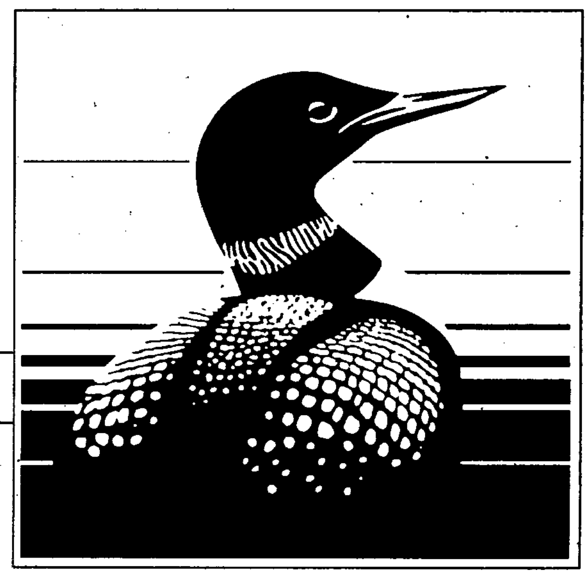
Bird use of the Little Qualicum River estuary, Vancouver Island British Columbia 1975 - 1979

Neil K. Dawe
Ron Buechert

Pacific and Yukon Region 1995
Canadian Wildlife Service
Environmental Conservation Branch



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BIRD USE OF THE LITTLE QUALICUM RIVER ESTUARY VANCOUVER ISLAND, BRITISH COLUMBIA 1975-1979

Neil K. Dawe
and Ron Buechert

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Abstract

The Little Qualicum River estuary consists of intertidal and estuarine habitats with sandspit, upland meadow, hedgerow and mature second growth mixed-forest. It is situated on the east coast of Vancouver Island and enters the Strait of Georgia. To determine the abundance and distribution of migratory and resident birds in the Little Qualicum River estuary, regular surveys were conducted weekly or biweekly from 19 January 1975 to 25 May 1979.

The number of bird species recorded using the study site over the study period was 173. This number includes 68 species of passerines, 28 species of waterfowl, 19 species of shorebirds, 11 species of raptors and 10 species in the gull family.

The study area supported a minimum of 37,271 birds in at least one stage of their life history during the 4.5 year study period.

Most of the birds counted using the area during the study were observed in spring. Spring numbers were dominated by gulls and waterfowl; the passerines ranked a distant third. In summer, bird use of the study area was at its lowest. Passerines were consistently about half of all the birds counted in summer and the gulls were about one quarter; in most years the waterfowl ranked third. The highest user group in autumn and winter was consistently the waterfowl. Second ranking was most often the gulls or passerines but their proportions often varied from year to year. Over the entire study waterfowl (mostly diving ducks) used the area in the largest numbers, gulls ranked second and passerines a distant third.

An annotated species list discusses arrival and departure dates, highest number seen in one day, habitat use and other details for each of the species. A checklist includes the species seen on the surveys as well as other species recorded on the estuary at other times.

Concluding comments note human impacts particularly from direct disturbance of the birds using the estuary and discuss possibilities for minimizing this disturbance. Suggestions are also made for further study of the avifauna that would complete the picture of bird use of the Little Qualicum River estuary.

Résumé

L'estuaire de la rivière Little Qualicum consiste en habitats intertidaux et estuariens de même qu'en bancs de sable, alpages, végétation riveraine et peuplements mûrs de seconde venue. Il est situé sur la côte est de l'île de Vancouver et débouche dans le détroit de Georgia. L'étude consistait à déterminer le taux d'abondance et la répartition des populations d'oiseaux migrateurs et d'oiseaux résidents dans l'estuaire, et à procéder pour cela à des relevés hebdomadaires et bimensuels, lesquels ont été effectués entre le 19 janvier 1975 et le 25 mai 1979.

Au cours de la période étudiée, on a enregistré la présence de 173 espèces d'oiseaux. Ce nombre comprenait 68 espèces de passereaux, 28 espèces d'oiseaux aquatiques, 19 espèces d'oiseaux de rivage, 11 espèces d'oiseaux rapaces et 10 espèces de mouettes.

Au cours de la même période (4,5 ans), on a observé qu'au moins 37 271 oiseaux séjournaient dans l'estuaire à au moins un stade de leur vie.

La plupart des oiseaux recensés dans l'estuaire ont été observés au printemps. Les effectifs printaniers comptaient surtout des mouettes et des oiseaux aquatiques, les passereaux arrivant loin derrière, au troisième rang. C'est en été que les effectifs étaient à leur plus bas, les passereaux comptant pour environ la moitié et les mouettes pour le quart de la population recensée, toutes espèces confondues; et la plupart des années, l'effectif des oiseaux aquatiques était le troisième en importance. Mais en automne et en hiver, c'est invariablement le groupe des oiseaux aquatiques qui était le plus important, le deuxième étant le plus souvent représenté par les mouettes et les passereaux, bien que leur proportion respective variait d'une année à l'autre. Pendant toute la durée de l'étude, on a observé que ce sont les oiseaux aquatiques (pour la plupart des canards plongeurs) qui fréquentaient l'estuaire en plus grand nombre, les mouettes arrivant en second et les passereaux en troisième, loin derrière.

Une liste annotée des espèces indique les dates des arrivées et des départs, le nombre le plus important observé en seul jour, l'usage qui est fait de l'habitat et divers autres renseignements concernant chaque espèce. Une liste de contrôle indique les espèces observées au cours des relevés ainsi que les diverses autres espèces enregistrées dans l'estuaire à d'autres moments.

Dans leur conclusion, les auteurs soulignent l'impact de l'homme sur le milieu, en particulier les perturbations directes qu'il cause sur les oiseaux fréquentant l'estuaire, et ils discutent des moyens d'en minimiser les effets. Ils recommandent également que d'autres études soient menées pour compléter les connaissances sur l'avifaune de l'estuaire de la rivière Little Qualicum.

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Pamela Whitehead, CWS, assisted with the production of the report.

Michael Dunn, CWS, reviewed the manuscript.

Introduction

Estuaries along coastal British Columbia are important to a diverse wildlife fauna, particularly resident and migratory birds (Dawe 1976, 1980, Dawe and Lang 1980, Dawe et al. 1994, Butler and Cannings 1989, Butler et al. 1989, Vermeer et al. 1992). This diverse fauna occurs as a result of two major factors: the variety of habitats that meet on these systems and the productivity of those habitats.

Habitats often associated with typical estuarine ecosystems include marine deep water areas, intertidal sand and gravel flats, cobble beaches, mudflats, spits, river and associated riparian habitats, brackish and saline estuarine marshes with their accompanying dendritic channels, and upland grass, forb, and shrub areas that grade to coastal forests.

This concentration of habitats with its accompanying edges and niches supports a tremendous diversity and abundance of wildlife. Inventories from the Little Qualicum River estuary, with an upland area of less than 40 ha, have reported minimums of 14 species of algae, 55 species of fungi, 22 species of bryophytes, 234 species of vascular plants, 29 species of molluscs, 62 families of arthropods, 15 species of fishes, 4 species of amphibians, 4 species of reptiles, 220 species of birds, and 20 species of mammals (Dawe 1976, 1980, unpublished).

Nutrients and sediments brought down from the watersheds by the rivers are deposited on the deltas providing rich substrates and growing conditions for estuarine marsh plants that, along with marine vegetation such as eelgrass (*Zostera* sp.) and algae, drive the detritus-based estuarine food web. Net primary production of these systems with their attendant marshes and algal beds rival, and in some cases exceed, the production of the tropical rain forests (Ricklefs 1979).

These estuarine ecosystems are important to the survival of both resident and migratory birds. Estuaries act as stepping stones to the millions of birds that migrate along our coast each year providing areas where they can rest and feed during their northern and southern journeys.

In addition, British Columbia's estuaries support Canada's largest wintering populations of waterbirds. Estuaries, in concert with farmlands and freshwater wetlands, form part of a wetlands complex (Eamer 1985) that supports hundreds of thousands of wintering waterbirds. During periods of freezing, however, when farmlands and freshwater marshes are no longer accessible, estuaries become critical habitat to the birds' survival (see Dawe 1980 and Eamer 1985). They are the only ice free areas that have enough food to support the birds over the freezing periods.

In British Columbia, most efforts to document bird-use of estuaries have focused on the larger systems such as the Fraser, Squamish, and Cowichan (Butler and Campbell 1987, Butler and Cannings 1989, Trethewey 1985, Blood et al. 1976); however, the importance of the smaller British Columbia estuaries should not be overlooked (see Butler et al. 1989). Collectively, these smaller systems contribute significantly to the maintenance of our migratory and resident bird populations.

The Canadian Wildlife Service (CWS) has long recognized the importance of these areas and over the past 15 years has gathered data on the bird use of many of our smaller estuaries. This report documents bird use and numbers on the Little Qualicum River estuary, British Columbia over the period 19 January 1975 through 1 February 1979.

In addition, data collected by the CWS as well as observations by other naturalists have been included in this report. The results will be of interest to both the wildlife manager and the birdwatching public who want to know more about the avifauna of the Little Qualicum River estuary.

The Study Area

The Little Qualicum River estuary (49^{0}22'N, 124^{0}29'W) is situated on the east coast of Vancouver Island approximately 5 km west of Qualicum Beach, British Columbia (Figure 1). The surficial geology of the study area is primarily marine and fluvial deltaic deposits. The channel and flood plain deposits on the delta consist largely of sands and gravels, although parts may be surfaced by a few centimeters of silt, clay or peat (Fyles 1963)

The mean annual temperatures range from 9^{0}C to 11^{0}C with an annual precipitation of between 660 mm and 1520 mm.

The Little Qualicum River flows from Cameron Lake to Qualicum Beach. Near its mouth, the river's mean annual discharge is 11.8 cubic meters per second. The monthly average flow is highest in December at 23.6 cubic meters per second and lowest at 2.16 cubic meters per second in August. (Environment Canada data averaged over the years from 1960 to 1982).

The Little Qualicum River estuary (Figure 2) is in the Coastal Douglas Fir Biogeoclimatic Zone. The diverse flora are described in detail by Dawe (1976, 1980). Some areas are covered with mature second growth conifers such as Douglas Fir, Western Red Cedar, Western Hemlock, Grand Fir and Sitka Spruce. Big-leaf Maple is interspersed throughout. Sword Fern (*Polystichum munitum*) and Oregon Grape (*Berberis nervosa*) dominate the forest floor. Other areas have a more open canopy with Waxberry (*Symphoricarpus albus*), Salmonberry (*Rubus spectabilis*) and Nootka Rose (*Rosa nutkana*) occupying the shrub understorey. Upland grassy fields, hedgerows and beach spit areas lie beyond the forest margin. On the estuary flats, *Carex lyngbyei, Juncus balticus, Potentilla pacifica, Agrostis alba* var. *stolonifera* and *Triglochin maritimum* predominate. Dendritic tidal channels that cross the flats are lined with monospecific stands of the tall form of the sedge *Carex lyngbyei* (Dawe 1982a).

All five species of salmon as well as Steelhead and Cutthroat Trout depend on the Little Qualicum River. Most of the salmon using the river are Chum; the run of this species was 65,000 fish in 1974 and it has been reported to sometimes exceed 100,000. Chum begin to gather at the river mouth in late September and early October waiting for the fall rains to swell the river. Dead fish can be seen in small numbers in mid-October and, by the end of November, the carcasses lie strewn along the banks and over much of the estuary. If the carcasses are not washed out to sea, large numbers of scavengers concentrate at the river mouth. Through May and June thousands of juvenile salmon can be found in the river and estuary.

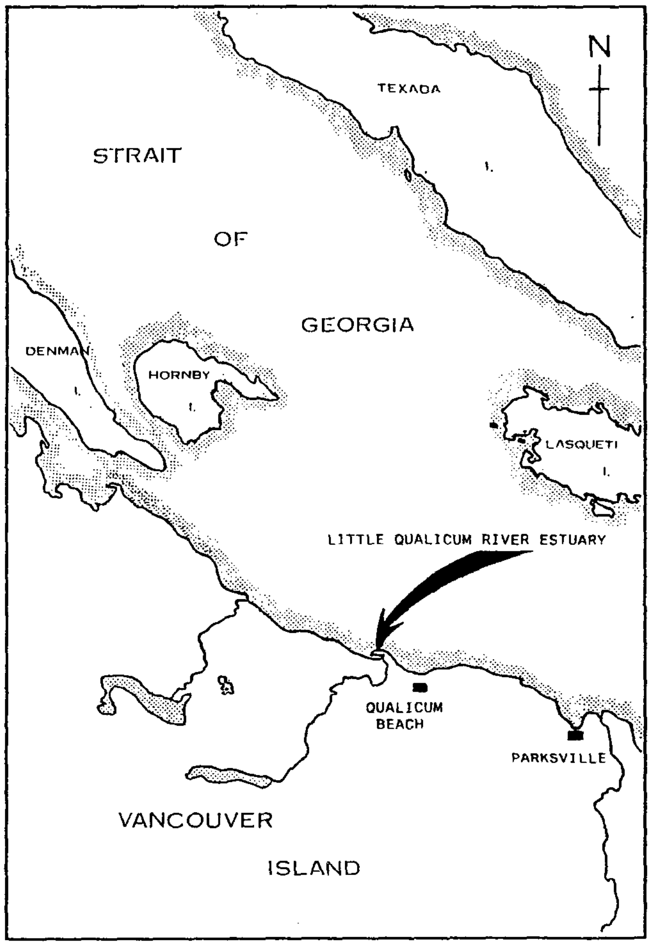

Figure 1. *Location of the Little Qualicum River estuary (adapted from Dawe 1976).*

Figure 2. *Air photo of the Little Qualicum River estuary in June 1974 showing the study area (Marshall-Stevenson Unit of the Qualicum National Wildlife Area).*

Pacific Herring spawns provide another significant resource for some birds. The timing of the spawn was regular over the study period (in mid-March 1975, on 14 March 1976, 17 March 1977, 15 March 1978 and 8 March 1979); 78% of all recorded herring deposition occurs in March (Webb and Hourston 1979). However, the size of the spawn varies; in 1976 the spawn was much larger than in any of the other years of the study period. Herring fry do not become plentiful until approximately 2 weeks after the peak spawn (Phillips 1984).

The study area is almost entirely within the Marshall-Stevenson Unit of the Qualicum National Wildlife Area (Figure 3) which encompasses approximately 50 hectares. The only exception is the stretch of beach between the Wildlife Area and Brant Point; the intertidal portion is now managed as part of the Parksville - Qualicum Beach Wildlife Management Area but the beach spit is privately owned and includes suburban housing as well as vacant land.

Methods and Limitations

The senior author covered the study area on foot, and using binoculars and a telescope, counted and recorded all birds observed or heard along a regular survey route (Figure 3).

Surveys were conducted at varying intervals, usually weekly or biweekly, from 19 January 1975 through 25 May 1979 (see Appendix I).

The numbers of birds recorded are considered to be generally accurate for the areas surveyed but are undoubtedly conservative due to inherent limitations (see Dawe 1982b). Poor visibility due to weather, and birds underwater or shielded by vegetation during the period of observation would lead to an underestimation of the numbers of birds recorded. The data are based on observations at a particular point in time and do not necessarily reflect the total bird use of the area under observation. For example, birds dependent on the estuary only for a few days during spring and autumn migration could be missed altogether if observation periods occurred on either side of their arrival and departure. Also, data were not collected at night; however, low tides on the study area during the winter months occur mostly during the night. Thus, in winter, observations were not made when the intertidal areas and algal beds were exposed, i.e. at times when they would likely be used by birds such as dabbling ducks.

Survey data were summarized using BASIC programs written by Allan Keller, CWS, and modified for seasonal summaries and statistics by the senior author (see Appendices III and IV). The summarized data were analyzed and much of the first draft of the report written by Ron Buechert under contract to the Mid Island Wildlife Watch Society. His contribution was reviewed and edited by the senior author.

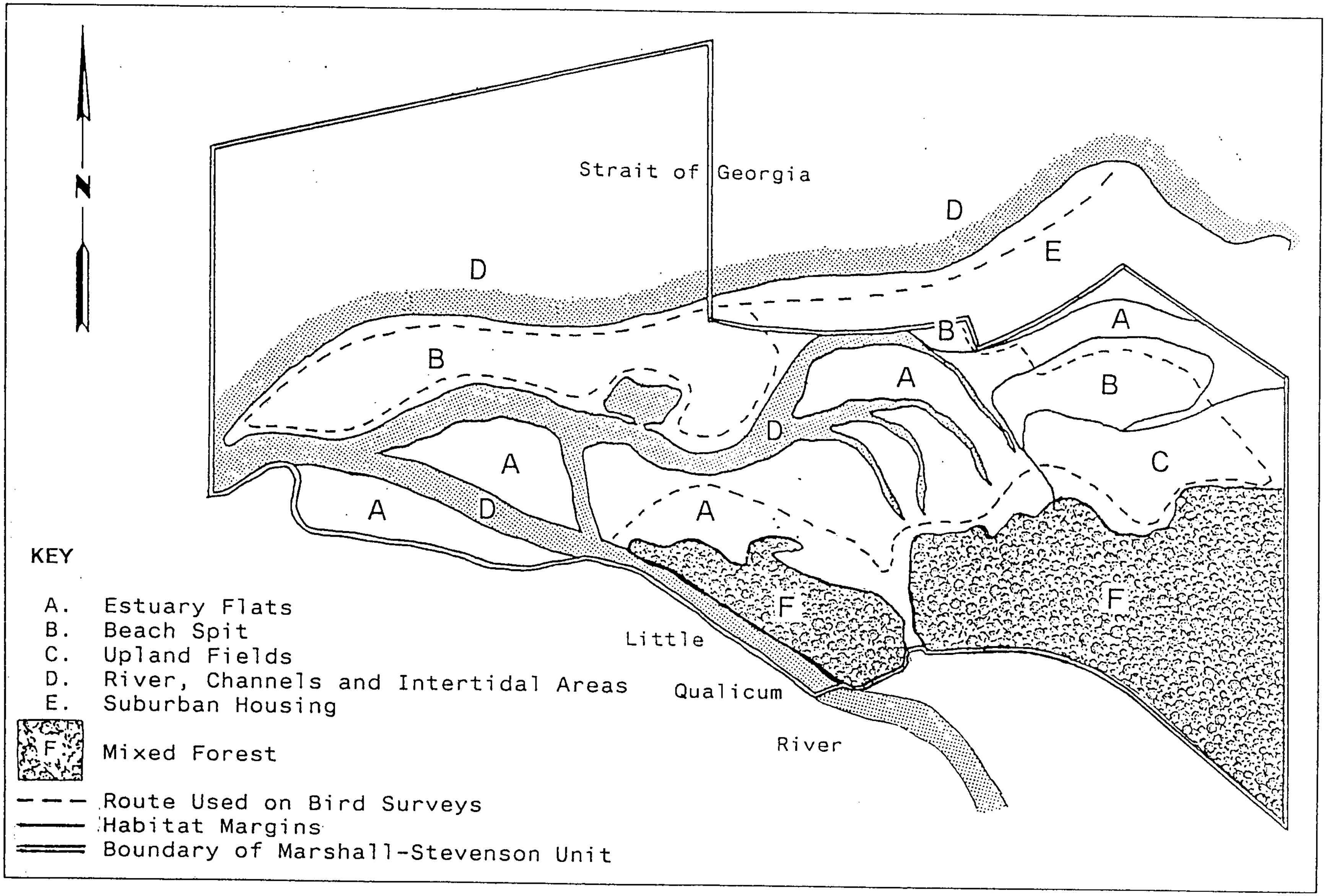

Figure 3. *The Little Qualicum River estuary showing bird survey route, habitats and boundaries of the Marshall-Stevenson Unit, Qualicum National Wildlife Area (adapted from Dawe 1976).*

Results and Discussion

Bird Use of the Wetland Area

Over the survey period, 173 species of birds were identified in the study area at the Little Qualicum River estuary. (A checklist of these species can be found in Appendix III). A total of 197,157 birds was recorded over 145 surveys. The counts for each survey are given in Appendices IV and V.

