

COOPERATIVE ROADSIDE WATERFOWL BREEDING POPULATION SURVEYS IN THE SOUTHERN YUKON TERRITORY

1999 Report

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Co-operators:

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Yukon College

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ABSTRACT

Populations of waterfowl (ducks, geese, swans, loons, grebes) were monitored weekly in wetlands along the road system in the southern Yukon Territory during a 5-week period from 2 May to 14 June, 1999. A total of 180 wetlands were surveyed at least once, and 141 of these were surveyed 5 times each in both 1999 and 1998.

The spring of 1999 was later than usual. April and May were warm and wet, while June was warm and dry. Water levels in many of the survey wetlands continue to be below normal.

Total bird numbers declined 25% from 1998 values and indicated pairs were down 5%, but these differences were not statistically significant. Overall 23 species declined in total numbers and seven increased from 1998. All common species except mallard declined in total numbers, but the only statistically significant changes among common species were declines in total numbers of northern shoveler (-46%) and indicated pairs of bufflehead (-20%). Significant changes in less common species included declines in total numbers of blue-winged teal (-84%), Canada goose (-91%), and Pacific loon (-46%).

Indicated pairs of dabblers and divers are at 121% and 78% of 1991 levels, respectively, while total numbers of dabblers and divers are at 129% and 89% of 1991 levels.

INTRODUCTION

The Yukon Waterfowl Management Plan (Yukon Waterfowl Technical Committee 1991) identified the lack of information on the trends in Yukon waterfowl populations as a problem that should be addressed. At that time, the only long-term information on waterfowl populations in the Yukon was provided by an annual aerial survey conducted since 1955 by the U.S. Fish and Wildlife Service on the Old Crow Flats as part of their annual Alaska-Yukon Waterfowl Breeding Population Survey (Conant et al. 1999). Thus a new survey program in the Yukon was initiated in 1991 modelled after a program begun in British Columbia in 1987 (Breault et al. in prep). Both the Yukon and B.C. surveys attempt to estimate the numbers of waterfowl breeding in a large number of wetlands adjacent to the road system each spring. Field work is carried out co-operatively by various groups having interest and expertise in waterfowl management. The estimates derived from the surveys provide an ongoing indication of the trend (increasing, stable, or decreasing) in waterfowl populations over a period of years in large portions of B.C. and the Yukon Territory. When combined with the results of surveys from other parts of North America, they help assess the trend in continental populations of waterfowl. Waterfowl and other bird sightings from these roadside surveys are also used for other purposes such as in the Birds of Yukon database.

This year (1999) was the ninth year of the Yukon survey.

METHODS

Data Collection

Waterfowl were counted in a sample of wetlands located along the Yukon road system. These wetlands are distributed along the Alaska Highway between Watson Lake and Beaver Creek, the south Klondike Highway between Whitehorse and Carcross, the North Klondike Highway between Whitehorse and Carmacks, and the Aishihik Road (Table 1, Figure 1). Each wetland was surveyed five times at weekly intervals beginning in early May to cover the range of breeding dates for the various species of waterfowl. Each wetland was censused from one to four vantage points with the aid of binoculars and a tripod-mounted telescope. In some cases it was impossible to census the entire wetland, but the same portion of the wetland was surveyed each time. At each wetland, the observer recorded the species composition, age, and sex of all waterbirds in as detailed a fashion as possible, as indicated on the data sheet (Appendix 1). Ice cover, if any, was noted as well.

Data Analysis

Data were keypunched into the SAS system (SAS Institute 1985) and all computer analyses were done using SAS. Four measures of waterfowl abundance were used for each species:

Total Birds: The total number of birds observed regardless of age or sex.

Total Males: The total number of males observed.

Observed Pairs: The total number of pairs observed.

Indicated Pairs: calculated as follows:

Indicated Pairs = Observed Pairs + Calculated Pairs

where

Calculated Pairs = Lone Males + (males in all-male groups of 4 or less). Note: A group of 2 males and one female was treated as a pair plus a lone male.

Estimates of the above parameters were generated by calculating the mean and standard error over the five replicate surveys. From the standard error, 95% percent confidence limits were calculated by multiplying by $t_{(.05,n-1)}$ where $n=5$, and $t=2.776$. Paired t-tests (SAS Institute 1988) were employed to test for differences between the numbers of birds seen on the 5 surveys in 1998 vs. 1999.

To determine trends from 1991 to 1999, we calculated the percentage change from 1991 to 1992 using the waterbodies surveyed in common between both years, then did the same for 1992-93, etc., using the waterbodies common to those pairs of years. The 1991 population index, being the starting point, was assigned an arbitrary value of 100 percent.

