

AERIAL SURVEYS OF WATERFOWL AND GULLS ON THE FRASER RIVER DELTA, 1992-93

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TECHNICAL REPORT SERIES NO. 203

Pacific and Yukon Region 1994
Canadian Wildlife Service



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This series may be cited as:

**Summers, K., P. Hayes, and R. McKelvey
Aerial Surveys of Waterfowl and Gulls on the
Fraser River Delta, 1992-93. Technical Report
Series No. 203. Canadian Wildlife Service,
Pacific and Yukon Region, British Columbia.**

**Issued under the Authority of the
Minister of Environment
Canadian Wildlife Service**

**© Ministry of Supply and Services Canada 1994
Catalogue No. CW69-5/203E
ISBN 0-662-22224-5
ISSN 0831-6481**

**Copies may be obtained from:
Canadian Wildlife Service
Pacific and Yukon Region
P.O. Box 340,
Delta, British Columbia
Canada V4K 3Y3**

Printed on recycled paper

ACKNOWLEDGEMENTS

This study was jointly funded by the Canadian Wildlife Service, the British Columbia Ministry of Environment, Lands and Parks (Wildlife Branch) and Ducks Unlimited Canada. We thank Tom Burgess and Kathleen Fry for arranging the participation of their agencies. We thank Fred Simpson for help with aerial surveys. Pam Whitehead and Shelagh Bucknell helped with the graphics and word processing.

ABSTRACT

This report presents the results of 14 weekly aerial surveys for waterfowl and gulls flown over the Fraser River estuary between mid October 1992 and mid January 1993. The data are compared to those summarized for 1966-74, 1982-83, 1983-84 and 1989-90 by McKelvey and Summers (1990). The annual estimate of dabbling duck use of the entire estuary (Boundary Bay and the Fraser River foreshore) was higher than for 1989-90 but still below that of earlier surveys. Mean total numbers of gulls were higher than for all previous surveys. Waterfowl counts were highly variable between surveys. Comparisons with mid-winter counts from the U.S. in the Pacific flyway were made. Although the Fraser River estuary showed an increase in waterfowl populations for 1992, while the flyway continued to show a decline, the overall downward trend is still apparent.

RESUME

Le présent rapport contient les résultats de 14 relevés aériens hebdomadaires de la sauvagine, des mouettes et des goélands qui ont survolé l'estuaire du Fraser entre la mi-octobre 1992 et la mi-janvier 1993. On a comparé les données à celles qui sont résumées par McKelvey *et al.* (1990) pour les périodes de 1966 à 1974, de 1982-83, de 1983-84 et de 1989-90. L'estimation annuelle de l'utilisation par les canards de surface de l'ensemble de l'estuaire (la baie Boundary et l'estran du Fraser) ne différait pas de façon significative des estimations des années précédentes. Le nombre total moyen de mouettes et de goélands était également dans les fourchettes de valeurs enregistrées dans les relevés antérieurs. Les denombrements de la sauvagine variaient considérablement d'un relevé à l'autre. D'après les comparaisons avec les dénombremens effectués au milieu de l'hiver dans la voie migratoire du Pacifique, même si en 1992 on enregistrait une augmentation des populations dans l'estuaire du Fraser tandis que dans la voie migratoire elles continuaient à décroître, la tendance générale à la baisse est encore manifeste.

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INTRODUCTION

The estuary of the Fraser River, British Columbia, is one of the most important wintering habitats for migratory birds in Canada (Taylor 1970; Cooperative Waterfowl Management Plan for British Columbia [CWMPBC] 1983). It is also adjacent to a large and growing human population whose development activities have resulted in the loss of considerable wetland habitat. The study reported here is part of a program designed to increase the existing information base on waterfowl populations. Its purpose is to assess long term trends in waterfowl populations, and incidentally gull populations, wintering in Boundary Bay and on the Fraser River foreshore, or collectively, the Fraser River estuary. The program was designed in 1989-90 to measure wintering populations at three-year intervals. This report documents the results of the second triennial survey conducted in 1992-93.

The 1992-93 results are presented and compared with those of 1966-74, 1982-83, and 1983-84 as reported by McKelvey *et al.* (1985), and with the first triennial survey in 1989-90 (McKelvey and Summers 1990). Trends are also compared with those of the U.S. Pacific flyway mid-winter waterfowl survey (Bartonek 1992). The results of species composition surveys on Boundary Bay are also reported.

METHODS

Survey Procedure

Fourteen aerial surveys were conducted weekly from October 1992 to January 1993 over the Fraser River estuary. The shoreline route and procedure used by McKelvey *et al.* (1985) was repeated for this study. The route is shown on Figure 1. The October to January period was selected again as it coincided with the waterfowl hunting season in southern British Columbia. At this time most ducks are believed to be located on the foreshore during the day, rather than being dispersed throughout adjacent farmland (Jury 1981; personal observations of wildlife biologists).

Surveys were conducted from a Cessna 172 which flew at an elevation of 60 m (200 feet) and at approximately 140 kph (85 mph), just outside the tide line. Surveys were flown to coincide with the 3.5 m (11 foot) tide at Point Atkinson. This tide level has been found to correspond with the highest concentration of ducks on the foreshore (McKelvey *et al.* 1985). Lower or higher tides tend to cause an unpredictable dispersion of birds, making number estimations more difficult. Where birds were found to be dispersed, adjustments in the flight line were sometimes necessary, but priority was given to birds near the land/water interface. Flights were generally not made on days when the wind exceeded 25 kph due to the difficulty in observing birds in choppy water.

The Boundary Bay and Fraser River foreshore survey areas were divided into subunits. For Boundary Bay, the flight line was divided at each major street which ended at the Bay. The foreshore was divided into geographically discrete areas (Figure 1). Observers sat on either side of the aircraft and recorded their observations into tape recorders for each survey unit. The observer on the landward side normally encountered most of the birds. Subsequent replicate counts were made with alternate observers facing the landward side. Counts from both sides of the aircraft were summed to determine the total number of birds present per survey per subunit.

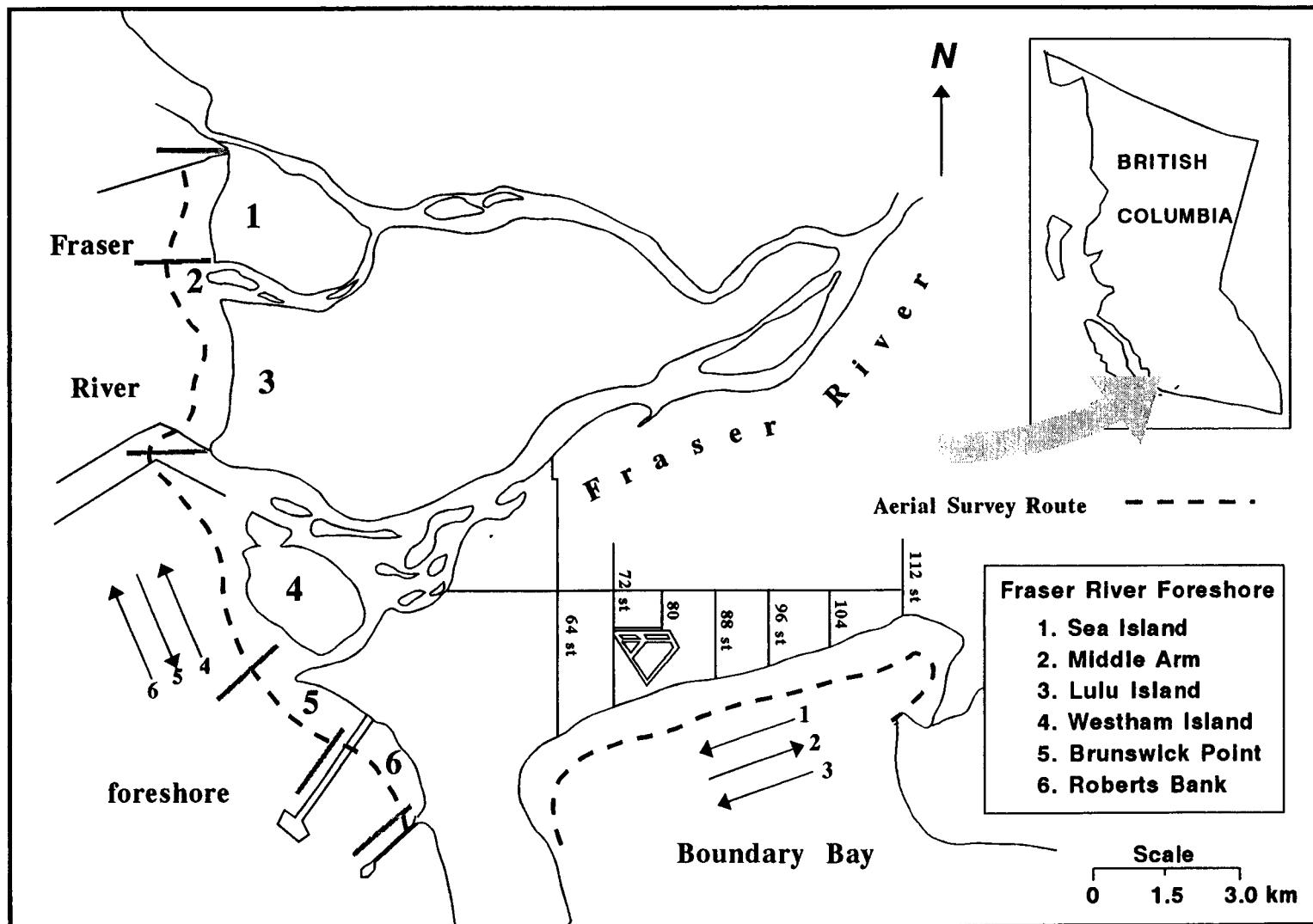


Figure 1. Fraser River estuary study area and the location of aerial survey routes, 1992-93.

Generally, each subunit was flown three times per day, resulting in three replicate estimates for each subunit. However, replicate counts could not always be conducted for the Sea Island foreshore and the mouth of the Fraser River at the Middle Arm due to restrictions imposed by Air Traffic Control at Vancouver International Airport. During freezing weather on January 6th and 12th 1993, only one survey of Boundary Bay was done on each day because no birds were present except at Crescent Beach. Survey dates and number of replicate counts per day for each subunit are shown in Appendix 1.

Species Composition

Ground surveys were also conducted on the Boundary Bay foreshore in order to determine approximate species composition of flocks surveyed from the air. These surveys were conducted from nine locations along the Boundary Bay dyke every two weeks on the day following the aerial survey. Species were recorded as: Mallard; Green-winged Teal; American Wigeon; Northern Pintail; Scaup; other dabblers; and other divers. For each day, the nine samples were combined to give a total species composition estimate for the Bay.

Data Analysis

Each replicate count was treated as an estimate of the number of birds present on that day. The mean of the three replicates was calculated and used as the final estimate for that day. Monthly means and standard errors were then calculated from the daily mean estimates to allow comparisons with data from previous years. Monthly standard errors were calculated using the methods described in McKelvey *et al.* (1985).

In order to facilitate trend comparisons between years the monthly means were added together to give an annual total. This is analogous to measuring the area under the curve of a graph of bird numbers versus time, and gives a measure of bird use-days. There are two advantages to using such a number. First, bird numbers on an area such as the Fraser River delta are very dynamic. The birds move from place to place very quickly, between days and throughout the winter season, in response to weather, food and disturbance. Numbers fluctuate seasonally to such an extent that a calculated mean number of birds present throughout the season will have an inherently large standard deviation, making between-year comparisons very difficult. Using bird-use days overcomes this problem because the precision of that estimate is high in comparison to the population standard deviation.

The second advantage results from the fact that many other coastal mid-winter surveys make a population estimate at only one time of the year, when it is assumed that the population is stable and all the birds are actually counted. Whether or not that is true remains to be seen but a single winter data point in any survey facilitates plotting of annual trends, the main purpose in such surveys.

Comparisons between monthly means and annual means were performed by calculating the value of the normal deviate, Z (Zar 1974). A Z-test is used to determine the probability of two means being significantly different when the number of degrees of freedom is difficult to determine. That was the case in this study wherein monthly means were added to produce the annual estimate of bird use. With a Z-test, probability can be expressed liberally as significant at the 0.05 level or conservatively, using multiple range tests, as $0.05/n$, where n is the number of comparisons being made. A two-tailed test was used because we were testing for a difference between means (greater or less than), not testing to see if one was greater than the other.

RESULTS

Weather

Table 1 describes the 1992-93 weather conditions in the study area compared with the normals for the same region. In 1992-93, the temperature in January was below normal. In December and January there was less precipitation than normal and generally more hours of sunshine. The wind speed was greater in October and lower in January than both the long-term average and long-term normal.

Table 1. Weather conditions on the Fraser River delta in 1992-93, compared with long-term averages.

Variable	Month	Long-term Average (1981-90)	Long-term Normals (1961-90)	1992-93 Average
Mean temperature range (°C)	October	10.1	6.4 - 13.5	8.2 - 14.3
	November	6.1	3.0 - 9.0	3.7 - 9.1
	December	3.0	0.8 - 6.1	-1.1 - 4.9
	January	4.1	0.1 - 5.7	-4.2 - 3.5
Precipitation (mm)	October	113.1	115.3	109.1
	November	206.8	169.9	168.3
	December	150.2	178.5	117.8
	January	152.4	149.8	103.4
Sunshine (hrs)	October	122.6	124.4	89.5
	November	64.4	66.7	69.3
	December	62.9	53.6	60.4
	January	52.0	54.9	94.2
Wind speed (km/h)	October	10	11E	13.6E
	November	12	12E	12.1E
	December	10	12E	12.4E
	January	11	12E	8.9E

Source: Canadian Climate Normals 1961-1990 from Vancouver International Airport (Environment Canada, Atmospheric Environment Service)

Seasonality

Table 2 shows the average monthly dabbling duck numbers from October 1992 to January 1993 in comparison to those seen in previous surveys. In 1992-93, peak numbers occurred in December for Boundary Bay and in November for the Fraser River foreshore. The November/December peak is consistent with other years.

Table 2. Mean number of dabbling ducks (in thousands) seen per month on aerial surveys of the Fraser River estuary, 1966-74 to 1992-93. Annual peak counts are shown in bold and underlined.

Month/Year	Sample size	Mean number of ducks (thousands)				
		Boundary Bay		Fraser Foreshore		
		Mean	SE*	Mean	SE*	
October	1966-74	13	18.3	0.5	28.5	0.9
	1982	2	28.9	4.5	28.3	5.9
	1983	4	24.3	2.7	19.8	1.6
	1985	1	25.4		26.0	
	1989	3	20.0	2.4	<u>22.3</u>	2.5
	1992	3	41.9	5.3	22.0	4.6
November	1966-74	11	<u>39.3</u>	5.9	<u>40.3</u>	7.8
	1982	5	<u>37.9</u>	6.4	28.7	4.3
	1983	5	30.0	3.2	<u>22.9</u>	4.8
	1989	6	24.5	1.9	14.5	1.5
	1992	4	44.4	7.9	<u>22.5</u>	1.9
December	1966-74	8	31.4	2.3	35.1	6.5
	1982	4	33.6	3.0	<u>37.4</u>	6.7
	1983	3	22.7	11.0	14.9	2.0
	1989	4	<u>33.5</u>	3.8	11.1	2.5
	1992	5	<u>45.5</u>	9.9	20.3	3.1
January	1966-74	6	10.7	5.7	17.1	6.9
	1983	5	29.9	4.2	20.9	6.5
	1984	3	<u>31.5</u>	7.7	16.5	1.7
	1986	1	15.7		34.7	
	1990	3	23.9	0.9	11.7	1.0
	1993	2	5.2	0.1	13.1	0.1

* SE = standard error

Appendix 2 and 3 contain the daily and monthly summaries of the number of each species per transect per survey. As in previous surveys Boundary Bay continued to receive the highest level of dabbling duck use, the majority of which occurred between Beach Grove and Boundary Bay Airport. Also as in past years, large numbers were often distributed along the shoreline east to 112th Street and on the mud flats east of Blackie Spit (Appendix 2 and 3).

Duck distribution along the Fraser River foreshore was also similar to that observed in other years (Table 3). The highest concentration of birds in this area was observed between the Tsawwassen and Roberts Bank causeways.

Table 3. A comparison of the total mean annual number of dabbling ducks (in thousands) on the Fraser River foreshore, as calculated from aerial surveys since 1966-74, and the proportion each route represents.

Survey Route	Number of Dabbling Ducks (thousands)									
	1966-74		1982-83		1983-84		1989-90		1992-93	
	No.	%	No.	%	No.	%	No.	%	No.	%
Sea Island	22.6	18.7	22.6	19.6	7.0	9.5	3.7	6.3	9.7	12.5
Middle Arm	not determined ¹		1.1	0.9	1.2	1.6	0.3	0.5	0.3	0.4
Lulu Island	15.0	12.4	8.1	1.7	4.8	6.5	9.1	15.3	4.6	5.9
Westham Island	53.8	44.5	18.4	16.0	4.3	5.8	6.5	10.9	8.5	10.9
Brunswick Point	29.6	24.5	24.4	21.2	16.8	22.7	3.9	6.6	12.6	16.2
Roberts Bank	not determined ¹		48.6	35.2	40.0	54.0	36.0	60.4	42.2 ²	54.2

¹ River Mouth data probably included in Sea Island or Lulu Island; Roberts Bank probably not distinguished from Brunswick Point, prior to causeway construction.

