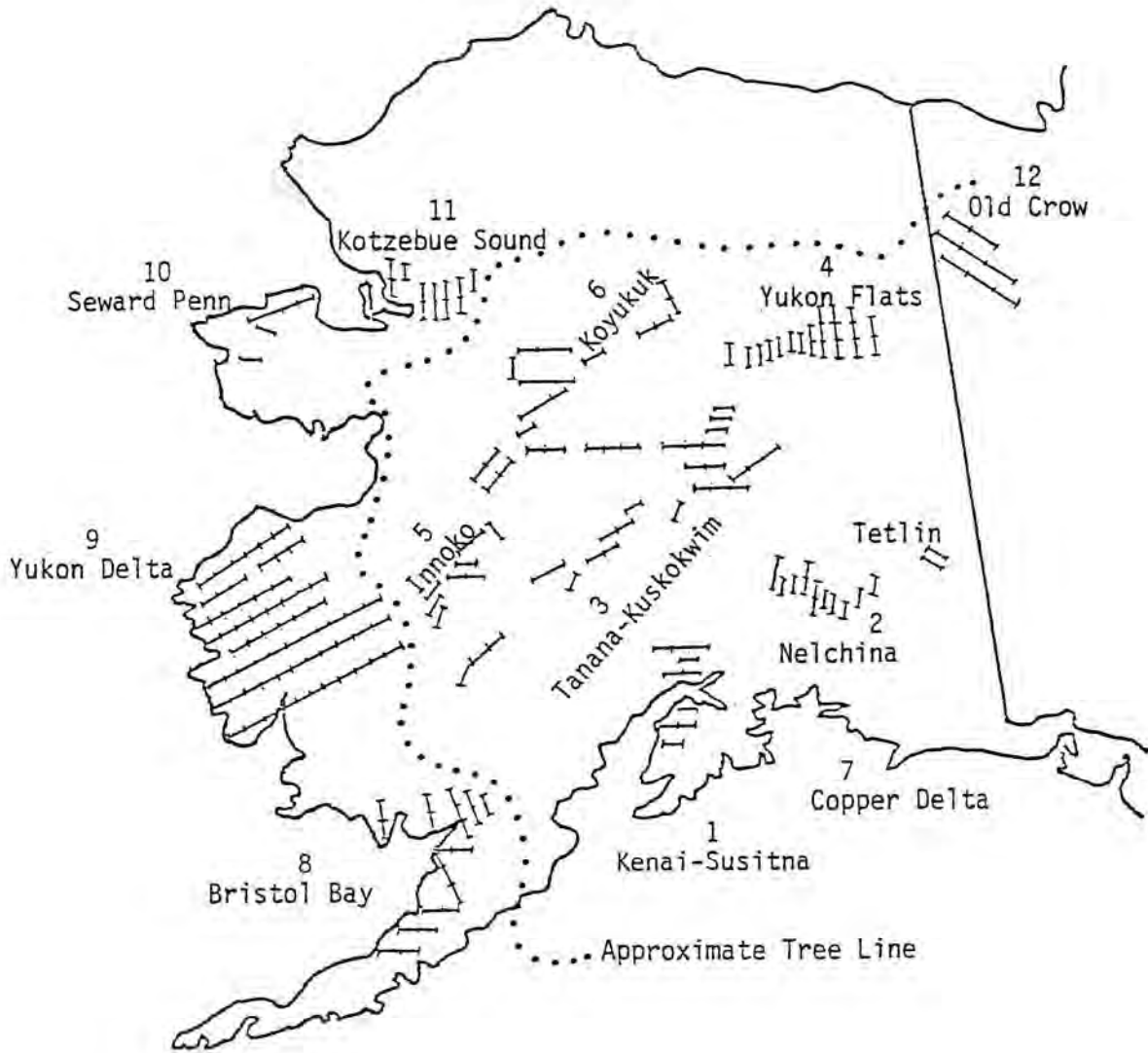


ALASKA - YUKON

WATERFOWL BREEDING POPULATION SURVEY

May 13 to June 7, 2011



By

Edward J. Mallek<sup>1</sup>  
Deborah J. Groves<sup>2</sup>

U.S. Fish and Wildlife Service  
Fairbanks<sup>1</sup> and Juneau<sup>2</sup>, Alaska

**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:** 13 May to 7 June 2011

**DATA SUPPLIED BY:** Ed Mallek<sup>1</sup> and Deborah J. Groves<sup>2</sup>  
U.S. Fish and Wildlife Service,  
Fairbanks<sup>1</sup> and Juneau<sup>2</sup>, Alaska

### **ABSTRACT**

Waterfowl breeding conditions within the survey area depend largely on the timing of spring phenology. Relatively normal spring phenology occurred in Interior and Coastal Alaska in 2011. Overall, waterfowl production is expected to be good across the survey area compared to previous long-term (1957-2010) production.

Total duck numbers were down 28% from the previous 10-year mean, but were only down 3% from the long-term mean (1957–2010). Dabbling ducks decreased from the previous 10-year mean by 33%, but were up 5% from the long-term mean. Divers and “miscellaneous” species differed by -22% and -7% from their previous 10-year means, respectively, and differed from their long-term means by -14% and -3%, respectively.

### **INTRODUCTION**

In 2011, the standardized waterfowl breeding pair survey in Alaska was conducted for the 55<sup>th</sup> consecutive year. Data collected from this survey 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 when compared to other fixed-wing aircraft. This is the last year that N754 will be used for this survey and it will be replaced on future surveys by Quest Kodiak aircraft.

### **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). Each recorded observation was linked to coordinates from the aircraft global positioning system. We then used a second computer program on the ground to transcribe the linked sound files and produce text files. 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 2011 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.

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.

Starting in 2002 and thereafter, the FWS Alaska Region Waterfowl Management Branch (WBM) followed methods adopted by the FWS DMBM doubling 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 (1957 to present) have been updated to reflect this change in analyses. However, the WMB does 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 habitat conditions were present for waterfowl nesting throughout Alaska in 2011, with average spring phenology occurring in the interior and coastal regions of the survey area.

## **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, that include data collected previous to 1977, may be more significant than depicted on the graphs and any long-term increases may be less significant than depicted (depending on the span of years in question). Likewise, long-term averages that include pre-1977 data 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**

Overall, total duck numbers in 2011 were below previous ten-year and long-term means (Tables 1, 2 and 9-20; Figures 1-3).

Dabbler populations decreased from 2010 by 38%, were 33% below the previous 10-year mean, and were up 5% from the previous long-term mean (1957-2010). The northern pintail population was 30% below the previous 10-year mean and 21% below 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. Results from this survey in 2011 (which does not include the Arctic Coastal Plain of Alaska) accounted for approximately 17% of the continental pintail population. American wigeon were down 36% from the previous 10-year mean and were up 9% from the long-term mean. The American green-winged teal population was down 21% from the previous 10-year mean, and up 55% from the long-term mean. Mallard and northern shoveler populations were down 36% and 45% from their previous 10-year means, respectively, and were up 7% from their long-term means.

Scaup, which account for the vast majority of divers observed on this survey, were down 15% from the previous 10-year mean, and down 9% from the long-term mean. The canvasback population was down 74% and 72% from the previous 10-year mean and long-term mean, respectively. Ring-necked duck and goldeneye populations were down 53% and 28% from their previous 10-year means, and were up 27% and down 29% from their long-term means, respectively. The bufflehead population was up 7% and 22% from the previous 10-year mean and long-term mean, respectively. The long-tailed duck population was down 11% from the previous 10-year mean and was also down 40% from the long-term mean. Eider and scoter populations were up 73% and down 10%, respectively, from their previous 10-year means and were down 6% and 17% from their long-term means. Mergansers were up 6% from the previous 10-year mean, and were up 109% 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 1985-2010) 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**

Trumpeter and tundra swan population estimates exceed their previous 10-year and long-term means, respectively (Tables 3, 9-20; Figure 3).