RESULTS

Weather Conditions

Spring was late arriving in the southern Yukon in 1999. March was a dry month, receiving only a third of the usual amount of precipitation and was slightly warmer than normal. April and May were wet months, each receiving more than twice the normal amount of precipitation. June was a warm, dry month with the temperature 1 degree above normal and precipitation half the normal amount. As in 1998, water levels in most wetlands were lower than normal, and some survey wetlands were drastically low.

Surveys

A total of 177 wetlands were surveyed at least once between May 5 and June 6 in 1998, and a total of 180 wetlands were surveyed at least once between May 2 and June 14 in 1999 (Tables 1, 2). A total of 141 wetlands was surveyed 5 times each in the same 5-week period each year (i.e. 5 May - 6 June 1998, 2 May - 14 June 1999). Details of which wetlands were surveyed on which surveys are available from the authors.

Overall Populations

A mean of 1061 waterfowl was counted during the 5 surveys in 1999, down 25% from 1411 in 1998. Indicated pairs were 522, down 5% from 1998 (Table 3). Totals and indicated pairs of dabbling ducks were down 30% and 10% respectively, from 1998 values. Diving duck totals were down 19% and indicated pairs were up 4% from 1998. These follow on increases of 53% and 11% respectively in pairs of dabblers and divers from 1997 to 1998. The net result is that pairs of dabblers and divers are at 121% and 78% of 1991 levels, respectively (Fig. 3). Most of the common species of ducks showed decreases in breeding pairs from 1998 to 1999 (Fig. 2). This decrease was significant for Blue-winged Teal (78%), and Bufflehead (20%). Blue-winged Teal (84%), Northern Shoveler (46%), Canada Goose (91%) and Pacific Loon (46%) showed significant decreases in total birds. Overall, 8 of 82 comparisons were statistically significant (all increases), whereas four would be significant by chance alone at the 5% probability level.

Populations by Stratum

There were statistically significant decreases as follows (Table 5): In stratum 1, Bufflehead pairs. In stratum 2, indicated pairs of American Green-winged Teal, All Dabblers and All Species, and total American Green-winged Teal, All Dabblers, Ring-necked Duck, All Divers and All Species. In stratum 4, total and indicated pairs of Northern Shoveler and Scaup sp. There were statistically significant increases as follows: In stratum 3, total and indicated pairs of Northern Pintail and Barrow's Goldeneye; In stratum 4, total and indicated pairs of Mallard; In stratum 5, indicated pairs of Scaup sp., All Divers and All Species. Overall, 22 of 120 comparisons were statistically significant (9 increases and 13 decreases), whereas six of these comparisons would be significant by chance alone at the 5% probability level.

DISCUSSION

The Alaska-Yukon Waterfowl Breeding Population Survey (AYS; Conant et al. 1999) is an annual aerial survey covering 11 major breeding areas in Alaska as well as Old Crow Flats in the Northern Yukon. The 1999 AYS also recorded decreases in waterfowl populations compared to 1998 levels, although most duck populations are above the 10-year and long-term-means. The decreases in the AYS were somewhat lower than those noted in the Yukon Roadside Survey (YRS) for diving ducks (4% versus 19% for the YRS), and for dabbling ducks (11% versus 30% for the YRS).

This year the entire data analysis and report preparation process required only about seven person-days to complete.

ACKNOWLEDGEMENTS

All the previously involved staff of the Canadian Wildlife Service (CWS), The Fish and Wildlife Branch of the Yukon Department of Renewable Resources (YDRR) and Yukon College (YC) continued their excellent dedication to this survey program in 1999. Thanks to M. Gill, N. Hughes, V. Loewen, D. Mossop, J. Staniforth, D. van de Wetering, and M. Waterreus.

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Table 1. Strata and survey crews involved in spring waterfowl surveys in the southern Yukon, 1998 and 1999.

Stratum No.	Number of Wetlands Surveyed in both 1998 and 1999	Crew time required (days)				Description	Survey Crew
		Per Survey		Total			
		1998	1999	1998	1999		
		1	26	2	2		
2	36	1.5	1.5	7.5	7.5	Whitehorse area, including: Alaska Highway between Jakes Corner and Mile 928; City of Whitehorse; South Klondike Highway (Carcross Rd.) as far south as Emerald Lake	1998 and 1999: N. Hughes, B. Bennett (CWS)
3	10	1.5	1.5	7.5	7.5	Alaska Highway between Mile 928 and Aishihik Rd.; Aishihik Rd.	1998: M. Waterreus J. Staniforth (YDRR) 1999: M. Waterreus, J. Staniforth (YDRR)
4	24	1	1	5	5	North Klondike Highway (Mayo Rd.) between Whitehorse and Carmacks	1998: D. Mossop, G. Loewen (YC) 1999: D.Mossop
5	45	2	2	10	10	Alaska Highway between Kluane Lake and Beaver Creek	1998: B. Bennett (CWS) 1999: M. Gill (CWS)
Total	141	8	8	40	40		

Table 2. Dates of breeding waterfowl surveys in the southern Yukon, May and June 1998 and 1999.