To estimate the minimum number of birds dependent on the Little Qualicum River estuary, the one-day maximum numbers of birds of each species were summed (Table 1). If the data for the entire 4.5 years of study were taken as a whole, a minimum of 37,271 birds depended on the Little Qualicum River estuary for some aspect of their life history during that period.

Applying this method to each year studied, minimum bird use of the estuary varied: 6814 birds in 1975 (Table 2); 15,832 birds in 1976 (Table 3); 14,437 birds in 1977 (Table 4); 16,146 birds in 1978 (Table 5) and 26,475 birds in 1979 (Table 6). In spite of year to year differences in the quantity and timing of surveys (Appendix I), the estimates for the minimum numbers of birds in 1976, 1977 and 1978 are relatively constant (approximately 15,300 birds). This estimate of mean yearly bird use seems to be supported by the average figure for the five years studied; on average at least 15,905 birds depended on the estuary each year.

The low totals for birds recorded in 1975 when 42 surveys were undertaken contrasts with the high totals for 1979 when we conducted only 9 surveys. No doubt this reflects whether a survey happened to coincide with the peaks of a particular bird activity. For example, over 13,000 gulls were observed on a single survey during the Pacific Herring spawn of March 1979; the peaks observed on surveys in other years were between 4000 and 7000 gulls except in 1975 when the peak numbers were below 400 gulls. However, the largest number of gulls observed in the study area was 53,000 counted during the herring spawn of 1976; that count did not occur during a survey.

Fluctuations within a similar wide range were also observed on the Englishman River estuary 15 kilometres to the southeast (Dawe et al. 1994). Using the same method on the data for the Englishman, a minimum of over 33,000 birds depended on that habitat in 1979-1980 whereas in 1988-1989 the minimum number recorded there was just over 8000 birds. The authors point out that these figures would have been similar if the tally omitted the one-day count of over 25,000 gulls that congregated during a major herring spawn in 1979-1980.

Species	Number	Season	Species	Number	Season	Species	Number	Season
RTLO	34	Spr 75	SACR	9	Spr 76	BUSH	20	Aut 75
PALO	227	Spr 78	BBPL	2	Aut 77	RBNU	4	Sum 77
COLO	40	Spr 78	SEPL	4	Aut 78	BRCR	3	Spr 78
YBLO	1	Spr 76	KILL	55	Sum 76	BEWR	4	Aut 77
PBGR	1	Sum 75	GRYE	3	Spr 75	HOWR	1	Sum 76
HOGR	26	Aut 76	LEYE	7	Sum 76	WIWR	8	Sum 76
RNGR	17	Aut 75	SPSA	6	Sum 77	MAWR	8	Sum 77
WEGR	1600	Aut 77	WHIM	17	Sum 76	GCKI	25	Win 75
DCCO	8	Sum 75	BLTU	155	Spr 76	RCKI	7	Aut 78
PECO	6	Aut 76	SAND	13	Sum 75	WEBL	2	Spr 76
GBHE	15	Sum 77	WESA	72	Spr 77	MOBL	1	Spr 76
TRUS	14	Win 78	LESA	19	Spr 75	TOSO	1	Spr 77
GWFG	5	Aut 76	BASA	2	Sum 76	SWTH	13	Sum 77
SNGO	1	Aut 75	PESA	2	Aut 75	HETH	1	Win 75
BRAN	1359	Spr 76	DUNL	132	Win 76	AMRO	66	Aut 78
CAGO	123	Aut 76	DOWI	25	Aut 78	VATH	13	Spr 76
WODU	2	Aut 77	COSN	15	Spr 77	WAPI	60	Aut 75
GWTE	150	Win 76	WIPH	1	Sum 76	CEWA	40	Aut 76
MALL	833	Win 78	RNPL	27	Sum 77	NOSH	1	Aut 76
NOPI	70	Aut 77	PAJA	1	Sum 76	EUST	4000	Aut 77
BWTE	8	Spr 77	GULL	13036	Spr 79	HUVI	1	Win 74
NOSL	1	Sum 76	COMU	18	Win 77	OCWA	17	Spr 76
GADW	2	Win 75	PIGU	12	Spr 75	YEWA	7	Sum 77
EUWI	2	Win 75	MAMU	214	Spr 76	YRWA	25	Aut 77
AMWI	638	Aut 75	RODO	9	Win 75	BTGW	1	Aut 76
RNDU	1	Win 78	BTPI	29	Sum 76	TOWA	5	Sum 76
GRSC	1840	Spr 76	MODO	1	Spr 75	MGWA	7	Spr 76
HADU	85	Spr 75	WSOW	2	Spr 77	COYE	9	Sum 77
OLDS	3230	Spr 79	GHOW	1	Aut 75	WIWA	16	Spr 76
SCOT	5050	Spr 79	SEOW	1	Aut 75	WETA	6	Spr 75
COGO	1611	Spr 79	CONI	20	Sum 75	RSTO	19	Aut 77
BAGO	1	Spr 76	BLSW	200	Sum 75	ATSP	1	Win 78
BUFF	150	Spr 79	VASW	2	Sum 75	CHSP	3	Spr 76
HOME	4	Aut 77	RUHU	9	Spr 77	SAVS	37	Aut 77
COME	267	Win 78	BEKI	5	Aut 75	FOSP	16	Aut 75
RBME	17	Aut 77	RBSA	2	Win 76	SOSP	19	Sum 77
RUDU	2	Win 78	DOWO	1	Win 74	LISP	11	Aut 76
TUVU	1	Spr 76	HAWO	2	Spr 76	WTSP	1	Aut 77
OSPR	2	Sum 75	NOFL	8	Sum 76	GCSP	21	Spr 75
BAEA	96	Win 78	PIWO	2	Spr 76	WCSP	15	Spr 76
NOHA	1	Sum 76	WWPE	3	Sum 75	DEJU	64	Win 75
SSHA	1	Sum 76	WIFL	5	Sum 75	SNBU	1	Aut 77
COHA	1	Win 75	PSFL	5	Spr 76	RWBL	34	Sum 77
NOGO	1	Aut 75	SAPH	1	Aut 76	WEME	3	Aut 75
RTHA	1	Aut 76	WEKI	1	Spr 77	BRBL	73	Sum 76
AMKE	1	Spr 75	TRSW	2	Spr 75	BHCO	27	Spr 79
MERL	1	Win 75	VGSW	25	Spr 75	PIGR	3	Aut 78
GYRF	1	Aut 75	NRWS	9	Sum 75	PUFI	10	Aut 76
RNPH	16	Sum 76	CLSW	6	Sum 75	HOFI	35	Aut 78
BLGR	1	Sum 77	BASW	90	Sum 75	RECR	49	Sum 76
RUGR	1	Aut 75	STJA	3	Aut 76	PISI	240	Win 75
CAQU	2	Spr 75	NOCR	129	Aut 75	AMGO	106	Sum 76
VIRA	7	Aut 78	CORA	37	Aut 78	EVGR	35	Spr 77
AMCO	1	Win 76	CBCH	33	Sum 75	HOSP	8	Sum 76
						Total	37271	

Table 1. *Estimated minimum numbers of birds dependent on the Little Qualicum River estuary, 19 January 1975 through 25 May 1979, based on the maximum number of each species observed on migratory bird surveys. For species names, see Appendix III.*

Species	Number	Season	Species	Number	Season	Species	Number	Season
RTLO	34	Spr 75	KILL	31	Sum 75	NOCR	129	Aut 75
PALO	20	Spr 75	GRYE	3	Spr 75	CORA	5	Sum 75
COLO	12	Spr 75	SPSA	3	Sum 75	CBCH	33	Sum 75
PBGR	1	Sum 75	BLTU	120	Spr 75	BUSH	20	Aut 75
HOGR	14	Aut 75	SAND	13	Sum 75	RBNU	2	Sum 75
RNGR	17	Aut 75	WESA	29	Sum 75	BRCR	1	Sum 75
WEGR	233	Win 74	LESA	19	Spr 75	BEWR	3	Aut 75
DCCO	8	Sum 75	PESA	2	Aut 75	WIWR	4	Spr 75
PECO	3	Sum 75	DUNL	10	Sum 75	MAWR	2	Sum 75
GBHE	6	Spr 75	LBDO	5	Sum 75	GCKI	20	Win 74
SWAN	7	Spr 75	COSN	1	Win 74	RCKI	5	Sum 75
TRUS	4	Win 74	BOGU	325	Spr 75	SWTH	6	Sum 75
GWFG	3	Aut 75	MEGU	131	Aut 75	AMRO	50	Win 74
SNGO	1	Aut 75	RBGU	3	Aut 75	VATH	5	Win 74
BRAN	657	Spr 75	CAGU	17	Aut 75	AMPI	60	Aut 75
CAGO	20	Aut 75	HEGU	3	Spr 75	CEWA	20	Sum 75
GWTE	60	Aut 75	THGU	117	Spr 75	EUST	201	Sum 75
MALL	198	Win 74	GWGU	227	Aut 75	HUVI	1	Win 74
NOPI	45	Aut 75	CATE	2	Sum 75	OCWA	5	Spr 75
EUWI	1	Win 74	PIGU	12	Spr 75	YEWA	1	Spr 75
AMWI	638	Aut 75	MAMU	29	Aut 75	YRWA	8	Spr 75
GRSC	179	Spr 75	RODO	5	Aut 75	MGWA	2	Sum 75
HADU	76	Spr 75	BTPI	7	Sum 75	COYE	6	Aut 75
OLDS	61	Spr 75	MODO	1	Spr 75	WIWA	1	Aut 75
BLSC	201	Spr 75	GHOW	1	Aut 75	WETA	6	Spr 75
SUSC	1147	Spr 75	SEOW	1	Aut 75	RSTO	8	Aut 75
WWSC	182	Aut 75	CONI	20	Sum 75	SAVS	18	Aut 75
COGO	135	Aut 75	BLSW	200	Sum 75	FOSP	16	Aut 75
BUFF	106	Aut 75	VASW	2	Sum 75	SOSP	14	Aut 75
HOME	1	Win 74	RUHU	7	Spr 75	LISP	6	Aut 75
COME	38	Sum 75	BEKI	5	Aut 75	GCSP	21	Spr 75
RBME	16	Aut 75	DOWO	1	Win 74	WCSP	5	Spr 75
OSPR	2	Sum 75	NOFL	7	Aut 75	DEJU	55	Aut 75
BAEA	10	Win 74	PIWO	1	Spr 75	RWBL	27	Sum 75
SSHA	1	Sum 75	WWPE	3	Sum 75	WEME	3	Aut 75
COHA	1	Win 74	WIFL	5	Sum 75	BRBL	63	Sum 75
NOGO	1	Aut 75	PSFL	4	Sum 75	BHCO	4	Spr 75
AMKE	1	Spr 75	TRSW	2	Spr 75	PUFI	6	Win 74
MERL	1	Sum 75	VGSW	25	Spr 75	HOFI	23	Aut 75
GYRF	1	Aut 75	NRWS	9	Sum 75	PISI	220	Aut 75
RNPH	8	Sum 75	CLSW	6	Sum 75	AMGO	43	Sum 75
RUGR	1	Aut 75	BASW	90	Sum 75	EVGR	20	Win 74
CAQU	2	Spr 75	STJA	1	Win 74	HOSP	7	Aut 75
						Total	6814	

Table 2. *Estimated minimum numbers of birds dependent on the Little Qualicum River estuary 19 January 1975 through 30 November 1975, based on the maximum number of each species observed on bird surveys. For species names, see Appendix III.*

Species	Number	Season	Species	Number	Season	Species	Number	Season
PALO	210	Spr 76	GRYE	3	Sum 76	BRCR	1	Spr 76
COLO	13	Aut 76	LEYE	7	Sum 76	BEWR	2	Sum 76
YBLO	1	Spr 76	SPSA	4	Sum 76	WIWR	8	Sum 76
HOGR	26	Aut 76	WHIM	17	Sum 76	MAWR	2	Aut 76
RNGR	11	Aut 76	BLTU	155	Spr 76	GCKI	25	Win 75
WEGR	297	Aut 76	SAND	9	Sum 76	RCKI	3	Win 75
DCCO	8	Sum 76	WESA	17	Sum 76	WEBL	2	Spr 76
PECO	6	Aut 76	LESA	6	Sum 76	MOBL	1	Spr 76
GBHE	8	Sum 76	BASA	2	Sum 76	SWTH	7	Sum 76
TRUS	5	Win 75	PESA	2	Aut 76	HETH	1	Win 75
GWFG	5	Aut 76	DUNL	21	Aut 76	AMRO	19	Spr 76
BRAN	1359	Spr 76	SBDO	3	Sum 76	VATH	13	Spr 76
CAGO	123	Aut 76	LBDO	6	Sum 76	AMPI	34	Aut 76
GWTE	69	Aut 76	COSN	7	Aut 76	CEWA	40	Aut 76
MALL	200	Aut 76	WIPH	1	Sum 76	NOSH	1	Aut 76
NOPI	21	Aut 76	PAJA	1	Sum 76	EUST	600	Sum 76
BWTE	7	Sum 76	GULL	6540	Spr 76	HUVI	1	Win 75
NOSL	1	Sum 76	COMU	2	Sum 76	OCWA	17	Spr 76
GADW	2	Win 75	PIGU	10	Aut 76	YEWA	4	Sum 76
EUWI	2	Win 75	MAMU	214	Spr 76	YRWA	14	Spr 76
AMWI	358	Aut 76	RODO	9	Win 75	BTGW	1	Aut 76
GRSC	1840	Spr 76	BTPI	29	Sum 76	TOWA	5	Sum 76
HADU	62	Sum 76	WSOW	1	Win 75	MGWA	7	Spr 76
OLDS	39	Spr 76	SEOW	1	Win 75	COYE	8	Sum 76
BLSC	346	Spr 76	CONI	9	Sum 76	WIWA	16	Spr 76
SUSC	977	Spr 76	BLSW	2	Spr 76	RSTO	15	Win 75
WWSC	139	Aut 76	RUHU	6	Spr 76	CHSP	3	Spr 76
COGO	470	Spr 76	BEKI	5	Sum 76	SAVS	35	Aut 76
BAGO	1	Spr 76	DOWO	1	Sum 76	FOSP	4	Aut 76
BUFF	97	Spr 76	HAWO	2	Spr 76	SOSP	15	Win 75
HOME	3	Aut 76	NOFL	8	Sum 76	LISP	11	Aut 76
COME	49	Aut 76	PIWO	2	Spr 76	GCSP	18	Win 75
RBME	8	Win 75	WWPE	1	Spr 76	WCSP	15	Spr 76
TUVU	1	Spr 76	WIFL	4	Sum 76	DEJU	64	Win 75
OSPR	2	Aut 76	PSFL	5	Spr 76	RWBL	23	Sum 76
BAEA	51	Win 75	SAPH	1	Aut 76	WEME	4	Win 75
NOHA	1	Sum 76	TRSW	2	Spr 76	BRBL	73	Sum 76
SSHA	1	Sum 76	VGSW	20	Spr 76	BHCO	3	Sum 76
COHA	1	Win 75	NRWS	3	Spr 76	PUFI	10	Aut 76
RTHA	1	Aut 76	CLSW	4	Spr 76	HOFI	22	Aut 76
MERL	1	Win 75	BASW	56	Sum 76	RECR	49	Sum 76
RNPH	16	Sum 76	STJA	3	Aut 76	PISI	240	Win 75
CAQU	2	Spr 76	NOCR	116	Aut 76	AMGO	106	Sum 76
VIRA	1	Aut 76	CORA	6	Sum 76	EVGR	13	Win 75
SACR	9	Spr 76	CBCH	30	Win 75	HOSP	8	Sum 76
SEPL	1	Sum 76	BUSH	8	Aut 76			
KILL	55	Sum 76	RBNU	2	Spr 76			
						Total	15832	

Table 3. *Estimated minimum numbers of birds dependent on the Little Qualicum River estuary 1 December 1975 through 30 November 1976, based on the maximum number of each species observed on bird surveys. For species names, see Appendix III.*

Species	Number	Season	Species	Number	Season	Species	Number	Season
RTLO	3	Spr 77	GRYE	1	Spr 77	WIWR	6	Spr 77
PALO	44	Win 76	LEYE	2	Sum 77	MAWR	8	Sum 77
COLO	10	Aut 77	WATA	2	Sum 77	GCKI	14	Aut 77
YBLO	1	Win 76	SPSA	6	Sum 77	RCKI	3	Spr 77
HOGR	20	Aut 77	BLTU	134	Spr 77	TOSO	1	Spr 77
RNGR	3	Win 76	SAND	10	Win 76	SWTH	13	Sum 77
WEGR	1600	Aut 77	WESA	72	Spr 77	AMRO	26	Sum 77
PECO	6	Sum 77	LESA	9	Spr 77	VATH	1	Win 76
GBHE	15	Sum 77	DUNL	132	Win 76	AMPI	1	Sum 77
TRUS	9	Aut 77	LBDO	1	Sum 77	CEWA	22	Sum 77
BRAN	527	Spr 77	COSN	15	Spr 77	NOSH	1	Aut 77
CAGO	2	Win 76	RNPL	27	Sum 77	EUST	4000	Aut 77
WODU	2	Aut 77	GULL	4150	Spr 77	HUVI	1	Aut 77
GWTE	150	Win 76	COMU	2	Sum 77	OCWA	9	Spr 77
MALL	463	Aut 77	PIGU	9	Aut 77	YEWA	7	Sum 77
NOPI	70	Aut 77	MAMU	15	Spr 77	YRWA	25	Aut 77
BWTE	8	Spr 77	BTPI	10	Spr 77	TOWA	4	Spr 77
NOSL	1	Sum 77	MODO	1	Sum 77	MGWA	3	Sum 77
EUWI	1	Win 76	WSOW	2	Spr 77	COYE	9	Sum 77
AMWI	481	Aut 77	CONI	7	Sum 77	WIWA	5	Sum 77
GRSC	18	Win 76	RUHU	9	Spr 77	RSTO	19	Aut 77
HADU	62	Sum 77	BEKI	5	Sum 77	SAVS	37	Aut 77
OLDS	34	Spr 77	RBSA	2	Win 76	FOSP	2	Spr 77
BLSC	217	Aut 77	DOWO	1	Spr 77	SOSP	19	Sum 77
SUSC	805	Spr 77	NOFL	5	Sum 77	LISP	8	Aut 77
WWSC	100	Win 76	PIWO	1	Win 76	WTSP	1	Aut 77
COGO	53	Win 76	WWPE	1	Sum 77	GCSP	12	Win 76
BUFF	57	Aut 77	WIFL	4	Sum 77	WCSP	4	Spr 77
HOME	4	Aut 77	PSFL	6	Sum 77	DEJU	36	Aut 77
COME	49	Spr 77	WEKI	1	Spr 77	SNBU	1	Aut 77
RBME	17	Aut 77	VGSW	22	Sum 77	RWBL	34	Sum 77
OSPR	1	Spr 77	NRWS	5	Spr 77	WEME	1	Aut 77
BAEA	6	Win 76	CLSW	2	Spr 77	BRBL	39	Sum 77
SSHA	1	Win 76	BASW	84	Sum 77	BHCO	6	Spr 77
COHA	1	Win 76	STJA	2	Spr 77	PUFI	5	Spr 77
MERL	1	Sum 77	NOCR	105	Aut 77	HOFI	25	Aut 77
RNPH	5	Spr 77	CORA	3	Spr 77	RECR	10	Win 76
BLGR	1	Sum 77	CBCH	29	Aut 77	PISI	100	Win 76
VIRA	2	Win 76	BUSH	8	Aut 77	AMGO	75	Sum 77
AMCO	1	Win 76	RBNU	4	Sum 77	EVGR	35	Spr 77
BBPL	2	Aut 77	BRCR	2	Spr 77	HOSP	3	Spr 77
SEPL	1	Sum 77	BEWR	4	Aut 77			
KILL	39	Sum 77	HOWR	1	Sum 77			
						Total	14437	