² During the freezing weather in January 1993, most of the birds attributed to Roberts Bank were sitting on the beach south of the Tsawwassen jetty, an area not otherwise included in the survey.

The freezing weather of late December 1992 and early January 1993 had major affects on the numbers and distribution of waterfowl. When Boundary Bay was frozen, bird numbers were low and birds were mostly congregated off the end of 12th Avenue in Tsawwassen (Beach Grove). During this period, larger than normal numbers of waterfowl were observed south of Blackie Spit as far as White Rock. On the Fraser River foreshore, the high number of birds recorded for Roberts Bank during the two January surveys were seen on Tsawwassen Beach (Appendices 2 and 3). They were observed standing on the beach in a long band, several birds wide, between the snow line and the tide line.

Gulls were seen in largest numbers in January on both Boundary Bay and the Fraser foreshore (Table 4). Peak counts in the past have occurred in October and January on Boundary Bay, and in December and January on the Fraser River foreshore. As in previous years, numbers were lowest for both areas during November. Gull numbers were higher on Boundary Bay than on the foreshore.

Table 4. Mean number of gulls seen per month on aerial surveys of the Fraser River delta, 1982-83 to 1992-93. Annual peak counts are shown in bold and underlined.

Month/Year	Sample size	Mean number of gulls (thousands)				
		Boundary Bay		Fraser Foreshore		
		Mean	SE*	Mean	SE*	
October	1982	2	1168	828	28	23
	1983	4	<u>4939</u>	3075	644	106
	1985	1	382		158	
	1989	3	1332	418	395	171
	1992	3	1425	561	622	247
November	1982	5	498	194	221	116
	1983	5	348	305	236	24
	1989	6	870	459	121	<u>50</u>
	1992	4	888	129	400	111
December	1982	4	<u>1419</u>	1121	<u>1006</u>	402
	1983	3	1507	669	<u>667</u>	173
	1989	4	<u>2309</u>	774	432	81
	1992	5	1762	483	639	338
January	1983	5	143	637	867	319
	1984	3	2261	1193	500	55
	1986	1	2590		433	
	1990	3	1957	808	<u>494</u>	211
	1993	2	<u>7234</u>	3421	<u>852</u>	274

* SE = standard error

Annual Trends

Annual measurements of dabbling duck and gull use are given in Table 5 and shown graphically on Figures 2 and 3. Statistical comparisons of the number of birds seen between years are summarized in Table 6. Dabbling duck use of the Fraser River foreshore has declined by 36% since its peak in 1966-74. In 1992-93, however, numbers were 30% higher than those of 1989-90. In Boundary Bay, numbers have tended to fluctuate more than on the Fraser River foreshore. The 1992-93 winter represented a

record high, with significantly more birds observed than during the 1966-74 and 1989-90 surveys ($p = .002$ and $.010$ respectively). For the total estuary, duck numbers were at the median of the five years of comparison, and were significantly different only from the 1989-90 low ($p < .001$).

Gull numbers were at an all time high on both Boundary Bay and the Fraser River foreshore. Overall, the number recorded was 25% higher than on the previous highest count year, 1983-84. This number was not significantly different than the numbers recorded on the other three winters of comparison (Table 6).

Table 5. A comparison of annual estimates of dabbling duck and gull use between October and January on Boundary Bay, the Fraser River foreshore and the Fraser River estuary from 1966-74 to 1992-93. Values in parenthesis are ± 2 standard errors.

Year	Dabbling Ducks (thousands)			Gulls (thousands)		
	Foreshore	Boundary Bay	Total	Foreshore	Boundary Bay	Total
1966 - 74 n=4	121.0 (± 24.6)	99.7 (± 17.1)	220.7 (± 30.0)	- -	- -	- -
1982 - 83 n=4	115.3 (± 23.8)	130.3 (± 18.9)	245.6 (± 30.4)	2122 (± 1054)	3228 (± 3090)	5350 (± 3264)
1983 - 84 n=4	74.1 (± 11.4)	108.5 (± 30.0)	182.6 (± 32.1)	2047 (± 424)	9055 (± 6758)	11102 (± 6772)
1989 - 90 n=4	59.6 (± 8.0)	101.9 (± 10.0)	161.5 (± 12.8)	1442 (± 576)	6468 (± 2560)	7910 (± 2424)
1992 - 93 n=4	77.9 (± 11.7)	137.0 (± 27.5)	214.9 (± 29.9)	2513 (± 1025)	11309 (± 7005)	13822 (± 7080)

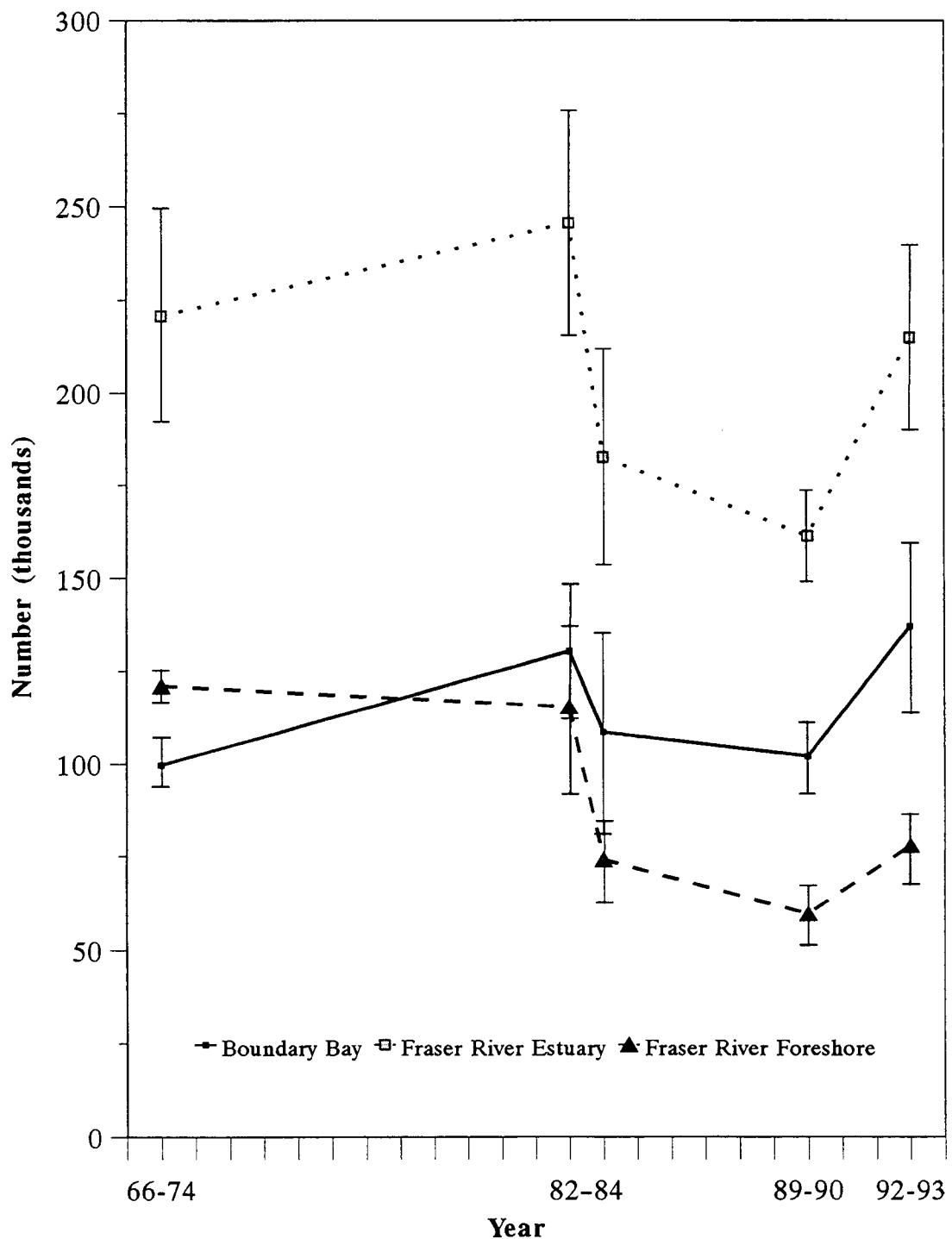


Figure 2. Mean number of **dabbling ducks** seen per winter on aerial surveys of Boundary Bay, the Fraser River foreshore and the Fraser River estuary from 1966-74 to 1992-93.

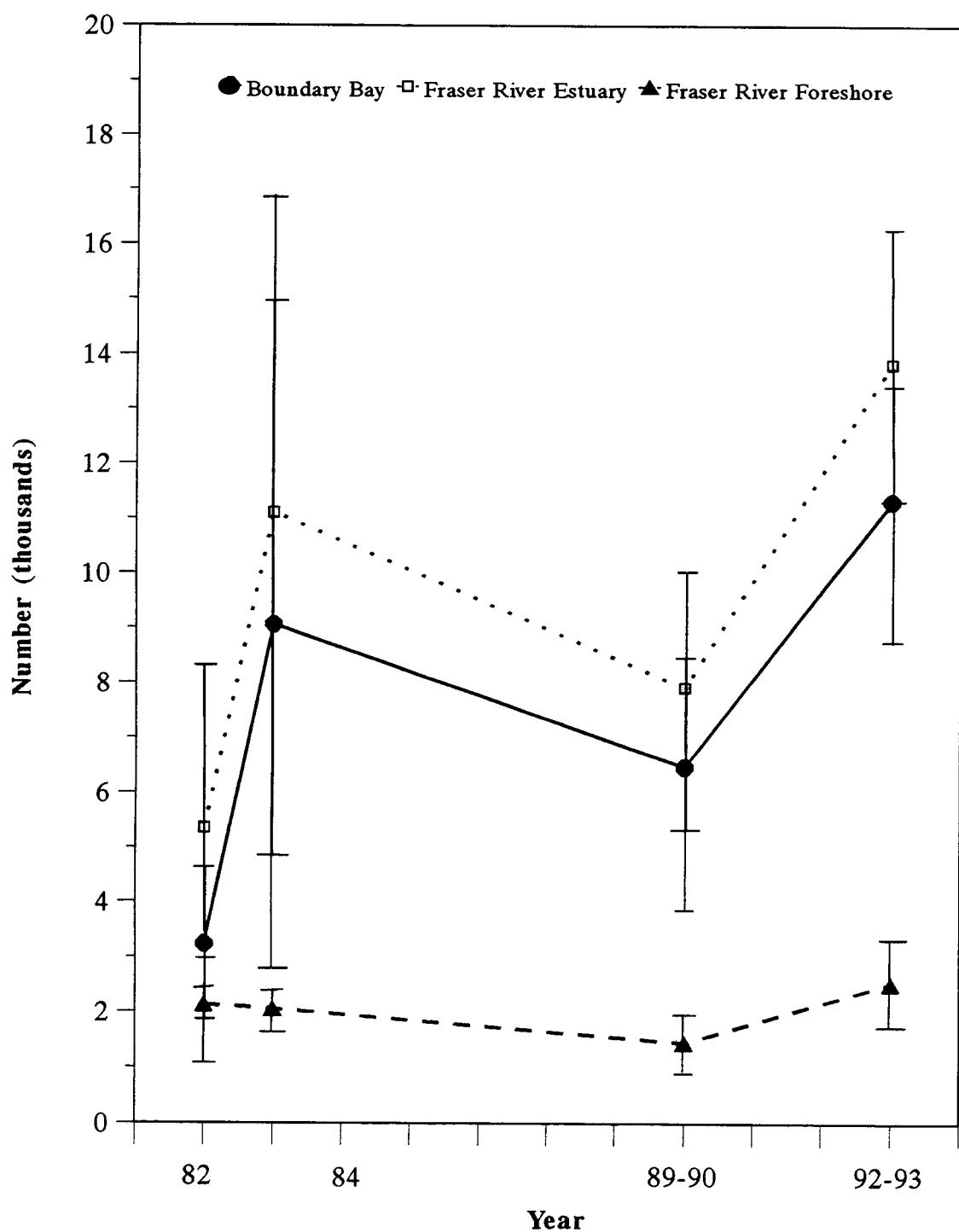


Figure 3. Mean number of gulls seen per winter on aerial surveys of Boundary Bay, the Fraser River foreshore and the Fraser River estuary from 1982-83 to 1992-93.

Table 6. Probability values resulting from Z-test comparisons of annual numbers of birds seen (Oct. - Jan.) between years for Boundary Bay, the Fraser River foreshore, and the Fraser River estuary.

Year	Probability of being the same											
	Fraser River Foreshore				Boundary Bay				Fraser River estuary			
DABBLING DUCKS												
	1966-74	1982-83	1983-84	1989-90	1966-74	1982-83	1983-84	1989-90	1966-74	1982-83	1983-84	1989-90
1982-83	.019	-			.741	-			.412	-		
1983-84	.500	.087	-		<.001*	.001*	-		.190	<.001*	-	
1989-90	.810	.007*	.542	-	<.001*	<.001*	.039	-	.034	<.001*	.099	-
1992-93	.026	.711	.085	.018	.002*	.005	.646	.010*	.849	.142	.080	<.001*

* significant at $a = 0.0125$ ($= 0.5/4$ where 4 is the number of other years with which each is being compared)

GULLS												
	1966-74	1982-83	1983-84	1989-90	1966-74	1982-83	1983-84	1989-90	1966-74	1982-83	1983-84	1989-90
1983-84		.134	-			.976	-			.497	-	
1989-90		.134	.779	-		.197	.099	-		.529	.749	-
1992-93		.046	.280	.194		.689	.407	.069		.070	.347	.116

No values are significant at $a = 0.0167$ ($= 0.5/3$ where 3 is the number of other years with which each is being compared)

A comparison of the Fraser River estuary counts with Pacific flyway mid-winter counts is shown in Figure 4. Although the dabbling duck population of the Fraser River estuary showed an increase in 1992, the population of the flyway continued to show a decline. Nevertheless, the overall downward trend is still apparent for the Fraser River estuary ($r = -0.35$).

Species Composition

Species composition varied among counts. Detailed data are presented in Appendix 5. Of dabbling ducks, on average American Wigeon were the most abundant species (33.7%) followed by Northern Pintails (29.0%), Mallards (25.6%), and Green-winged Teal (11.7%) (Table 7). Table 7 compares this species composition to that of previous years. The trend is similar to that of 1989-90. Nevertheless, there appears to have been a decrease in the proportion of Northern Pintail. The 1992-93 numbers show a dramatic increase in the proportion of Green-winged Teal since 1983.

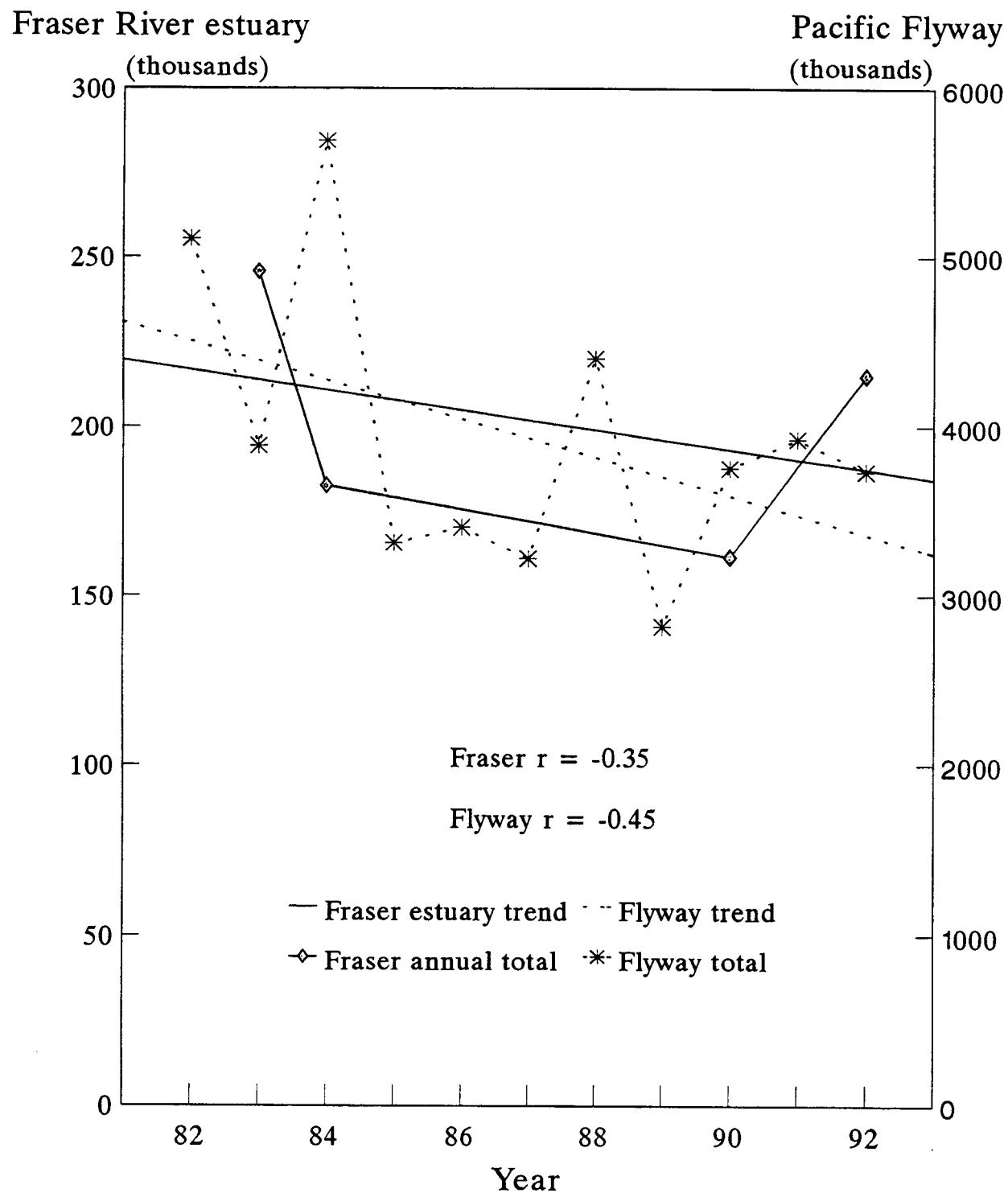


Figure 4. Number of dabbling ducks on the Fraser River estuary compared to total mid-winter estimates for the Pacific Flyway from 1982 to 1992.