Survey No.	Survey Dates	
	1998	1999
	1*	5-9 May
2*	13-15 May	13-20 May
3*	17-22 May	20-27 May
4*	22-28 May	30 May- 4 June
5*	1-6 June	6-14 June

* Surveys used to compare 1998 and 1999 waterfowl populations.

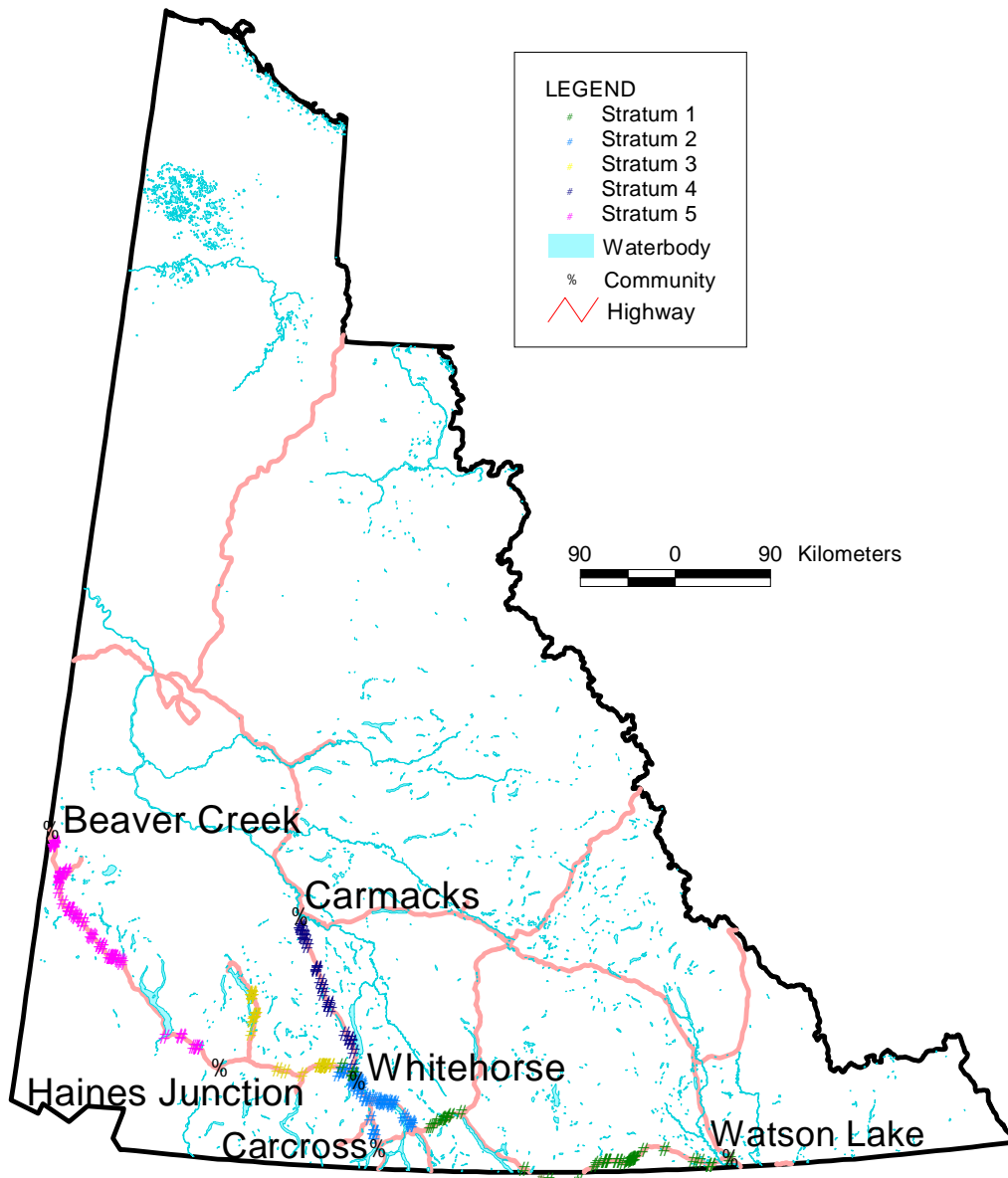


Figure 1. Locations of wetlands surveyed in the southern Yukon, spring 1999

Table 3. Results of 1997 and 1998 waterfowl breeding pair surveys in the southern Yukon Territory.