Table 4. *Estimated minimum numbers of birds dependent on the Little Qualicum River estuary 1 December 1976 through 30 November 1977, based on the maximum number of each species observed on bird surveys. For species names, see Appendix III.*

Species	Number	Season	Species	Number	Season	Species	Number	Season
RTLO	2	Spr 78	GRYE	2	Aut 78	MAWR	3	Aut 78
PALO	227	Spr 78	SPSA	2	Sum 78	GCKI	12	Aut 78
COLO	40	Spr 78	BLTU	71	Spr 78	RCKI	7	Aut 78
HOGR	21	Aut 78	SAND	5	Spr 78	SWTH	3	Sum 78
RNGR	3	Aut 78	WESA	1	Sum 78	AMRO	66	Aut 78
WEGR	586	Spr 78	LESA	1	Sum 78	AMPI	50	Spr 78
DCCO	8	Spr 78	DUNL	8	Win 77	CEWA	7	Sum 78
PECO	2	Spr 78	DOWI	25	Aut 78	NOSH	1	Spr 78
GBHE	6	Spr 78	COSN	7	Spr 78	EUST	120	Sum 78
TRUS	10	Aut 78	GULL	6040	Spr 78	OCWA	2	Spr 78
BRAN	649	Spr 78	COMU	18	Win 77	YEWA	2	Sum 78
CAGO	1	Aut 78	PIGU	6	Spr 78	YRWA	2	Sum 78
GWTE	23	Aut 78	MAMU	2	Sum 78	TOWA	1	Spr 78
MALL	487	Aut 78	BTPI	11	Sum 78	WIWA	3	Sum 78
NOPI	20	Aut 78	CONI	11	Sum 78	RSTO	4	Aut 78
EUWI	1	Win 77	BLSW	16	Sum 78	SAVS	15	Spr 78
AMWI	610	Aut 78	RUHU	4	Spr 78	FOSP	2	Aut 78
GRSC	450	Spr 78	BEKI	3	Aut 78	SOSP	8	Spr 78
HADU	85	Spr 78	DOWO	1	Sum 78	GCSP	12	Win 77
OLDS	1290	Spr 78	HAWO	1	Aut 78	WCSP	4	Spr 78
SCOT	4040	Spr 78	NOFL	4	Sum 78	DEJU	20	Spr 78
COGO	502	Spr 78	WIFL	1	Sum 78	RWBL	25	Spr 78
BUFF	82	Aut 78	PSFL	4	Sum 78	WEME	2	Aut 78
HOME	3	Aut 78	TRSW	1	Spr 78	BRBL	11	Sum 78
COME	56	Spr 78	VGSW	4	Spr 78	BHCO	2	Spr 78
RBME	13	Spr 78	NRWS	4	Spr 78	PIGR	3	Aut 78
TUVU	1	Sum 78	BASW	12	Sum 78	PUFI	2	Sum 78
BAEA	30	Win 77	STJA	1	Aut 78	HOFI	35	Aut 78
RTHA	1	Aut 78	NOCR	92	Win 77	RECR	3	Sum 78
MERL	1	Sum 78	CORA	37	Aut 78	PISI	20	Aut 78
RNPH	6	Spr 78	CBCH	3	Sum 78	AMGO	8	Sum 78
VIRA	7	Aut 78	BRCR	3	Spr 78	EVGR	1	Spr 78
SEPL	4	Aut 78	BEWR	2	Spr 78	HOSP	3	Spr 78
KILL	13	Spr 78	WIWR	4	Spr 78			
						Total	16146	

Table 5. *Estimated minimum numbers of birds dependent on the Little Qualicum River estuary 1 December 1977 through 30 November 1978, based on the maximum number of each species observed on bird surveys. For species names, see Appendix III.*

Species	Number	Season	Species	Number	Season	Species	Number	Season
COLO	8	Win 78	KILL	7	Win 78	RCKI	1	Win 78
HOGR	3	Win 78	SPSA	2	Spr 79	SWTH	4	Spr 79
RNGR	2	Win 78	BLTU	155	Spr 79	AMRO	40	Spr 79
WEGR	286	Spr 79	SAND	9	Spr 79	VATH	2	Spr 79
PECO	1	Win 78	SBDO	2	Win 78	AMPI	1	Spr 79
GBHE	4	Spr 79	COSN	1	Win 78	CEWA	2	Spr 79
TRUS	14	Win 78	GULL	13036	Spr 79	EUST	53	Win 78
BRAN	513	Spr 79	COMU	2	Spr 79	OCWA	1	Spr 79
CAGO	2	Win 78	PIGU	3	Spr 79	YEWA	6	Spr 79
GWTE	42	Win 78	MAMU	10	Spr 79	TOWA	4	Spr 79
MALL	833	Win 78	RODO	3	Spr 79	WIWA	5	Spr 79
NOPI	12	Win 78	BTPI	1	Spr 79	RSTO	10	Win 78
EUWI	1	Win 78	RUHU	3	Spr 79	ATSP	1	Win 78
AMWI	241	Win 78	BEKI	2	Win 78	SAVS	8	Spr 79
RNDU	1	Win 78	DOWO	1	Spr 79	SOSP	9	Spr 79
GRSC	360	Spr 79	NOFL	1	Win 78	LISP	1	Spr 79
HADU	29	Win 78	WIFL	2	Spr 79	GCSP	12	Win 78
OLDS	3230	Spr 79	PSFL	7	Spr 79	WCSP	8	Win 78
SCOT	5050	Spr 79	VGSW	11	Spr 79	DEJU	30	Win 78
COGO	1611	Spr 79	CLSW	1	Spr 79	RWBL	24	Spr 79
BAGO	1	Win 78	BASW	10	Spr 79	WEME	2	Win 78
BUFF	150	Spr 79	STJA	1	Win 78	BRBL	1	Spr 79
HOME	3	Win 78	NOCR	47	Win 78	BHCO	27	Spr 79
COME	267	Win 78	CORA	1	Win 78	PUFI	2	Spr 79
RBME	4	Spr 79	CBCH	1	Spr 79	HOFI	33	Win 78
RUDU	2	Win 78	BRCR	1	Spr 79	RECR	1	Spr 79
BAEA	96	Win 78	BEWR	4	Spr 79	PISI	80	Win 78
SSHA	1	Win 78	WIWR	4	Spr 79	AMGO	4	Spr 79
RNPH	2	Win 78	MAWR	2	Win 78	EVGR	1	Spr 79
VIRA	1	Win 78	GCKI	1	Spr 79	HOSP	1	Spr 79
						Total	26475	

Table 6. *Estimated minimum numbers of birds dependent on the Little Qualicum River estuary 1 December 1978 through 25 May 1979, based on the maximum number of each species observed on bird surveys. For species names, see Appendix III.*

Seasonal Numbers

Winter: Figure 4 shows the proportion of species group use on the estuary in the 5 winters surveyed. Waterfowl was the prominent group in every winter (consistently about half of all birds); most of the waterfowl were diving ducks except in the winter of 1978-1979 when dabbling ducks were more numerous. The second ranked position was held by the gulls in some years and by the passerines in others; the 2 groups were often close in numbers but in the winters of 1976-1977 and 1978-1979 the gulls were several times more numerous than the third ranking passerines. Throughout the study, the total number of birds seen each winter (Appendix II) was lower than the number of birds seen in the spring or autumn. This is only partly explained by the lower number of surveys in winter.

Spring: Figure 5 shows the proportion of species group use on the estuary in the springs of 1975 to 1979. The gulls and the waterfowl shared the top; gulls had the highest proportion in 1976, 1977 and 1979 (approximately 50%) whereas the waterfowl, never far behind, ranked first in 1978 and 1975. Passerines were the third most abundant group except in 1978 when the numbers of grebes counted were slightly larger. In 4 of the 5 years surveyed, spring had the highest seasonal total (Appendix II).

Summer: Figure 6 shows the species group use on the estuary in summer; the proportions are almost constant over the 4 summers surveyed. Approximately half of the birds seen were passerines and the gulls ranked second with approximately 25% of the total. The next most numerous taxonomic groups were the waterfowl followed by the shorebirds except in 1975 when the shorebirds ranked just ahead of the waterfowl and the combined number of birds recorded in the "other" category was also relatively large. In general, there were fewer birds counted in summer than in other seasons. For a comparison of the number of surveys in each season and the total number of birds counted each season refer to Appendices I and II.

Autumn: Figure 7 shows the proportion of species group use on the estuary in each autumn surveyed. Waterfowl were the highest user group, accounting for more than half of all birds seen in 1976 and 1978. In 1975 and 1976, most of the waterfowl tallied in autumn were diving ducks whereas in 1977 and 1978 the majority was dabbling ducks. Gulls ranked second and passerines third in 1975, 1976 and 1978 but 1977 was different; passerines ranked second and grebes third. Autumn had the second highest seasonal total in 3 of the 4 years surveyed (Appendix II).

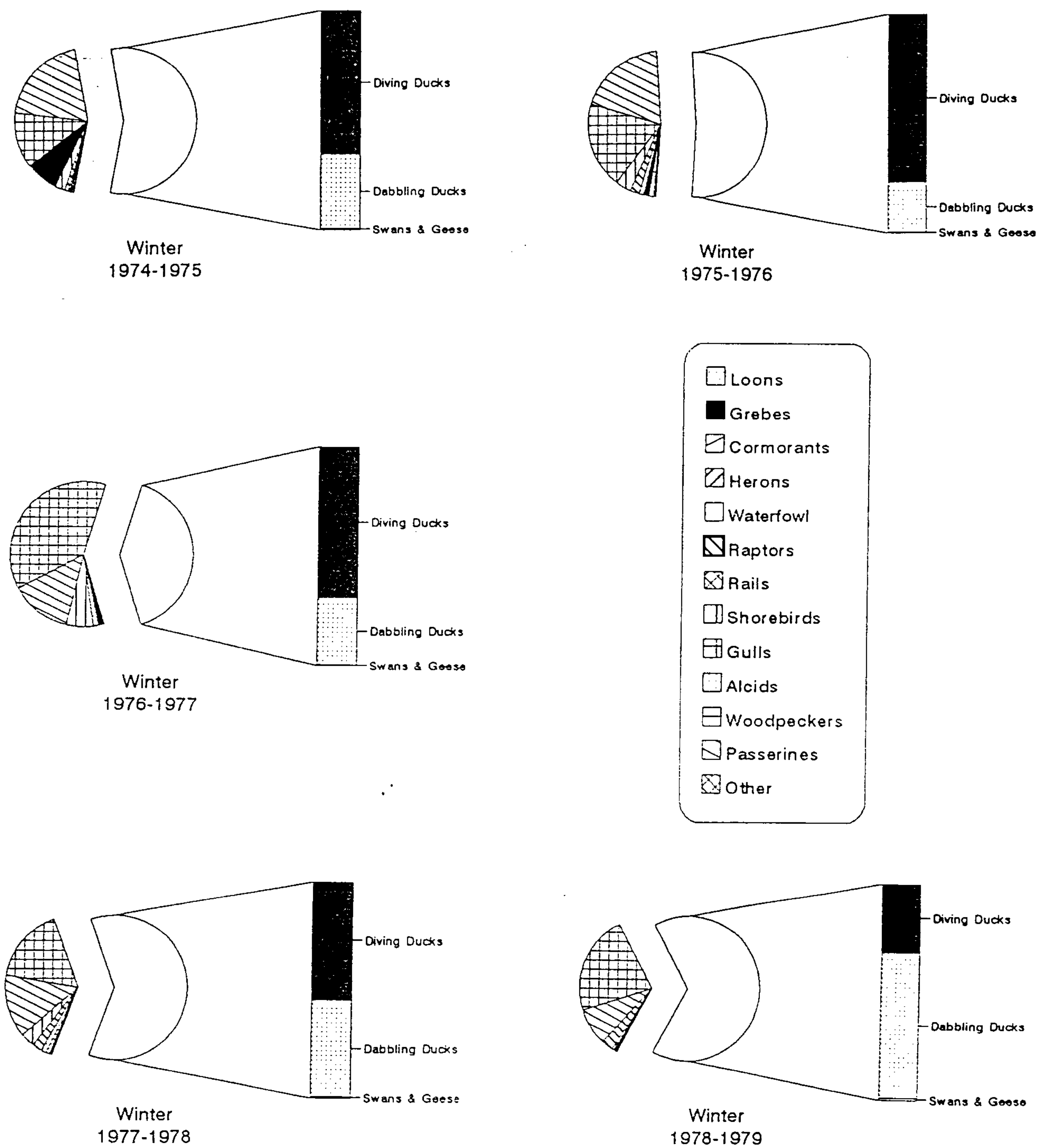

Figure 4. *Proportional species group use of the Little Qualicum River estuary each winter from 1974-1975 to 1978-1979.*

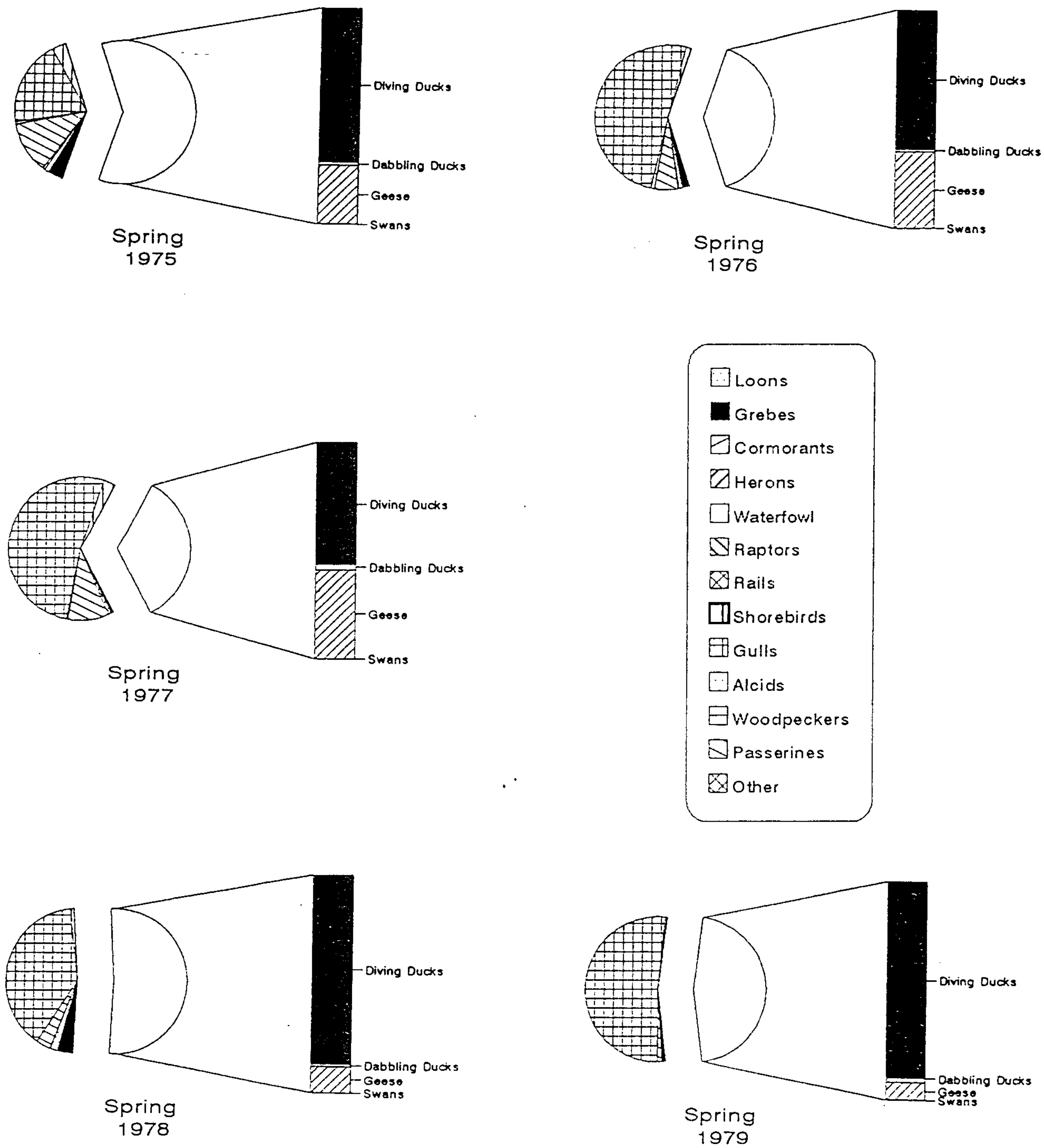

Figure 5. *Proportional species group use of the Little Qualicum River estuary each spring from 1975 to 1979.*

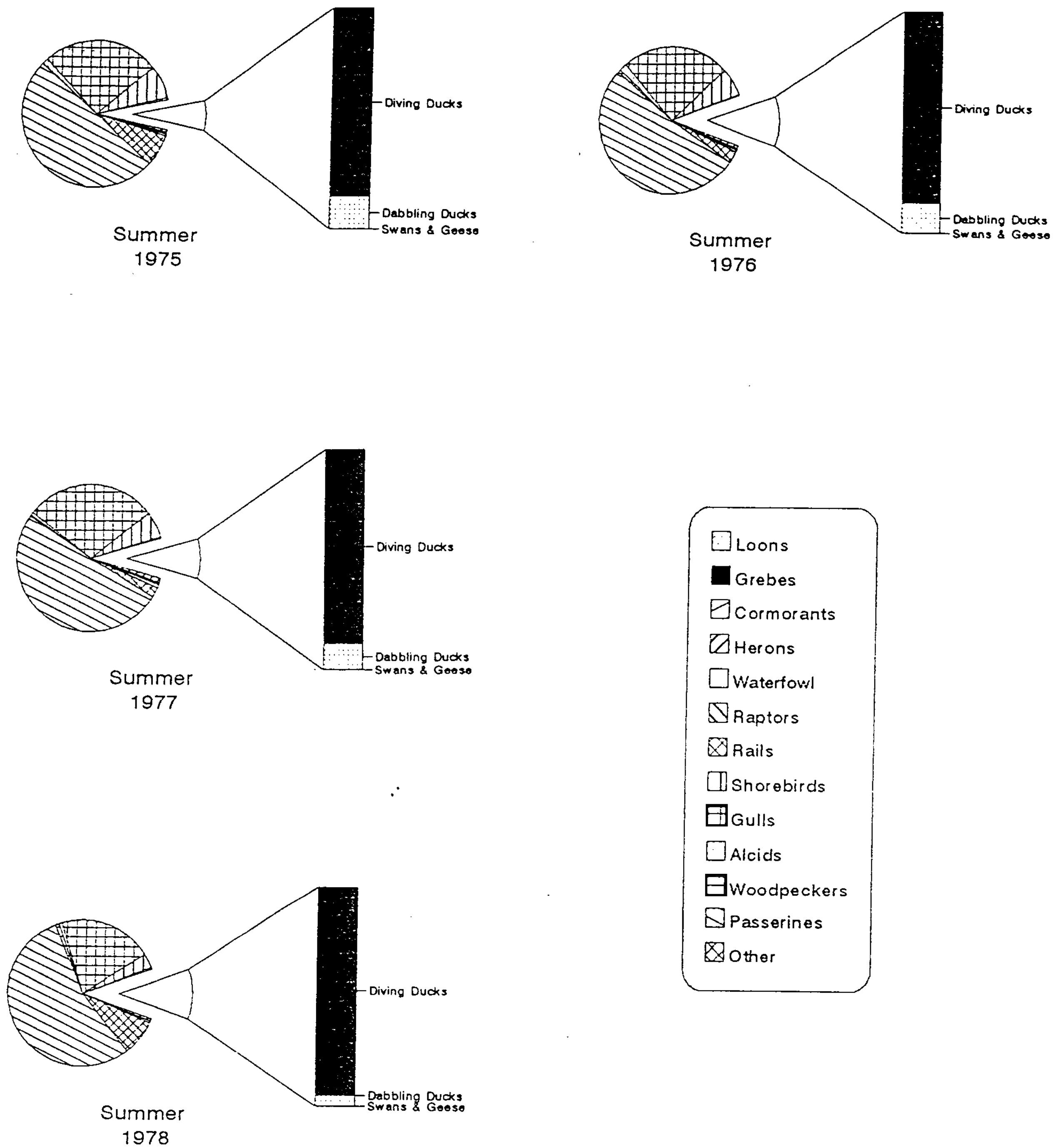

Figure 6. *Proportional species group use of the Little Qualicum River estuary each summer from 1975 to 1979.*

