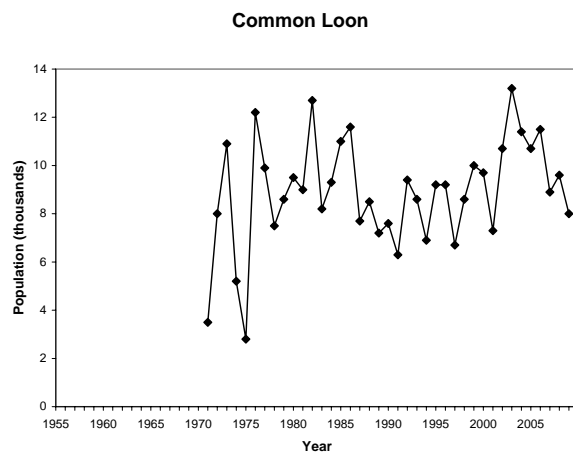
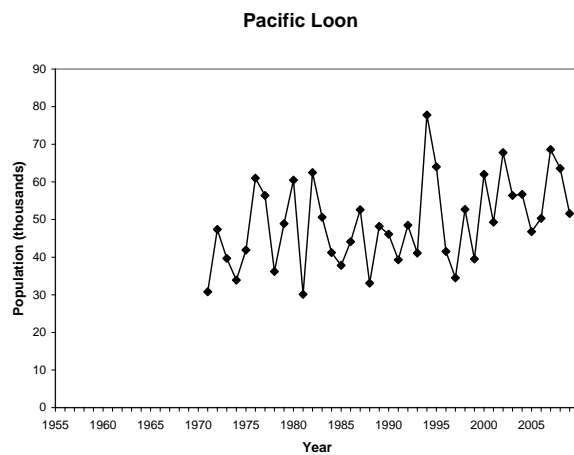
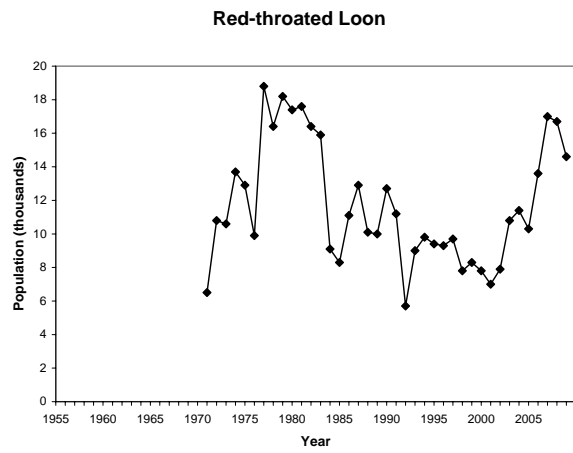
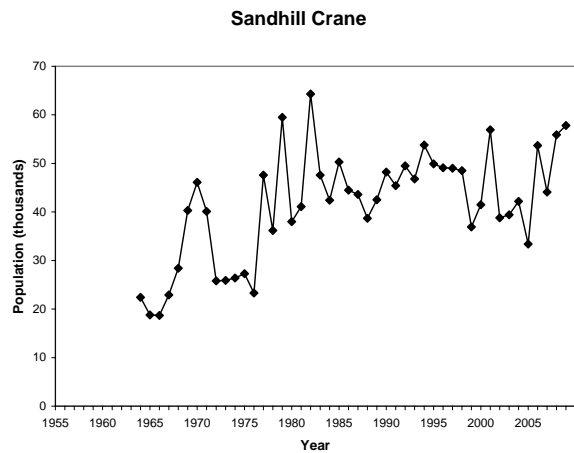


Figure 4. Trends in sandhill cranes and loons from the Alaska-Yukon Waterfowl Breeding Population Survey.