Table 7. Comparison of the relative abundance of dabbling duck species on Boundary Bay from 1966-74 to 1992-93. Values presented are annual average percentages based on the total number of ducks counted.

Year	Percentage			
	Mallard	Green-winged Teal	American Wigeon	Northern Pintail
1966-74 ¹	29.7	9.4	25.0	35.9
1983-84 ²	13.3	0.6	27.9	58.2
1989-90 ³	18.1	1.8	55.1	24.8
1992-93	25.6	11.7	33.7	29.0

¹ data from McKelvey *et al.* (1985). Percentages were first readjusted for each month to only consider identified dabbling ducks. Figures were then averaged for October to January to correspond with other years aerial surveys.

² data from McKelvey *et al.* (1985). Percentages for November and December were averaged. No data was available for October.

³ unpublished data from Breault and McCormick, collected in 1989-90

DISCUSSION AND CONCLUSIONS

A striking difference between this year's data and those of previous years was the low number of waterfowl and high number of gulls present on the estuary in January. This is the result of upland freshwater habitats and much of the marine shorelines being frozen. Under these weather conditions, gulls were still able to feed at the garbage dumps, while dabbling ducks which remained in the area were only able to feed on the tide flats, and only at night when the tides were low. Many ducks may therefore have been forced to leave the area.

Another departure from the "norm" is that the data do not appear to directly follow the downward population trend evident from previous years' surveys. Nevertheless, the overall trend is still declining. The greatest increase in waterfowl numbers was on Boundary Bay in October and November. In those two months combined, populations were up 40,000 over 1989-90. Without those increases, the total annual number would more closely have reflected that of 1989-90. The October figures were substantially higher than those for October of all previous surveys.

The apparent increase in the number of ducks in 1992-93 could be due to a number of reasons. First, continental populations could be starting to recover, although Pacific flyway counts do not seem to indicate this. Secondly, higher duck numbers may also have resulted from cold weather farther north sending more birds south. Third, changes in land use in other areas, such as development on important uplands or other estuarine areas, may have forced more ducks into the delta area. Finally, the increase

could simply be indicative of the large errors inherent in this type of survey.

It is important that this year's data not be viewed in isolation. Surveys must continue in order to determine whether these observations were an anomaly, marked a reversal in trend, or whether no long term trends exist. It is also essential to remember that trends that appear insignificant according to statistics may be significant from a conservation perspective. Caution should be exercised when analyzing the situation strictly on statistics or one year's data.

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APPENDICES

APPENDIX 1

**Dates and number of replicate counts per waterfowl survey of Boundary Bay
and the Fraser River foreshore, 1992-93.**

Date	Number of Replicate Counts						
	Sea Island	Middle Arm	Lulu Island	Westham Island	Brunswick Point	Roberts Bank	Boundary Bay
15 Oct. 1992	3	3	3	3	3	3	3
21 Oct. 1992	2	2	3	3	3	3	3
27 Oct. 1992	3	3	3	3	3	3	3
03 Nov. 1992	3	3	3	3	3	3	3
10 Nov. 1992	3	3	3	3	3	3	3
18 Nov. 1992	3	3	3	3	3	3	3
24 Nov. 1992	3	3	3	3	3	3	3
01 Dec. 1992	2	3	3	3	3	3	3
08 Dec. 1992	3	2	3	3	3	3	3
15 Dec. 1992	3	3	3	3	3	3	3
22 Dec. 1992	3	1	3	3	3	3	3
29 Dec. 1992	3	3	3	3	3	3	3
06 Jan. 1993	3	3	3	3	3	3	1
12 Jan. 1993	3	2	3	3	3	3	1

APPENDIX 2

**Daily summaries of numbers of birds seen by species groups,
on each transect, for each survey.**

BOUNDARY BAY

Dabbling Ducks

Date	No. of Counts	Mean	Std. Dev.	Minimum	Maximum
92/10/15	3	31,594.0	6,337.2	23,054	38,218
92/10/21	3	45,072.3	5,942.5	36,675	49,560
92/10/27	3	49,135.3	473.4	48,741	49,801
92/11/03	3	36,817.0	1,408.8	34,835	37,984
92/11/10	3	37,094.0	1,666.4	34,775	38,617
92/11/18	3	35,460.3	6,296.6	30,582	44,351
92/11/24	3	68,031.0	4,046.7	63,050	72,962
92/12/01	3	65,402.0	4,226.0	59,648	69,678
92/12/08	3	35,880.3	5,056.3	32,160	43,029
92/12/15	3	65,377.7	8,423.9	57,415	77,033
92/12/22	3	48,451.3	2,447.0	45,250	51,190
92/12/29	3	12,598.7	2,196.6	9,629	14,873
93/01/06	1	5,089.0	0.0	5,089	5,089
93/01/12	1	5,275.0	0.0	5,275	5,275

Diving Ducks

Date	No. of Counts	Mean	Std. Dev.	Minimum	Maximum
92/10/15	3	997.7	518.6	379	1,6489
92/10/21	3	2,064.3	969.7	1,320	3,434
92/10/27	3	945.7	1,051.4	145	2,431
92/11/03	3	2,891.7	493.5	2,265	3,471
92/11/10	3	3,237.7	1,635.2	1,314	5,311
92/11/18	3	3,187.7	273.5	2,884	3,547
92/11/24	3	3,309.7	1,455.0	2,108	5,357
92/12/01	3	3,025.0	765.1	2,311	4,086
92/12/08	3	3,275.0	1,606.7	1,106	4,946
92/12/15	3	2,245.3	541.9	1,531	2,843
92/12/22	3	1,654.0	542.8	977	2,306
92/12/29	3	484.0	353.9	102	955
93/01/06	1	246.0	0.0	246	246
93/01/12	1	161.0	0.0	161	161

Total Ducks

Date	No. of Counts	Mean	Std. Dev.	Minimum	Maximum
92/10/15	3	32,591.7	6,839.8	23,433	39,866
92/10/21	3	47,136.7	4,977.5	40,109	50,999
92/10/27	3	50,081.0	841.1	49,125	51,172
92/11/03	3	39,708.7	1,076.7	38,306	40,923
92/11/10	3	40,331.7	2,601.3	37,863	43,928
92/11/18	3	38,648.0	6,278.4	33,466	47,483
92/11/24	3	71,340.7	4,446.5	65,158	75,426
92/12/01	3	68,427.0	4,885.3	61,959	73,764
92/12/08	3	39,155.3	6,352.4	33,266	47,975
92/12/15	3	67,623.0	8,411.2	60,258	79,395
92/12/22	3	50,105.3	2,279.0	46,929	52,167
92/12/29	3	13,082.7	1,843.2	10,584	14,975
93/01/06	1	5,335.0	0.0	5,335	5,335
93/01/12	1	5,436.0	0.0	5,436	5,436

Snow Geese

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
92/10/15	3	0.0	0.0	0	0
92/10/21	3	0.0	0.0	0	0
92/10/27	3	0.0	0.0	0	0
92/11/03	3	0.0	0.0	0	0
92/11/10	3	0.0	0.0	0	0
92/11/18	3	0.0	0.0	0	0
92/11/24	3	0.0	0.0	0	0
92/12/01	3	0.0	0.0	0	0
92/12/08	3	0.0	0.0	0	0
92/12/15	3	0.0	0.0	0	0
92/12/22	3	0.0	0.0	0	0
92/12/29	3	0.0	0.0	0	0
93/01/06	1	0.0	0.0	0	0
93/01/12	1	0.0	0.0	0	0

Total Geese

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
92/10/15	3	1.0	1.4	0	3
92/10/21	3	3.3	4.7	0	10
92/10/27	3	1.7	2.4	0	5
92/11/03	3	0.0	0.0	0	0
92/11/10	3	0.0	0.0	0	0
92/11/18	3	9.3	13.2	0	28
92/11/24	3	0.3	0.5	0	1
92/12/01	3	23.3	33.0	0	70
92/12/08	3	0.7	0.9	0	2
92/12/15	3	2.0	2.8	0	6
92/12/22	3	0.0	0.0	0	0
92/12/29	3	11.0	15.6	0	33
93/01/06	1	87.0	0.0	87	87
93/01/12	1	32.0	0.0	32	32

Swans

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
92/10/15	3	0.0	0.0	0	0
92/10/21	3	0.0	0.0	0	0
92/10/27	3	0.0	0.0	0	0
92/11/03	3	0.0	0.0	0	0
92/11/10	3	0.0	0.0	0	0
92/11/18	3	1.3	1.9	0	4
92/11/24	3	3.7	0.9	3	5
92/12/01	3	0.0	0.0	0	0
92/12/08	3	0.0	0.0	0	0
92/12/15	3	0.0	0.0	0	0
92/12/22	3	0.0	0.0	0	0
92/12/29	3	0.0	0.0	0	0
93/01/06	1	0.0	0.0	0	0
93/01/12	1	0.0	0.0	0	0

Total Waterfowl

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
92/10/15	3	32,592.7	6,840.1	23,433	39,866
92/10/21	3	47,140.0	4,972.7	40,119	50,999
92/10/27	3	50,082.7	840.9	49,125	51,172
92/11/03	3	39,708.7	1,076.7	38,306	40,923
92/11/10	3	40,331.7	2,601.3	37,863	43,928
92/11/18	3	38,658.7	6,272.2	33,466	47,483
92/11/24	3	71,344.7	4,447.1	65,161	75,430
92/12/01	3	68,450.3	4,890.8	61,959	73,764
92/12/08	3	39,156.0	6,351.7	33,268	47,975
92/12/15	3	67,625.0	8,414.0	60,258	79,401
92/12/22	3	50,105.3	2,279.0	46,929	52,167
92/12/29	3	13,093.7	1,854.5	10,584	15,008
93/01/06	1	5,422.0	0.0	5,422	5,422
93/01/12	1	5,468.0	0.0	5,468	5,468

Shorebirds

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
92/10/15	3	12,711.3	10,210.3	5,350	27,150
92/10/21	3	19,498.7	11,114.4	4,020	29,605
92/10/27	3	23,725.0	12,079.6	11,575	40,200
92/11/03	3	24,507.0	8,186.0	15,320	35,201
92/11/10	3	18,983.3	4,773.9	13,450	25,100
92/11/18	3	7,933.3	3,308.9	5,300	12,600
92/11/24	3	10,766.7	9,287.0	4,100	23,900
92/12/01	3	11,820.0	6,672.0	2,400	17,000
92/12/08	3	1,033.3	1,053.2	75	2,500
92/12/15	3	11,532.3	5,168.8	4,597	17,000
92/12/22	3	5,873.3	3,839.8	1,800	11,020
92/12/29	3	1,430.7	864.0	600	2,622
93/01/06	1	0.0	0.0	0	0
93/01/12	1	8,191.0	0.0	8,191	8,191

Gulls

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
92/10/15	3	1,185.7	315.0	741	1,432
92/10/21	3	594.7	199.0	346	833
92/10/27	3	2,494.0	658.4	1,564	2,998
92/11/03	3	1,027.3	378.8	655	1,547
92/11/10	3	583.0	134.0	411	738
92/11/18	3	1,164.0	556.9	636	1,934
92/11/24	3	779.3	152.7	610	980
92/12/01	3	2,774.3	455.9	2,186	3,297
92/12/08	3	902.7	414.3	459	1,456
92/12/15	3	2,085.0	161.6	1,861	2,236
92/12/22	3	366.3	192.4	207	637
92/12/29	3	2,683.0	161.0	2,528	2,905
93/01/06	1	3,813.0	0.0	3,813	3,813
93/01/12	1	10,655.0	0.0	10,655	10,655

Divers (loons, grebes, cormorants)

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
92/10/15	3	5.3	0.5	5	6
92/10/21	3	92.3	37.4	54	143
92/10/27	3	69.7	35.2	39	119
92/11/03	3	29.0	2.2	26	31
92/11/10	3	23.0	6.2	16	31
92/11/18	3	18.3	1.2	17	20
92/11/24	3	67.3	14.4	47	79
92/12/01	3	12.7	3.3	9	17
92/12/08	3	8.0	2.2	6	11
92/12/15	3	29.0	10.0	20	43
92/12/22	3	17.3	7.4	8	26
92/12/29	3	4.7	2.4	3	8
93/01/06	1	0.0	0.0	0	0
93/01/12	1	1.0	0.0	1	1

Total Birds without shorebirds

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
92/10/15	3	33,812.3	6,607.9	24,884	40,666
92/10/21	3	47,863.7	5,162.4	40,584	51,984
92/10/27	3	52,678.7	1,455.7	50,780	54,317
92/11/03	3	40,778.3	1,091.9	39,236	41,615
92/11/10	3	40,939.3	2,492.7	38,485	44,358
92/11/18	3	39,849.7	6,068.9	35,426	48,431
92/11/24	3	72,196.7	4,433.4	65,994	76,090
92/12/01	3	71,248.3	5,024.3	64,823	77,088
92/12/08	3	40,066.7	6,760.3	33,738	49,437
92/12/15	3	69,745.3	8,484.7	62,146	81,587
92/12/22	3	50,492.7	2,416.3	47,160	52,813
92/12/29	3	15,782.7	1,948.2	13,206	17,916
93/01/06	1	9,235.0	0.0	9,235	9,235
93/01/12	1	16,124.0	0.0	16,124	16,124

TOTAL BIRDS

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
92/10/15	3	46,523.7	15,679.0	30,518	67,816
92/10/21	3	67,362.3	8,362.4	56,004	75,894
92/10/27	3	76,403.7	11,962.4	65,892	93,139
92/11/03	3	65,285.3	8,346.2	56,935	76,685
92/11/10	3	59,922.7	5,726.8	51,935	65,075
92/11/18	3	47,783.0	5,565.9	40,726	54,331
92/11/24	3	82,963.3	11,700.7	70,094	98,406
92/12/01	3	83,068.3	7,771.7	74,234	93,148
92/12/08	3	41,100.0	6,686.2	33,813	49,962
92/12/15	3	81,277.7	10,109.8	70,100	94,587
92/12/22	3	56,366.0	6,072.0	48,960	63,833
92/12/29	3	17,213.3	2,410.0	13,806	18,986
93/01/06	1	9,235.0	0.0	9,235	9,235
93/01/12	1	24,315.0	0.0	24,315	24,315

BRUNSWICK POINT

Dabbling Ducks

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
92/10/15	3	4,800.3	1,823.4	3,302	7,367
92/10/21	3	4,998.0	951.7	3,805	6,134
92/10/27	3	2,086.0	307.2	1,660	2,373
92/11/03	3	3,555.3	538.4	2,800	4,016
92/11/10	3	5,436.7	2,690.4	2,500	9,000
92/11/18	3	5,216.7	62.4	5,150	5,300
92/11/24	3	6,300.7	684.1	5,437	7,110
92/12/01	3	5,051.0	827.3	3,953	5,950
92/12/08	3	766.7	405.1	420	1,335
92/12/15	3	1,895.0	229.5	1,580	2,120
92/12/22	3	968.3	347.1	500	1,330
92/12/29	3	3,058.0	519.4	2,431	3,703
93/01/06	3	253.7	229.1	0	555
93/01/12	3	2,015.0	655.3	1,205	2,810