Trumpeter Swans – The estimated trumpeter swan population in boreal forest strata (1-4, 6, and 7) was 17,100 adults and sub-adults, 7% above the previous 10-year mean, and 75% above the long-term mean (1964–2010). Overall, good production is expected this year for trumpeter swans in Alaska.

Tundra Swans – The tundra swan population estimate from tundra strata (8-11), not including the Arctic Coastal Plain of Alaska, was 111,600, which is 20% below the previous 10-year mean,

and 11% above the long-term mean. The breeding index (singles and pairs) was 86,000, which is 3% above the previous 10-year mean. Overall, good production is expected this year for tundra swans in western Alaska.

### **Cranes**

The sandhill crane population estimate in 2011 was 51,500, which is 8% above the previous 10-year mean and 24% above the long-term mean (Tables 4, 9-20; Figure 4)

### **Loons**

The 2011 red-throated loon population estimate was 13,200, up 8% from the previous 10-year mean.

The 2010 Pacific loon population estimate was 57,900, up 3% from the previous 10-year mean.

The 2010 common loon population estimate was 6,300, down 38% from the previous 10-year mean (Tables 5-7; Figure 4).

### **CONCLUSION**

Overall, total duck numbers in 2011 were below previous ten-year means (dabblers -33%, divers -22%, and total -28%). However, the total duck number was only 3% below the long-term mean. Overall waterfowl production within the survey area is expected to be good.

### **TELEMETRY**

A Telonics telemetry receiver-scanner is incorporated in the panel of the survey aircraft. This year we did not receive any requests to scan for frequencies during the survey.

### **ACKNOWLEDGMENTS**

We thank John Pribbenow, Daryl Carson, Wade Smith and other OAS personnel for providing a fast yet thorough annual inspection to the aircraft prior to the survey, and for their help during the survey related to aircraft engine starting issues. We also thank Doug Alcorn, Russ Oates, Eric Taylor, and Kevin Fox for their needed support. Special thanks to Mike Spindler, Bo Sloan, Bill Schaff, Gene Peltola, and Lee Anne Ayres for providing housing, vehicles, or other logistic support.

*The findings and conclusions in this article are those of the authors and do not necessarily represent the views of the U.S. Fish and Wildlife Service.*

## **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, 2002 - 2011 (estimates in thousands).

Species	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Ducks:										
Dabblers:										
Mallard	667.2	843.5	811.1	703.3	515.4	575.6	526.0	496.4	597.8	410.9
Am. black duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gadwall	1.0	4.6	1.9	2.7	1.8	3.2	3.9	2.0	2.9	1.3
Am. Wigeon	1036.5	1019.5	897.1	873.2	821.4	1102.9	910.2	795.0	1056.7	613.1
Am. green-winged teal	631.1	1035.4	818.6	713.1	779.7	814.6	646.1	649.6	941.2	633.6
Blue-winged teal	0.0	2.9	2.2	2.8	0.0	9.2	0.0	0.0	3.9	1.5
N. shoveler	580.7	671.0	642.5	666.2	408.4	573.1	459.7	457.0	617.6	318.0
N. pintail	942.0	848.3	927.4	905.5	1040.3	1120.2	1259.1	932.5	1146.5	734.5
SUBTOTAL	3858.5	4425.2	4100.8	3866.8	3567.0	4198.8	3805.0	3332.5	4366.6	2712.9
Divers:										
Redhead	4.6	3.0	2.4	0.2	10.1	1.6	2.0	0.8	1.3	0.8
Canvasback	142.4	88.9	210.6	95.1	73.2	90.8	85.0	41.0	56.0	24.8
Scaups	815.4	1027.2	1001.0	960.8	883.0	1178.0	1069.1	822.0	947.8	835.9
Ring-necked duck	51.9	96.2	71.5	78.6	83.4	61.0	40.5	28.7	45.7	30.2
Goldeneyes	104.7	75.8	92.5	61.0	88.2	38.0	52.2	31.9	40.5	49.1
Bufflehead	38.3	46.7	43.9	51.7	46.2	60.6	56.1	58.3	53.0	54.6
SUBTOTAL	1157.3	1337.8	1421.9	1247.4	1184.1	1430.0	1304.9	982.7	1144.3	995.4
Miscellaneous:										
Long-tailed duck	84.1	83.2	83.3	66.3	103.0	127.8	101.0	65.8	80.9	80.0
Eiders	24.1	17.5	17.4	7.9	13.7	16.0	17.5	14.8	7.6	24.7
Scoters	319.7	399.0	367.3	350.2	400.6	396.2	347.1	366.4	289.3	312.0
Ruddy duck	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.8
Mergansers	22.9	20.6	22.0	36.3	27.0	36.3	26.9	24.2	30.5	29.1
SUBTOTAL	450.8	520.3	490.8	460.7	544.3	576.3	492.5	471.2	408.3	446.6
TOTAL DUCKS	5466.6	6283.3	6013.5	5574.9	5295.4	6205.1	5602.4	4786.4	5919.2	4154.9

Table 2. Status of Alaska-Yukon waterfowl breeding population estimates (thousands, adjusted for visibility bias) by species and strata in 2011, with comparisons to 2010, the previous 10-year mean, and the long-term mean.

Species	Strata <sup>a</sup>			2011 Total	2010 Total	10-Year Mean <sup>b</sup>	Long-Term Mean <sup>c</sup>	% Change From		
	1-7	8-11	12					2010	10-Year Mean	Long-Term Mean
Ducks:										
Dabblers:										
Mallard	236.8	167.8	6.3	410.9	597.8	645.5	382.3	-31	-36	+7
Am. black duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	--	--
Gadwall	0.0	1.3	0.0	1.3	2.9	3.1	2.1	-55	-58	-38
Am. wigeon	317.1	225.0	71.0	613.1	1056.7	961.8	564.3	-42	-36	+9
Am. green-winged teal	328.8	291.1	13.7	633.6	941.2	805.8	409.4	-33	-21	+55
Blue-winged teal	1.5	0.0	0.0	1.5	3.9	2.1	1.3	-62	-29	+15
N. shoveler	129.9	178.2	9.9	318.0	617.6	574.2	297.9	-49	-45	+7
N. pintail	209.4	505.4	19.7	734.5	1146.5	1054.8	924.4	-36	-30	-21
Subtotal	1223.5	1368.8	120.6	2712.9	4366.6	4047.4	2581.7	-38	-33	+5
Divers:										
Redhead	0.8	0.0	0.0	0.8	1.3	2.6	1.6	-38	-69	-50
Canvasback	20.7	1.5	2.6	24.8	56.0	97.2	89.4	-56	-74	-72
Scaups	267.3	494.9	73.7	835.9	947.8	985.2	923.5	-12	-15	-9
Ring-necked duck	26.1	3.7	0.4	30.2	45.7	64.4	23.7	-34	-53	+27
Goldeneyes	41.5	6.8	0.8	49.1	40.5	68.0	69.4	21	-28	-29
Bufflehead	52.7	1.9	0.0	54.6	53.0	50.9	44.7	3	7	+22
Subtotal	409.1	508.8	77.5	995.4	1144.3	1268.4	1152.4	-13	-22	-14
Miscellaneous:										
Long-tailed duck	1.4	70.1	8.5	80.0	80.9	89.5	134.2	-1	-11	-40
Eiders	0.0	24.7	0.0	24.7	7.6	14.3	26.2	225	73	-6
Scoters	22.3	201.0	88.7	312.0	289.3	347.8	374.4	8	-10	-17
Ruddy duck	0.8	0.0	0.0	0.8	0.0	0.2	0.1	--	344	+658
Mergansers	9.4	17.6	2.1	29.1	30.5	27.4	13.9	-5	6	+109
Subtotal	33.9	313.4	99.3	446.6	408.3	479.2	548.8	9	-7	-19
Total Ducks	1666.5	2191.0	297.4	4154.9	5919.2	5794.9	4282.9	-30	-28	-3

<sup>a</sup>1-7 Interior Alaska Taiga; 8-11 Coastal Alaska Tundra; 12 Old Crow Flats, Yukon Territory, Canada

<sup>b</sup>2001-2010

<sup>c</sup>1957-2010



Table 3. Alaska. Ten year trend in tundra swan breeding population observations, 2002 - 2011 (estimates in thousands).