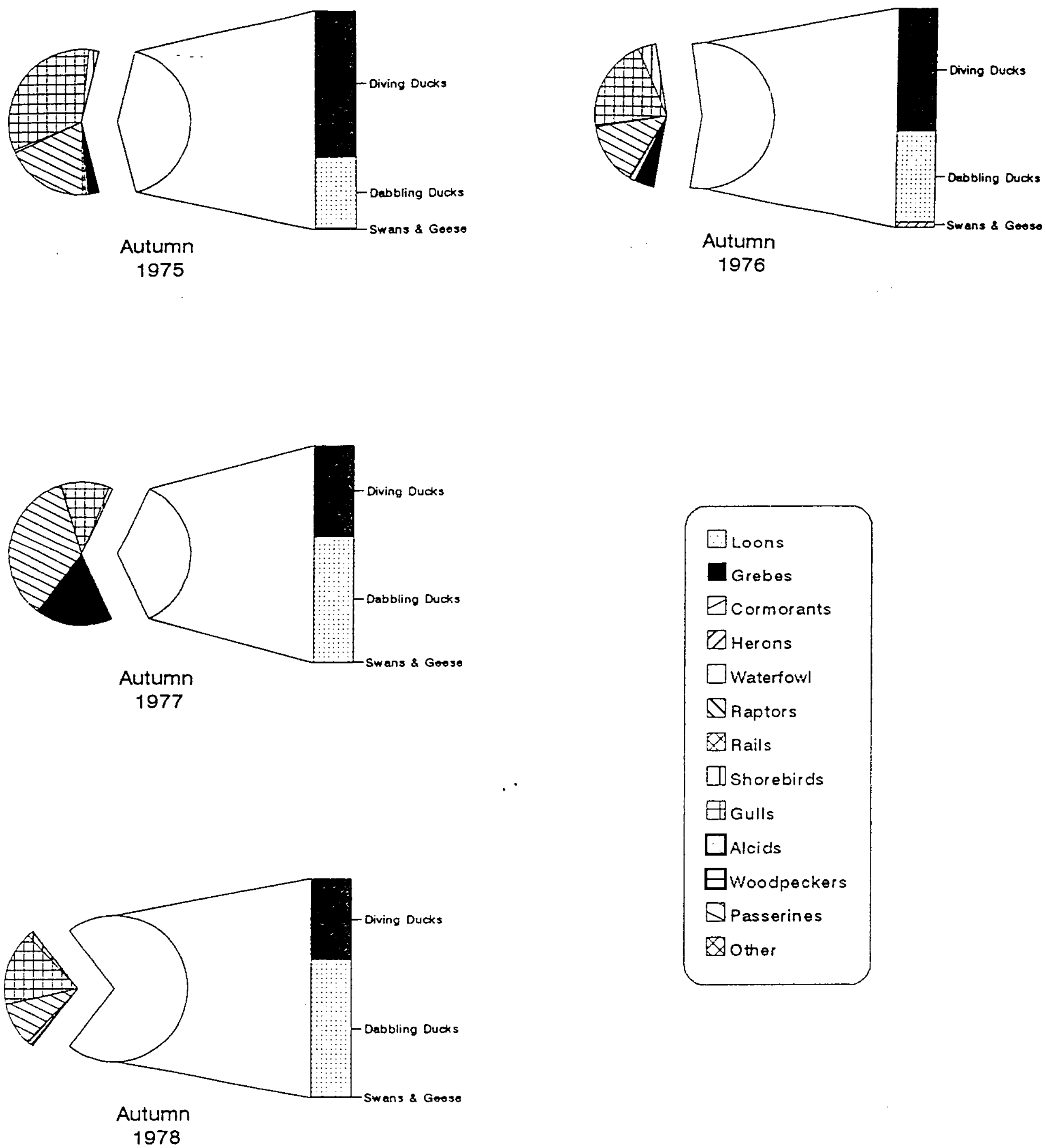

Figure 7. *Proportional species group use of the Little Qualicum River estuary each autumn from 1975 to 1979.*

Species Composition

The following annotated species list includes summarized data from the survey period. Species groups are presented in taxonomic sequence. Within each group or subgroup, species are discussed in decreasing order of highest use of the estuary during the survey.

Loons: Four species of loons were recorded over the study period: the Pacific Loon was the most abundant followed by the Common Loon, the Red-Throated Loon and the Yellow-billed Loon. A combined total of 1215 birds were observed (<1% of all birds). Seasonal fluctuations in the numbers of all loons combined are shown in Figure 8.

Pacific Loon numbers totalled 712 birds over the study period (59% of all loons). Although they were seen in every season, most of the birds were recorded in spring (69%) and winter (18%). Four days account for 75% of all of the birds seen: 20 March 1978-227, 12 April 1976-210, 4 February 1976-55 and 31 January 1977-44. The presence of this species was intermittent; in all seasons there were periods 3 to 12 weeks long in which no Pacific Loons were seen. Most birds were seen offshore.

The Common Loon used the estuary in lower numbers but more consistently than the Pacific Loon; the total seen in the study was 440 birds. It was present in every season with a high frequency of occurrence (usually above 65%). Numbers were highest in spring (36%) and autumn (32%) and lowest in summer (10%). The peak number was 40 birds recorded on 20 March 1978. Most birds were observed between Brant Point and the river mouth.

A total of 49 Red-throated Loons was recorded. The majority were spring migrants: 4 March 1975-2, 11 March 1975-34, 12 May 1977-3, 5 May 1978-2. Most of the remainder occurred in autumn: 1 October 1975-1 and 8 October 1975-5.

Three Yellow-billed Loons were seen: 8 March 1973-1 (Dawe 1976), 4 March 1976-1 and 4 January 1977-1.

Grebes: Four species of grebes were recorded: Western, Horned, Red-necked and Pied-billed. Their combined total was 5391 birds (3% of all birds). Seasonal fluctuations in the numbers of all grebes combined are shown in Figure 9.

The Western Grebe was by far the most abundant of the grebes with a total of 4900 birds seen (91% of all grebes). The timing of the migrations and the numbers involved varied. The earliest arrival recorded during the study period was on 20 September (1976) and the latest departure was a single straggler on 27 June (1977). The peak numbers in the spring movement were: 25 February 1975-239, 20 March 1978-586, 22 March 1979-286 and 12 April 1976-252. Each of these 4 large groups accounted for more than half of the Western Grebes seen in that season. The only exception was in spring, 1977, when comparatively few Western Grebes were seen (17 birds total). Birds were not seen outside of the broad migration periods described. Although large congregations of this gregarious grebe are often associated with Pacific Herring spawns in the spring (Campbell et al. 1990), the peak number seen in this study was 1600 birds on 17 October 1977. However Dawe (1980) recorded 4800 Western Grebes in the study area at about the time of a Pacific Herring spawn on 14 March 1976.

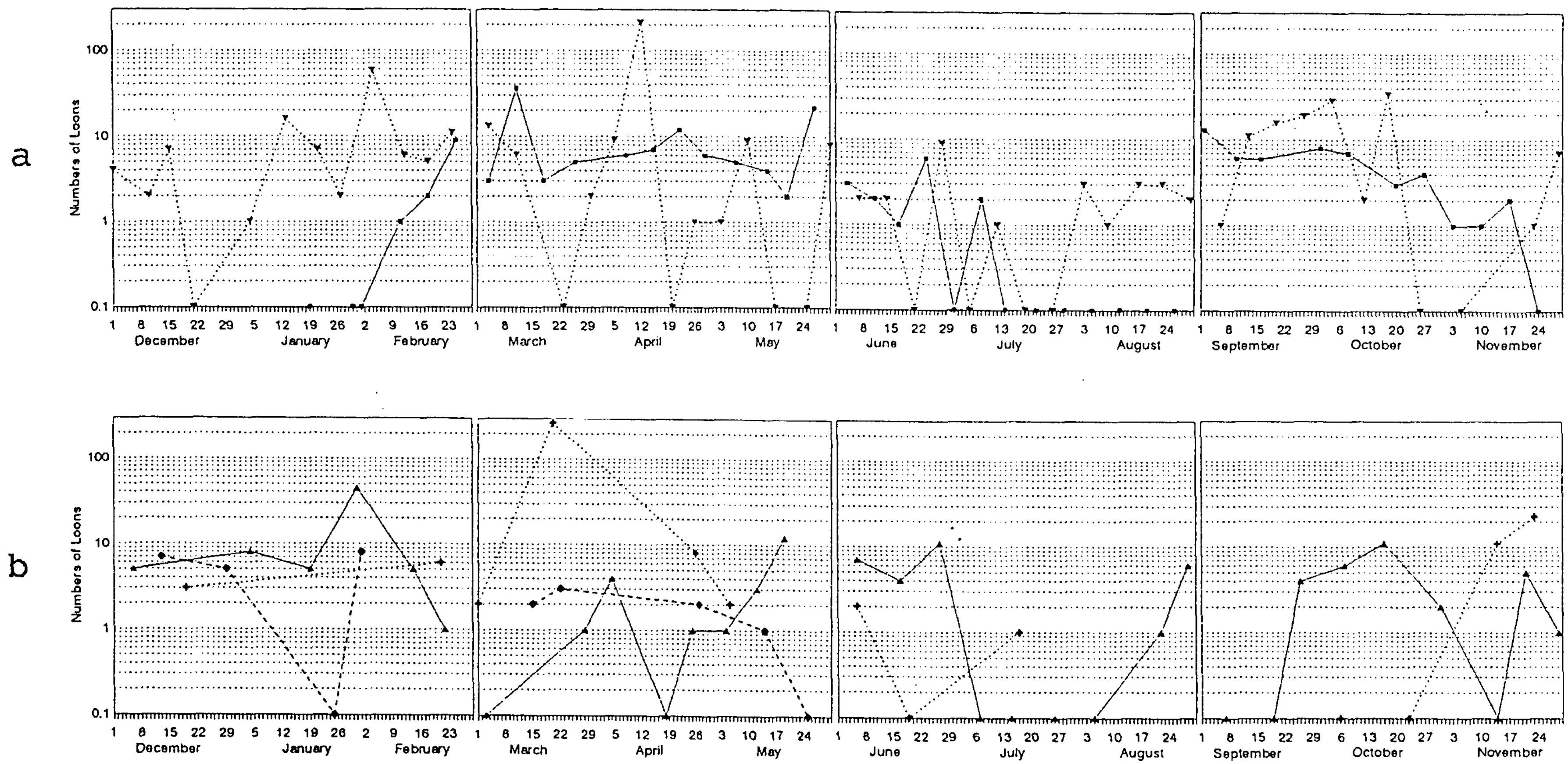

Figure 8. *Seasonal fluctuations in numbers of loons on the Little Qualicum River estuary, winter 1974-1975 through spring 1979: 1975 - solid line(a); 1976 - dotted line(a); 1977 - solid line(b); 1978 - dotted line(b); 1979 - dashed line(b). Note: Each year begins with data from December of previous year.*

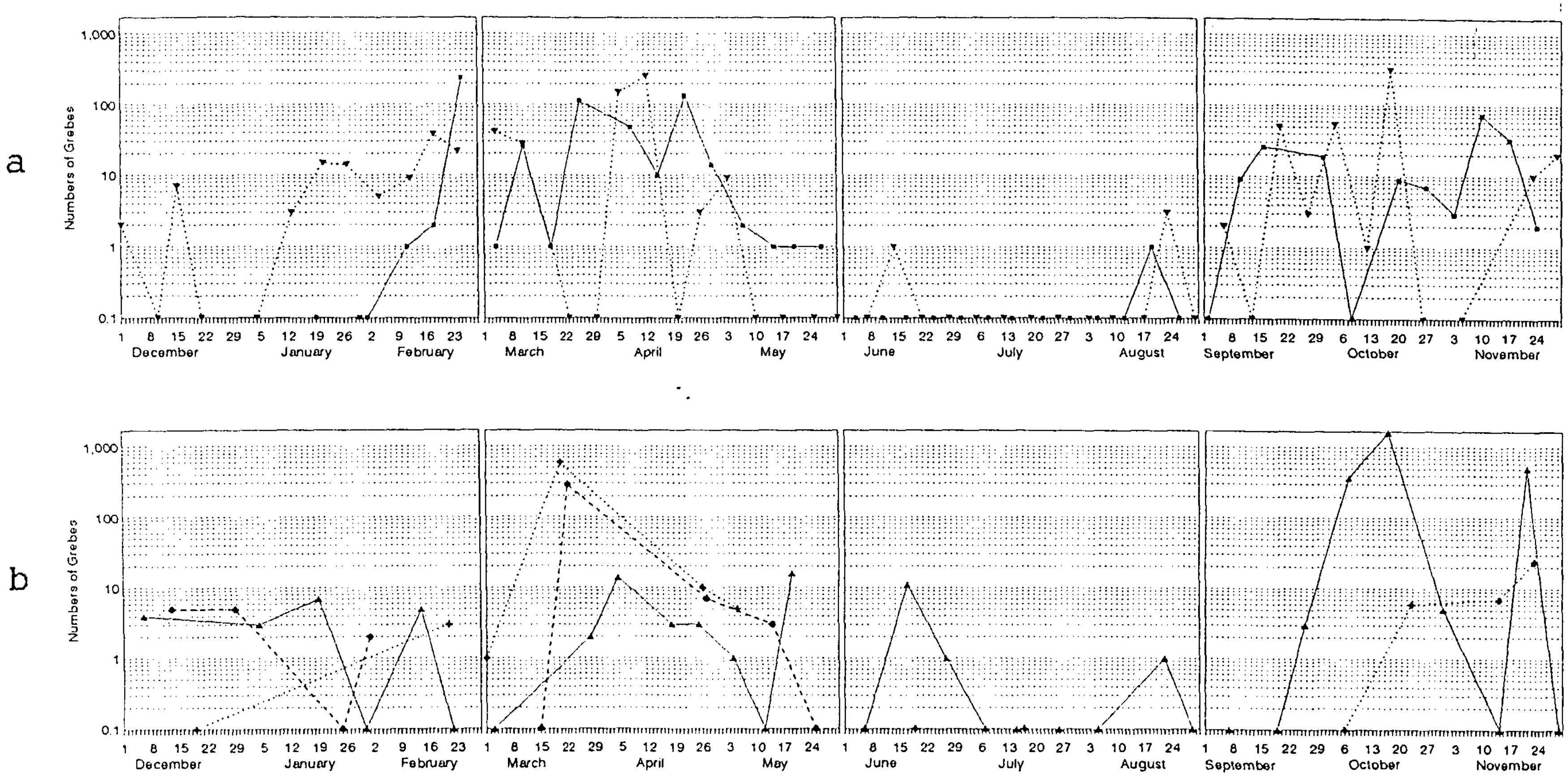

Figure 9. *Seasonal fluctuations in numbers of grebes on the Little Qualicum River estuary, winter 1974-1975 through spring 1979: 1975 - solid line(a); 1976 - dotted line(a); 1977 - solid line(b); 1978 - dotted line(b); 1979 - dashed line(b). Note: Each year begins with data from December of previous year.*

A total of 343 Horned Grebes was seen during the surveys (6% of all grebes). The earliest arrival occurred between on 23 August (1976) and the latest departure was 20 May (1975); Horned Grebes were not recorded outside of this overwintering period. Seasonal numbers were highest in autumn (45%) when a peak of 26 birds was recorded on 4 October 1976; the spring numbers (32%) were also higher than those of winter (22%).

We saw a total of 147 Red-necked Grebes over the study period. The earliest arrival was 22 August (1977) and the latest departure was 15 May (1975); outside of this period each year the species was not seen. Most of the birds were seen in autumn (65%); a peak of 17 grebes was observed on 1 October 1975. The total number of Red-necked Grebes counted in winter and spring over the study period was almost equal. Abundance of this species on the estuary (based on a ratio of the number of birds seen each year over the number of surveys done) declined by approximately 50% during the study but the data is too limited to draw any conclusion. The species was on the 'Blue List' (threatened status) during the entire study period but was delisted in 1982 due to an apparent increase in numbers at that time (Campbell et al. 1990).

One Pied-billed Grebe was recorded using the estuary on 19 August 1975.

Cormorants: Two species of cormorants were recorded with a combined total of 116 birds (<1% of all birds). The total numbers of Pelagic Cormorants and Double-crested Cormorants identified were equal. In addition, a total of 8 birds was recorded simply as cormorant species. For seasonal fluctuations in the numbers of all cormorants combined, see Figure 10.

A total of 54 Double-crested Cormorants was observed. This species is an uncommon resident on the estuary. It occurred mostly in summer (57%); in spring and autumn, the average numbers were equal (20%) and only 1 bird was seen in winter. A peak of 8 birds was recorded on 9 August 1975.

The total number of Pelagic Cormorants was also 54 birds. However, in contrast with the Double-crested Cormorant, most of the Pelagic Cormorants were seen in autumn (54%) and summer (31%); 4 birds were seen the winter and 4 birds in the spring. The maximum number seen in a day was 6 birds on 27 September 1976.

Herons: The Great Blue Heron was the only species of heron reported over the study period; a total of 301 birds were seen (<1% of all birds). The highest numbers of herons occurred in summer (37%); the lowest counts were made in winter (13%). The frequency of occurrence was high, usually above 66%. A peak of 15 individuals was recorded on 17 June 1977.

Swans: A total of 161 swans was reported during the study period (<1% of all birds). All were Trumpeters except 7 birds that were recorded simply as swan species. The earliest arrival each year occurred from 14 to 24 November and the latest departure usually on 20 to 23 March; during the period of their stay, the frequency of occurrence was usually above 66%. Most Trumpeter Swans were observed in winter (68%) with a peak of 14 birds occurring on 25 January 1979 and again on the 1 February 1979.