Diving Ducks

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
92/10/15	3	1.7	2.4	0	5
92/10/21	3	53.3	36.8	10	100
92/10/27	3	322.3	161.0	130	524
92/11/03	3	186.0	227.1	2	506
92/11/10	3	151.7	120.4	5	300
92/11/18	3	210.3	229.6	1	530
92/11/24	3	333.3	471.4	0	1,000
92/12/01	3	655.0	319.1	400	1,105
92/12/08	3	1.7	2.4	0	5
92/12/15	3	6.7	9.4	0	20
92/12/22	3	17.3	12.7	0	30
92/12/29	3	35.0	24.8	0	55
93/01/06	3	0.0	0.0	0	0
93/01/12	3	1.0	1.4	0	3

Total Ducks

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
92/10/15	3	4,802.0	1,822.4	3,302	7,367
92/10/21	3	5,051.3	914.9	3,905	6,144
92/10/27	3	2,408.3	461.1	1,790	2,897
92/11/03	3	3,741.3	711.1	2,802	4,522
92/11/10	3	5,588.3	2,616.4	2,650	9,005
92/11/18	3	5,427.0	178.9	5,300	5,680
92/11/24	3	6,634.0	1,108.9	5,437	8,110
92/12/01	3	5,706.0	1,079.3	4,413	7,055
92/12/08	3	768.3	403.7	425	1,335
92/12/15	3	1,901.7	232.2	1,580	2,120
92/12/22	3	985.7	340.5	522	1,330
92/12/29	3	3,093.0	539.7	2,431	3,753
93/01/06	3	253.7	229.1	0	555
93/01/12	3	2,016.0	654.1	1,208	2,810

Snow Geese

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
92/10/15	3	0.0	0.0	0	0
92/10/21	3	2,133.3	2,049.9	0	4,900
92/10/27	3	0.0	0.0	0	0
92/11/03	3	4,366.7	579.3	3,600	5,000
92/11/10	3	0.0	0.0	0	0
92/11/18	3	1,250.0	353.6	750	1,500
92/11/24	3	0.0	0.0	0	0
92/12/01	3	1,166.7	623.6	500	2,000
92/12/08	3	0.0	0.0	0	0
92/12/15	3	150.0	40.8	100	200
92/12/22	3	6.7	9.4	0	20
92/12/29	3	356.7	253.8	0	570
93/01/06	3	34.3	46.4	0	100
93/01/12	3	0.0	0.0	0	0

Total Geese

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
92/10/15	3	6.7	9.4	0	20
92/10/21	3	2,133.3	2,049.9	0	4,900
92/10/27	3	0.0	0.0	0	0
92/11/03	3	4,366.7	579.3	3,600	5,000
92/11/10	3	0.0	0.0	0	0
92/11/18	3	1,250.0	353.6	750	1,500
92/11/24	3	1.7	2.4	0	5
92/12/01	3	1,168.3	625.8	500	2,005
92/12/08	3	0.0	0.0	0	0
92/12/15	3	150.0	40.8	100	200
92/12/22	3	6.7	9.4	0	20
92/12/29	3	358.3	254.8	0	570
93/01/06	3	34.3	46.4	0	100
93/01/12	3	0.0	0.0	0	0

Swans

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	0.0	0.0	0	0
921021	3	0.0	0.0	0	0
921027	3	19.3	2.5	16	22
921103	3	12.0	8.3	3	23
921110	3	8.3	11.1	0	24
921118	3	24.3	3.7	20	29
921124	3	44.0	2.9	41	48
921201	3	35.7	2.1	33	38
921208	3	3.0	2.4	0	6
921215	3	23.0	8.8	14	35
921222	3	22.0	8.6	11	32
921229	3	123.3	64.9	75	215
930106	3	177.3	48.5	110	222
930112	3	165.3	25.3	130	188

Total Waterfowl

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	4,808.7	1,816.9	3,322	7,367
921021	3	7,184.7	2,511.4	3,905	10,005
921027	3	2,427.7	461.5	1,810	2,919
921103	3	8,120.0	1,284.1	6,425	9,532
921110	3	5,596.7	2,607.8	2,674	9,006
921118	3	6,701.3	465.9	6,079	7,200
921124	3	6,679.7	1,105.8	5,485	8,151
921201	3	6,910.0	1,575.9	5,449	9,098
921208	3	771.3	405.9	425	1,341
921215	3	2,074.7	199.5	1,794	2,240
921222	3	1,014.3	344.2	545	1,361
921229	3	3,574.7	544.3	3,081	4,333
930106	3	465.3	315.6	110	877
930112	3	2,181.3	650.1	1,396	2,988

Shorebirds

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	1,275.0	954.4	10	2,315
921021	3	1,366.7	1,291.9	0	3,100
921027	3	7,700.3	7,083.4	1	17,100
921103	3	3,333.3	4,714.0	0	10,000
921110	3	2,083.3	469.6	1,500	2,650
921118	3	1,666.7	2,357.0	0	5,000
921124	3	1,516.7	1,057.0	50	2,500
921201	3	0.0	0.0	0	0
921208	3	0.0	0.0	0	0
921215	3	2,108.3	2,063.2	325	5,000
921222	3	3,366.7	4,761.2	0	10,100
921229	3	266.7	377.1	0	800
930106	3	0.0	0.0	0	0
930112	3	916.7	1,121.3	50	2,500

Gulls

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	627.3	282.3	229	849
921021	3	62.7	32.4	17	89
921027	3	409.7	66.7	320	480
921103	3	244.7	42.3	204	303
921110	3	639.0	822.1	24	1,801
921118	3	38.0	24.5	7	67
921124	3	54.3	15.9	35	74
921201	3	10.0	2.8	6	12
921208	3	0.3	0.5	0	1
921215	3	319.0	79.8	225	420
921222	3	4.0	2.2	1	6
921229	3	178.7	6.8	172	188
930106	3	83.3	48.2	25	143
930112	3	148.0	17.8	133	173

Divers (loons, grebes, cormorants)

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	2.7	0.9	2	4
921021	3	3.3	3.4	0	8
921027	3	5.0	5.1	0	12
921103	3	100.3	126.4	6	279
921110	3	0.7	0.9	0	2
921118	3	3.7	2.1	1	6
921124	3	0.0	0.0	0	0
921201	3	0.3	0.5	0	1
921208	3	1.0	1.4	0	3
921215	3	0.0	0.0	0	0
921222	3	0.7	0.9	0	2
921229	3	0.0	0.0	0	0
930106	3	0.3	0.5	0	1
930112	3	0.0	0.0	0	0

Total Birds without shorebirds

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	5,442.3	1,936.3	3,970	8,178
921021	3	7,251.0	2,541.8	3,922	10,090
921027	3	2,845.0	518.2	2,137	3,363
921103	3	8,466.0	1,183.9	6,908	9,776
921110	3	6,237.3	2,041.9	4,478	9,100
921118	3	6,743.7	482.8	6,092	7,246
921124	3	6,738.3	1,114.3	5,520	8,213
921201	3	6,921.3	1,572.4	5,462	9,104
921208	3	772.7	405.2	425	1,341
921215	3	2,399.0	138.8	2,216	2,552
921222	3	1,019.0	345.3	548	1,366
921229	3	3,753.3	543.6	3,253	4,509
930106	3	549.0	289.9	192	902
930112	3	2,329.3	636.2	1,569	3,126

TOTAL BIRDS

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	6,717.3	2,758.4	3,980	10,493
921021	3	8,617.7	3,784.7	3,922	13,190
921027	3	10,545.3	7,394.7	2,138	20,135
921103	3	11,799.3	5,027.6	6,908	18,714
921110	3	8,320.7	2,165.4	5,978	11,200
921118	3	8,410.3	2,731.9	6,092	12,246
921124	3	8,255.0	1,511.9	6,532	10,213
921201	3	6,921.3	1,572.4	5,462	9,104
921208	3	772.7	405.2	425	1,341
921215	3	4,507.3	1,928.5	2,877	7,216
921222	3	4,385.7	4,429.1	1,143	10,648
921229	3	4,020.0	413.4	3,498	4,509
930106	3	549.0	289.9	192	902
930112	3	3,246.0	1,720.3	1,619	5,626

LULU ISLAND

Dabbling Ducks

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	2,471.0	493.2	1,927	3,121
921021	3	4,016.7	776.5	3,060	4,962
921027	3	1,322.0	351.7	1,025	1,816
921103	3	1,414.3	661.5	500	2,043
921110	3	666.3	116.9	501	752
921118	3	1,548.0	753.7	600	2,444
921124	3	450.0	74.4	347	520
921201	3	909.3	50.6	852	975
921208	3	163.3	132.2	60	350
921215	3	734.0	123.8	575	877
921222	3	346.7	75.4	240	400
921229	3	782.0	167.9	547	929
930106	3	248.3	36.6	220	300
930112	3	535.7	285.2	145	818

Diving Ducks

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	18.0	22.7	0	50
921021	3	35.0	24.8	0	55
921027	3	13.3	18.9	0	40
921103	3	61.7	62.8	10	150
921110	3	3.3	4.7	0	10
921118	3	18.7	24.3	1	53
921124	3	45.7	11.3	30	56
921201	3	8.3	8.5	0	20
921208	3	0.0	0.0	0	0
921215	3	12.7	17.9	0	38
921222	3	9.7	8.1	3	21
921229	3	5.7	0.9	5	7
930106	3	0.0	0.0	0	0
930112	3	2.0	1.6	0	4

Total Ducks

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	2,489.0	476.8	1,977	3,125
921021	3	4,051.7	797.2	3,060	5,012
921027	3	1,335.3	344.7	1,025	1,816
921103	3	1,476.0	709.3	510	2,193
921110	3	669.7	112.2	511	752
921118	3	1,566.7	755.7	601	2,446
921124	3	495.7	69.2	398	550
921201	3	917.7	48.2	857	975
921208	3	163.3	132.2	60	350
921215	3	746.7	126.7	575	877
921222	3	356.3	80.4	243	421
921229	3	787.7	168.5	552	936
930106	3	248.3	36.6	220	300
930112	3	537.7	286.4	145	820

Snow Geese

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	3,995.0	474.6	3,500	4,635
921021	3	1,624.0	688.2	850	2,522
921027	3	2,655.0	782.4	1,850	3,715
921103	3	3,273.7	758.2	2,203	3,860
921110	3	2,906.0	778.9	1,998	3,900
921118	3	2,653.7	1,186.2	1,409	4,250
921124	3	3,833.3	1,077.3	2,950	5,350
921201	3	3,420.0	433.4	2,850	3,900
921208	3	5,166.7	1,433.7	3,500	7,000
921215	3	836.7	129.2	700	1,010
921222	3	341.7	82.5	250	450
921229	3	541.7	298.8	150	875
930106	3	316.7	239.2	100	650
930112	3	1,276.7	1,271.7	355	3,075

Total Geese

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	3,995.0	474.6	3,500	4,635
921021	3	1,624.0	688.2	850	2,522
921027	3	2,655.0	782.4	1,850	3,715
921103	3	3,273.7	758.2	2,203	3,860
921110	3	2,906.0	778.9	1,998	3,900
921118	3	2,653.7	1,186.2	1,409	4,250
921124	3	3,833.3	1,077.3	2,950	5,350
921201	3	3,421.0	434.5	2,850	3,903
921208	3	5,166.7	1,433.7	3,500	7,000
921215	3	836.7	129.2	700	1,010
921222	3	341.7	82.5	250	450
921229	3	541.7	298.8	150	875
930106	3	316.7	239.2	100	650
930112	3	1,277.3	1,272.7	355	3,077

Swans

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	0.0	0.0	0	0
921021	3	0.0	0.0	0	0
921027	3	5.0	7.1	0	15
921103	3	7.3	10.4	0	22
921110	3	45.3	19.0	29	72
921118	3	32.7	15.0	12	47
921124	3	37.7	11.5	23	51
921201	3	16.0	11.4	0	26
921208	3	87.7	22.0	64	117
921215	3	42.0	15.1	23	60
921222	3	80.3	16.0	58	95
921229	3	62.0	19.3	35	79
930106	3	65.0	28.6	30	100
930112	3	25.7	3.4	21	29

Total Waterfowl

Date	No. of Counts	Mean	Std. Dev.	Minimum	Maximum
921015	3	6,484.0	489.1	5,827	7,000
921021	3	5,675.7	1,322.8	4,560	7,534
921027	3	3,995.3	1,097.8	3,030	5,531
921103	3	4,757.0	928.3	3,928	6,053
921110	3	3,621.0	791.6	2,779	4,681
921118	3	4,253.0	1,260.4	2,915	5,942
921124	3	4,366.7	1,008.0	3,551	5,787
921201	3	4,354.7	463.6	3,733	4,846
921208	3	5,417.7	1,567.2	3,662	7,467
921215	3	1,625.3	230.6	1,418	1,947
921222	3	778.3	145.9	581	929
921229	3	1,391.3	239.0	1,060	1,615
930106	3	630.0	220.2	450	940
930112	3	1,840.7	1,382.4	529	3,752

Shorebirds

Date	No. of Counts	Mean	Std. Dev.	Minimum	Maximum
921015	3	20.0	21.6	0	50
921021	3	8.3	11.8	0	25
921027	3	0.3	0.5	0	1
921103	3	0.0	0.0	0	0
921110	3	3.3	4.7	0	10
921118	3	50.0	40.8	0	100
921124	3	10.0	14.1	0	30
921201	3	0.0	0.0	0	0
921208	3	0.0	0.0	0	0
921215	3	0.0	0.0	0	0
921222	3	0.0	0.0	0	0
921229	3	0.0	0.0	0	0
930106	3	0.0	0.0	0	0
930112	3	8.3	11.8	0	25

Gulls

Date	No. of Counts	Mean	Std. Dev.	Minimum	Maximum
921015	3	70.0	38.6	17	108
921021	3	2.0	1.6	0	4
921027	3	45.0	44.3	2	106
921103	3	38.7	27.5	0	62
921110	3	5.3	2.6	3	9
921118	3	13.3	9.8	2	26
921124	3	41.0	15.3	20	56
921201	3	23.0	19.9	7	51
921208	3	5.7	2.1	3	8
921215	3	397.7	43.0	337	432
921222	3	31.7	22.9	15	64
921229	3	552.0	140.9	444	751
930106	3	197.7	225.5	23	516
930112	3	367.0	177.7	232	618

Divers (loons, grebes, cormorants)

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	4.3	3.7	0	9
921021	3	10.7	2.6	7	13
921027	3	5.3	2.1	3	8
921103	3	22.3	9.7	15	36
921110	3	4.0	2.9	0	7
921118	3	9.7	6.6	5	19
921124	3	23.3	21.0	7	53
921201	3	1.7	1.2	0	3
921208	3	3.0	2.2	1	6
921215	3	2.0	1.4	1	4
921222	3	17.7	24.3	0	52
921229	3	4.0	2.9	0	7
930106	3	1.0	0.8	0	2
930112	3	0.0	0.0	0	0

Total Birds without shorebirds

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	6,560.3	458.7	5,936	7,025
921021	3	5,689.3	1,324.5	4,572	7,550
921027	3	4,047.7	1,063.1	3,143	5,540
921103	3	4,819.3	897.8	4,000	6,069
921110	3	3,631.0	796.2	2,782	4,696
921118	3	4,280.0	1,263.1	2,924	5,965
921124	3	4,433.3	982.8	3,619	5,816
921201	3	4,381.3	477.2	3,747	4,898
921208	3	5,426.3	1,567.6	3,670	7,476
921215	3	2,028.3	261.2	1,759	2,382
921222	3	828.3	140.8	649	993
921229	3	1,947.3	350.1	1,509	2,366
930106	3	828.7	230.6	504	1,017
930112	3	2,207.7	1,276.4	1,147	4,003

TOTAL BIRDS

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	6,580.3	437.2	5,986	7,025
921021	3	5,697.7	1,317.5	4,597	7,550
921027	3	4,048.0	1,062.9	3,144	5,540
921103	3	4,819.3	897.8	4,000	6,069
921110	3	3,634.3	792.6	2,792	4,696
921118	3	4,330.0	1,303.2	2,924	6,065
921124	3	4,443.3	974.6	3,649	5,816
921201	3	4,381.3	477.2	3,747	4,898
921208	3	5,426.3	1,567.6	3,670	7,476
921215	3	2,028.3	261.2	1,759	2,382
921222	3	828.3	140.8	649	993
921229	3	1,947.3	350.1	1,509	2,366
930106	3	828.7	230.6	504	1,017
930112	3	2,216.0	1,271.7	1,147	4,003

ROBERTS BANK

Dabbling Ducks

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	4,244.3	289.0	4,034	4,653
921021	3	6,359.7	850.2	5,750	7,562
921027	3	6,110.7	367.2	5,805	6,627
921103	3	10,840.3	1,238.0	9,211	12,210
921110	3	9,123.0	1,840.1	6,855	11,362
921118	3	15,080.3	1,397.4	13,116	16,250
921124	3	16,809.3	2,286.0	13,963	19,560
921201	3	22,428.3	2,831.1	18,890	25,820
921208	3	14,783.3	3,258.9	10,300	17,950
921215	3	13,860.0	2,087.9	11,200	16,300
921222	3	15,872.7	465.6	15,490	16,528
921229	3	1,598.3	235.0	1,397	1,928
930106	3	10,526.7	1,411.0	8,710	12,150
930112	3	9,384.7	477.5	8,718	9,811