Stratum	Status	2002	2003	2004	2005	Y E A R					2011	2001 - 2010 Average	% Change from 2010	% Change from Avg
						2006	2007	2008	2009	2010				
8	Singles & pairs	12.7	13.7	10.9	8.5	12.4	8.4	9.3	9.9	8.3	9.1	10.5	+10	-13
Bristol Bay	Flocks	5.1	1.2	2.4	15.6	5.4	7.5	3.6	3.6	0.0	6.1	4.8	-	+27
	Total	17.8	14.9	13.3	24.1	17.8	15.9	12.9	13.5	8.3	15.2	15.3	+83	-1
9	Singles & pairs	50.7	51.6	49.8	53.2	52.9	66.2	73.4	60.6	64.4	58.0	57.3	-10	+1
Yukon Delta	Flocks	26.6	6.8	143.1	52.2	58.2	67.6	46.7	17.0	8.9	17.9	46.0	+101	-61
	Total	77.3	58.4	192.9	105.4	111.1	133.8	120.1	77.6	73.3	75.9	103.2	+4	-26
10	Singles & pairs	8.1	7.4	8.3	5.5	4.1	7.3	7.2	7.8	7.3	8.0	6.9	+10	+16
Seward Pen.	Flocks	0.0	0.8	0.6	0.0	0.0	4.5	0.0	0.0	3.4	0.8	1.3	-76	-38
	Total	8.1	8.2	8.9	5.5	4.1	11.8	7.2	7.8	10.7	8.8	8.3	-18	+6
11	Singles & pairs	8.9	7.8	5.6	6.7	7.2	11.4	10.9	11.9	9.9	10.9	8.7	+10	+25
Kotzebue So.	Flocks	3.0	0.8	6.1	0.0	1.4	6.0	24.9	0.3	0.0	0.8	4.4	-	-82
	Total	11.9	8.6	11.7	6.7	8.6	17.4	35.8	12.2	9.9	11.7	13.1	+18	-11
Total	Singles & pairs	80.4	80.5	74.6	73.9	76.6	93.3	100.8	90.2	89.9	86.0	83.4	-4	+3
	Flocks	34.7	9.6	152.2	67.8	65.0	85.6	75.2	20.9	12.3	25.6	56.4	+108	-55
	Total	115.1	90.1	226.8	141.7	141.6	178.9	176.0	111.1	102.2	111.6	139.9	+9	-20

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, 2002 - 2011 (estimates in thousands).

Stratum	Y E A R										2001 - 2010 Average	% Change from 2010	% Change from Avg.
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011			
1. Kenai-Susitna	0.3	0.0	0.4	0.2	0.2	0.1	0.1	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.	0.7	1.3	1.0	0.6	0.4	0.6	1.1	0.9	0.7	1.7	0.9	+143	+89
4. Yukon Flats	1.4	1.5	1.5	1.1	0.4	0.9	1.4	1.2	1.1	1.5	1.1	+36	+36
5. Innoko	0.4	0.2	0.4	0.5	0.2	0.2	1.1	0.9	0.2	1.8	0.5	+800	+260
6. Koyukuk	0.6	0.8	2.3	0.6	0.8	0.9	1.2	1.7	1.7	1.2	1.2	-29	+0
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	3.4	3.8	5.6	3.0	2.0	2.7	4.9	4.8	3.8	6.3	3.8	+66	+66
8. Bristol Bay	5.9	3.8	2.4	2.5	4.5	5.1	7.7	5.6	8.5	6.5	5.2	-24	+25
9. Yukon Delta	19.5	23.2	22.5	22.3	36.3	27.7	33.9	38.0	34.3	28.7	29.2	-16	-2
10. Seward Pen.	7.6	5.1	9.2	2.2	4.7	6.0	5.2	4.1	4.3	3.7	5.5	-14	-33
11. Kotzebue So.	2.3	3.6	2.6	3.1	6.1	2.5	4.1	5.1	4.9	6.2	4.0	+27	+55
Subtotal - Tundra	35.3	35.7	36.7	30.1	51.6	41.3	50.9	52.8	52.0	45.1	43.9	-13	+3
TOTAL - ALASKA	38.7	39.5	42.3	33.1	53.6	44.0	55.8	57.6	55.8	51.4	47.7	-8	+8
12. Old Crow Flats Yukon	0.1	0.0	0.0	0.3	0.1	0.1	0.1	0.1	0.0	0.1	0.1	-	+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, 2002 - 2011 (estimates in thousands).

Stratum	2002	2003	2004	2005	2006	Y E A R					2001 - 2010		% Change from 2010	% Change from Avg.
						2007	2008	2009	2010	2011	Average			
1. Kenai-Susitna	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	-100	-
2. Nelchina	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.3	0.0	0.3	0.5	0.1	+67	+400
3. Tanana-Kusko.	0.3	0.1	0.1	0.1	0.2	0.4	0.5	0.3	0.8	0.1	0.3	0.3	-88	-67
4. Yukon Flats	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.3	0.0	0.0	0.0	-100	-
5. Innoko	0.3	0.9	1.0	0.5	0.2	0.5	0.8	0.3	0.5	0.2	0.5	0.5	-60	-60
6. Koyukuk	0.2	0.3	0.1	0.2	0.2	0.3	0.3	0.4	0.3	0.3	0.3	0.2	+0	+50
7. Copper Delta	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-
Subtotal - Interior	1.0	1.4	1.3	1.0	0.6	1.2	2.0	1.0	2.4	1.1	1.3	1.3	-54	-15
8. Bristol Bay	0.6	1.3	1.3	1.2	0.8	2.0	0.6	1.4	1.5	1.4	1.2	1.2	-7	+17
9. Yukon Delta	3.9	3.6	5.4	4.4	5.7	5.9	7.6	4.8	5.6	5.3	5.2	5.2	-5	+2
10. Seward Pen.	1.9	3.4	2.9	3.2	5.2	6.6	4.7	6.9	3.6	4.8	3.9	3.9	+33	+23
11. Kotzebue So.	0.3	0.9	0.3	0.2	1.0	0.9	1.3	0.0	0.2	0.3	0.5	0.5	+50	-40
Subtotal - Tundra	6.7	9.2	9.9	9.0	12.7	15.4	14.2	13.1	10.9	11.8	10.8	10.8	+8	+9
TOTAL - ALASKA	7.7	10.6	11.2	10.0	13.3	16.6	16.2	14.1	13.3	12.9	12.0	12.0	-3	+7
12. Old Crow Flats Yukon	0.1	0.2	0.2	0.4	0.4	0.3	0.4	0.5	0.2	0.3	0.3	0.3	+50	+0

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, 2002 - 2011 (estimates in thousands).

Stratum	Y E A R										2001 - 2010 Average	% Change from 2010	% Change from Avg.
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011			
1. Kenai-Susitna	0.4	0.3	0.3	0.6	0.2	0.4	0.3	0.1	0.3	0.1	0.3	-67	-67
2. Nelchina	0.7	0.1	0.1	0.0	0.1	0.0	0.6	0.6	0.4	0.1	0.3	-75	-67
3. Tanana-Kusko.	0.6	1.1	0.7	0.6	0.8	0.7	1.3	1.1	0.4	0.6	0.8	+50	-25
4. Yukon Flats	3.5	4.9	4.2	4.0	2.8	4.0	4.3	4.3	1.2	2.7	3.6	+125	-25
5. Innoko	0.2	0.6	0.5	0.3	0.2	0.5	0.3	0.1	0.4	0.7	0.4	+75	+75
6. Koyukuk	1.0	0.8	0.9	0.3	0.1	0.8	0.5	0.7	0.3	0.3	0.6	+0	-50
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	6.4	7.8	6.7	5.8	4.2	6.4	7.3	6.9	3.0	4.5	6.1	+50	-26
8. Bristol Bay	4.2	1.1	2.9	0.3	2.3	0.6	1.7	1.0	1.5	1.2	1.7	-20	-29
9. Yukon Delta	45.1	40.2	39.1	29.7	36.6	52.0	44.3	34.4	34.7	39.3	39.0	+13	+1
10. Seward Pen.	5.2	1.4	2.6	4.3	1.9	2.5	1.9	4.5	2.9	3.2	3.0	+10	+7
11. Kotzebue So.	2.9	3.0	2.0	3.1	2.5	4.9	5.3	2.5	4.8	4.9	3.3	+2	+48
Subtotal - Tundra	57.4	45.7	46.6	37.4	43.3	60.0	53.2	42.4	43.9	48.6	47.0	+11	+3
TOTAL - ALASKA	63.8	53.5	53.3	43.2	47.5	66.4	60.5	49.3	46.9	53.1	53.0	+13	+0
12. Old Crow Flats Yukon	3.9	3.0	3.4	3.6	2.8	2.1	3.0	2.4	1.4	4.8	2.9	+243	+66

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, 2002 - 2011 (estimates in thousands).