SPECIES	TOTAL BIRDS				INDICATED PAIRS				CHANGE (%)	
	1999	SE	1998	SE	1999	SE	1998	SE	TOTAL	IND.PRS.P
Mallard	156.4	25.6	144.6	20.0	85.2	8.9	78.8	7.9	8	8
Gadwall	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	-100	.
Eurasian Wigeon	0.4	0.4	0.6	0.4	0.2	0.2	0.4	0.2	-33	-50
American Wigeon	119.8	16.9	179.8	44.7	59.4	2.5	70.2	6.6	-33	-15
American Green-winged Teal	147.8	59.3	258.2	119.5	63.8	18.8	62.8	9.4	-43	2
Blue-winged Teal	2.4	0.7	15.0	3.1	2.0	0.6	9.2	2.1	-84 *	-78 *
Cinnamon Teal	0.0	0.0	0.2	0.2	0.0	0.0	0.2	0.2	-100	-100
Northern Shoveler	70.2	4.4	129.4	17.4	38.8	5.1	54.0	10.6	-46 *	-28
Northern Pintail	41.2	20.3	48.6	18.3	21.0	7.0	25.4	7.8	-15	-17
Dabbler sp.	3.2	3.2	0.4	0.4	1.6	1.6	0.0	0.0	700	.
TOTAL DABLERS	541.4	118.4	777.0	206.0	272.0	34.3	301.0	33.7	-30	-10
Common Merganser	1.8	0.9	2.0	0.6	1.0	0.4	0.8	0.2	-10	25
Red-breasted Merganser	0.4	0.4	1.6	1.2	0.2	0.2	0.8	0.6	-75	-75
Redhead	2.2	2.2	2.0	1.3	0.8	0.8	1.4	0.7	10	-43
Canvasback	12.2	2.4	16.8	10.7	6.4	0.7	6.8	4.0	-27	-6
Scaup sp.	192.6	29.4	215.0	52.3	88.6	19.1	81.0	12.8	-10	9
Ring-necked Duck	89.4	9.2	126.6	30.4	44.6	5.2	31.2	7.6	-29	43
Common Goldeneye	4.2	3.3	1.6	0.5	2.6	2.1	1.2	0.5	163	117
Barrow's Goldeneye	88.0	13.6	120.0	31.5	53.4	7.2	55.6	6.9	-27	-4
Bufflehead	56.6	6.5	68.8	9.2	30.8	2.4	38.4	4.0	-18	-20 *
Oldsquaw	0.6	0.6	0.2	0.2	0.2	0.2	0.2	0.2	200	0
Harlequin Duck	1.2	0.8	0.2	0.2	0.6	0.4	0.2	0.2	500	200
White-winged Scoter	2.8	1.7	5.2	2.7	1.0	0.4	2.8	1.3	-46	-64
Surf Scoter	3.4	2.7	2.2	1.7	0.8	0.5	1.2	1.0	55	-33
Ruddy Duck	1.4	1.0	2.0	0.9	1.2	1.0	1.0	0.4	-30	20
Duck sp.	28.4	23.3	2.8	1.2	0.0	0.0	0.4	0.4	914	-100
TOTAL DIVERS	456.8	35.9	564.2	77.0	232.2	19.7	222.6	16.0	-19	4
Greater White-fronted Goose	0.4	0.4	0.2	0.2	0.2	0.2	0.0	0.0	100	.
Canada Goose	0.4	0.4	4.6	1.1	0.2	0.2	0.6	0.2	-91 *	-67
TOTAL GEESE	0.8	0.5	4.8	1.2	0.4	0.2	0.6	0.2	-83 *	-33
Red-necked Grebe	19.2	3.9	19.8	1.6	6.4	1.2	6.6	0.9	-3	-3
Horned Grebe	19.2	3.1	28.8	4.4	7.4	2.0	12.2	2.2	-33	-39
TOTAL GREBES	38.4	6.2	48.6	5.7	13.8	3.0	18.8	2.7	-21	-27
Common Loon	1.6	0.7	2.0	0.4	0.6	0.2	0.4	0.2	-20	50
Pacific Loon	3.0	0.8	5.6	1.4	1.4	0.4	2.2	0.6	-46 *	-36
TOTAL LOONS	4.6	1.2	7.6	1.6	2.0	0.5	2.6	0.7	-39 *	-23
Tundra Swan	0.2	0.2	0.4	0.4	0.0	0.0	0.2	0.2	-50	-100
Trumpeter Swan	4.6	0.7	6.6	2.6	1.8	0.5	2.4	1.4	-30	-25
Swan sp.	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	.	.
TOTAL SWANS	5.0	0.8	7.0	2.9	1.8	0.5	2.6	1.6	-29	-31
TOTAL WATERFOWL	1061	109.8	1411	286.6	522.2	34.2	548.4	51.5	-25	-5