Diving Ducks

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	67.0	94.8	0	201
921021	3	111.3	102.7	28	256
921027	3	127.3	96.1	0	232
921103	3	142.3	135.7	0	325
921110	3	59.0	66.6	7	153
921118	3	252.0	73.5	200	356
921124	3	129.0	121.0	37	300
921201	3	880.0	176.8	630	1,010
921208	3	84.0	84.7	0	200
921215	3	225.3	183.0	15	461
921222	3	132.3	123.8	13	303
921229	3	16.7	17.0	0	40
930106	3	17.7	11.1	3	30
930112	3	606.7	261.6	250	870

Total Ducks

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	4,311.3	383.8	4,034	4,854
921021	3	6,471.0	796.5	5,800	7,590
921027	3	6,238.0	439.7	5,900	6,859
921103	3	10,982.7	1,102.6	9,536	12,210
921110	3	9,182.0	1,784.5	7,008	11,379
921118	3	15,332.3	1,324.3	13,472	16,450
921124	3	16,938.3	2,298.0	14,000	19,610
921201	3	23,308.3	2,986.6	19,520	26,820
921208	3	14,867.3	3,263.1	10,352	17,950
921215	3	14,085.3	2,181.5	11,215	16,500
921222	3	16,005.0	457.2	15,503	16,609
921229	3	1,615.0	228.8	1,437	1,938
930106	3	10,544.3	1,422.1	8,713	12,180
930112	3	9,991.3	385.7	9,588	10,511

Snow Goose

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	0.0	0.0	0	0
921021	3	0.0	0.0	0	0
921027	3	0.0	0.0	0	0
921103	3	0.0	0.0	0	0
921110	3	0.0	0.0	0	0
921118	3	0.0	0.0	0	0
921124	3	0.0	0.0	0	0
921201	3	0.0	0.0	0	0
921208	3	0.0	0.0	0	0
921215	3	0.0	0.0	0	0
921222	3	0.0	0.0	0	0
921229	3	0.0	0.0	0	0
930106	3	0.0	0.0	0	0
930112	3	0.0	0.0	0	0

Total Geese

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	0.0	0.0	0	0
921021	3	3.3	4.7	0	10
921027	3	0.0	0.0	0	0
921103	3	0.0	0.0	0	0
921110	3	0.0	0.0	0	0
921118	3	0.0	0.0	0	0
921124	3	12.3	2.1	10	15
921201	3	20.7	22.2	3	52
921208	3	0.0	0.0	0	0
921215	3	1.7	2.4	0	5
921222	3	1.3	1.9	0	4
921229	3	16.7	23.6	0	50
930106	3	0.7	0.9	0	2
930112	3	0.0	0.0	0	0

Swans

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	0.0	0.0	0	0
921021	3	0.0	0.0	0	0
921027	3	0.0	0.0	0	0
921103	3	0.0	0.0	0	0
921110	3	0.0	0.0	0	0
921118	3	2.7	3.1	0	7
921124	3	0.0	0.0	0	0
921201	3	0.0	0.0	0	0
921208	3	0.0	0.0	0	0
921215	3	0.0	0.0	0	0
921222	3	1.3	1.9	0	4
921229	3	0.0	0.0	0	0
930106	3	0.0	0.0	0	0
930112	3	0.0	0.0	0	0

Waterfowl

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	4,311.3	383.8	4,034	4,854
921021	3	6,474.3	793.7	5,810	7,590
921027	3	6,238.0	439.7	5,900	6,859
921103	3	10,982.7	1,102.6	9,536	12,210
921110	3	9,182.0	1,784.5	7,008	11,379
921118	3	15,335.0	1,321.3	13,479	16,451
921124	3	16,950.7	2,296.7	14,015	19,622
921201	3	23,329.0	2,967.5	19,572	26,827
921208	3	14,867.3	3,263.1	10,352	17,950
921215	3	14,087.0	2,183.4	11,215	16,505
921222	3	16,007.7	456.7	15,503	16,609
921229	3	1,631.7	219.2	1,437	1,938
930106	3	10,545.0	1,422.9	8,713	12,182
930112	3	9,991.3	385.7	9,588	10,511

Shorebirds

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	278.3	335.3	0	750
921021	3	0.0	0.0	0	0
921027	3	1,473.3	410.0	1,000	2,000
921103	3	0.0	0.0	0	0
921110	3	4,566.7	4,903.3	1,000	11,500
921118	3	83.3	62.4	0	150
921124	3	5,033.3	857.6	4,000	6,100
921201	3	500.3	408.7	0	1,001
921208	3	166.7	235.7	0	500
921215	3	6,833.3	3,566.8	2,000	10,500
921222	3	8,083.3	3,218.3	3,550	10,700
921229	3	5,300.0	4,393.9	900	11,300
930106	3	184.7	223.8	4	500
930112	3	4,110.7	3,318.8	2	8,130

Gulls

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	75.7	11.1	60	85
921021	3	28.0	24.5	5	62
921027	3	144.0	49.3	80	200
921103	3	38.0	44.2	0	100
921110	3	22.0	21.4	4	52
921118	3	14.7	11.0	1	28
921124	3	38.7	18.0	16	60
921201	3	24.3	25.9	5	61
921208	3	2.7	0.9	2	4
921215	3	311.7	196.8	69	551
921222	3	27.0	18.0	5	49
921229	3	342.7	101.3	216	464
930106	3	213.0	21.9	197	244
930112	3	257.7	88.7	167	378

Divers (loons, grebes, cormorants)

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	4.7	3.4	0	8
921021	3	1.7	1.2	0	3
921027	3	2.0	2.8	0	6
921103	3	110.3	142.7	3	312
921110	3	2.7	2.5	0	6
921118	3	2.0	0.8	1	3
921124	3	1.3	0.5	1	2
921201	3	0.0	0.0	0	0
921208	3	3.3	3.4	0	8
921215	3	1.3	0.9	0	2
921222	3	73.7	103.5	0	220
921229	3	1.7	2.4	0	5
930106	3	0.0	0.0	0	0
930112	3	0.0	0.0	0	0

Total Birds without shorebirds

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	4,393.0	368.4	4,126	4,914
921021	3	6,509.3	794.8	5,815	7,622
921027	3	6,387.7	448.1	5,986	7,013
921103	3	11,141.3	942.6	9,950	12,255
921110	3	9,210.7	1,789.8	7,015	11,399
921118	3	15,356.3	1,330.7	13,488	16,486
921124	3	16,994.3	2,315.6	14,034	19,687
921201	3	23,355.0	2,944.2	19,636	26,836
921208	3	14,873.3	3,265.3	10,356	17,962
921215	3	14,401.7	2,379.3	11,286	17,060
921222	3	16,109.7	565.6	15,533	16,878
921229	3	1,976.7	127.3	1,873	2,156
930106	3	10,758.0	1,425.6	8,910	12,380
930112	3	10,249.0	474.3	9,755	10,889

TOTAL BIRDS

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	4,671.3	703.1	4,126	5,664
921021	3	6,509.3	794.8	5,815	7,622
921027	3	7,861.0	820.6	7,164	9,013
921103	3	11,141.3	942.6	9,950	12,255
921110	3	13,777.3	3,488.2	10,218	18,515
921118	3	15,439.7	1,279.5	13,638	16,486
921124	3	22,027.7	2,121.0	19,034	23,687
921201	3	23,855.3	2,536.3	20,637	26,836
921208	3	15,040.0	3,427.5	10,356	18,462
921215	3	21,235.0	3,370.6	16,859	25,060
921222	3	24,193.0	3,351.4	19,468	26,878
921229	3	7,276.7	4,296.8	3,056	13,173
930106	3	10,942.7	1,600.7	8,960	12,880
930112	3	14,359.7	3,498.5	9,757	18,233

FRASER RIVER MIDDLE ARM

Dabbling Ducks

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	250.0	40.8	200	300
921021	2	0.0	0.0	0	0
921027	3	116.7	62.4	50	200
921103	3	108.3	31.2	75	150
921110	3	83.3	23.6	50	100
921118	3	91.7	42.5	50	150
921124	3	35.0	24.8	0	55
921201	3	81.7	40.9	25	120
921208	2	25.0	25.0	0	50
921215	3	65.7	24.9	42	100
921222	1	0.0	0.0	0	0
921229	3	341.7	158.6	125	500
930106	3	0.7	0.9	0	2
930112	2	77.5	27.5	50	105

Diving Ducks

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	0.0	0.0	0	0
921021	2	0.0	0.0	0	0
921027	3	0.0	0.0	0	0
921103	3	0.0	0.0	0	0
921110	3	1.7	2.4	0	5
921118	3	0.0	0.0	0	0
921124	3	0.0	0.0	0	0
921201	3	0.0	0.0	0	0
921208	2	0.0	0.0	0	0
921215	3	0.7	0.9	0	2
921222	1	0.0	0.0	0	0
921229	3	0.0	0.0	0	0
930106	3	2.3	3.3	0	7
930112	2	5.0	5.0	0	10

Total Ducks

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	250.0	40.8	200	300
921021	2	0.0	0.0	0	0
921027	3	116.7	62.4	50	200
921103	3	108.3	31.2	75	150
921110	3	85.0	24.8	50	105
921118	3	91.7	42.5	50	150
921124	3	35.0	24.8	0	55
921201	3	81.7	40.9	25	120
921208	2	25.0	25.0	0	50
921215	3	66.3	24.6	42	100
921222	1	0.0	0.0	0	0
921229	3	341.7	158.6	125	500
930106	3	3.0	2.9	0	7
930112	2	82.5	22.5	60	105

Snow Goose

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	0.0	0.0	0	0
921021	2	1.0	1.0	0	2
921027	3	58.3	51.4	0	125
921103	3	0.0	0.0	0	0
921110	3	0.0	0.0	0	0
921118	3	1.0	1.4	0	3
921124	3	0.0	0.0	0	0
921201	3	16.7	23.6	0	50
921208	2	0.0	0.0	0	0
921215	3	0.0	0.0	0	0
921222	1	0.0	0.0	0	0
921229	3	0.0	0.0	0	0
930106	3	0.0	0.0	0	0
930112	2	0.0	0.0	0	0

Total Geese

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	0.0	0.0	0	0
921021	2	1.0	1.0	0	2
921027	3	58.3	51.4	0	125
921103	3	0.0	0.0	0	0
921110	3	0.0	0.0	0	0
921118	3	1.0	1.4	0	3
921124	3	0.0	0.0	0	0
921201	3	16.7	23.6	0	50
921208	2	0.0	0.0	0	0
921215	3	0.0	0.0	0	0
921222	1	0.0	0.0	0	0
921229	3	0.0	0.0	0	0
930106	3	0.0	0.0	0	0
930112	2	0.0	0.0	0	0

Swans

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	0.0	0.0	0	0
921021	2	0.0	0.0	0	0
921027	3	0.0	0.0	0	0
921103	3	0.0	0.0	0	0
921110	3	0.0	0.0	0	0
921118	3	0.0	0.0	0	0
921124	3	0.0	0.0	0	0
921201	3	0.0	0.0	0	0
921208	2	0.0	0.0	0	0
921215	3	0.0	0.0	0	0
921222	1	0.0	0.0	0	0
921229	3	0.0	0.0	0	0
930106	3	0.0	0.0	0	0
930112	2	0.0	0.0	0	0

Total Waterfowl

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	250.0	40.8	200	300
921021	2	1.0	1.0	0	2
921027	3	175.0	20.4	150	200
921103	3	108.3	31.2	75	150
921110	3	85.0	24.8	50	105
921118	3	92.7	43.9	50	153
921124	3	35.0	24.8	0	55
921201	3	98.3	18.4	75	120
921208	2	25.0	25.0	0	50
921215	3	66.3	24.6	42	100
921222	1	0.0	0.0	0	0
921229	3	341.7	158.6	125	500
930106	3	3.0	2.9	0	7
930112	2	82.5	22.5	60	105

Shorebirds

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	0.0	0.0	0	0
921021	2	0.0	0.0	0	0
921027	3	0.0	0.0	0	0
921103	3	0.0	0.0	0	0
921110	3	0.0	0.0	0	0
921118	3	0.0	0.0	0	0
921124	3	0.0	0.0	0	0
921201	3	0.0	0.0	0	0
921208	2	0.0	0.0	0	0
921215	3	0.0	0.0	0	0
921222	1	0.0	0.0	0	0
921229	3	0.0	0.0	0	0
930106	3	0.0	0.0	0	0
930112	2	0.0	0.0	0	0

Gulls

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	0.0	0.0	0	0
921021	2	2.5	2.5	0	5
921027	3	0.0	0.0	0	0
921103	3	4.3	5.4	0	12
921110	3	1.3	0.9	0	2
921118	3	0.7	0.5	0	1
921124	3	3.3	1.9	2	6
921201	3	29.3	18.8	6	52
921208	2	2.0	0.0	2	2
921215	3	70.0	51.9	2	128
921222	1	4.0	0.0	4	4
921229	3	72.3	59.6	11	153
930106	3	4.3	1.7	2	6
930112	2	9.0	5.0	4	14

Divers (loons, grebes, cormorants)

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	2.3	3.3	0	7
921021	2	2.5	1.5	1	4
921027	3	0.0	0.0	0	0
921103	3	2.3	2.6	0	6
921110	3	5.0	1.4	3	6
921118	3	2.3	1.7	0	4
921124	3	2.7	2.5	0	6
921201	3	0.7	0.5	0	1
921208	2	0.5	0.5	0	1
921215	3	0.0	0.0	0	0
921222	1	0.0	0.0	0	0
921229	3	0.0	0.0	0	0
930106	3	1.0	0.8	0	2
930112	2	1.5	1.5	0	3

Total Birds without shorebirds

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	252.7	40.5	201	300
921021	2	6.0	5.0	1	11
921027	3	175.7	20.4	150	200
921103	3	115.0	30.1	88	157
921110	3	91.3	23.9	58	113
921118	3	96.0	44.5	52	157
921124	3	41.3	27.8	2	62
921201	3	128.3	36.8	82	172
921208	2	27.5	24.5	3	52
921215	3	136.3	35.4	102	185
921222	1	4.0	0.0	4	4
921229	3	414.0	196.6	136	553
930106	3	8.3	2.4	5	10
930112	2	93.0	26.0	67	119

TOTAL BIRDS

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	252.7	40.5	201	300
921021	2	6.0	5.0	1	11
921027	3	175.7	20.4	150	200
921103	3	115.0	30.1	88	157
921110	3	91.3	23.9	58	113
921118	3	96.0	44.5	52	157
921124	3	41.3	27.8	2	62
921201	3	128.3	36.8	82	172
921208	2	27.5	24.5	3	52
921215	3	136.3	35.4	102	185
921222	1	4.0	0.0	4	4
921229	3	414.0	196.6	136	553
930106	3	8.3	2.4	5	10
930112	2	93.0	26.0	67	119

SEA ISLAND

Dabbling Ducks

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	1,971.0	1,010.4	980	3,358
921021	2	1,046.0	279.0	767	1,325
921027	3	19,641.7	25,006.3	1,400	55,000
921103	3	850.7	91.3	722	925
921110	3	1,675.0	397.4	1,300	2,225
921118	3	1,403.3	180.8	1,150	1,560
921124	3	897.0	594.6	110	1,547
921201	2	848.5	131.5	717	980
921208	3	266.7	59.5	215	350
921215	3	809.3	124.3	662	966
921222	3	224.0	34.5	187	270
921229	3	779.3	344.8	385	1,225
930106	3	585.7	75.4	487	670
930112	3	167.3	53.7	112	240

Diving Ducks

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	35.0	30.8	0	75
921021	2	103.5	98.5	5	202
921027	3	13.3	18.9	0	40
921103	3	75.0	54.0	25	150
921110	3	67.0	94.8	0	201
921118	3	53.7	68.3	0	150
921124	3	1,651.3	247.3	1,454	2,000
921201	2	103.0	97.0	6	200
921208	3	46.0	56.1	0	125
921215	3	1.0	1.4	0	3
921222	3	297.3	216.2	22	550
921229	3	33.3	47.1	0	100
930106	3	185.0	32.4	155	230
930112	3	1,354.0	458.5	1,010	2,002

Total Ducks

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	2,006.0	982.0	1,055	3,358
921021	2	1,149.5	180.5	969	1,330
921027	3	19,655.0	25,025.2	1,400	55,040
921103	3	925.7	38.0	872	955
921110	3	1,742.0	378.7	1,300	2,225
921118	3	1,457.0	219.5	1,150	1,650
921124	3	2,548.3	384.9	2,110	3,047
921201	2	951.5	34.5	917	986
921208	3	312.7	45.9	248	350
921215	3	810.3	125.5	662	969
921222	3	521.3	209.8	237	737
921229	3	812.7	343.1	385	1,225
930106	3	770.7	51.4	717	840
930112	3	1,521.3	419.6	1,200	2,114