Stratum	Y E A R										2001 - 2010 Average	% Change from 2010	% Change from Avg.
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011			
1. Kenai-Susitna	1.9	1.7	1.6	2.0	1.8	1.3	1.6	0.7	1.6	1.5	1.7	-6	-12
2. Nelchina	0.1	0.3	0.5	0.0	0.5	0.2	0.1	0.2	0.1	0.0	0.3	-100	-100
3. Tanana-Kusko.	2.0	2.4	1.3	1.2	0.9	0.4	1.8	1.6	1.4	1.3	1.3	-7	+0
4. Yukon Flats	1.8	3.1	1.9	1.1	2.3	1.4	1.1	1.1	0.8	0.1	1.5	-88	-93
5. Innoko	0.2	0.5	0.0	0.5	0.2	0.3	0.6	0.2	0.8	0.4	0.3	-50	+33
6. Koyukuk	0.8	0.8	1.3	0.6	0.2	0.3	0.3	1.0	0.9	0.6	0.7	-33	-14
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	6.8	8.8	6.6	5.4	5.9	3.9	5.5	4.8	5.6	3.9	5.8	-30	-33
8. Bristol Bay	1.2	1.4	1.5	1.1	1.1	2.6	1.2	0.8	0.9	0.8	1.2	-11	-33
9. Yukon Delta	2.6	2.3	2.9	3.3	4.1	2.3	2.6	2.4	3.2	1.4	2.7	-56	-48
10. Seward Pen.	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-
11. Kotzebue So.	0.1	0.2	0.2	0.6	0.2	0.0	0.0	0.0	0.1	0.1	0.2	+0	-50
Subtotal - Tundra	3.9	3.9	4.7	5.1	5.4	4.9	3.8	3.2	4.2	2.3	4.1	-45	-44
TOTAL - ALASKA	10.7	12.7	11.3	10.5	11.3	8.8	9.3	8.0	9.8	6.2	9.9	-37	-37
12. Old Crow Flats Yukon	0.2	0.5	0.1	0.2	0.3	0.2	0.2	0.2	0.0	0.1	0.2	-	-50

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, 2011 , 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	36	52	132	80	44	80	20	92	260	28	48	36	908
Linear miles in sample	144	208	528	320	176	320	80	368	1040	112	192	144	3,632
No. of transects in sample	6	10	18	12	7	10	7	11	8	4	7	3	103
No. of segments in sample	9	13	33	20	11	20	10	23	65	7	12	8	231
Expansion factor	61.111	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 / 14 / 2011 THRU 5 / 14 / 2011

SPECIES	DRAKES	PAIRS	GROUPED BIRDS	INDICATED TOTAL BIRDS (T)	VISIBILITY RATIO (V)	POPULATION INDEX (P)
MALLARD	6	7		26	3.57	5672
BLACK DUCK					1.57	
GADWALL					3.04	
AMERICAN WIGEON	5	2	20	34	3.65	7584
GREEN-WINGED TEAL		5		10	8.88	5427
BLUE-WINGED TEAL					10.31	
SHOVELER		1		2	3.35	409
PINTAIL	6	1	6	20	2.51	3068
REDHEAD a					3.11	
CANVASBACK	2			4	2.43	594
SCAUP a		3		6	1.82	667
RING-NECKED DUCK a	1	5		11	4.02	2702
GOLDENEYE	7	7		28	3.61	6177
BUFFLEHEAD	2	1		6	1.86	682
LONG-TAILED DUCK		1		2	1.99	243
EIDER					3.58	
SCOTER	3	5	15	31	1.08	2046
RUDDY DUCK					5.94	
MERGANSE		4	20	28	1.27	2173
SUB - TOTAL	32	42	61	208		37445
CANADA GOOSE					1.00	
SWAN	4	6	3	19	1.00	1161
CRANE	1			1	1.00	61

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)	36
S = SQUARE MILES IN THE SAMPLE	NUMBER OF SEGMENTS	9
V = VISIBILITY RATIO	EXPANSION FACTOR	61.111
$P = A * (T/S) * V$		

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

TABLE 10.

WATERFOWL BREEDING POPULATION SURVEY

STRATUM: 2

NELCHINA

DATES: 6 / 7 / 2011 THRU 6 / 7 / 2011

SPECIES	DRAKES	PAIRS	GROUPED BIRDS	INDICATED TOTAL BIRDS (T)	VISIBILITY RATIO (V)	POPULATION INDEX (P)
MALLARD	17	4	5	47	3.57	12584
BLACK DUCK					1.57	
GADWALL					3.04	
AMERICAN WIGEON	8	4		24	3.65	6570
GREEN-WINGED TEAL	10	2		24	8.88	15984
BLUE-WINGED TEAL					10.31	
SHOVELER					3.35	
PINTAIL	3	3	17	29	2.51	5459
REDHEAD a					3.11	
CANVASBACK		1		2	2.43	365
SCAUP a	50	52	5	159	1.82	21704
RING-NECKED DUCK a	4	4	8	20	4.02	6030
GOLDENEYE	4		6	14	3.61	3791
BUFFLEHEAD	15			30	1.86	4185
LONG-TAILED DUCK	2			4	1.99	597
EIDER					3.58	
SCOTER	12	15	13	67	1.08	5427
RUDDY DUCK					5.94	
MERGANSE			6	6	1.27	572
SUB - TOTAL	125	85	60	426		83267
CANADA GOOSE		1		2	1.00	150
SWAN	9	15		39	1.00	2925
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 / 17 / 2011 THRU 5 / 26 / 2011

SPECIES	DRAKES	PAIRS	GROUPED BIRDS	INDICATED TOTAL BIRDS (T)	VISIBILITY RATIO (V)	POPULATION INDEX (P)
MALLARD	87	39	5	257	3.57	64641 64.6
BLACK DUCK					1.57	
GADWALL					3.04	
AMERICAN WIGEON	64	105	6	344	3.65	88463 88.5
GREEN-WINGED TEAL	33	36		138	8.88	86338 86.3
BLUE-WINGED TEAL		1		2	10.31	1453 1.5
SHOVELER	37	45		164	3.35	38708 38.7
PINTAIL	67	33		200	2.51	35368 35.4
REDHEAD a					3.11	
CANVASBACK	3	9	8	32	2.43	5479 5.5
SCAUP a	83	272	159	786	1.82	100787 100.8
RING-NECKED DUCK a	7	6		19	4.02	5381 5.4
GOLDENEYE	18	21		78	3.61	19839 19.8
BUFFLEHEAD	35	39	8	156	1.86	20443 20.4
LONG-TAILED DUCK		2		4	1.99	561 0.6
EIDER					3.58	
SCOTER	7	19	18	70	1.08	5326 5.3
RUDDY DUCK		1		2	5.94	837 0.8
MERGANSE	15	7		44	1.27	3937 3.9
SUB - TOTAL	456	635	204	2296		477560 477.5
CANADA GOOSE	1	2		6	1.00	423 0.4
SWAN	19	36	36	127	1.00	8948 8.9
CRANE	6	3	12	24	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)	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 / 21 / 2011 THRU 5 / 21 / 2011