^a Probability that 1999 means are different from 1998 means as determined by paired t-tests comparing surveys 1-5 in 1998 with surveys 1-5 in 1999. *p<0.05; **p<0.01; ***p<0.001

Table 4. Means and 95 percent confidence limits for waterfowl (Total Birds, Total Males, Observed Pairs, and Indicated Pairs) observed during 5 surveys of ponds in 5 different strata in the southern Yukon, May and June 1998 and 1999. Confidence limits are expressed as a percentage of the mean.

1998 SPECIES	TOTAL	95%	TOTAL	95%	OBSERVERED	95%	INDICATED	95%
	BIRDS	CL	MALES	CL	PAIRS	CL	PAIRS	CL
American Green-winged Teal	258.2	129	154.4	116	27.6	108	62.8	42
Scaup sp.	215.0	68	137.8	69	43.6	39	81.0	44
American Wigeon	179.8	69	103.6	64	50.2	38	70.2	26
Mallard	144.6	38	104.8	30	26.0	80	78.8	28
Northern Shoveler	129.4	37	78.0	39	33.2	46	54.0	54
Ring-necked Duck	126.6	67	96.6	58	13.8	88	31.2	68
Barrow's Goldeneye	120.0	73	63.0	41	33.6	60	55.6	34
Bufflehead	68.8	37	40.6	30	23.8	52	38.4	29
Northern Pintail	48.6	104	33.4	92	8.6	132	25.4	85
Horned Grebe	28.8	42	12.2	51	12.0	47	12.2	51
Red-necked Grebe	19.8	22	6.6	39	6.6	39	6.6	39
Canvasback	16.8	177	9.6	182	5.2	160	6.8	163
Blue-winged Teal	15.0	58	9.2	62	5.2	57	9.2	62
Trumpeter Swan	6.6	108	2.4	162	2.4	162	2.4	162
Pacific Loon	5.6	69	2.2	74	2.2	74	2.2	74
White-winged Scoter	5.2	147	2.8	131	2.4	166	2.8	131
Canada Goose	4.6	68	0.6	113	0.6	113	0.6	113
Surf Scoter	2.2	220	1.2	224	1.0	215	1.2	224
Redhead	2.0	181	1.4	148	0.6	278	1.4	148
Ruddy Duck	2.0	124	1.0	124	1.0	124	1.0	124
Common Merganser	2.0	88	0.8	69	0.8	69	0.8	69
Common Loon	2.0	62	0.4	170	0.4	170	0.4	170
Common Goldeneye	1.6	88	1.2	113	0.4	170	1.2	113
Red-breasted Merganser	1.6	202	0.8	202	0.8	202	0.8	202
Duck sp.	1.4	119	0.2	278	0.0	0	0.2	278
Eurasian Wigeon	0.6	185	0.4	170	0.2	278	0.4	170
Tundra Swan	0.4	278	0.2	278	0.2	278	0.2	278
Dabbler sp.	0.4	278	0.0	0	0.0	0	0.0	0
Cinnamon Teal	0.2	278	0.2	278	0.0	0	0.2	278
Oldsquaw	0.2	278	0.2	278	0.0	0	0.2	278
Harlequin Duck	0.2	278	0.2	278	0.0	0	0.2	278
Gadwall	0.2	278	0.0	0	0.0	0	0.0	0
Greater White-fronted Goose	0.2	278	0.0	0	0.0	0	0.0	0
Total Birds	1410.6	56	866.0	51	302.4	39	548.4	26
1999 SPECIES	TOTAL	95%	TOTAL	95%	OBSERVERED	95%	INDICATED	95%
	BIRDS	CL	MALES	CL	PAIRS	CL	PAIRS	CL
Scaup sp.	192.6	42	122.2	42	44.0	73	88.6	60
Mallard	156.4	45	107.4	35	33.2	71	85.2	29
American Green-winged Teal	147.8	111	95.4	99	27.6	100	63.8	82
American Wigeon	119.8	39	70.4	35	35.6	33	59.4	12
Ring-necked Duck	89.4	29	66.4	36	15.2	48	44.6	32
Barrow's Goldeneye	88.0	43	55.0	40	29.0	60	53.4	37
Northern Shoveler	70.2	17	48.4	12	17.0	52	38.8	37
Bufflehead	56.6	32	33.8	22	17.6	49	30.8	21
Northern Pintail	41.2	137	30.4	135	6.6	100	21.0	92
ALL GREBES	38.4	45	13.8	61	13.2	59	13.8	61
Horned Grebe	19.2	44	7.4	74	7.2	73	7.4	74
Red-necked Grebe	19.2	57	6.4	51	6.0	51	6.4	51
Duck sp.	14.2	228	0.0	0	0.0	0	0.0	0
Canvasback	12.2	55	7.6	47	3.4	84	6.4	29
Trumpeter Swan	4.6	41	1.8	76	1.6	69	1.8	76
Common Goldeneye	4.2	218	2.6	228	1.6	202	2.6	228
Surf Scoter	3.4	222	1.6	202	0.2	278	0.8	170
Dabbler sp.	3.2	278	1.6	278	1.6	278	1.6	278
Pacific Loon	3.0	72	1.4	79	1.4	79	1.4	79
White-winged Scoter	2.8	164	1.8	172	0.6	113	1.0	124
Blue-winged Teal	2.4	87	2.0	88	0.4	278	2.0	88
Redhead	2.2	278	0.8	278	0.4	278	0.8	278
Common Merganser	1.8	141	1.0	124	0.8	170	1.0	124
Common Loon	1.6	118	0.6	113	0.6	113	0.6	113
Ruddy Duck	1.4	194	1.2	224	0.2	278	1.2	224
Harlequin Duck	1.2	185	0.6	185	0.6	185	0.6	185
Oldsquaw	0.6	278	0.2	278	0.0	0	0.2	278
Red-breasted Merganser	0.4	278	0.2	278	0.2	278	0.2	278
Eurasian Wigeon	0.4	278	0.2	278	0.2	278	0.2	278
Greater White-fronted Goose	0.4	278	0.2	278	0.2	278	0.2	278
Canada Goose	0.4	278	0.2	278	0.2	278	0.2	278
Tundra Swan	0.2	278	0.0	0	0.0	0	0.0	0
Swan sp.	0.2	278	0.0	0	0.0	0	0.0	0
Total Birds	1061.2	29	668.8	21	253.2	33	522.2	18