Snow Goose

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	791.7	560.9	0	1,230
921021	2	3,125.5	1,694.5	1,431	4,820
921027	3	633.3	23.6	600	650
921103	3	633.3	102.7	500	750
921110	3	1,508.3	426.7	1,110	2,100
921118	3	1,071.7	412.6	715	1,650
921124	3	91.7	65.6	0	150
921201	2	10.0	10.0	0	20
921208	3	0.0	0.0	0	0
921215	3	0.0	0.0	0	0
921222	3	0.0	0.0	0	0
921229	3	0.0	0.0	0	0
930106	3	0.0	0.0	0	0
930112	3	0.0	0.0	0	0

Total Geese

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	791.7	560.9	0	1,230
921021	2	3,126.5	1,693.5	1,433	4,820
921027	3	633.3	23.6	600	650
921103	3	633.3	102.7	500	750
921110	3	1,508.3	426.7	1,110	2,100
921118	3	1,071.7	412.6	715	1,650
921124	3	93.3	66.5	0	150
921201	2	10.0	10.0	0	20
921208	3	0.0	0.0	0	0
921215	3	0.0	0.0	0	0
921222	3	2.7	2.5	0	6
921229	3	62.3	88.2	0	187
930106	3	18.7	9.8	6	30
930112	3	7.0	6.2	0	15

Swans

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	0.0	0.0	0	0
921021	2	4.5	4.5	0	9
921027	3	1.7	0.5	1	2
921103	3	0.0	0.0	0	0
921110	3	1.7	1.2	0	3
921118	3	6.7	9.4	0	20
921124	3	0.0	0.0	0	0
921201	2	0.0	0.0	0	0
921208	3	1.0	1.4	0	3
921215	3	0.0	0.0	0	0
921222	3	0.0	0.0	0	0
921229	3	0.0	0.0	0	0
930106	3	0.0	0.0	0	0
930112	3	0.0	0.0	0	0

Total Waterfowl

Date	No. of Counts	Mean	Std. Dev.	Minimum	Maximum
921015	3	2,797.7	1,442.7	1,055	4,588
921021	2	4,280.5	1,517.5	2,763	5,798
921027	3	20,290.0	25,037.6	2,001	55,692
921103	3	1,559.0	139.0	1,372	1,705
921110	3	3,252.0	604.8	2,410	3,803
921118	3	2,535.3	520.8	2,000	3,241
921124	3	2,641.7	435.6	2,110	3,177
921201	2	961.5	44.5	917	1,006
921208	3	313.7	44.5	251	350
921215	3	810.3	125.5	662	969
921222	3	524.0	211.2	237	739
921229	3	875.0	268.6	572	1,225
930106	3	789.3	50.3	747	860
930112	3	1,528.3	414.5	1,215	2,114

Shorebirds

Date	No. of Counts	Mean	Std. Dev.	Minimum	Maximum
921015	3	33.3	47.1	0	100
921021	2	0.0	0.0	0	0
921027	3	500.0	463.7	100	1,150
921103	3	0.0	0.0	0	0
921110	3	633.3	579.3	0	1,400
921118	3	233.3	205.5	0	500
921124	3	2,833.3	3,591.0	0	7,900
921201	2	0.0	0.0	0	0
921208	3	0.0	0.0	0	0
921215	3	16.7	23.6	0	50
921222	3	33.3	47.1	0	100
921229	3	516.7	476.7	0	1,150
930106	3	269.7	375.0	0	800
930112	3	2,041.7	310.7	1,650	2,410

Gulls

Date	No. of Counts	Mean	Std. Dev.	Minimum	Maximum
921015	3	57.7	64.7	0	148
921021	2	1.5	0.5	1	2
921027	3	28.7	20.0	5	54
921103	3	0.7	0.5	0	1
921110	3	4.0	1.6	2	6
921118	3	3.7	0.5	3	4
921124	3	92.0	23.9	59	115
921201	2	21.5	8.5	13	30
921208	3	2.0	1.4	0	3
921215	3	99.3	70.6	37	198
921222	3	6.0	3.6	3	11
921229	3	251.7	83.9	145	350
930106	3	16.0	18.5	0	42
930112	3	188.3	94.3	100	319

Divers (loons, grebes, cormorants)

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	3.0	1.6	1	5
921021	2	8.5	3.5	5	12
921027	3	1.0	1.4	0	3
921103	3	4.3	1.7	2	6
921110	3	4.3	2.1	2	7
921118	3	18.7	22.2	1	50
921124	3	61.7	47.8	4	121
921201	2	103.0	98.0	5	201
921208	3	1.7	1.7	0	4
921215	3	0.3	0.5	0	1
921222	3	0.7	0.9	0	2
921229	3	33.3	47.1	0	100
930106	3	0.0	0.0	0	0
930112	3	0.0	0.0	0	0

Total Birds without shorebirds

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	2,860.0	1,506.0	1,059	4,745
921021	2	4,291.0	1,521.0	2,770	5,812
921027	3	20,320.3	25,038.5	2,007	55,723
921103	3	1,566.3	140.2	1,378	1,714
921110	3	3,260.7	606.6	2,416	3,813
921118	3	2,558.3	542.0	2,009	3,296
921124	3	2,796.3	394.4	2,333	3,297
921201	2	1,087.0	151.0	936	1,238
921208	3	317.3	44.3	255	354
921215	3	910.0	149.1	700	1,032
921222	3	530.7	214.1	241	752
921229	3	1,160.0	230.7	973	1,485
930106	3	805.3	39.7	767	860
930112	3	1,716.7	362.4	1,361	2,214

TOTAL BIRDS

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	2,893.3	1,547.9	1,059	4,845
921021	2	4,291.0	1,521.0	2,770	5,812
921027	3	20,820.3	24,765.8	2,257	55,823
921103	3	1,566.3	140.2	1,378	1,714
921110	3	3,894.0	968.3	2,916	5,213
921118	3	2,791.7	447.2	2,209	3,296
921124	3	5,629.7	3,958.9	2,333	11,197
921201	2	1,087.0	151.0	936	1,238
921208	3	317.3	44.3	255	354
921215	3	926.7	160.4	700	1,048
921222	3	564.0	169.6	341	752
921229	3	1,676.7	511.2	973	2,172
930106	3	1,075.0	365.1	776	1,589
930112	3	3,758.3	430.4	3,225	4,279

WESTHAM ISLAND

Dabbling Ducks

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	2,028.3	471.9	1,371	2,457
921021	3	2,764.7	986.7	2,060	4,160
921027	3	1,788.3	380.1	1,493	2,325
921103	3	3,636.7	640.9	2,990	4,510
921110	3	1,365.7	351.7	900	1,750
921118	3	1,519.7	533.8	903	2,205
921124	3	2,056.0	254.7	1,715	2,327
921201	3	2,127.7	556.8	1,506	2,857
921208	3	2,596.0	776.8	1,750	3,626
921215	3	3,347.3	309.6	2,932	3,675
921222	3	649.7	287.4	440	1,056
921229	3	6,144.0	1,731.8	4,640	8,570
930106	3	1,528.7	537.3	961	2,250
930112	3	822.0	189.5	574	1,034

Diving Ducks

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	36.7	51.9	0	110
921021	3	18.3	22.5	0	50
921027	3	0.3	0.5	0	1
921103	3	54.0	37.7	10	102
921110	3	1.0	0.8	0	2
921118	3	1.0	0.8	0	2
921124	3	203.3	141.0	4	304
921201	3	5.0	3.7	1	10
921208	3	86.7	57.9	10	150
921215	3	176.7	235.8	0	510
921222	3	70.3	66.5	1	160
921229	3	41.7	50.0	0	112
930106	3	0.0	0.0	0	0
930112	3	0.3	0.5	0	1

Total Ducks

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	2,065.0	420.9	1,481	2,457
921021	3	2,783.0	1,009.0	2,065	4,210
921027	3	1,788.7	380.6	1,493	2,326
921103	3	3,690.7	605.4	3,092	4,520
921110	3	1,366.7	352.3	900	1,751
921118	3	1,520.7	532.9	905	2,205
921124	3	2,259.3	266.8	2,017	2,631
921201	3	2,132.7	559.6	1,510	2,867
921208	3	2,682.7	807.1	1,760	3,726
921215	3	3,524.0	120.9	3,435	3,695
921222	3	720.0	243.5	490	1,057
921229	3	6,185.7	1,708.7	4,653	8,570
930106	3	1,528.7	537.3	961	2,250
930112	3	822.3	189.6	574	1,034

Snow Goose

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	3,386.7	1,289.7	2,310	5,200
921021	3	3,866.7	838.0	3,000	5,000
921027	3	3,916.7	768.5	3,300	5,000
921103	3	3,061.3	736.5	2,475	4,100
921110	3	2,490.0	910.4	1,370	3,600
921118	3	5,276.3	1,259.5	3,500	6,279
921124	3	5,333.3	704.0	4,400	6,100
921201	3	8,650.0	2,159.1	5,600	10,300
921208	3	0.0	0.0	0	0
921215	3	4,950.0	1,192.3	3,600	6,500
921222	3	5,166.7	235.7	5,000	5,500
921229	3	3,561.7	860.9	2,424	4,506
930106	3	2,111.7	381.8	1,700	2,620
930112	3	0.0	0.0	0	0

Total Geese

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	3,386.7	1,289.7	2,310	5,200
921021	3	3,870.0	836.9	3,000	5,000
921027	3	3,916.7	768.5	3,300	5,000
921103	3	3,061.3	736.5	2,475	4,100
921110	3	2,490.0	910.4	1,370	3,600
921118	3	5,276.3	1,259.5	3,500	6,279
921124	3	5,333.3	704.0	4,400	6,100
921201	3	8,650.0	2,159.1	5,600	10,300
921208	3	1.0	1.4	0	3
921215	3	4,950.0	1,192.3	3,600	6,500
921222	3	5,167.7	235.0	5,000	5,500
921229	3	3,561.7	860.9	2,424	4,506
930106	3	2,111.7	381.8	1,700	2,620
930112	3	0.0	0.0	0	0

Swans

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	0.0	0.0	0	0
921021	3	7.0	5.4	0	13
921027	3	10.3	0.9	9	11
921103	3	2.0	2.8	0	6
921110	3	30.3	12.4	14	44
921118	3	32.7	6.6	24	40
921124	3	94.7	17.7	70	111
921201	3	108.0	53.9	65	184
921208	3	17.3	6.2	9	24
921215	3	46.7	18.7	21	65
921222	3	107.3	18.8	85	131
921229	3	243.0	55.1	176	311
930106	3	110.3	27.6	74	141
930112	3	213.3	24.0	187	245

Total Waterfowl

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	5,451.7	871.1	4,767	6,681
921021	3	6,660.0	1,828.4	5,082	9,223
921027	3	5,715.7	613.4	5,008	6,504
921103	3	6,754.0	579.8	5,935	7,198
921110	3	3,887.0	1,252.3	2,303	5,365
921118	3	6,829.7	1,743.7	4,429	8,518
921124	3	7,687.3	820.2	6,528	8,300
921201	3	10,890.7	2,583.0	7,294	13,242
921208	3	2,701.0	805.6	1,784	3,745
921215	3	8,520.7	1,312.7	7,089	10,260
921222	3	5,995.0	297.2	5,575	6,219
921229	3	9,990.3	1,002.7	8,719	11,170
930106	3	3,750.7	460.0	3,216	4,339
930112	3	1,035.7	212.6	761	1,279

Shorebird

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	141.7	79.8	60	250
921021	3	51.7	42.9	0	105
921027	3	215.7	121.8	62	360
921103	3	0.0	0.0	0	0
921110	3	68.3	96.6	0	205
921118	3	50.0	40.8	0	100
921124	3	0.0	0.0	0	0
921201	3	100.0	141.4	0	300
921208	3	0.0	0.0	0	0
921215	3	375.0	113.7	225	500
921222	3	0.0	0.0	0	0
921229	3	0.0	0.0	0	0
930106	3	40.0	56.6	0	120
930112	3	255.3	7.5	250	266

Gulls

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	72.7	42.2	38	132
921021	3	34.0	21.8	4	55
921027	3	203.7	125.6	44	351
921103	3	100.3	125.6	9	278
921110	3	29.7	28.1	5	69
921118	3	140.7	45.7	76	174
921124	3	31.7	2.5	29	35
921201	3	18.0	3.7	14	23
921208	3	37.0	48.1	1	105
921215	3	115.7	66.6	33	196
921222	3	30.3	22.4	14	62
921229	3	205.0	98.3	66	276
930106	3	64.3	41.4	11	112
930112	3	155.3	86.8	91	278

Divers (loons, grebes, cormorants)

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	14.7	8.8	7	27
921021	3	55.0	20.5	26	71
921027	3	6.7	3.7	2	11
921103	3	24.7	6.6	16	32
921110	3	8.3	4.9	2	14
921118	3	57.0	26.7	20	82
921124	3	26.7	30.6	5	70
921201	3	11.0	0.8	10	12
921208	3	2.0	1.4	1	4
921215	3	4.0	2.4	1	7
921222	3	8.0	5.0	4	15
921229	3	0.7	0.5	0	1
930106	3	0.3	0.5	0	1
930112	3	0.7	0.5	0	1

Total Birds without shorebirds

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	5,544.7	906.0	4,844	6,824
921021	3	6,752.3	1,853.3	5,152	9,350
921027	3	5,935.3	732.5	5,071	6,862
921103	3	6,879.7	647.5	5,970	7,425
921110	3	3,925.0	1,282.7	2,310	5,448
921118	3	7,029.0	1,775.3	4,589	8,761
921124	3	7,752.0	789.5	6,636	8,340
921201	3	10,924.0	2,587.3	7,321	13,278
921208	3	2,740.0	766.2	1,890	3,747
921215	3	8,642.3	1,293.4	7,292	10,386
921222	3	6,034.3	269.9	5,653	6,238
921229	3	10,196.7	1,002.0	8,993	11,446
930106	3	3,816.0	483.0	3,227	4,410
930112	3	1,194.3	288.8	859	1,564

TOTAL BIRDS

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
921015	3	5,686.3	886.2	5,026	6,939
921021	3	6,804.0	1,893.4	5,152	9,455
921027	3	6,151.0	610.7	5,431	6,924
921103	3	6,879.7	647.5	5,970	7,425
921110	3	3,993.3	1,291.2	2,310	5,448
921118	3	7,079.0	1,785.3	4,639	8,861
921124	3	7,752.0	789.5	6,636	8,340
921201	3	11,024.0	2,680.5	7,321	13,578
921208	3	2,740.0	766.2	1,890	3,747
921215	3	9,017.3	1,348.0	7,517	10,786
921222	3	6,034.3	269.9	5,653	6,238
921229	3	10,196.7	1,002.0	8,993	11,446
930106	3	3,856.0	485.9	3,227	4,410
930112	3	1,449.7	295.7	1,109	1,830

APPENDIX 3

**Monthly summaries of numbers of birds seen by species groups,
on each transect, for each survey during 1992/93 aerial census.**

FRASER RIVER FORESHORE (all transects combined)

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
<i>Dabbling Ducks</i>					
Oct/92	3	22,005.1	6,556.9	15,765.0	31,065.3
Nov/92	4	22,540.8	3,299.9	18,350.0	26,548.0
Dec/92	5	20,304.7	6,164.8	12,703.3	31,446.5
Jan/93	2	13,072.9	70.8	13,002.2	13,143.7
<i>Diving Ducks</i>					
Oct/92	3	318.8	130.0	158.3	476.7
Nov/92	4	925.3	835.9	283.7	2,362.7
Dec/92	5	590.4	548.8	132.3	1,651.3
Jan/93	2	1,087.0	882.0	205.0	1,969.0
<i>Total Ducks</i>					
Oct/92	3	22,323.9	6,680.3	15,923.3	31,542.0
Nov/92	4	23,466.1	3,974.2	18,633.7	28,910.7
Dec/92	5	20,895.1	6,686.5	12,835.7	33,097.8
Jan/93	2	14,159.9	811.2	13,348.7	14,971.2
<i>Snow Goose</i>					
Oct/92	3	8,729.1	1,476.9	7,263.3	10,750.5
Nov/92	4	9,437.6	1,636.6	6,904.3	11,335.0
Dec/92	5	6,868.3	3,233.9	4,460.0	13,263.3
Jan/93	2	1,869.7	593.0	1,276.7	2,462.7
<i>Total Geese</i>					
Oct/92	3	8,733.8	1,479.5	7,263.3	10,758.2
Nov/92	4	9,441.5	1,636.2	6,904.3	11,335.0
Dec/92	5	6,890.7	3,230.7	4,540.7	13,286.7
Jan/93	2	1,883.2	598.8	1,284.3	2,482.0
<i>Total Swans</i>					
Oct/92	3	15.9	15.2	0.0	36.3
Nov/92	4	95.6	55.1	21.3	176.3
Dec/92	5	203.9	118.2	109.0	428.3
Jan/93	2	378.5	25.8	352.7	404.3