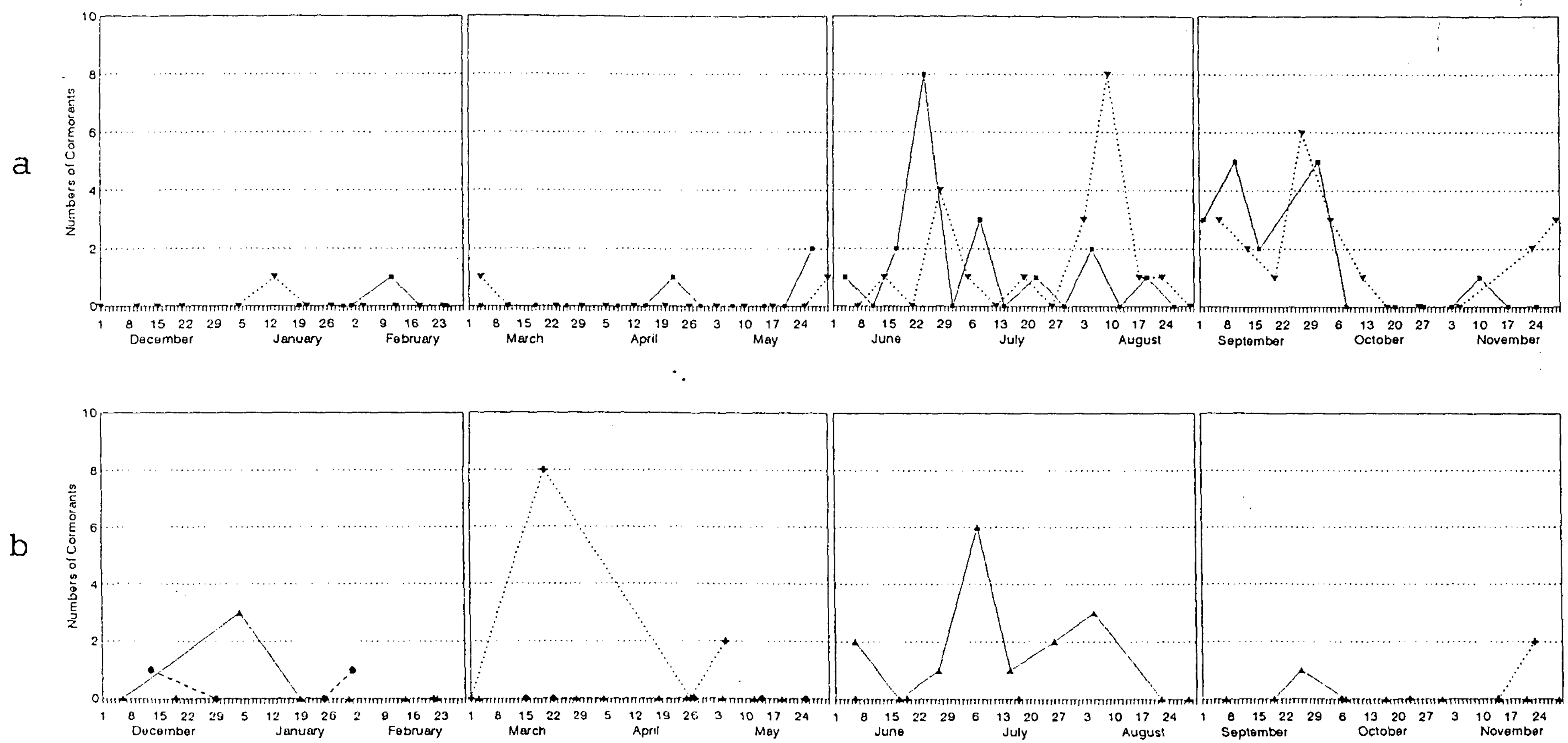

Figure 10. *Seasonal fluctuations in numbers of cormorants on the Little Qualicum River estuary, winter 1974-1975 through spring 1979: 1975 - solid line(a); 1976 - dotted line(a); 1977 - solid line(b); 1978 - dotted line(b); 1979 - dashed line(b). Note: Each year begins with data from December of previous year.*

Geese: Four goose species with a combined total of 10,361 birds (5% of all birds) were recorded during the study period. The Brant was the most abundant; a total of 10,197 was tallied (98% of all geese). All of the Brant passed through in spring except for 14 individuals seen on 6 September 1976. The earliest arrival was observed during the first 4 days of March, whenever those days were surveyed (1975, 1976, 1977 and 1978). The latest departure occurred between 25 April (1977) and 17 May (1976). In our surveys, the numbers of Brant always peaked during the early part of their presence on the estuary: 657 birds on 15 April 1975, 1359 birds on 23 March 1976, 527 birds on 28 March 1977, 649 birds on 20 March 1978, and 513 birds on 22 March 1979 (Figure 11).

We saw a total of 153 Canada Geese: 20 birds on 27 October 1975, 123 birds on 12 October 1976, 2 birds on 29 November 1976, 2 birds on 6 December 1976, 1 bird on 7 July 1977, 1 bird on 23 October 1978, 2 birds on 25 January 1979 and 2 birds on 1 February 1979.

A total of 9 Greater White-fronted Geese were seen during the study: 3 birds on 16 September 1975, 1 bird on 6 September 1976 and 5 birds on 12 October 1976.

The Snow Goose was seen twice: 1 bird on 20 October 1975 and 1 bird on 27 October 1975.

Dabbling Ducks: During the study period, 9 species of dabbling ducks were recorded representing a total of 15,905 birds (8% of all birds). The most abundant were the Mallard and the American Wigeon followed by the Green-winged Teal. The remaining species (together comprising < 3% of dabbling ducks) were: Northern Pintail, Blue-winged Teal, Eurasian Wigeon, Gadwall, Northern Shoveller and Wood Duck. During the autumn, a number of birds were reported simply as dabbling duck species; these amounted to a total of 4% of all dabbling ducks seen during the study.

Seasonal fluctuations in numbers of dabbling ducks are shown in Figure 12. Arrivals began in small numbers at the end of August and continued until the beginning of October when the numbers jumped; 58% of all dabbling ducks were reported in autumn. Through the winter, counts were also frequently high but by February the numbers on the estuary were dropping back to the low levels present in summer, as described for each species. The peak number during the study was 1113 birds recorded on 29 December 1978.

We saw a total of 6936 Mallards (44% of dabbling ducks). They were reported in every season of the study period but their numbers were comparatively low and their presence was discontinuous in spring (frequency of occurrence 64%) and even lower in summer; the period from 7 July to 9 August had no sightings at all. The Mallard was seen most in winter (55%) and autumn (42%) when it was recorded on almost every survey. Each year numbers began to climb at the beginning of October (Figure 13) and later reached a peak: 198 birds on 11 February 1975, 200 birds on 23 November 1976, 463 birds on 21 November 1977 and 833 birds on 29 December 1978. By the beginning of March, numbers had returned to the low levels of spring and summer. Normally, 1 or 2 broods are produced each year on the estuary.

American Wigeon numbers totalled 6515 birds over the study period (41% of dabbling ducks). The earliest arrival was a single bird on 26 August (1976)

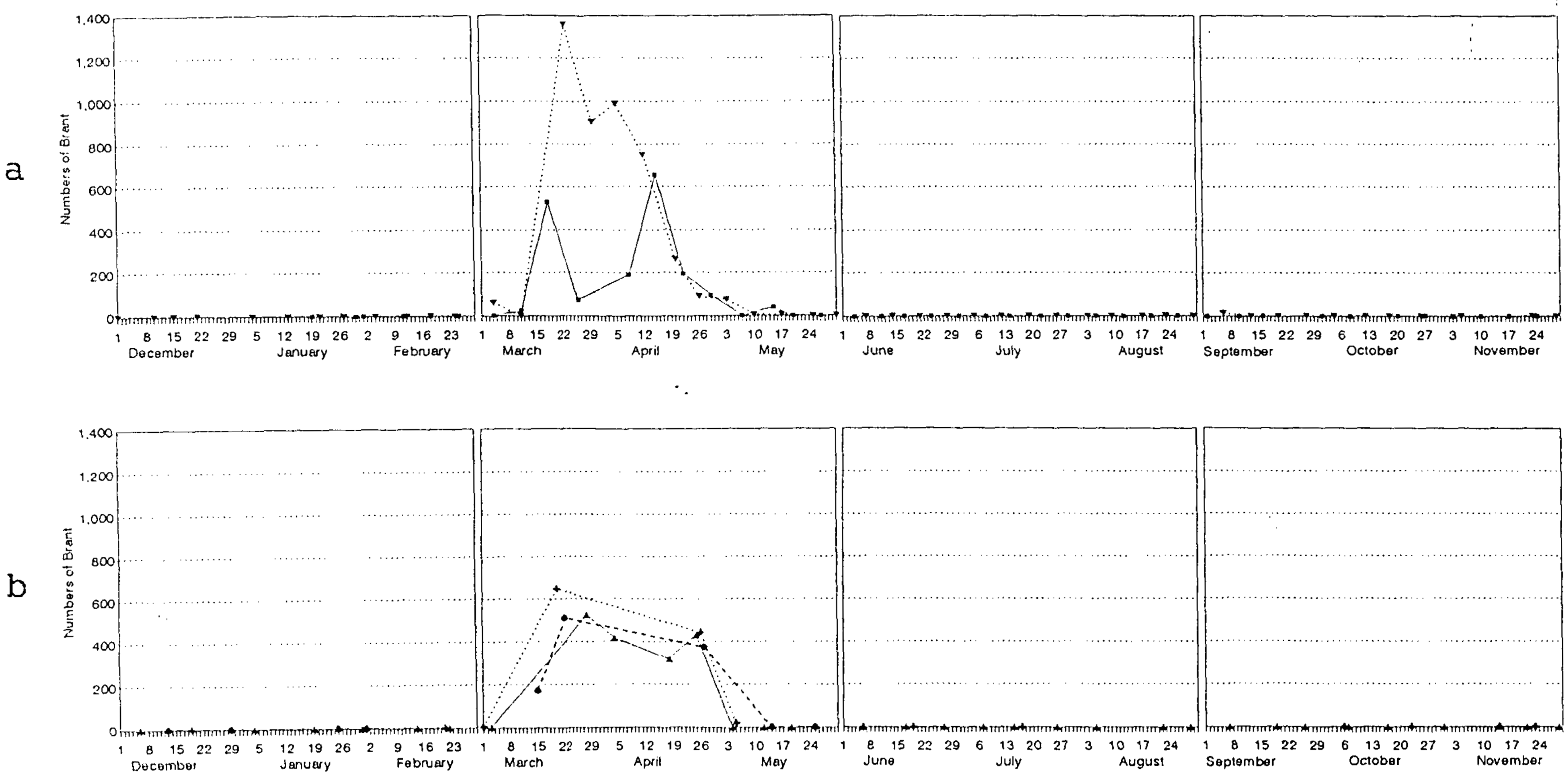

Figure 11. *Seasonal fluctuations in numbers of Brant on the Little Qualicum River estuary, winter 1974-1975 through spring 1979: 1975 - solid line(a); 1976 - dotted line(a); 1977 - solid line(b); 1978 - dotted line(b); 1979 - dashed line(b). Note: Each year begins with data from December of previous year.*

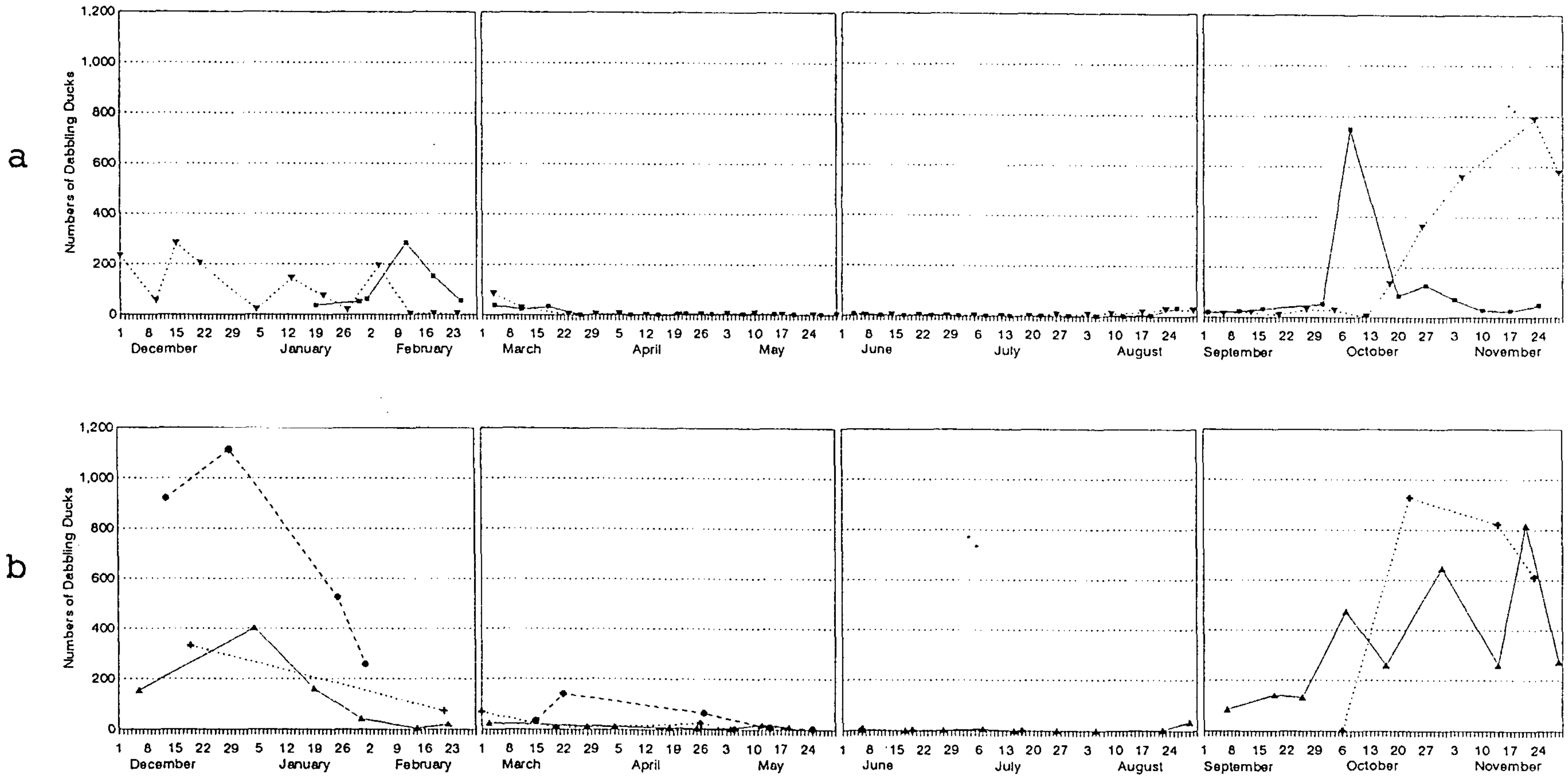

Figure 12. *Seasonal fluctuations in numbers of Dabbling Ducks on the Little Qualicum River estuary, winter 1974-1975 through spring 1979: 1975 - solid line(a); 1976 - dotted line(a); 1977 - solid line(b); 1978 - dotted line(b); 1979 - dashed line(b). Note: Each year begins with data from December of previous year.*

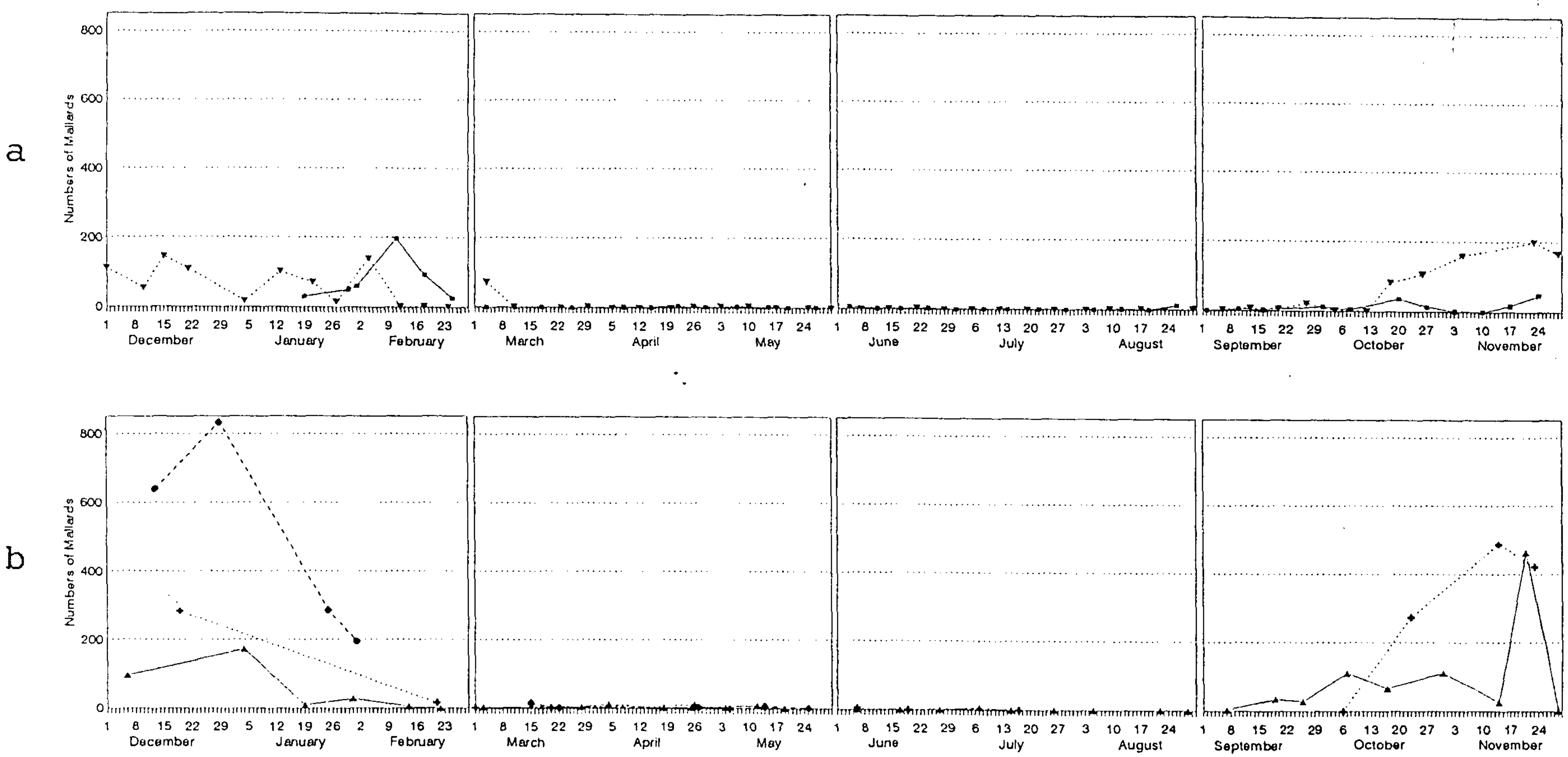

Figure 13. *Seasonal fluctuations in numbers of Mallards on the Little Qualicum River estuary, winter 1974-1975 through spring 1979: 1975 - solid line(a); 1976 - dotted line(a); 1977 - solid line(b); 1978 - dotted line(b); 1979 - dashed line(b). Note: Each year begins with data from December of previous year.*

and the latest departure occurred each year between 26 March (1975) and the 27 April (1979) with the exception of 2 stragglers seen on 12 May (1977). Seasonal fluctuations in the numbers seen are shown in Figure 14. The majority of American Wigeons were seen in autumn (70%); the height and the timing of the peak numbers in the autumn migration were relatively consistent: 638 birds on 8 October 1975, 581 birds on 23 November 1976, 481 birds on 31 October 1977 and 610 birds on 23 October 1978.