Table 5. Stratum by stratum results of 1998 and 1999 waterfowl breeding pair surveys in the southern Yukon Territory.

STRATUM SPECIES	TOTAL BIRDS				INDICATED PAIRS				CHANGE (%)	
	1999	SE	1998	SE	1999	SE	1998	SE	TOTAL p	IND.PRS.p
1 Mallard	12.0	4.9	20.6	5.3	9.4	3.8	12.6	2.4	-42	-25
American Wigeon	5.2	1.3	10.0	2.8	2.6	0.7	6.6	2.3	-48	-61
American Green-winged Teal	6.4	2.5	11.0	5.3	4.0	1.3	6.2	2.7	-42	-35
Northern Shoveler	0.0	0.0	14.4	14.4	0.0	0.0	3.2	3.2	-100	-100
Northern Pintail	1.4	0.4	2.2	1.3	0.8	0.2	1.2	0.7	-36	-33
ALL DABBLERS	25.0	6.3	58.2	22.8	16.8	4.1	29.8	9.1	-57	-44
Scaup sp.	32.8	11.8	42.0	19.9	11.8	5.7	12.0	4.0	-22	-2
Ring-necked Duck	16.8	5.9	17.2	3.8	4.6	2.4	7.0	3.5	-2	-34
Barrow's Goldeneye	16.8	3.1	25.2	4.5	10.6	2.0	15.2	2.6	-33	-30
Bufflehead	6.8	2.1	13.8	2.1	4.4	1.3	8.4	1.3	-51	-48 *
ALL DIVERS	73.2	19.6	98.2	21.4	31.4	9.8	42.6	6.8	-25	-26
ALL SPECIES	98.2	25.3	156.4	42.1	48.2	13.4	72.4	13.8	-37	-33
2 Mallard	38.8	3.9	48.6	7.4	24.4	2.6	28.8	3.1	-20	-15
American Wigeon	11.8	3.4	29.0	11.6	6.6	1.7	11.6	2.1	-59	-43
American Green-winged Teal	14.4	5.5	38.8	10.1	9.8	3.4	20.0	1.6	-63 *	-51 *
Northern Shoveler	15.8	2.0	38.6	10.3	9.4	0.8	13.8	4.4	-59	-32
Northern Pintail	2.8	1.7	9.8	3.1	1.8	1.0	7.0	2.3	-71	-74
ALL DABBLERS	83.6	11.2	164.8	29.6	52.0	7.5	81.2	6.3	-49 *	-36