SPECIES	DRAKES	PAIRS	GROUPED BIRDS	INDICATED TOTAL BIRDS (T)	VISIBILITY RATIO (V)	POPULATION INDEX (P)
MALLARD	58	41	12	210	3.57	101210
BLACK DUCK					1.57	
GADWALL					3.04	
AMERICAN WIGEON	64	74	10	286	3.65	140927
GREEN-WINGED TEAL	23	35	12	128	8.88	153446
BLUE-WINGED TEAL					10.31	
SHOVELER	16	39		110	3.35	49748
PINTAIL	94	34	40	296	2.51	100300
REDHEAD a		1		2	3.11	840
CANVASBACK	5	3	15	31	2.43	10170
SCAUP a	44	132	160	468	1.82	114988
RING-NECKED DUCK a		2		4	4.02	2171
GOLDENEYE	2	4		12	3.61	5848
BUFFLEHEAD	25	19		88	1.86	22097
LONG-TAILED DUCK					1.99	
EIDER					3.58	
SCOTER	3	8	8	30	1.08	4374
RUDDY DUCK					5.94	
MERGANSE	2			4	1.27	686
SUB - TOTAL	336	392	257	1669		706802
CANADA GOOSE	1	3		8	1.00	1080
SWAN	2	4		10	1.00	1350
CRANE	7		4	11	1.00	1485

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 / 25 / 2011 THRU 5 / 25 / 2011

SPECIES	DRAKES	PAIRS	GROUPED BIRDS	INDICATED TOTAL BIRDS (T)	VISIBILITY RATIO (V)	POPULATION INDEX (P)
MALLARD	21	5		52	3.57	14345 14.3
BLACK DUCK					1.57	
GADWALL					3.04	
AMERICAN WIGEON	18	41		118	3.65	33281 33.3
GREEN-WINGED TEAL	18	9		54	8.88	37054 37.1
BLUE-WINGED TEAL					10.31	
SHOVELER	31	21		104	3.35	26922 26.9
PINTAIL	59	17		152	2.51	29481 29.5
REDHEAD a					3.11	
CANVASBACK		1		2	2.43	376 0.4
SCAUP a	15	21		57	1.82	8016 8.0
RING-NECKED DUCK a	2			2	4.02	621 0.6
GOLDENEYE	3	4		14	3.61	3905 3.9
BUFFLEHEAD	3	4		14	1.86	2012 2.0
LONG-TAILED DUCK					1.99	
EIDER					3.58	
SCOTER	3	12		30	1.08	2504 2.5
RUDDY DUCK					5.94	
MERGANSE	3	2		10	1.27	981 1.0
SUB - TOTAL	176	137		609		159499 159.5
CANADA GOOSE	5	4	3	21	1.00	1623 1.6
SWAN	9	7		23	1.00	1777 1.8
CRANE	6		17	23	1.00	1777 1.8

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 / 22 / 2011 THRU 5 / 22 / 2011

SPECIES	DRAKES	PAIRS	GROUPED BIRDS	INDICATED TOTAL BIRDS (T)	VISIBILITY RATIO (V)	POPULATION INDEX (P)
MALLARD	49	15		128	3.57	23419 23.4
BLACK DUCK					1.57	
GADWALL					3.04	
AMERICAN WIGEON	42	58		200	3.65	37413 37.4
GREEN-WINGED TEAL	18	8		52	8.88	23665 23.7
BLUE-WINGED TEAL					10.31	
SHOVELER	21	17		76	3.35	13048 13.0
PINTAIL	109	19		256	2.51	32931 32.9
REDHEAD a					3.11	
CANVASBACK	1			2	2.43	249 0.2
SCAUP a	32	78	34	222	1.82	20707 20.7
RING-NECKED DUCK a	4	12	14	42	4.02	8653 8.7
GOLDENEYE		5		10	3.61	1850 1.9
BUFFLEHEAD	10	7		34	1.86	3241 3.2
LONG-TAILED DUCK					1.99	
EIDER					3.58	
SCOTER	5	19		48	1.08	2657 2.7
RUDDY DUCK					5.94	
MERGANSE	1	2		6	1.27	391 0.4
SUB - TOTAL	292	240	48	1076		168224 168.2
CANADA GOOSE	2	4		12	1.00	615 0.6
SWAN	8	12	5	37	1.00	1896 1.9
CRANE	10	4	6	24	1.00	1230 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)	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 / 13 / 2011 THRU 5 / 13 / 2011

SPECIES	DRAKES	PAIRS	GROUPED BIRDS	INDICATED TOTAL BIRDS (T)	VISIBILITY RATIO (V)	POPULATION INDEX (P)
MALLARD	67	29	18	210	3.57	14994 15.0
BLACK DUCK					1.57	
GADWALL					3.04	
AMERICAN WIGEON	9	10		38	3.65	2774 2.8
GREEN-WINGED TEAL	4	6	19	39	8.88	6926 6.9
BLUE-WINGED TEAL					10.31	
SHOVELER	3	2	8	18	3.35	1206 1.2
PINTAIL	14	3	20	54	2.51	2711 2.7
REDHEAD a					3.11	
CANVASBACK			70	70	2.43	3402 3.4
SCAUP a	1	5		11	1.82	400 0.4
RING-NECKED DUCK a		3		6	4.02	482 0.5
GOLDENEYE	1			2	3.61	144 0.1
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	11		24	1.27	610 0.6
SUB - TOTAL	100	70	135	474		33724 33.7
CANADA GOOSE	35	66	167	369	1.00	7380 7.4
SWAN	8	14		36	1.00	720 0.7
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)	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 / 26 / 2011 THRU 5 / 27 / 2011

SPECIES	DRAKES	PAIRS	GROUPED BIRDS	INDICATED TOTAL BIRDS (T)	VISIBILITY RATIO (V)	POPULATION INDEX (P)	
MALLARD	56	10	6	138	4.01	59549	59.5
BLACK DUCK					1.56		
GADWALL	2			4	3.04	1309	1.3
AMERICAN WIGEON	13	24		74	3.84	30578	30.6
GREEN-WINGED TEAL	20	9		58	8.36	52177	52.2
BLUE-WINGED TEAL					10.31		
SHOVELER	8	7		30	3.79	12235	12.2
PINTAIL	87	27		228	3.05	74831	74.8
REDHEAD a					3.11		
CANVASBACK					2.43		
SCAUP a	60	121	125	427	1.93	88681	88.7
RING-NECKED DUCK a					4.02		
GOLDENEYE		1		2	3.61	777	0.8
BUFFLEHEAD					1.86		
LONG-TAILED DUCK	3	5		16	1.87	3220	3.2
EIDER					3.58		
SCOTER	46	140	118	490	1.17	61692	61.7
RUDDY DUCK					5.94		
MERGANSE	8	9		34	1.27	4647	4.6
SUB - TOTAL	303	353	249	1501		389695	389.6
CANADA GOOSE	4	3	5	19	1.00	2045	2.0
SWAN	29	28	57	142	1.00	15280	15.3
CRANE	27	8	17	60	1.00	6457	6.5

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 / 28 / 2011 THRU 6 / 3 / 2011

SPECIES	DRAKES	PAIRS	GROUPED BIRDS	INDICATED TOTAL BIRDS (T)	VISIBILITY RATIO (V)	POPULATION INDEX (P)
MALLARD	71	25	9	201	4.01	82461 82.5
BLACK DUCK					1.56	
GADWALL					3.04	
AMERICAN WIGEON	67	79	5	297	3.84	116680 116.7
GREEN-WINGED TEAL	80	29		218	8.36	186454 186.5
BLUE-WINGED TEAL					10.31	
SHOVELER	100	50	6	306	3.79	118650 118.7
PINTAIL	291	70	65	787	3.05	245574 245.6
REDHEAD a					3.11	
CANVASBACK	2			4	2.43	994 1.0
SCAUP a	137	461	363	1422	1.93	280779 280.8
RING-NECKED DUCK a	3	3		9	4.02	3701 3.7
GOLDENEYE	4	2		12	3.61	4432 4.4
BUFFLEHEAD	3			6	1.86	1142 1.1
LONG-TAILED DUCK	64	44		216	1.87	41324 41.3
EIDER	12	13		50	3.58	18313 18.3
SCOTER	74	296	117	857	1.17	102583 102.6
RUDDY DUCK					5.94	
MERGANSE	7	7	18	46	1.27	5977 6.0
SUB - TOTAL	915	1079	583	4431		1209065 1209.2
CANADA GOOSE	151	122	281	827	1.00	84608 84.6
SWAN	305	131	175	742	1.00	75912 75.9
CRANE	141	49	42	281	1.00	28748 28.7