The Green-winged Teal was the third most abundant dabbling duck with a total of 1331 birds (8% of dabbling ducks). The earliest arrival was 17 August (1976) and the latest departure was 19 May (1977). Seasonal fluctuations in the abundance of Green-winged Teal are shown in Figure 15. Numbers were usually highest in autumn (53% of all Green-winged Teal) and winter (36%) but even then the presence of these ducks was erratic; the probability of seeing a Green-winged Teal on the estuary for any day in autumn ranged over the years from 50% to 89%; for winter it ranged from 0% to 100%. Peak numbers were recorded: 60 birds on 8 October 1975, 69 birds on 5 November 1976, 150 birds on 19 January 1977 and 23 Birds on 23 October 1978.

Northern Pintail numbers totalled 362 birds (2% of dabbling ducks). The earliest arrival dates in the autumn migration were from 17 August to 29 August (in 1975, 1976 and 1977). Most pintails had left by the end of November but 1 or 2 birds either stayed on or returned occasionally in December, January and February; the latest departure was 18 February 1975 during this study. The year 1978 appears to be unusual in that the first record on the estuary was 20 pintails on 23 October; this might be explained by the lack of surveys in August and September of that year. Nevertheless, in this study it was unusual for 12 birds to be seen on 29 December 1978, and 8 birds on 25 January 1979. In total over the years surveyed, the species was seen most in autumn (78%) when the following peak numbers were recorded: 45 birds on 8 October 1975, 21 birds on 4 October 1976 and 70 birds on 19 September 1977.

A total of 50 Blue-winged Teal were tallied during the survey. The earliest arrival was 10 May (1976) and the latest departure was 23 August (1976). Most of these teal were seen in the summer of 1976 (28 birds) when a peak of 7 birds was recorded 3 times. The remainder were seen in the spring of 1976 (2 birds), in the spring of 1977 (16 birds) and in the summer of 1977 (4 birds). Overall, the peak number recorded was 8 birds on 12 May 1977 and again on 19 May 1977. There were no Blue-winged Teal seen in 1975, 1978 or 1979; however, there were 3 teal recorded simply as teal species.

We saw a total of 16 Eurasian Wigeon over the study period: 10 birds in winter, 5 birds in autumn and 1 bird in spring. The earliest arrival occurred on 26 October (1976) and the latest departure was 11 February (1975) except for 1 bird recorded on 28 March 1977. The maximum of 2 birds was recorded on 2 occasions.

Four Gadwall were observed over the study period: 2 birds on 21 December 1975 and 2 birds on 13 January 1976.

Three Northern Shovellers were reported over the study period: 1 on 17 August 1976, 1 on 22 August 1977 and 1 on 21 November 1977.

Two Wood Ducks were reported on the estuary on 17 October 1977.

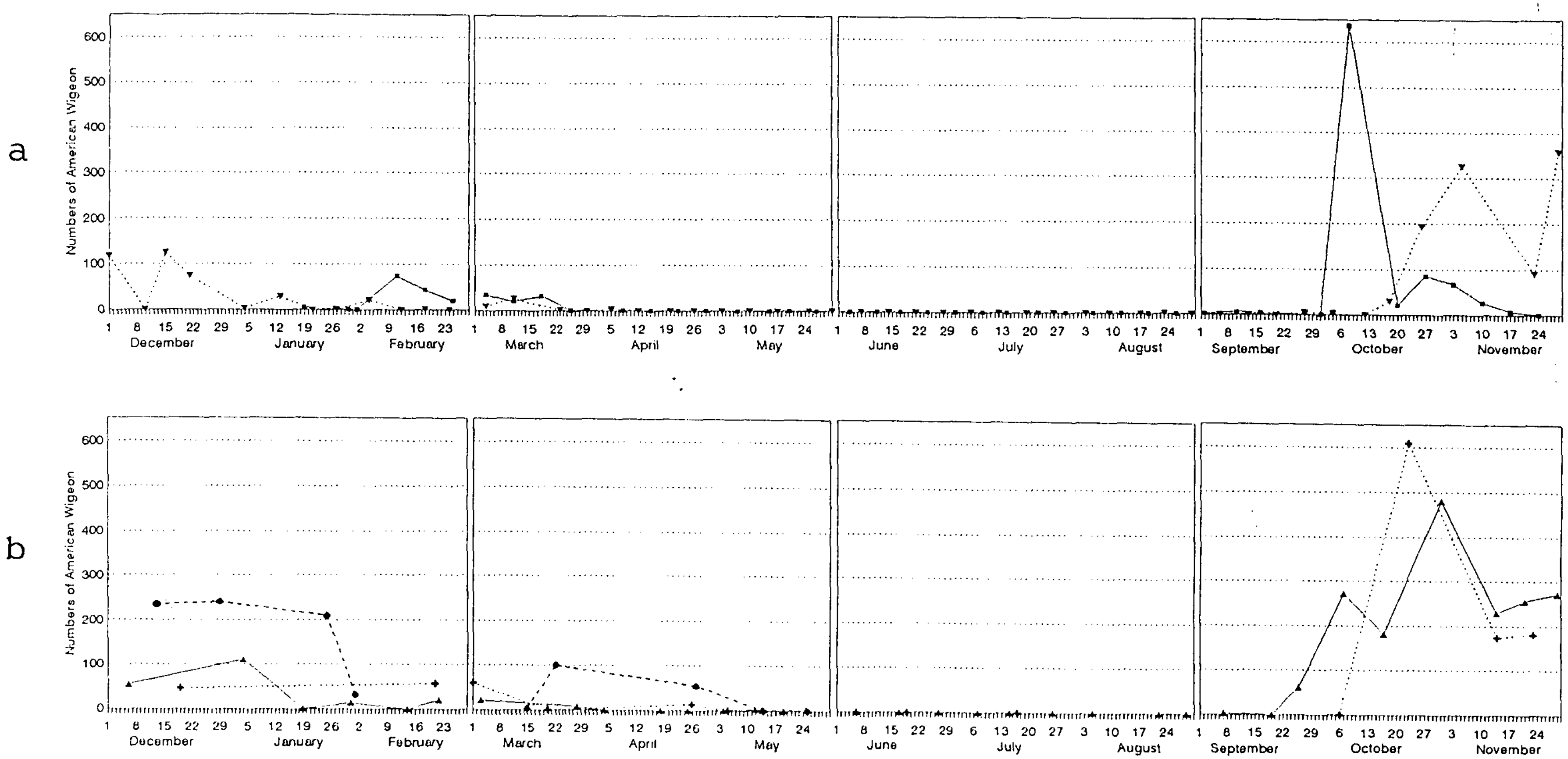

Figure 14. *Seasonal fluctuations in numbers of American Wigeon on the Little Qualicum River estuary, winter 1974-1975 through spring 1979: 1975 - solid line(a); 1976 - dotted line(a); 1977 - solid line(b); 1978 - dotted line(b); 1979 - dashed line(b). Note: Each year begins with data from December of previous year.*

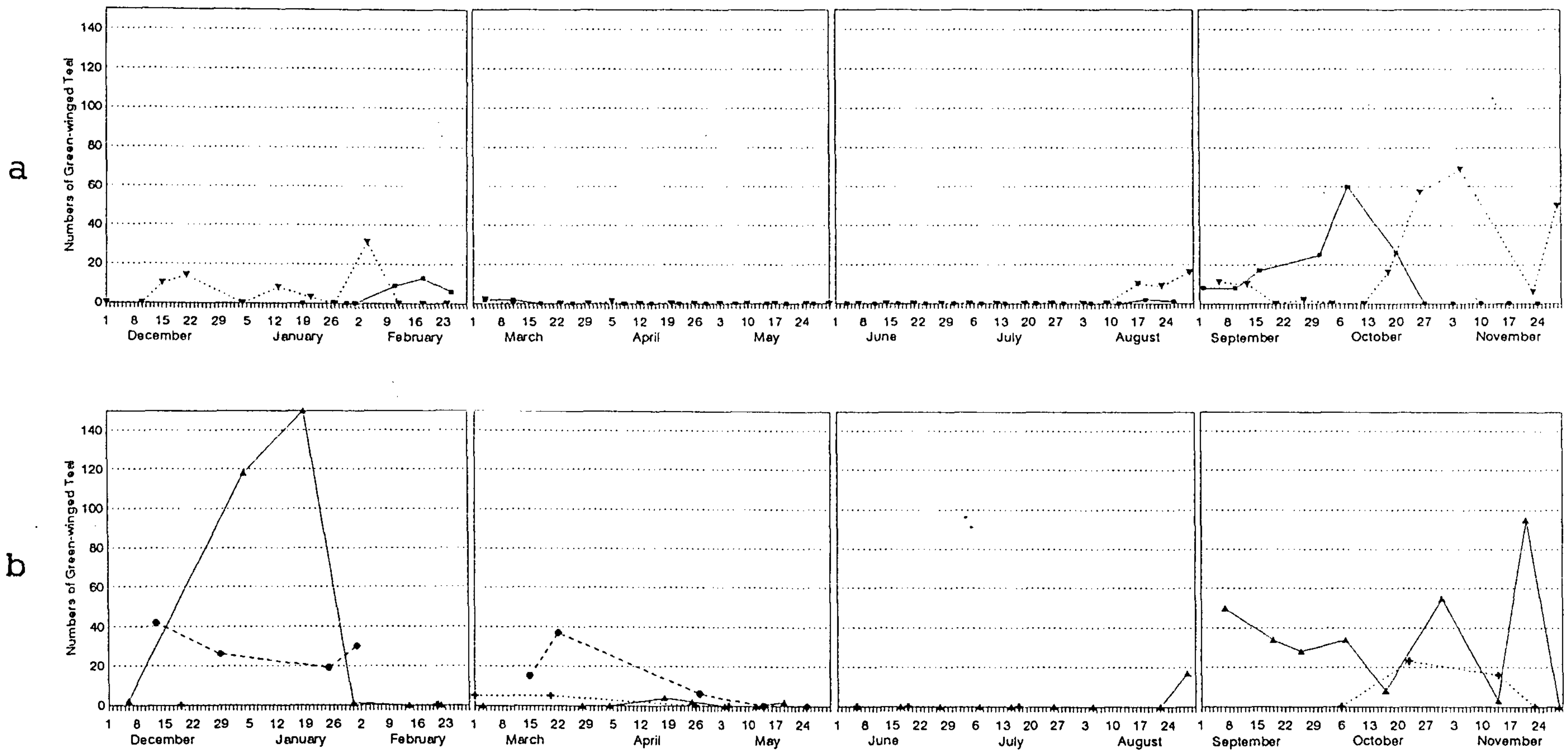

Figure 15. *Seasonal fluctuations in numbers of Green-winged Teal on the Little Qualicum River estuary, winter 1974-1975 through spring 1979: 1975 - solid line(a); 1976 - dotted line(a); 1977 - solid line(b); 1978 - dotted line(b); 1979 - dashed line(b). Note: Each year begins with data from December of previous year.*

Diving Ducks: During the study period, 14 species of diving ducks were recorded with a combined total of 60,083 birds (30% of all birds). The most numerous group was the scoters with a combined total of 36,201 birds (60% of all diving ducks) which included the Surf Scoter, the Black Scoter and the White-winged Scoter; however 61% of this total for all scoters was reported simply as scoter species. After the scoters, the Oldsquaw was the most abundant diving duck followed by Common Goldeneye, Greater Scaup, Bufflehead, Common Merganser and Harlequin Duck. The remaining species (together comprising < 1% of all diving ducks) were: Red-breasted Merganser, Hooded Merganser, Barrow's Goldeneye, Ruddy Duck and Ring Necked Duck.

From a summer population that was usually between 10 and 150 diving ducks, numbers increased through autumn (Figure 16) and reached an autumn migration peak of between 475 and 800 birds in November or December, then declined slightly through the remainder of winter. However, the greatest numbers of diving ducks were observed in spring (67%) when single-day counts of over 1000 birds occurred: 1257 birds on 15 April 1975, 1160 birds on 5 April 1976, 3372 birds on 12 April 1976, 1379 birds on 20 April 1976, 1147 birds on 25 April 1977, 6398 birds on 20 March 1978, 7214 birds on 15 March 1979 and a peak of 8764 birds on 22 March 1979. In some years the highest numbers were in conjunction with a Pacific Herring spawn in mid March but in most years the peak was in April. The majority of surviving herring eggs would likely be hatching at that time and the numbers of juvenile Chum would be starting to increase.

The most abundant of the scoters identified was the Surf Scoter, with a total of at least 6521 birds (11% of all diving ducks). The birds were present in every season but in July and August numbers were low (< 15 birds) and occurrence sporadic. Most Surf Scoters were seen in spring (78%) when the following peaks were recorded: 1147 birds on 15 April 1975, 977 birds on 20 April 1976, 805 birds on 25 April 1977, 466 birds on 26 April 1978. The only survey in April of 1979 did not record any Surf Scoters. During autumn and winter the number of Surf Scoters on the estuary was usually between 10 and 100 birds; there were no consistent peaks to mark autumn movements (Figure 17).

The number of Black Scoters identified totalled 4350 birds (7% of all diving ducks). The earliest arrival occurred in the period from 26 September to 23 October and the latest departure was from 25 April to 5 May except for 3 birds seen on 6 June 1977. Black Scoters were seen most in spring (42%) and autumn (34%); the numbers of Black Scoters in autumn always exceeded the numbers of Surf Scoters during this study. Spring migrational peaks of more than 175 Black Scoters occurred consistently in April; the highest number observed during the study was 346 birds on 12 April 1976. Autumn migration was marked by lesser peaks, as shown in Figure 18.

We recorded 3204 White-winged Scoters (5% of all diving ducks). The earliest arrivals came in September or October and the latest departures by 1 July except in 1976 when 3 birds were seen on the estuary on 3 August. The White-winged Scoter, unlike the other 2 scoters, was most abundant in autumn (38%) and winter (37%). Peaks numbers occurred within a 3 week period in autumn: 182 birds on 7 November 1975, 139 birds on 23 November 1976, 86 birds on 31 October 1977 and 66 birds on 23 November 1978 (Figure 19).

a

b

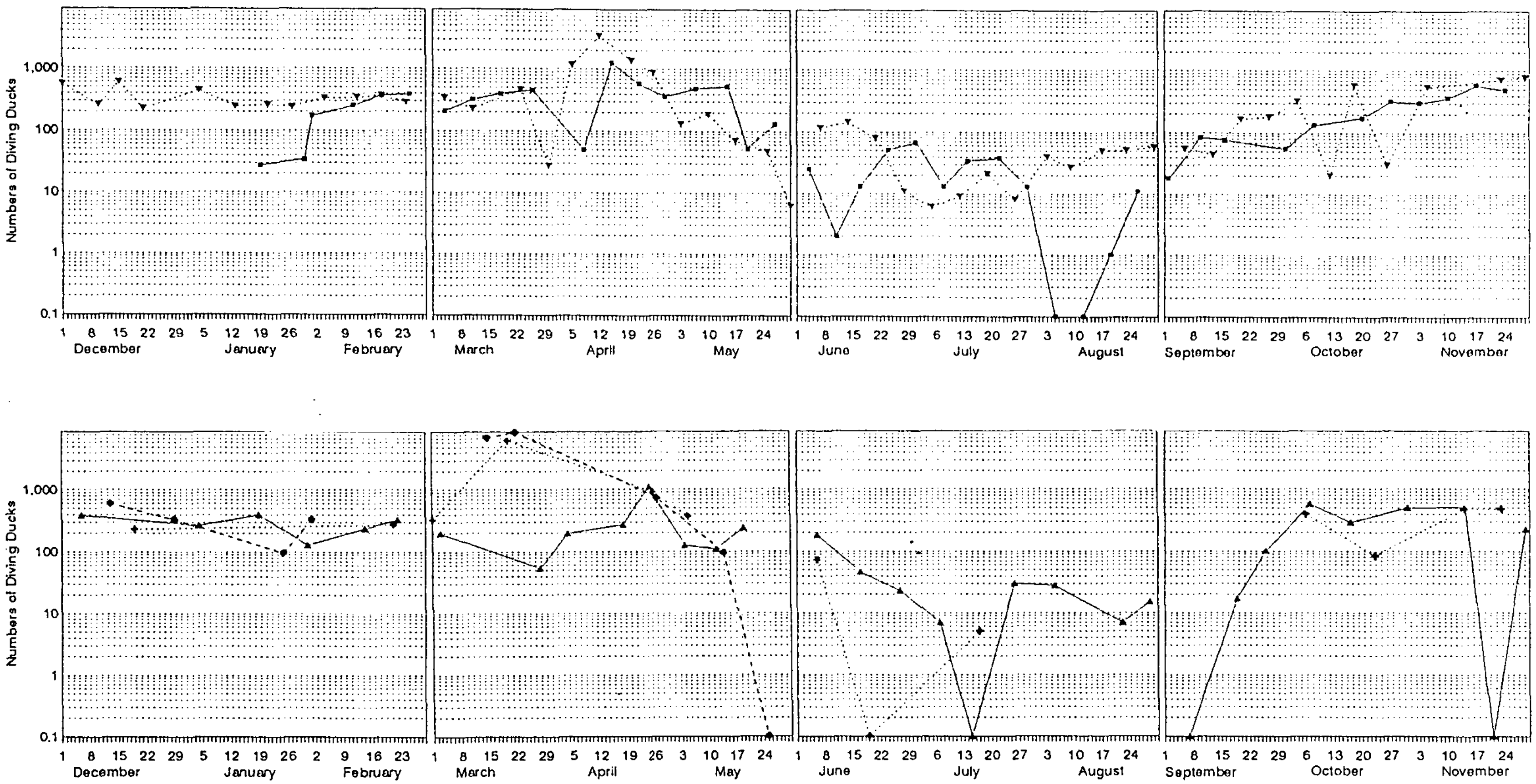

Figure 16. *Seasonal fluctuations in numbers of Diving Ducks on the Little Qualicum River estuary, winter 1974-1975 through spring 1979: 1975 - solid line(a); 1976 - dotted line(a); 1977 - solid line(b); 1978 - dotted line(b); 1979 - dashed line(b). Note: Each year begins with data from December of previous year.*