Scaup sp.	56.2	11.1	45.2	8.4	13.4	1.9	17.2	2.9	24	-22
Ring-necked Duck	13.8	3.4	43.2	10.9	5.2	1.1	6.2	1.7	-68 *	-16
Barrow's Goldeneye	33.2	6.8	44.6	7.3	21.4	3.2	21.2	2.4	-26	1
Bufflehead	9.4	2.6	14.0	2.6	5.6	1.2	8.0	1.0	-33	-30
ALL DIVERS	112.6	21.5	147.0	19.3	45.6	4.1	52.6	4.0	-23 *	-13
ALL SPECIES	196.2	32.3	311.8	39.3	97.6	11.4	133.8	9.8	-37 *	-27 **
3 Mallard	3.4	0.9	3.8	1.6	2.4	0.7	2.6	1.1	-11	-8
American Wigeon	11.2	2.3	10.8	3.9	7.2	1.3	4.8	1.1	4	50
American Green-winged Teal	7.6	3.4	6.0	2.6	4.4	1.8	4.2	1.9	27	5
Northern Shoveler	4.4	2.4	13.2	4.1	2.6	1.3	8.2	2.7	-67	-68
Northern Pintail	6.2	1.4	2.2	1.6	4.4	1.2	1.8	1.4	182 ***	144

ALL DABBLERS	32.8	2.4	36.0	11.4	21.0	1.6	21.6	6.9	-9	-3
Scaup sp.	9.4	2.8	7.8	2.1	5.0	1.5	4.8	1.4	21	4
Ring-necked Duck	1.4	1.4	5.4	4.7	1.0	1.0	2.8	2.3	-74	-64
Barrow's Goldeneye	2.4	0.7	0.0	0.0	1.4	0.2	0.0	0.0	.	*
Bufflehead	3.0	1.3	2.0	1.1	1.8	0.6	1.0	0.5	50	80
ALL DIVERS	16.2	4.7	15.2	5.4	9.2	2.7	8.6	3.1	7	7
ALL SPECIES	49.0	3.7	51.2	15.9	30.2	1.8	30.2	9.3	-4	0
4 Mallard	19.8	5.6	10.4	2.8	11.4	2.3	7.0	1.4	90 *	63 *
American Wigeon	21.0	5.6	33.2	6.8	10.4	3.0	19.0	3.8	-37	-45
American Green-winged Teal	13.6	4.9	13.0	5.9	5.2	0.9	8.0	2.6	5	-35
Northern Shoveler	5.6	1.5	8.6	2.0	2.6	1.1	4.8	1.2	-35 *	-46 *
Northern Pintail	6.8	5.8	3.2	1.5	0.8	0.4	1.8	0.8	113	-56
ALL DABBLERS	66.8	9.2	68.4	14.9	30.4	4.1	40.6	7.1	-2	-25
Scaup sp.	15.0	6.6	33.2	5.7	8.6	4.0	21.2	4.7	-55 *	-59 *
Ring-necked Duck	10.6	3.9	9.4	4.6	4.8	1.8	5.4	2.2	13	-11
Barrow's Goldeneye	8.6	2.6	28.8	21.4	4.8	1.6	7.4	2.4	-70	-35
Bufflehead	13.8	4.7	20.0	5.6	5.8	1.2	11.4	3.0	-31	-49
ALL DIVERS	48.0	13.3	91.4	26.7	24.0	6.7	45.4	5.2	-47	-47
ALL SPECIES	114.8	6.2	159.8	41.2	54.4	9.1	86.0	12.0	-28	-37
5 Mallard	82.4	20.0	61.2	8.1	37.6	3.0	27.8	1.5	35	35
American Wigeon	70.6	21.3	96.8	33.0	32.6	3.0	28.2	5.5	-27	16
American Green-winged Teal	105.8	46.7	189.4	102.6	40.4	13.1	24.4	4.0	-44	66
Northern Shoveler	44.4	5.6	54.6	5.9	24.2	4.0	24.0	4.4	-19	1
Northern Pintail	24.0	12.1	31.2	11.8	13.2	5.3	13.6	4.0	-23	-3
ALL DABBLERS	327.2	100.5	433.2	154.4	148.0	23.7	118.0	15.9	-24	25
Scaup sp.	79.2	14.1	86.8	23.7	49.8	10.2	25.8	5.4	-9	93 *
Ring-necked Duck	46.8	8.6	51.4	12.2	29.0	6.4	9.8	2.0	-9	196
Barrow's Goldeneye	27.0	6.4	21.4	3.1	15.2	2.8	11.8	1.9	26	29
Bufflehead	23.6	7.4	19.0	3.8	13.2	3.4	9.6	1.9	24	38
ALL DIVERS	176.6	8.5	178.6	28.0	107.2	7.8	57.0	6.9	-1	88 **
ALL SPECIES	503.8	99.1	611.8	177.2	255.2	18.4	175.0	21.5	-18	46 *