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)	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 / 2011 THRU 6 / 3 / 2011

SPECIES	DRAKES	PAIRS	GROUPED BIRDS	INDICATED TOTAL BIRDS (T)	VISIBILITY RATIO (V)	POPULATION INDEX (P)
MALLARD	7	1		16	4.01	8822   8.8
BLACK DUCK					1.56	
GADWALL					3.04	
AMERICAN WIGEON	11	5	5	37	3.84	19536   19.5
GREEN-WINGED TEAL	6	3		18	8.36	20691   20.7
BLUE-WINGED TEAL					10.31	
SHOVELER	6	11		34	3.79	17718   17.7
PINTAIL	85	17	72	276	3.05	115748   115.7
REDHEAD a					3.11	
CANVASBACK					2.43	
SCAUP a	15	70	55	210	1.93	55729   55.7
RING-NECKED DUCK a					4.02	
GOLDENEYE					3.61	
BUFFLEHEAD					1.86	
LONG-TAILED DUCK	13	14		54	1.87	13885   13.9
EIDER	2	2	5	13	3.58	6399   6.4
SCOTER	12	41	8	114	1.17	18340   18.3
RUDDY DUCK					5.94	
MERGANSE	1	5	16	28	1.27	4890   4.9
SUB - TOTAL	158	169	161	800		281757   281.6
CANADA GOOSE	7	3		20	1.00	2750   2.8
SWAN	28	15	6	64	1.00	8800   8.8
CRANE	15	6		27	1.00	3713   3.7

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)	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 / 2011 THRU 6 / 4 / 2011

SPECIES	DRAKES	PAIRS	GROUPED BIRDS	INDICATED TOTAL BIRDS (T)	VISIBILITY RATIO (V)	POPULATION INDEX (P)
MALLARD	14	5		38	4.01	16984
BLACK DUCK					1.56	
GADWALL					3.04	
AMERICAN WIGEON	46	22		136	3.84	58208
GREEN-WINGED TEAL	15	2		34	8.36	31681
BLUE-WINGED TEAL					10.31	
SHOVELER	22	13		70	3.79	29570
PINTAIL	73	25	8	204	3.05	69349
REDHEAD a					3.11	
CANVASBACK	1			2	2.43	542
SCAUP a	63	124	13	324	1.93	69697
RING-NECKED DUCK a					4.02	
GOLDENEYE	1	1		4	3.61	1609
BUFFLEHEAD	1	1		4	1.86	829
LONG-TAILED DUCK	14	14		56	1.87	11672
EIDER					3.58	
SCOTER	16	52	5	141	1.17	18387
RUDDY DUCK					5.94	
MERGANSE	4	1	5	15	1.27	2123
SUB - TOTAL	270	260	31	1028		310652
CANADA GOOSE	12	13		50	1.00	5573
SWAN	38	30	7	105	1.00	11703
CRANE	21	10	15	56	1.00	6242

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 / 2011 THRU 6 / 5 / 2011

SPECIES	DRAKES	PAIRS	GROUPED BIRDS	INDICATED TOTAL BIRDS (T)	VISIBILITY RATIO (V)	POPULATION INDEX (P)
MALLARD	11	10		42	2.74	6297 6.3
BLACK DUCK					1.57	
GADWALL					3.04	
AMERICAN WIGEON	68	34	5	209	6.21	71023 71.0
GREEN-WINGED TEAL	11	5		32	7.84	13729 13.7
BLUE-WINGED TEAL					10.31	
SHOVELER	16	10		52	3.49	9931 9.9
PINTAIL	55	10	5	135	2.66	19651 19.7
REDHEAD a					3.11	
CANVASBACK	8	1		18	2.59	2551 2.6
SCAUP a	121	209	49	588	2.29	73685 73.7
RING-NECKED DUCK a		1		2	4.02	440 0.4
GOLDENEYE		2		4	3.61	790 0.8
BUFFLEHEAD					2.21	
LONG-TAILED DUCK	26	13		78	1.99	8494 8.5
EIDER					3.58	
SCOTER	152	330	169	1133	1.43	88660 88.7
RUDDY DUCK					5.94	
MERGANSE	3		24	30	1.27	2085 2.1
SUB - TOTAL	471	625	252	2323		297336 297.4
CANADA GOOSE	6	3	17	35	1.00	1915 1.9
SWAN	6	5		16	1.00	876 0.9
CRANE	2			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).

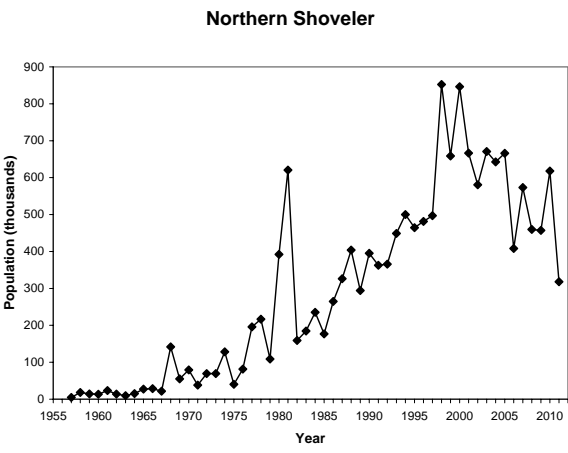
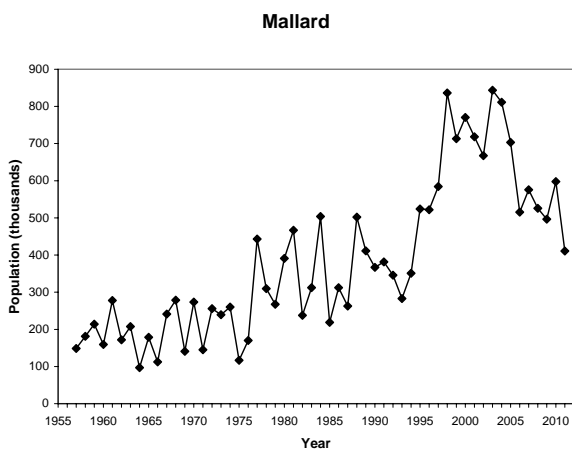
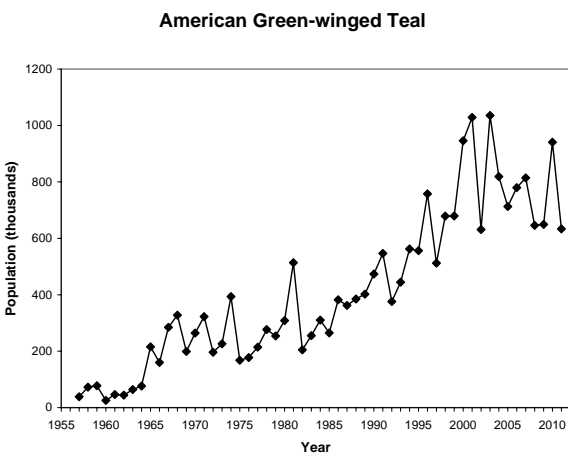
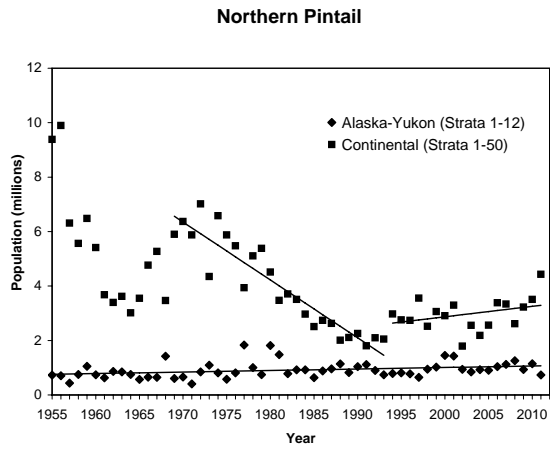
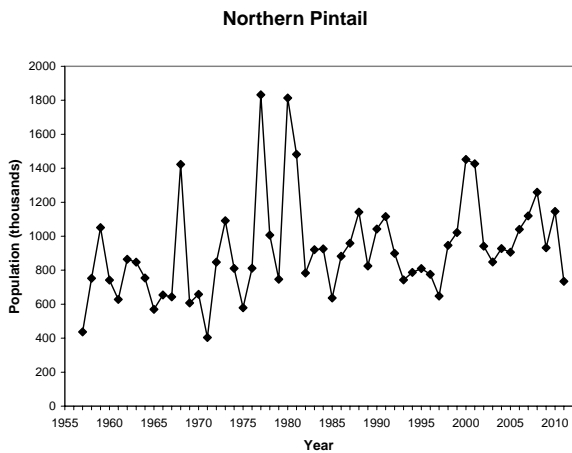