Waterfowl

Oct/92	3	31,073.7	6,043.3	24,103.3	38,841.7
Nov/92	4	33,003.2	4,775.3	25,623.7	38,361.0
Dec/92	5	27,989.7	9,770.2	17,804.7	46,544.2
Jan/93	2	16,421.6	238.3	16,183.3	16,659.8

Shorebirds

Oct/92	3	4,354.9	3,915.9	1,426.7	9,889.7
Nov/92	4	5,541.2	2,956.4	2,083.3	9,393.3
Dec/92	5	5,533.4	4,544.9	166.7	11,483.3
Jan/93	2	3,913.5	3,419.2	494.3	7,332.7

Gulls

Oct/92	3	621.7	348.4	130.7	903.3
Nov/92	4	400.0	191.4	211.0	701.3
Dec/92	5	638.9	675.3	49.7	1,602.3
Jan/93	2	852.0	273.3	578.7	1,125.3

Divers

Oct/92	3	44.4	26.7	20.0	81.7
Nov/92	4	124.6	87.3	25.0	264.3
Dec/92	5	55.2	45.3	7.7	116.7
Jan/93	2	2.4	0.2	2.2	2.7

Total Birds without Shorebirds

Oct/92	3	31,754.6	6,049.9	25,053.0	39,711.7
Nov/92	4	33,540.7	4,622.9	26,356.0	38,755.7
Dec/92	5	28,689.2	9,499.4	19,448.0	46,797.0
Jan/93	2	17,277.7	512.3	16,765.3	17,790.0

TOTAL BIRDS

Oct/92	3	36,109.4	9,766.9	26,801.3	49,601.3
Nov/92	4	39,081.9	5,467.1	33,711.0	48,149.0
Dec/92	5	34,222.6	8,525.9	24,323.8	47,397.3
Jan/93	2	21,191.2	3,931.5	17,259.7	25,122.7

BOUNDARY BAY

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
<i>Dabbling Ducks</i>					
Oct/92	3	41,933.9	7,497.2	31,594	49,135
Nov/92	4	44,350.6	13,685.9	35,460	68,031
Dec/92	5	45,542.0	19,874.3	12,599	65,402
Jan/93	2	5,182.0	93.0	5,089	5,275

Diving Ducks

Oct/92	3	1,335.9	515.5	946	2,064
Nov/92	4	3,156.7	159.0	2,892	3,310
Dec/92	5	2,136.7	1,006.1	484	3,275
Jan/93	2	203.5	42.5	161	246

Total Ducks

Oct/92	3	43,269.8	7,645.6	32,592	50,081
Nov/92	4	47,507.3	13,773.4	38,648	71,341
Dec/92	5	47,678.7	20,511.9	13,083	68,427
Jan/93	2	5,385.5	50.5	5,335	5,436

Snow Goose

Oct/92	3	0.0	0.0	0	0
Nov/92	4	0.0	0.0	0	0
Dec/92	5	0.0	0.0	0	0
Jan/93	2	0.0	0.0	0	0

Total Geese

Oct/92	3	2.0	1.0	1	3
Nov/92	4	2.4	4.0	0	9
Dec/92	5	7.4	8.9	0	23
Jan/93	2	59.5	27.5	32	87

Total Swans

Oct/92	3	0.0	0.0	0	0
Nov/92	4	1.3	1.5	0	4
Dec/92	5	0.0	0.0	0	0
Jan/93	2	0.0	0.0	0	0

Waterfowl

Oct/92	3	43,271.8	7,646.2	32,593	50,083
Nov/92	4	47,510.9	13,773.4	38,659	71,345
Dec/92	5	47,686.1	20,513.2	13,094	68,450
Jan/93	2	5,445.0	23.0	5,422	5,468

Shorebirds

Oct/92	3	18,645.0	4,536.7	12,711	23,725
Nov/92	4	15,547.6	6,574.8	7,933	24,507
Dec/92	5	6,337.9	4,679.1	1,033	11,820
Jan/93	2	4,095.5	4,095.5	0	8,191

Gulls

Oct/92	3	1,424.8	793.6	595	2,494
Nov/92	4	888.4	223.8	583	1,164
Dec/92	5	1,762.3	965.8	366	2,774
Jan/93	2	7,234.0	3,421.0	3,813	10,655

Divers

Oct/92	3	55.8	36.9	5	92
Nov/92	4	34.4	19.4	18	67
Dec/92	5	14.3	8.5	5	29
Jan/93	2	0.5	0.5	0	1

Total Birds without Shorebirds

Oct/92	3	44,784.9	8,003.9	33,812	52,679
Nov/92	4	48,441.0	13,721.6	39,850	72,197
Dec/92	5	49,467.1	20,541.1	15,783	71,248
Jan/93	2	12,679.5	3,444.5	9,235	16,124

TOTAL BIRDS

Oct/92	3	63,429.9	12,511.4	46,524	76,404
Nov/92	4	63,988.6	12,657.8	47,783	82,963
Dec/92	5	55,805.1	24,891.8	17,213	83,068
Jan/93	2	16,775.0	7,540.0	9,235	24,315

BRUNSWICK POINT

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
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Dabbling Ducks

Oct/92	3	3,961.4	1,328.6	2,086	4,998
Nov/92	4	5,127.3	993.9	3,555	6,301
Dec/92	5	2,347.8	1,576.0	767	5,051
Jan/93	2	1,134.3	880.7	254	2,015

Diving Ducks

Oct/92	3	125.8	140.6	2	322
Nov/92	4	220.3	68.5	152	333
Dec/92	5	143.1	256.2	2	655
Jan/93	2	0.5	0.5	0	1

Total Ducks

Oct/92	3	4,087.2	1,191.5	2,408	5,051
Nov/92	4	5,347.7	1,036.7	3,741	6,634
Dec/92	5	2,490.9	1,804.4	768	5,706
Jan/93	2	1,134.8	881.2	254	2,016

Snow Goose

Oct/92	3	711.1	1,005.7	0	2,133
Nov/92	4	1,404.2	1,784.9	0	4,367
Dec/92	5	336.0	435.1	0	1,167
Jan/93	2	17.2	17.2	0	34

Total Geese

Oct/92	3	713.3	1,004.1	0	2,133
Nov/92	4	1,404.6	1,784.6	0	4,367
Dec/92	5	336.7	435.7	0	1,168
Jan/93	2	17.2	17.2	0	34

Total Swans

Oct/92	3	6.4	9.1	0	19
Nov/92	4	22.2	13.9	8	44
Dec/92	5	41.4	42.3	3	123
Jan/93	2	171.3	6.0	165	177

Waterfowl

Oct/92	3	4,807.0	1,942.0	2,428	7,185
Nov/92	4	6,774.4	896.1	5,597	8,120
Dec/92	5	2,869.0	2,249.4	771	6,910
Jan/93	2	1,323.3	858.0	465	2,181

Shorebirds

Oct/92	3	3,447.3	3,007.6	1,275	7,700
Nov/92	4	2,150.0	714.0	1,517	3,333
Dec/92	5	1,148.3	1,360.7	0	3,367
Jan/93	2	458.3	458.3	0	917

Gulls

Oct/92	3	366.6	232.5	63	627
Nov/92	4	244.0	242.1	38	639
Dec/92	5	102.4	127.6	0	319
Jan/93	2	115.7	32.3	83	148

Divers

Oct/92	3	3.7	1.0	3	5
Nov/92	4	26.2	42.8	0	100
Dec/92	5	0.4	0.4	0	1
Jan/93	2	0.2	0.2	0	0

Total Birds without Shorebirds

Oct/92	3	5,179.4	1,808.3	2,845	7,251
Nov/92	4	7,046.3	845.0	6,237	8,466
Dec/92	5	2,973.1	2,244.4	773	6,921
Jan/93	2	1,439.2	890.2	549	2,329

TOTAL BIRDS

Oct/92	3	8,626.8	1,562.8	6,717	10,545
Nov/92	4	9,196.3	1,503.9	8,255	11,799
Dec/92	5	4,121.4	1,963.8	773	6,921
Jan/93	2	1,897.5	1,348.5	549	3,246

LULU ISLAND

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
<i>Dabbling Ducks</i>					
Oct/92	3	2,603.2	1,104.1	1,322	4,017
Nov/92	4	1,019.7	470.2	450	1,548
Dec/92	5	587.1	283.1	163	909
Jan/93	2	392.0	143.7	248	536
<i>Diving Ducks</i>					
Oct/92	3	22.1	9.3	13	35
Nov/92	4	32.3	22.7	3	62
Dec/92	5	7.3	4.3	0	13
Jan/93	2	1.0	1.0	0	2
<i>Total Ducks</i>					
Oct/92	3	2,625.3	1,113.1	1,335	4,052
Nov/92	4	1,052.0	474.4	496	1,567
Dec/92	5	594.3	285.5	163	918
Jan/93	2	393.0	144.7	248	538
<i>Snow Goose</i>					
Oct/92	3	2,758.0	970.7	1,624	3,995
Nov/92	4	3,166.7	443.6	2,654	3,833
Dec/92	5	2,061.3	1,910.8	342	5,167
Jan/93	2	796.7	480.0	317	1,277
<i>Total Geese</i>					
Oct/92	3	2,758.0	970.7	1,624	3,995
Nov/92	4	3,166.7	443.6	2,654	3,833
Dec/92	5	2,061.5	1,910.9	342	5,167
Jan/93	2	797.0	480.3	317	1,277
<i>Total Swans</i>					
Oct/92	3	1.7	2.4	0	5
Nov/92	4	30.8	14.3	7	45
Dec/92	5	57.6	26.1	16	88
Jan/93	2	45.3	19.7	26	65
<i>Waterfowl</i>					
Oct/92	3	5,385.0	1,036.6	3,995	6,484
Nov/92	4	4,249.4	408.1	3,621	4,757
Dec/92	5	2,713.5	1,826.6	778	5,418
Jan/93	2	1,235.3	605.3	630	1,841

Shorebirds

Oct/92	3	9.6	8.1	0	20
Nov/92	4	15.8	20.1	0	50
Dec/92	5	0.0	0.0	0	0
Jan/93	2	4.2	4.2	0	8

Gulls

Oct/92	3	39.0	28.1	2	70
Nov/92	4	24.6	15.5	5	41
Dec/92	5	202.0	228.2	6	552
Jan/93	2	282.3	84.7	198	367

Divers

Oct/92	3	6.8	2.8	4	11
Nov/92	4	14.8	8.3	4	23
Dec/92	5	5.7	6.1	2	18
Jan/93	2	0.5	0.5	0	1

Total Birds without Shorebirds

Oct/92	3	5,432.4	1,041.7	4,048	6,560
Nov/92	4	4,290.9	428.7	3,631	4,819
Dec/92	5	2,922.3	1,704.9	828	5,426
Jan/93	2	1,518.2	689.5	829	2,208

TOTAL BIRDS

Oct/92	3	5,442.0	1,049.5	4,048	6,580
Nov/92	4	4,306.7	428.4	3,634	4,819
Dec/92	5	2,922.3	1,704.9	828	5,426
Jan/93	2	1,522.3	693.7	829	2,216

ROBERTS BANK

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
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Dabbling Ducks

Oct/92	3	5,571.6	944.0	4,244	6,360
Nov/92	4	12,963.2	3,103.6	9,123	16,809
Dec/92	5	13,708.5	6,761.0	1,598	22,428
Jan/93	2	9,955.7	571.0	9,385	10,527

Diving Ducks

Oct/92	3	101.9	25.5	67	127
Nov/92	4	145.6	69.1	59	252
Dec/92	5	267.7	313.6	17	880
Jan/93	2	312.2	294.5	18	607

Total Ducks

Oct/92	3	5,673.4	967.8	4,311	6,471
Nov/92	4	13,108.8	3,144.4	9,182	16,938
Dec/92	5	13,976.2	6,997.3	1,615	23,308
Jan/93	2	10,267.8	276.5	9,991	10,544

Snow Goose

Oct/92	3	0.0	0.0	0	0
Nov/92	4	0.0	0.0	0	0
Dec/92	5	0.0	0.0	0	0
Jan/93	2	0.0	0.0	0	0

Total Geese

Oct/92	3	1.1	1.6	0	3
Nov/92	4	3.1	5.3	0	12
Dec/92	5	8.1	8.8	0	21
Jan/93	2	0.3	0.3	0	1

Total Swans

Oct/92	3	0.0	0.0	0	0
Nov/92	4	0.7	1.2	0	3
Dec/92	5	0.3	0.5	0	1
Jan/93	2	0.0	0.0	0	0

Waterfowl

Oct/92	3	5,674.6	968.8	4,311	6,474
Nov/92	4	13,112.6	3,148.7	9,182	16,951
Dec/92	5	13,984.5	6,997.1	1,632	23,329
Jan/93	2	10,268.2	276.8	9,991	10,545

Shorebirds

Oct/92	5	583.9	639.1	0	1,473
Nov/92	4	2,420.8	2,385.1	0	5,033
Dec/92	5	4,176.7	3,261.2	167	8,083
Jan/93	2	2,147.7	1,963.0	185	4,111

Gulls

Oct/92	3	82.6	47.6	28	144
Nov/92	4	28.3	10.3	15	39
Dec/92	5	141.7	152.0	3	343
Jan/93	2	235.3	22.3	213	258

Divers

Oct/92	3	2.8	1.3	2	5
Nov/92	4	29.1	46.9	1	110
Dec/92	5	16.0	28.9	0	74
Jan/93	2	0.0	0.0	0	0

Total Birds without Shorebirds

Oct/92	3	5,763.3	970.2	4,393	6,509
Nov/92	4	13,175.7	3,130.4	9,211	16,994
Dec/92	5	14,143.3	6,889.8	1,977	23,355
Jan/93	2	10,503.5	254.5	10,249	10,758

TOTAL BIRDS

Oct/92	3	6,347.2	1,307.2	4,671	7,861
Nov/92	4	15,596.5	4,016.9	11,141	22,028
Dec/92	5	18,320.0	6,424.1	7,277	24,193
Jan/93	2	12,651.2	1,708.5	10,943	14,360

FRASER RIVER MIDDLE ARM

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
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Dabbling Ducks

Oct/92	3	122.2	102.1	0	250
Nov/92	4	79.6	27.3	35	108
Dec/92	5	102.8	122.9	0	342
Jan/93	2	39.1	38.4	1	78

Diving Ducks

Oct/92	3	0.0	0.0	0	0
Nov/92	4	0.4	0.7	0	2
Dec/92	5	0.1	0.3	0	1
Jan/93	2	3.7	1.3	2	5

Total Ducks

Oct/92	3	122.2	102.1	0	250
Nov/92	4	80.0	27.3	35	108
Dec/92	5	102.9	122.8	0	342
Jan/93	2	42.8	39.8	3	83

Snow Goose

Oct/92	3	19.8	27.3	0	58
Nov/92	4	0.3	0.4	0	1
Dec/92	5	3.3	6.7	0	17
Jan/93	2	0.0	0.0	0	0

Total Geese

Oct/92	3	19.8	27.3	0	58
Nov/92	4	0.3	0.4	0	1
Dec/92	5	3.3	6.7	0	17
Jan/93	2	0.0	0.0	0	0

Total Swans

Oct/92	3	0.0	0.0	0	0
Nov/92	4	0.0	0.0	0	0
Dec/92	5	0.0	0.0	0	0
Jan/93	2	0.0	0.0	0	0

Waterfowl

Oct/92	3	142.0	104.3	1	250
Nov/92	4	80.3	27.4	35	108
Dec/92	5	106.3	122.4	0	342
Jan/93	2	42.8	39.8	3	83

Shorebirds

Oct/92	3	0.0	0.0	0	0
Nov/92	4	0.0	0.0	0	0
Dec/92	5	0.0	0.0	0	0
Jan/93	2	0.0	0.0	0	0

Gulls

Oct/92	3	0.8	1.2	0	3
Nov/92	4	2.4	1.5	1	4
Dec/92	5	35.5	30.7	2	72
Jan/93	2	6.7	2.3	4	9

Divers

Oct/92	3	1.6	1.1	0	3
Nov/92	4	3.1	1.1	2	5
Dec/92	5	0.2	0.3	0	1
Jan/93	2	1.3	0.3	1	2

Total Birds without Shorebirds

Oct/92	3	144.8	103.0	6	253
Nov/92	4	85.9	27.2	41	115
Dec/92	5	142.0	145.8	4	414
Jan/93	2	50.7	42.3	8	93

TOTAL BIRDS

Oct/92	3	144.8	103.0	6	253
Nov/92	4	85.9	27.2	41	115
Dec/92	5	142.0	145.8	4	414
Jan/93	2	50.7	42.3	8	93