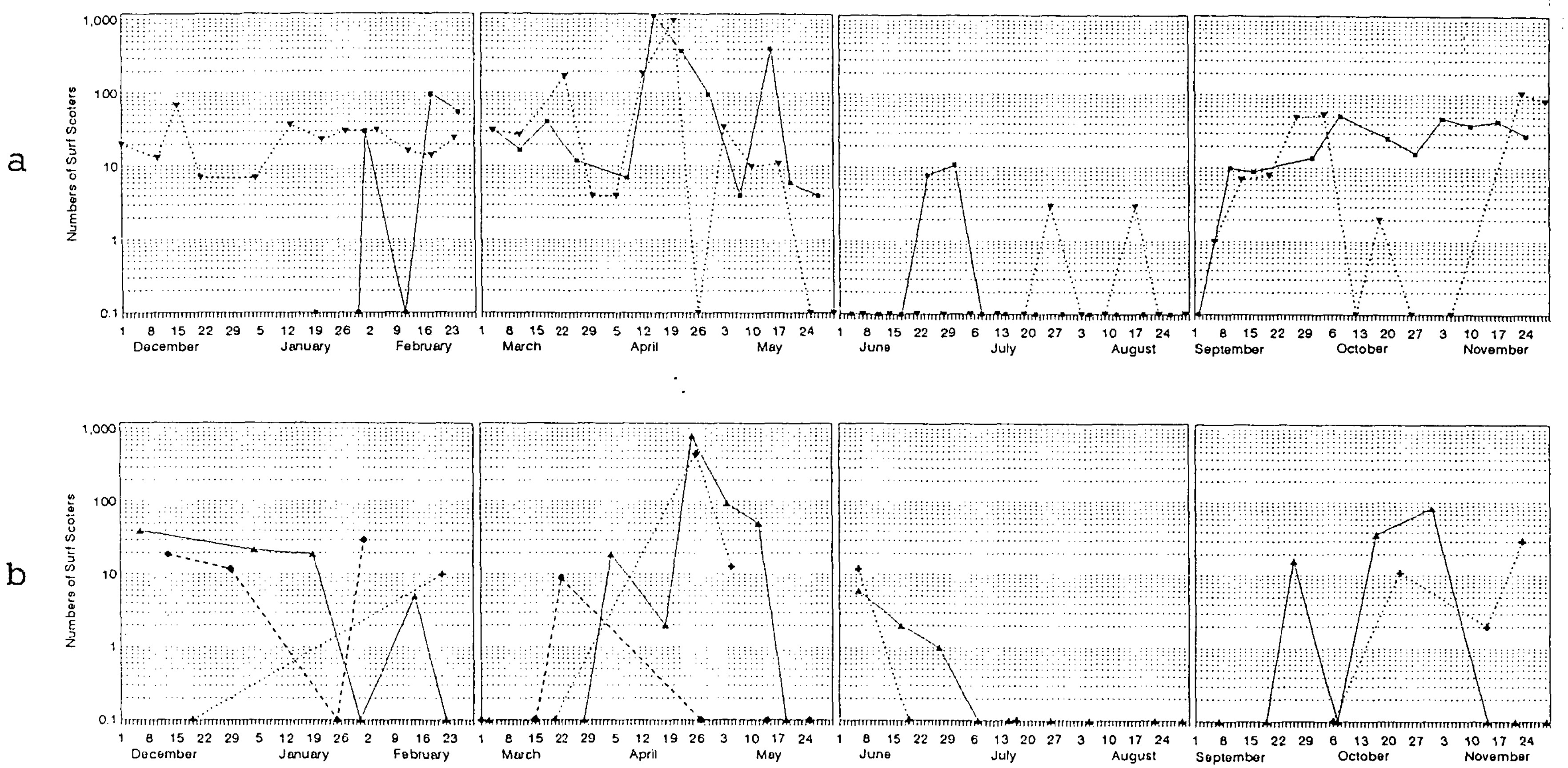

Figure 17. *Seasonal fluctuations in numbers of Surf Scoters on the Little Qualicum River estuary, winter 1974-1975 through spring 1979: 1975 - solid line(a); 1976 - dotted line(a); 1977 - solid line(b); 1978 - dotted line(b); 1979 - dashed line(b). Note: Each year begins with data from December of previous year.*

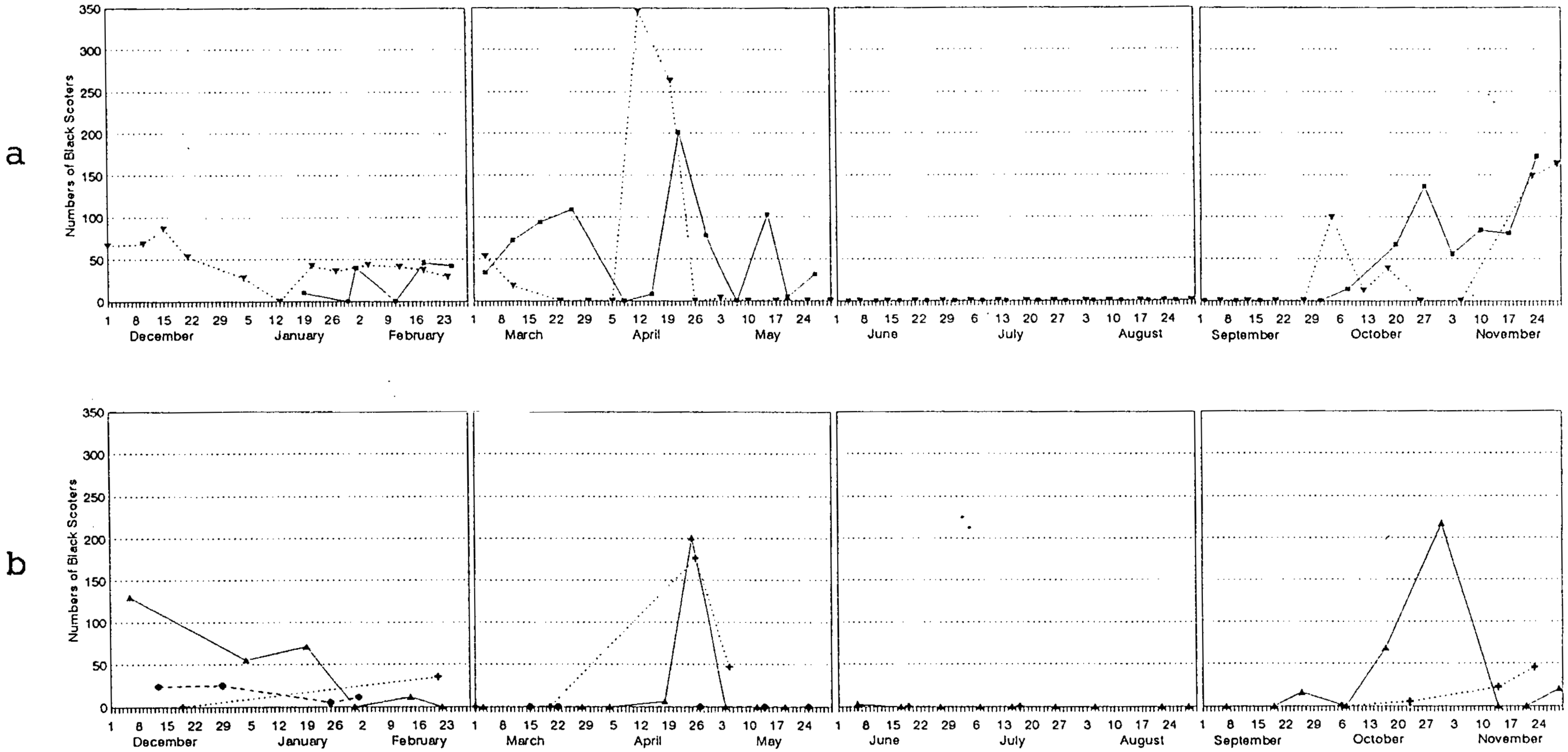

Figure 18. *Seasonal fluctuations in numbers of Black Scoters on the Little Qualicum River estuary, winter 1974-1975 through spring 1979: 1975 - solid line(a); 1976 - dotted line(a); 1977 - solid line(b); 1978 - dotted line(b); 1979 - dashed line(b). Note: Each year begins with data from December of previous year.*

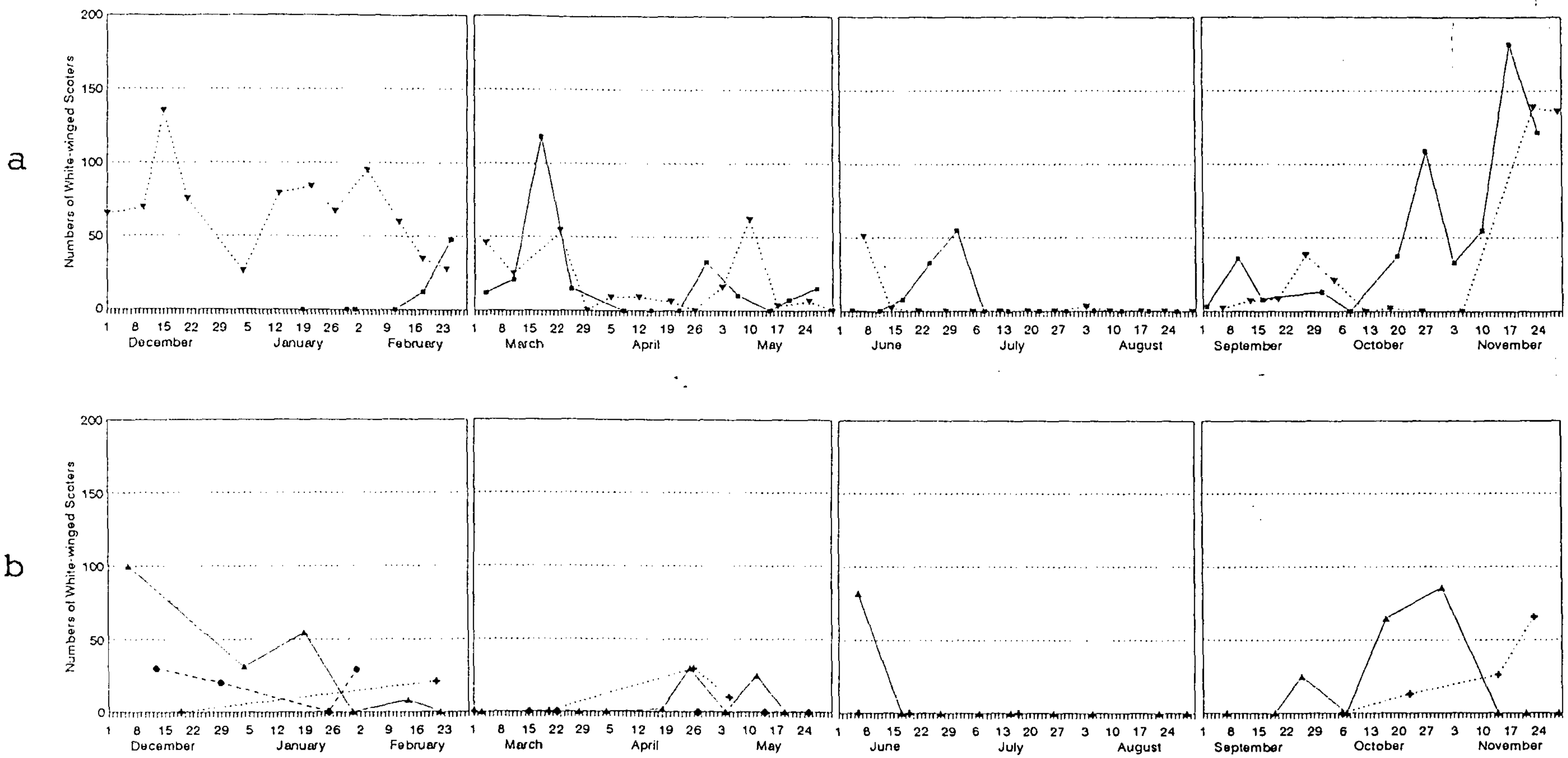

Figure 19. *Seasonal fluctuations in numbers of White-winged Scoters on the Little Qualicum River estuary, winter 1974-1975 through spring 1979: 1975 - solid line(a); 1976 - dotted line(a); 1977 - solid line(b); 1978 - dotted line(b); 1979 - dashed line(b). Note: Each year begins with data from December of previous year.*

The most abundant diving duck after the scoters was the Oldsquaw with a total 7629 individuals seen (13% of all diving ducks). The earliest arrival recorded during the study was 18 October (1976) and the latest departure was 19 May (1977). During this period, the frequency of occurrence was low (33% on average), in spite of their high numbers. Almost all of these ducks were seen in spring (99%); 3 surveys which coincided with the spawning of Pacific Herring account for 96% of all the Oldsquaw seen: 1290 birds on 20 March 1978, 2800 birds on 15 March 1979 and 3230 birds on 22 March 1979. Peak numbers for other years illustrate the irruptive nature of this species on the estuary: 61 birds on 15 April 1975, 39 birds on 23 March 1976 and 34 birds on 18 April 1977.

Two species of Goldeneye were reported during the surveys. The Common Goldeneye ranked fifth in abundance among the diving ducks with a total of 5595 birds seen (9% of all diving ducks). The earliest arrival was reported in the period from 6 October to 3 November of each year and the latest departure occurred from the end of March to 15 May. From the first to the last sighting of each year, between 10 and 100 Common Goldeneye were present almost continuously (Figure 20); the frequency of occurrence was 100% in winter, 87% in autumn and 70% in spring. Nevertheless, most of the birds (65%) were seen in spring. The peak number for each year was: 135 birds on 17 November 1975, 470 birds on 12 April 1976, 53 birds on 19 January 1977, 502 birds on 20 March 1978 and 1611 birds on 15 March 1979.

Two Barrow's Goldeneye were observed over the study period: 1 bird on 26 April 1976 and 1 bird on 13 December 1978.

A total of 4488 Greater Scaup was reported (7% of all diving ducks). Their earliest arrival each year was reported from 27 September to 23 October and the latest departure occurred from 15 March to 12 May. Between first and last appearances, the scaup's presence on the estuary was not continuous (average frequency of occurrence = 64% during those times). No scaups were seen in summer. Numbers were highest in spring (88% of all Greater Scaups) when scaups were sometimes present in large numbers (especially in 1976) among the many other diving ducks congregating as a prelude to migration and possibly feeding on newly hatched Pacific Herring fry or arrivals of juvenile Chum Salmon. However, in other years (especially 1975 and 1977) most or all of the Greater Scaup had apparently left the area prior to the major congregation of diving ducks in April. This is illustrated by a comparison of seasonal fluctuations in the numbers of Greater Scaup (Figure 21) with the fluctuations in the total numbers of diving ducks (Figure 16). Peak numbers of scaup for each year varied: 179 birds on 26 March 1975, 1840 birds on 12 April 1976, 18 birds on 19 January 1977, 450 birds on 20 March 1978, 360 birds on 15 March 1979.

a

b

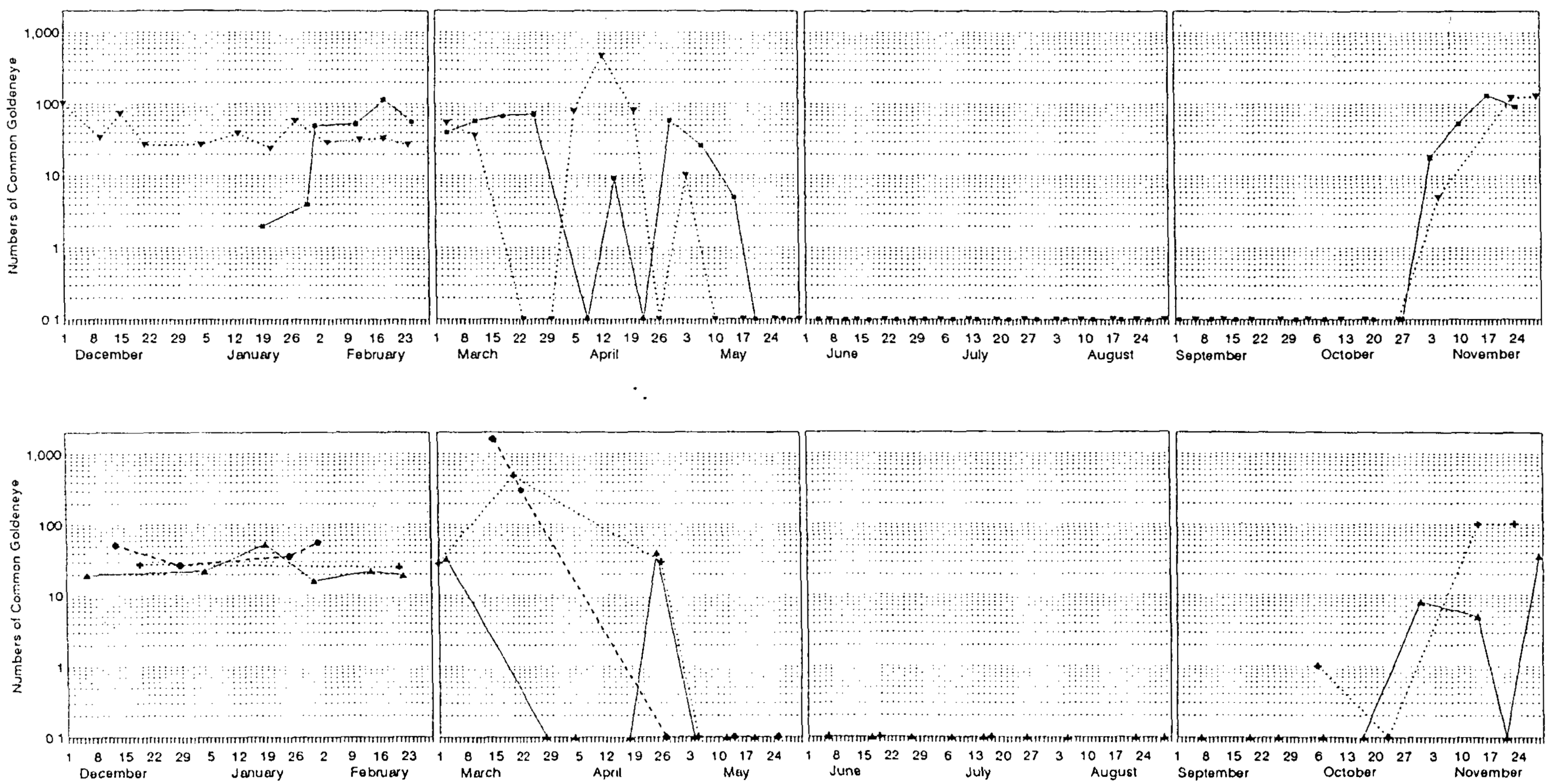

Figure 20. *Seasonal fluctuations in numbers of Common Goldeneye on the Little Qualicum River estuary, winter 1974-1975 through spring 1979: 1975 - solid line(a); 1976 - dotted line(a); 1977 - solid line(b); 1978 - dotted line(b); 1979 - dashed line(b). Note: Each year begins with data from December of previous year.*

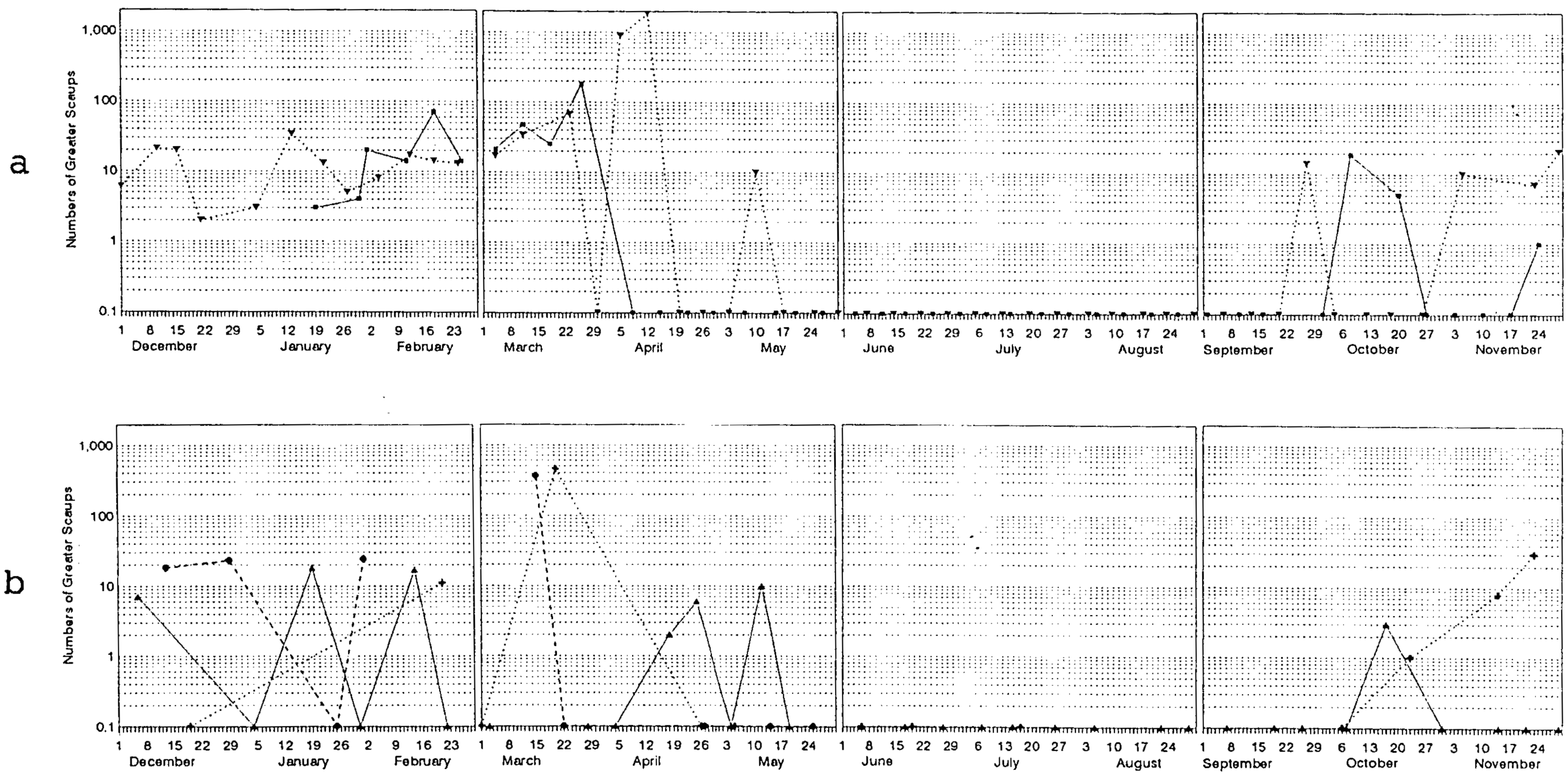

Figure 21. *Seasonal fluctuations in numbers of Greater Scaups on the Little Qualicum River estuary, winter 1974-1975 through spring 1979: 1975 - solid line(a); 1976 - dotted line(a);*
1977 - solid line(b); 1978 - dotted line(b); 1979 - dashed line(b).
Note: Each year begins with data from December of previous year.