Figure 1. Trends in dabbling ducks from the Alaska-Yukon Waterfowl Breeding Population Survey.

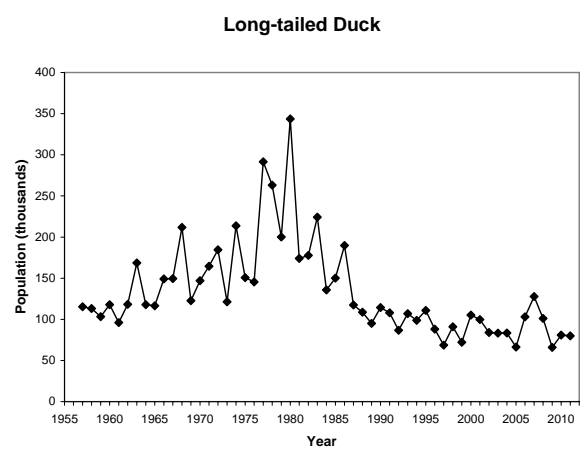
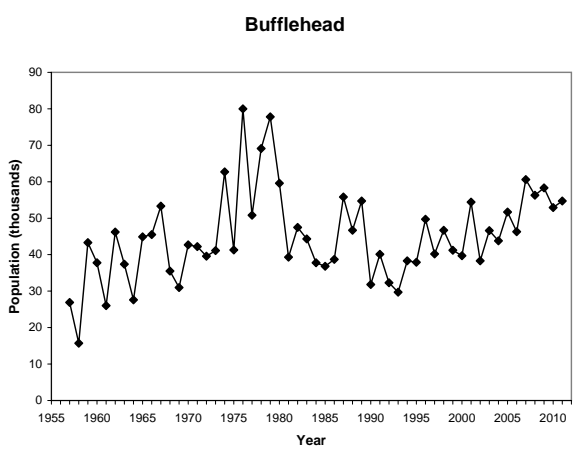
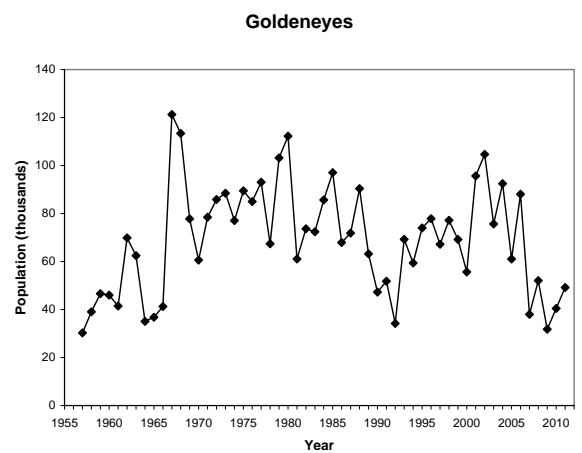
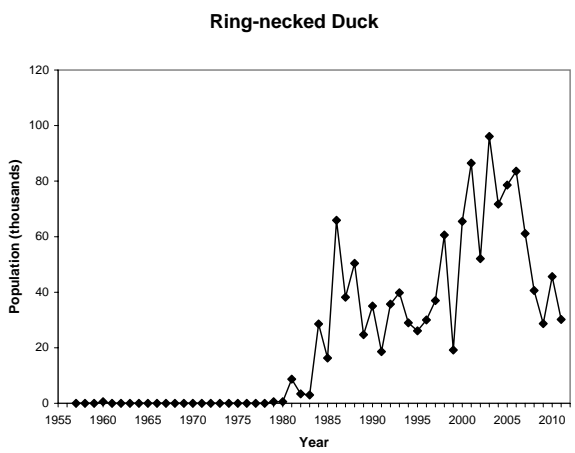
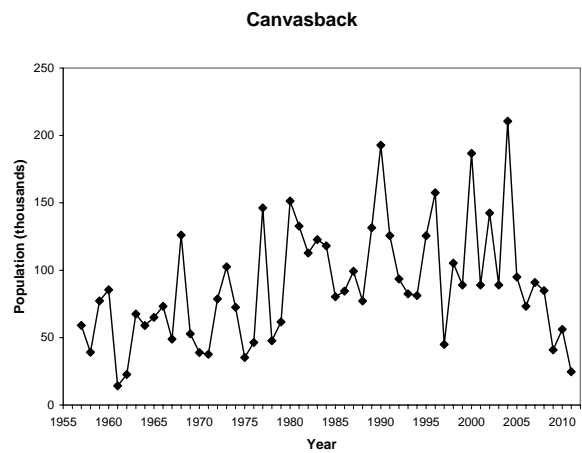
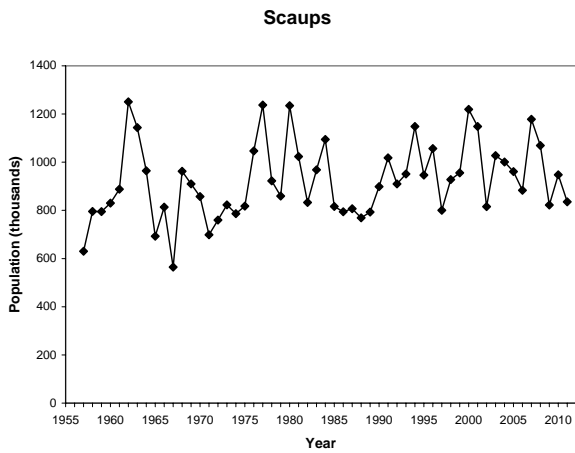


Figure 2. Trends in diver ducks from the Alaska-Yukon Waterfowl Breeding Population Survey.