SEA ISLAND

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
<i>Dabbling Ducks</i>					
Oct/92	3	7,552.9	8,556.4	1,046	19,642
Nov/92	4	1,206.5	346.6	851	1,675
Dec/92	5	585.6	279.0	224	849
Jan/93	2	376.5	209.2	167	586
<i>Diving Ducks</i>					
Oct/92	3	50.6	38.4	13	104
Nov/92	4	461.8	686.8	54	1,651
Dec/92	5	96.1	105.9	1	297
Jan/93	2	769.5	584.5	185	1,354
<i>Total Ducks</i>					
Oct/92	3	7,603.5	8,528.9	1,150	19,655
Nov/92	4	1,668.3	586.5	926	2,548
Dec/92	5	681.7	231.7	313	952
Jan/93	2	1,146.0	375.3	771	1,521
<i>Snow Goose</i>					
Oct/92	3	1,516.8	1,139.3	633	3,126
Nov/92	4	826.3	524.9	92	1,508
Dec/92	5	2.0	4.0	0	10
Jan/93	2	0.0	0.0	0	0
<i>Total Geese</i>					
Oct/92	3	1,517.2	1,139.8	633	3,127
Nov/92	4	826.7	524.4	93	1,508
Dec/92	5	15.0	23.9	0	62
Jan/93	2	12.8	5.8	7	19
<i>Total Swans</i>					
Oct/92	3	2.1	1.9	0	5
Nov/92	4	2.1	2.7	0	7
Dec/92	5	0.2	0.4	0	1
Jan/93	2	0.0	0.0	0	0
<i>Waterfowl</i>					
Oct/92	3	9,122.7	7,919.6	2,798	20,290
Nov/92	4	2,497.0	606.7	1,559	3,252
Dec/92	5	696.9	241.4	314	962
Jan/93	2	1,158.8	369.5	789	1,528

Shorebirds

Oct/92	3	177.8	228.3	0	500
Nov/92	4	925.0	1,124.8	0	2,833
Dec/92	5	113.3	202.0	0	517
Jan/93	2	1,155.7	886.0	270	2,042

Gulls

Oct/92	3	29.3	22.9	2	58
Nov/92	4	25.1	38.7	1	92
Dec/92	5	76.1	94.6	2	252
Jan/93	2	102.2	86.2	16	188

Divers

Oct/92	3	4.2	3.2	1	9
Nov/92	4	22.3	23.5	4	62
Dec/92	5	27.8	39.6	0	103
Jan/93	2	0.0	0.0	0	0

Total Birds without Shorebirds

Oct/92	3	9,157.1	7,915.2	2,860	20,320
Nov/92	4	2,545.4	619.1	1,566	3,261
Dec/92	5	801.0	325.4	317	1,160
Jan/93	2	1,261.0	455.7	805	1,717

TOTAL BIRDS

Oct/92	3	9,334.9	8,141.5	2,893	20,820
Nov/92	4	3,470.4	1,494.0	1,566	5,630
Dec/92	5	914.3	467.0	317	1,677
Jan/93	2	2,416.7	1,341.7	1,075	3,758

WESTHAM ISLAND

<u>Date</u>	<u>No. of Counts</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
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Dabbling Ducks

Oct/92	3	2,193.8	415.4	1,788	2,765
Nov/92	4	2,144.5	898.8	1,366	3,637
Dec/92	5	2,972.9	1,813.8	650	6,144
Jan/93	2	1,175.3	353.3	822	1,529

Diving Ducks

Oct/92	3	18.4	14.8	0	37
Nov/92	4	64.8	82.8	1	203
Dec/92	5	76.1	57.4	5	177
Jan/93	2	0.2	0.2	0	0

Total Ducks

Oct/92	3	2,212.2	419.1	1,789	2,783
Nov/92	4	2,209.3	919.4	1,367	3,691
Dec/92	5	3,049.0	1,814.5	720	6,186
Jan/93	2	1,175.5	353.2	822	1,529

Snow Goose

Oct/92	3	3,723.3	238.9	3,387	3,917
Nov/92	4	4,040.2	1,280.8	2,490	5,333
Dec/92	5	4,465.7	2,792.6	0	8,650
Jan/93	2	1,055.8	1,055.8	0	2,112

Total Geese

Oct/92	3	3,724.4	239.6	3,387	3,917
Nov/92	4	4,040.2	1,280.8	2,490	5,333
Dec/92	5	4,466.1	2,792.4	1	8,650
Jan/93	2	1,055.8	1,055.8	0	2,112

Total Swans

Oct/92	3	5.8	4.3	0	10
Nov/92	4	39.9	33.8	2	95
Dec/92	5	104.5	77.6	17	243
Jan/93	2	161.8	51.5	110	213

Waterfowl

Oct/92	3	5,942.4	518.7	5,452	6,660
Nov/92	4	6,289.5	1,434.7	3,887	7,687
Dec/92	5	7,619.5	2,965.3	2,701	10,891
Jan/93	2	2,393.2	1,357.5	1,036	3,751

Shorebirds

Oct/92	3	136.3	67.1	52	216
Nov/92	4	29.6	30.3	0	68
Dec/92	5	95.0	145.3	0	375
Jan/93	2	147.7	107.7	40	255

Gulls

Oct/92	3	103.4	72.6	34	204
Nov/92	4	75.6	47.1	30	141
Dec/92	5	81.2	70.8	18	205
Jan/93	2	109.8	45.5	64	155

Divers

Oct/92	3	25.4	21.2	7	55
Nov/92	4	29.2	17.6	8	57
Dec/92	5	5.1	3.8	1	11
Jan/93	2	0.5	0.2	0	1

Total Birds without Shorebirds

Oct/92	3	6,077.4	503.2	5,545	6,752
Nov/92	4	6,396.4	1,464.5	3,925	7,752
Dec/92	5	7,707.5	2,996.4	2,740	10,924
Jan/93	2	2,505.2	1,310.8	1,194	3,816

TOTAL BIRDS

Oct/92	3	6,213.8	458.4	5,686	6,804
Nov/92	4	6,426.0	1,441.2	3,993	7,752
Dec/92	5	7,802.5	3,044.4	2,740	11,024
Jan/93	2	2,652.8	1,203.2	1,450	3,856

APPENDIX 4

**Z-test results of annual and monthly comparisons of dabbling ducks and gulls
for the Fraser River foreshore and Boundary Bay, October 1992 to January 1993.
This table shows the probability of means being the same.**

DABBING DUCKS

BOUNDARY BAY		1966-74	1982-83	1983-84	1989-90
October	1982-83	.019	-		
	1983-84	.028	.378	-	
	1989-90	.490	.080	.234	-
	1992-93	<.001	.061	.003	<.001
November	1982-83	.872	-		
	1983-84	.164	.271	-	
	1989-90	.017	.045	.138	-
	1992-93	.603	.522	.091	.014
December	1982-83	.562	-		
	1983-84	.441	.337	-	
	1989-90	.638	.984	.352	-
	1992-93	.165	.250	.124	.603
January	1982-83	.007	-		
	1983-84	.030	.857	-	
	1989-90	.022	.161	.327	-
	1992-93	.332	<.001	.001	<.001
FORESHORE		1966-74	1982-83	1983-84	1989-90
October	1982-83	.976	-		
	1983-84	<.001	.164	-	
	1989-90	.020	.347	.400	-
	1992-93	.177	.401	.653	.952
November	1982-83	.097	-		
	1983-84	.029	.184	-	
	1989-90	.001	.001	.048	-
	1992-93	.026	.187	.937	<.001
December	1982-83	.802	-		
	1983-84	.003	.001	-	
	1989-90	<.001	<.001	.234	-
	1992-93	.039	.020	.144	.011
January	1982-83	.688	-		
	1983-84	.934	.315	-	
	1989-90	.441	.161	.015	-
	1992-93	.562	.230	.046	.165

GULLS

BOUNDARY BAY		1982-83	1983-84	1989-90
October	1983-84	.238	-	
	1989-90	.857	.246	-
	1992-93	.795	.263	.897
November	1983-84	.682	-	
	1989-90	.453	.342	-
	1992-93	.095	.103	.968
December	1983-84	.944	-	
	1989-90	.516	.435	-
	1992-93	.779	.757	.549
January	1983-84	.119	-	-
	1989-90	.078	.834	-
	1992-93	.041	.171	.134
FRASER		1982-83	1983-84	1989-90
October	1983-84	<.001	-	
	1989-90	.033	.214	
	1992-93	.017	.936	.447
November	1983-84	.896	-	
	1989-90	.429	.037	-
	1992-93	.267	.150	.022
December	1983-84	.440	-	-
	1989-90	.161	.218	-
	1992-93	.484	.944	.546
January	1983-84	.258	-	
	1989-90	.326	.976	-
	1992-93	.968	.208	.298

APPENDIX 5

Waterfowl Species Composition at Boundary Bay

Location	Mallard		Green-winged Teal		American Wigeon		Northern Pintail		Scaup		Other Dabblers		Other Divers		Total
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.
16 October, 1992															
12th Ave.	202	43.3	15	3.2	144	30.9	73	15.7	22	4.7	2	0.4	8	1.7	466
64th St.	78	100.0		0.0		0.0		0.0		0.0		0.0		0.0	78
72nd St.	71	59.2	34	28.3	15	12.5		0.0		0.0		0.0		0.0	120
80th St.	Not checked														
88th St.	86	63.2	10	7.4	10	7.4	30	22.1		0.0		0.0		0.0	136
96th St.	25	29.8		0.0	4	4.8	5	6.0	50	59.5		0.0		0.0	84
104th St.	14	7.1		0.0	28	14.3	154	78.6		0.0		0.0		0.0	196
112th St.	18	10.5	16	9.3	15	8.7	103	59.9		0.0	20	11.6		0.0	172
Blackie Spit	Not checked														
TOTAL	494	39.5	75	6.0	216	17.3	365	29.2	72	5.8	22	1.8	8	0.6	1252
28 October, 1992															
12th Ave.	202	19.9	45	4.4	514	50.6	154	15.2	100	9.9		0.0		0.0	1015
64th St.	60	85.7	10	14.3		0.0		0.0		0.0		0.0		0.0	70
72nd St.	72	28.3	6	2.4	159	62.6	17	6.7		0.0		0.0		0.0	254
80th St.	Included with 72nd														
88th St.	23	24.5	6	6.4	52	55.3	13	13.8		0.0		0.0		0.0	94
96th St.	109	34.4	20	6.3	77	24.3	111	35.0		0.0		0.0		0.0	317
104th St.	Included with 96th & 112th														
112th St.	236	30.2	58	7.4	182	23.3	306	39.1		0.0		0.0		0.0	782
Blackie Spit	42	13.8	45	14.8	105	34.5	109	35.9		0.0		0.0	3	1.0	304
TOTAL	744	26.2	190	6.7	1089	38.4	710	25.0	100	3.5	0	0.0	3	0.1	2836
11 November, 1992															
12th Ave.	61	6.7	158	17.4	354	39.0	299	33.0	27	3.0	7	0.8	1	0.1	907
64th St.	116	39.2	60	20.3	77	26.0	43	14.5		0.0		0.0		0.0	296
72nd St.	86	29.2	82	27.8	49	16.6	78	26.4		0.0		0.0		0.0	295
80th St.	37	14.1	67	25.5	36	13.7	123	46.8		0.0		0.0		0.0	263
88th St.	122	32.3	47	12.4	52	13.8	147	38.9	10	2.6		0.0		0.0	378
96th St.	127	26.4	61	12.7	88	18.3	193	40.1	12	2.5		0.0		0.0	481
104th St.	153	48.4	27	8.5	64	20.3	54	17.1	18	5.7		0.0		0.0	316
112th St.	No birds														
Blackie Spit	Not checked														
TOTAL	702	23.9	502	17.1	720	24.5	937	31.9	67	2.3	7	0.2	1	0.0	2936

Location	Mallard		Green-winged Teal		American Wigeon		Northern Pintail		Scaup		Other Dabblers		Other Divers		Total
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.
25 November, 1992															
12th Ave.	30	5.6	90	16.8	174	32.5	108	20.2	122	22.8	10	1.9	1	0.2	535
64th St.	8	5.6	43	30.1	31	21.7	61	42.7		0.0		0.0		0.0	143
72nd St.	11	8.7	22	17.5	36	28.6	57	45.2		0.0		0.0		0.0	126
80th St.	21	17.9	28	23.9	17	14.5	51	43.6		0.0		0.0		0.0	117
88th St.	29	12.9	19	8.5	101	45.1	75	33.5		0.0		0.0		0.0	224
96th St.	145	56.9	19	7.5	87	34.1	4	1.6		0.0		0.0		0.0	255
104th St.	101	46.8	52	24.1	53	24.5	10	4.6		0.0		0.0		0.0	216
112th St.	75	29.4	37	14.5	98	38.4	3	1.2	42	16.5		0.0		0.0	255
Blackie Spit	Not checked														
TOTAL	420	22.4	310	16.6	597	31.9	369	19.7	164	8.8	10	0.5	1	0.1	1871
9 December, 1992															
12th Ave.	53	7.8	85	12.4	317	46.4	226	33.1		0.0	2	0.3		0.0	683
64th St.	39	12.3	30	9.5	126	39.7	118	37.2		0.0	4	1.3		0.0	317
72nd St.	35	15.7	2	0.9	148	66.4	38	17.0		0.0		0.0		0.0	223
80th St.	15	6.8		0.0	167	76.3	37	16.9		0.0		0.0		0.0	219
88th St.	41	10.7		0.0	269	70.4	72	18.8		0.0		0.0		0.0	382
96th St.	116	29.8	5	1.3	183	47.0	36	9.3	47	12.1	2	0.5		0.0	389
104th St.	147	36.8	16	4.0	146	36.6	90	22.6		0.0		0.0		0.0	399
112th St.	7	7.1	13	13.1	12	12.1	67	67.7		0.0		0.0		0.0	99
Blackie Spit	Not checked														
TOTAL	453	16.7	151	5.6	1368	50.5	684	25.2	47	1.7	8	0.3	0	0.0	2711
21 December, 1992															
12th Ave.	20	2.7	92	12.5	373	50.7	123	16.7	127	17.3		0.0		0.0	735
64th St.	89	18.1	59	12.0	178	36.1	167	33.9		0.0		0.0		0.0	493
72nd St.	50	35.7	4	2.9	24	17.1	60	42.9		0.0		0.0	2	1.4	140
80th St.	27	9.7	5	1.8	111	39.9	135	48.6		0.0		0.0		0.0	278
88th St.	63	20.5	6	1.9	98	31.8	141	45.8		0.0		0.0		0.0	308
96th St.	117	28.3	32	7.7	31	7.5	234	56.5		0.0		0.0		0.0	414
104th St.	152	41.8	16	4.4	109	29.9	85	23.4	2	0.5		0.0		0.0	364
112th St.	5	3.3	17	11.3	30	20.0	64	42.7	28	18.7		0.0	6	4.0	150
Blackie Spit	Not checked														
TOTAL	523	18.1	231	8.0	954	33.1	1009	35.0	157	5.4	0	0.0	8	0.3	2882

Location	Mallard		Green-winged Teal		American Wigeon		Northern Pintail		Scaup		Other Dabblers		Other Divers		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	
5 January, 1993																
12th Ave.	345	48.3	125	17.5	23	3.2	206	28.9	0.0	15	2.1	0.0	0.0	0.0	714	
64th St.	Ice, no birds															
72nd St.	Ice, no birds															
88th St.	Ice, no birds															
96th St.	Ice, no birds															
104th St.	Ice, no birds															
112th St.	23	85.2	0.0		0.0		4	14.8	0.0	0.0		0.0		0.0		27
Blackie Spit	98	26.2	147	39.3	44	11.8	36	9.6	34	9.1	0.0	15	4.0	0.0	374	
TOTAL	466	41.8	272	24.4	67	6.0	246	22.1	34	3.0	15	1.3	15	1.3	1115	
TOTAL ALL	3802	24.4	1731	11.1	5011	32.1	4320	27.7	641	4.1	62	0.4	36	0.2	15603	

APPENDIX 6

Average number and relative abundance of dabbling duck species observed on Boundary Bay in 1992-93. The greatest number per survey is shown in bold.

Date	Number and proportion of population														
	Mallard		Green-Winged Teal		American Wigeon		Northern Pintail		Scaup		Other Dabblers		Other Divers		Total
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#
16 Oct.	494	39.5	75	6.0	216	17.3	365	29.2	72	5.8	22	1.8	8	0.6	1252
28 Oct.	744	26.2	190	6.7	1089	38.4	710	25.0	100	3.5	0	0.0	3	0.1	2836
11 Nov.	702	23.9	502	17.1	720	24.5	937	31.9	67	2.3	7	0.2	1	0.0	2936
25 Nov.	420	22.4	310	16.6	597	31.9	369	19.7	164	8.8	10	0.5	1	0.1	1871
9 Dec.	453	16.7	151	5.6	1368	50.5	684	25.2	47	1.7	8	0.3	0	0.0	2711
21 Dec.	523	18.1	231	8.0	954	33.1	1009	35.0	157	5.4	0	0.0	8	0.3	2882
5 Jan.	466	41.8	272	24.4	67	6.0	246	22.1	34	3.0	15	1.3	15	1.3	1115
TOTAL	3802	24.4	1731	11.1	5011	32.1	4320	27.7	641	4.1	62	0.4	36	0.2	15603