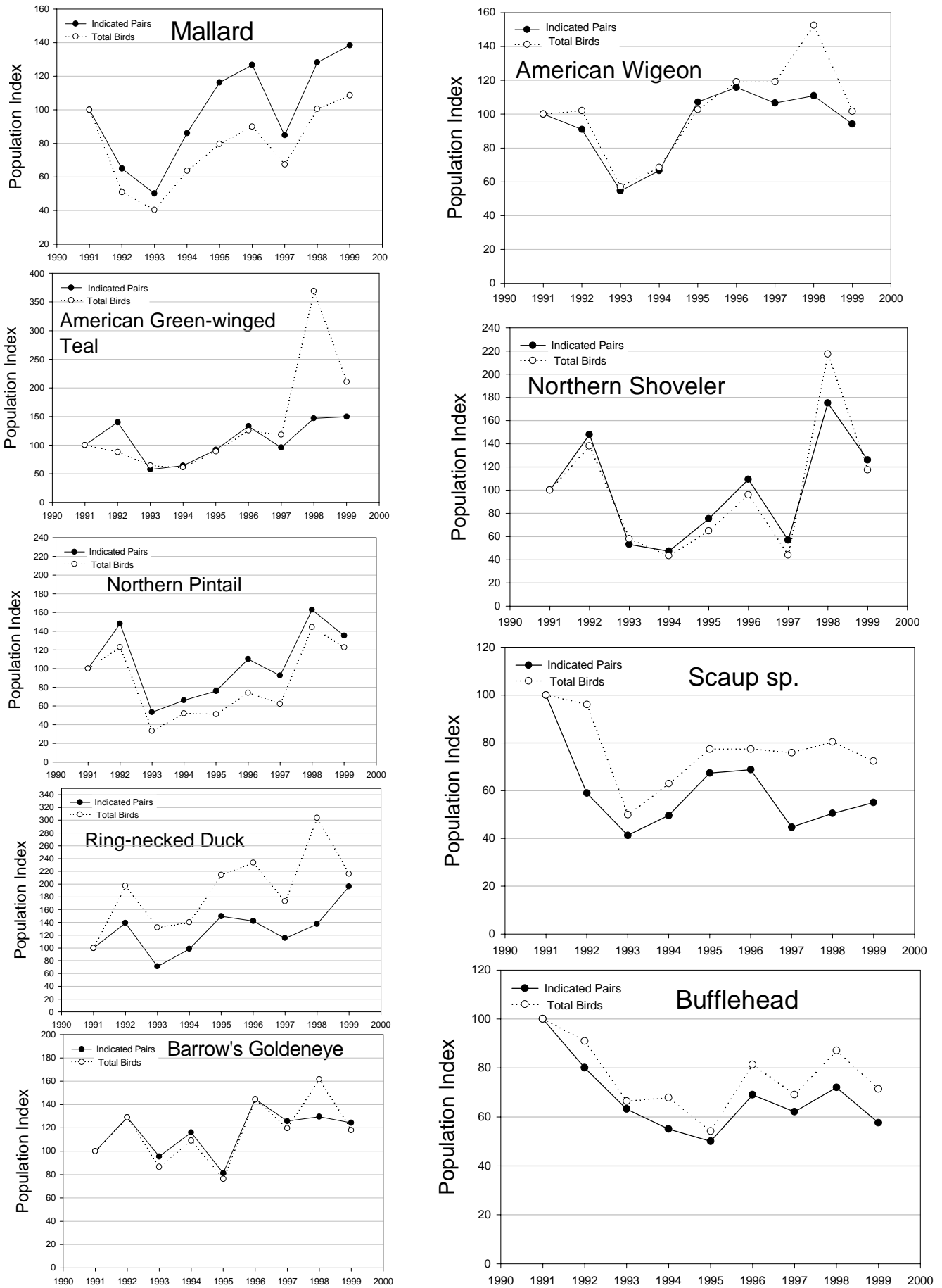


Figure 2. Trends in population indices (total numbers and indicated pairs) of common waterfowl species observed on the Yukon Roadside surveys, 1991-1999.