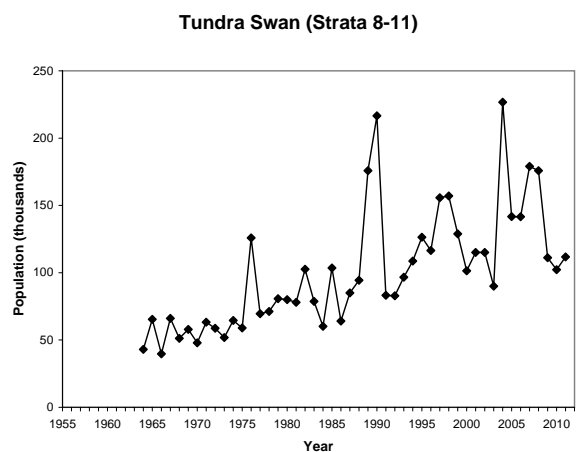
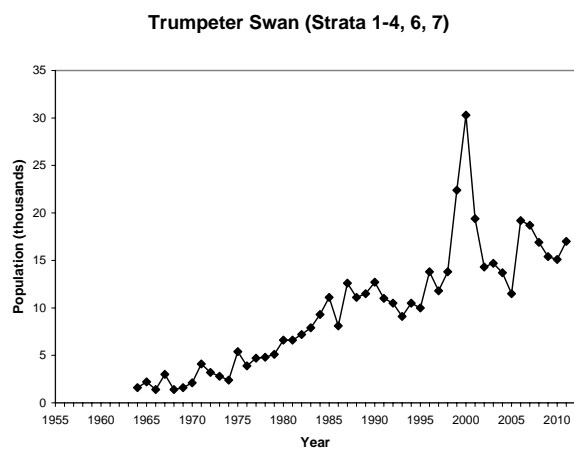
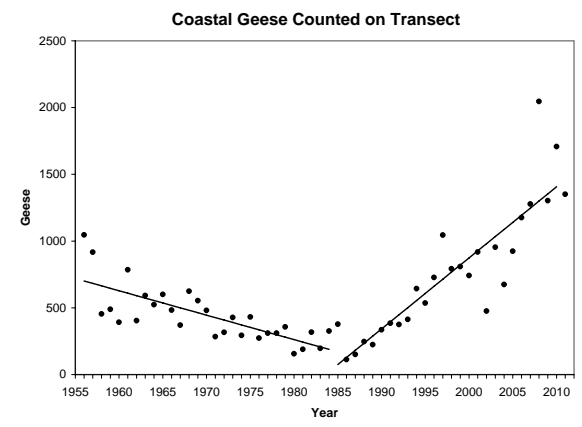
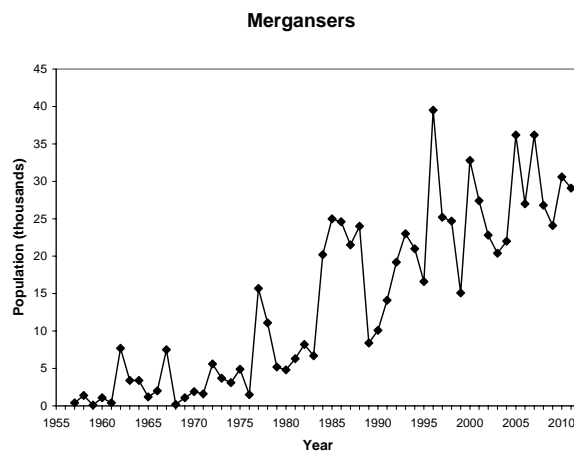
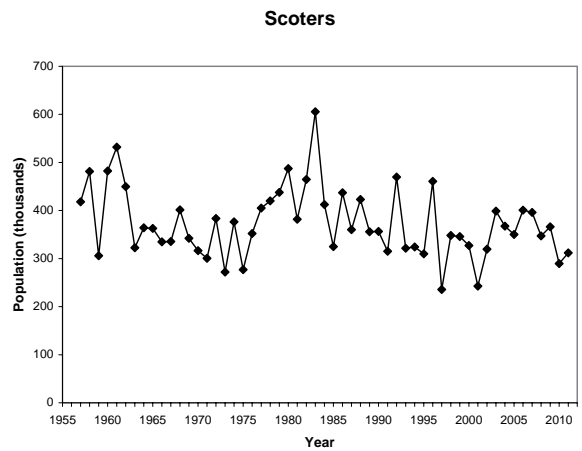
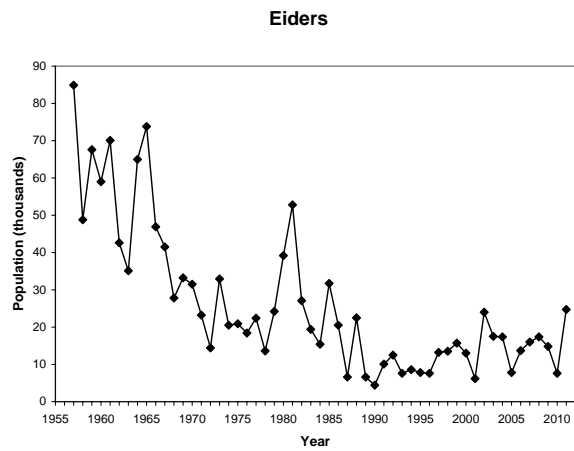


Figure 3. Trends in diver ducks, coastal geese, and swans from the Alaska-Yukon Waterfowl Breeding Population Survey.

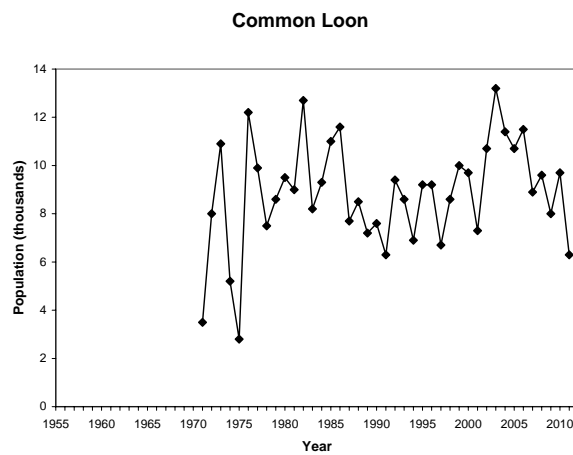
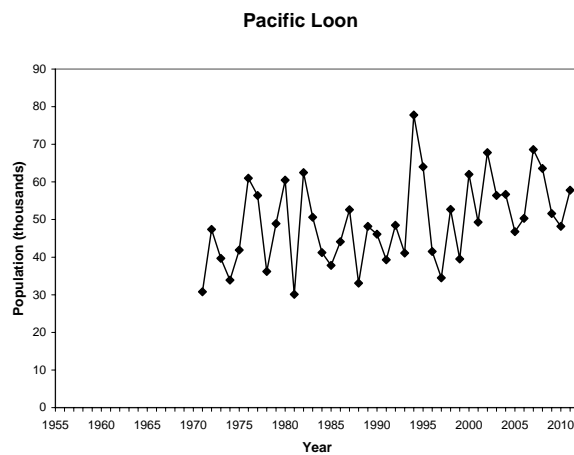
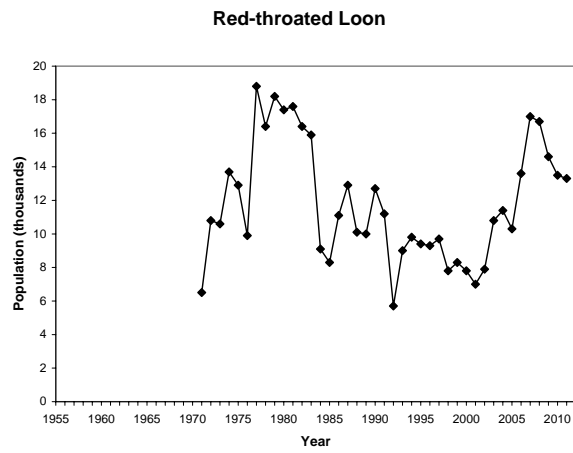
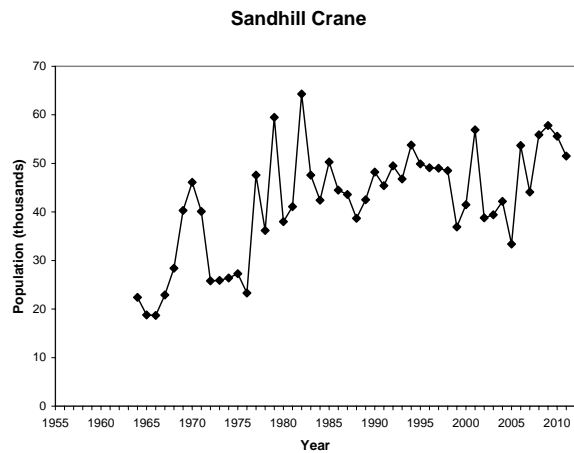


Figure 4. Trends in sandhill cranes and loons from the Alaska-Yukon Waterfowl Breeding Population Survey.