The total number of Bufflehead seen over the study period was 2698 birds (4% of all diving ducks). During this study, the earliest arrival was always seen in the period from on 23 October to 31 October and the latest departure occurred from 25 April to 7 May, except for 1 straggler on 15 May 1975 and another on 6 June 1977. While overwintering, Bufflehead used the estuary almost continuously (frequency of occurrence = 97% on average). The numbers present fluctuated from week to week (see Figure 22) but the average number seen in each season remained relatively constant; in spring 37% of all Bufflehead were tallied, in winter 33% and in autumn 29%. The peak number for each year sometimes occurred in the spring migration and sometimes in the autumn: 106 birds on 17 November 1975, 97 birds on 12 April 1976, 57 birds on 31 October 1977, 82 birds on 14 November 1978 and 150 birds on 22 March 1979.

Three species of mergansers were recorded. The Common Merganser, with a total of 1842 birds tallied (3% of all diving ducks), was by far the most abundant; it was observed in every season on almost every survey (frequency of occurrence = 89% overall). Seasonal fluctuations in the numbers of Common Mergansers are shown in Figure 23. Winter had the highest seasonal average (30%) due mainly to the peak of 267 birds seen on 13 December 1978; the counts for summer (27%), spring (25%) and autumn (18%) were close behind. Other peaks occurred at various times of year: 38 birds on 22 July 1975, 49 birds on 20 September 1976, 49 birds on 28 March 1977 and 56 birds 1 March 1978.

The Red-breasted Merganser was the second most abundant merganser with a total of 164 birds reported. The birds were seen in every season but the numbers varied. The largest numbers were seen in autumn (49%) and spring (37%); far fewer were seen in winter (12%) and summer (2%). Peaks were recorded at various times of the year: 16 birds on 10 November 1975, 8 birds on 4 February 1976, 17 birds on 19 September 1977 and 13 birds on 20 March 1978.

Hooded Merganser numbers totalled 29 birds. During the study, the earliest arrival always occurred in the period from 7 to 27 October and the latest departure from 21 January to 14 February. Most of the birds were seen in autumn (72%) and the remainder occurred in winter. The peak number of 4 birds was recorded on 7 October 1977.

We saw total of 1382 Harlequin Ducks. They occurred in every season surveyed, however there was a period of approximately 4 to 8 weeks each summer when no Harlequin Ducks were present (Figure 24). The earliest arrival each year occurred from 17 August to 26 September (excluding 1978 because August and September were not surveyed) and the latest departure occurred from 6 June to 21 June. During autumn, winter and spring the frequency of occurrence averaged 68%. The species was most abundant in spring (32%) and autumn (31%); counts in winter (19%) and summer (18%) were lower. The following peak numbers indicate that Harlequin Ducks did not congregate during herring spawns on the Little Qualicum River estuary: 76 birds on 27 May 1975, 62 birds on 14 June 1976, 62 birds again almost one year later on 6 June 1977 and 85 birds on 5 May 1978.

Three Ruddy Ducks were seen: 1 bird on 29 December 1978 and 2 birds on 1 February 1979.

The Ring-necked Duck was seen twice: 1 bird on 13 December 1979 and 1 bird on 29 December 1979.

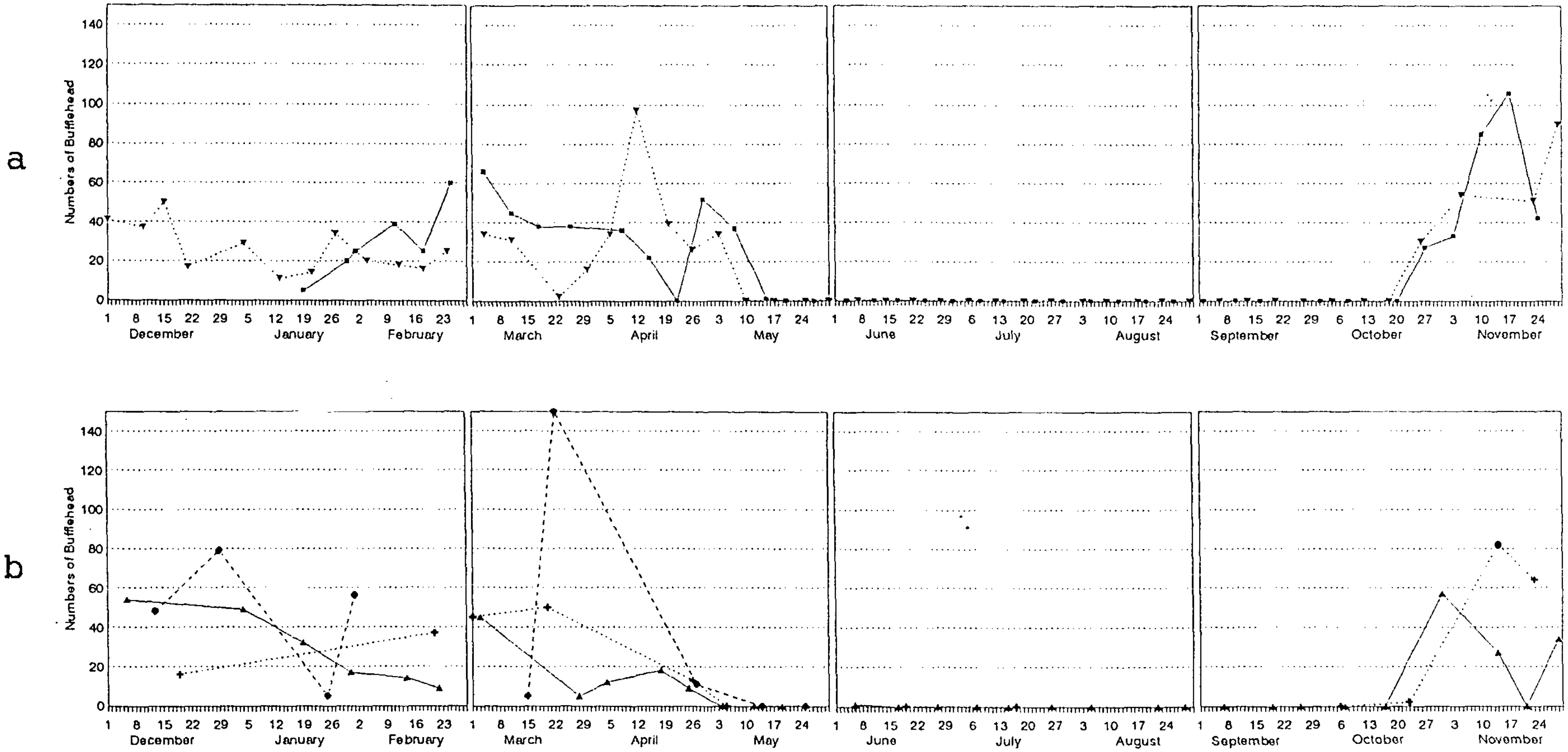

Figure 22. *Seasonal fluctuations in numbers of Bufflehead on the Little Qualicum River estuary, winter 1974-1975 through spring 1979: 1975 - solid line(a); 1976 - dotted line(a); 1977 - solid line(b); 1978 - dotted line(b); 1979 - dashed line(b). Note: Each year begins with data from December of previous year.*

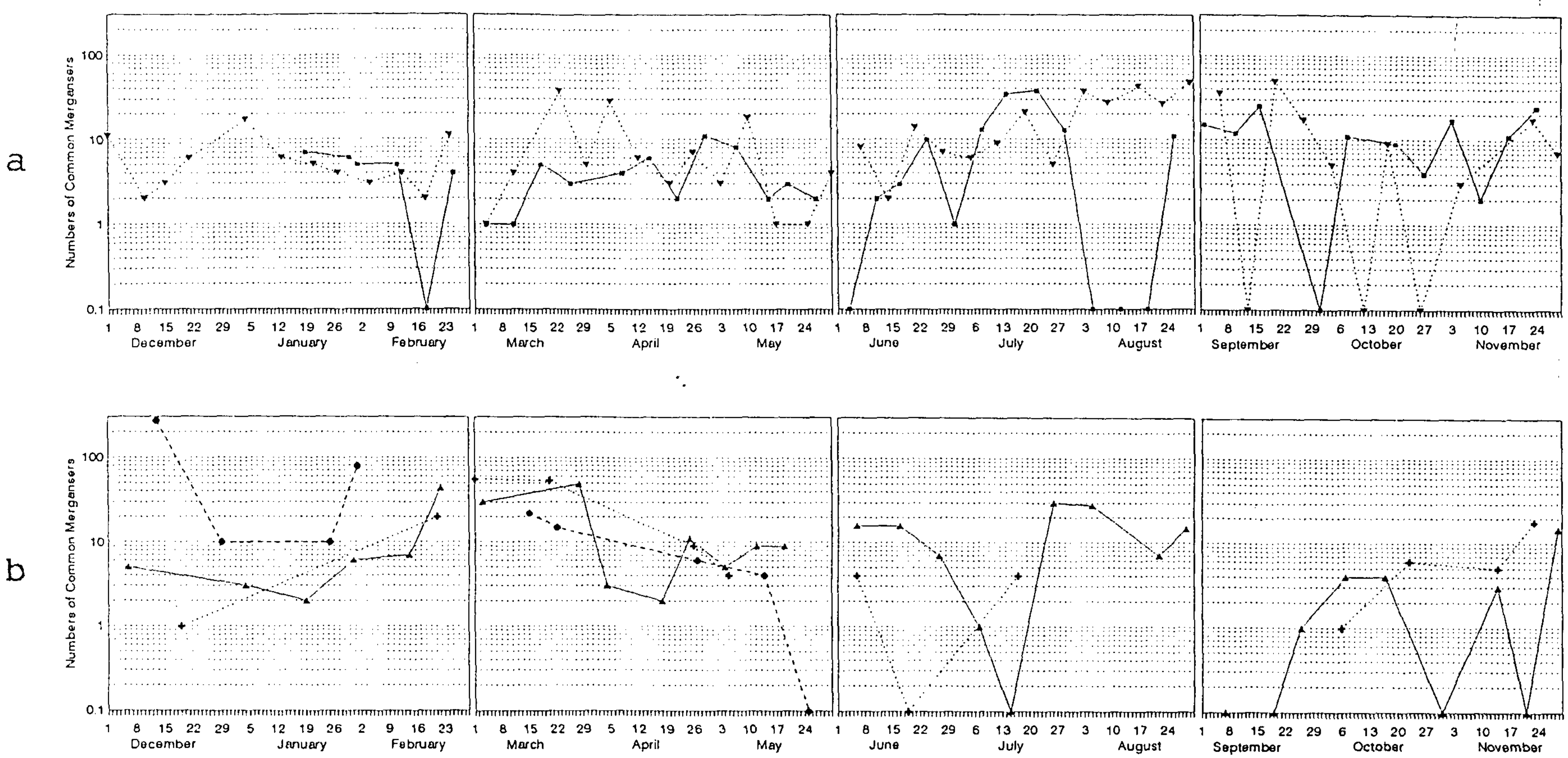

Figure 23. *Seasonal fluctuations in numbers of Common Mergansers on the Little Qualicum River estuary, winter 1974-1975 through spring 1979: 1975 - solid line(a); 1976 - dotted line(a); 1977 - solid line(b); 1978 - dotted line(b); 1979 - dashed line(b). Note: Each year begins with data from December of previous year.*

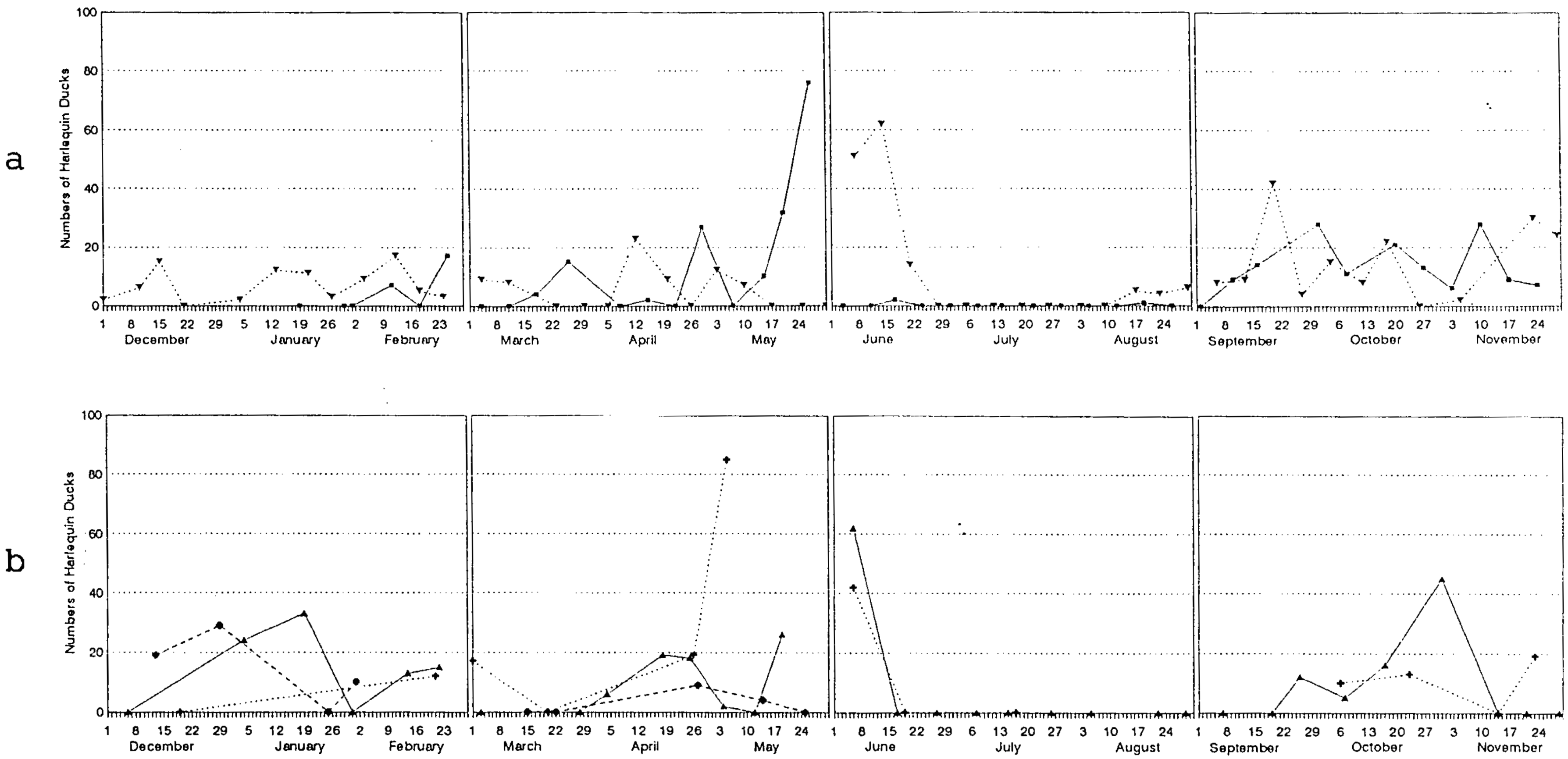

Figure 24. *Seasonal fluctuations in numbers of Harlequin Ducks on the Little Qualicum River estuary, winter 1974-1975 through spring 1979: 1975 - solid line(a); 1976 - dotted line(a); 1977 - solid line(b); 1978 - dotted line(b); 1979 - dashed line(b). Note: Each year begins with data from December of previous year.*

Raptors: The total number of raptors seen was 615 birds (<0.5% of all birds) representing 11 species.

The Bald Eagle was by far the most abundant raptor; a total of 555 was tallied (90% of raptors) over the study. Its presence was recorded in every season (frequency of occurrence = 61%). Numbers were lowest in autumn (5%) and summer (5%); most of the birds were seen in winter (80%) because of the presence of spawning chum salmon. Survey counts are especially high when the salmon carcasses are not flushed out of the system by high water. The Bald Eagle has been observed taking scoters and goldeneye on the estuary; for a detailed description, see Dawe (1976 and 1980). In this study, the 3 highest counts were: 96 birds on 13 December 1978, 51 birds on 21 December 1975 and 30 birds on 19 December 1977.

The observed numbers of Osprey totalled 20 birds (3% of raptors). During the first year, 1 or 2 Ospreys were seen using the estuary on 10 of the 14 surveys done in the period from 11 June 1975 to 10 September 1975 (frequency of occurrence = 71%). Dawe (1976) recorded the Osprey on the estuary as early as 28 April (1975) and as late as 10 October (1975); it was observed regularly hunting over open water during that year. The following year 1 or 2 birds were reported on 5 of the 22 surveys from 26 April 1976 to 20 September 1976 (frequency of occurrence = 23%). In 1977, there were only 3 sightings of one individual each on 4 May 1977, 6 June 1977 and 26 July 1977 (frequency of occurrence = 33%). No ospreys were recorded in the surveys of 1978 and 1979.

There were 13 records for the Merlin, all involving lone birds; most of them were seen in the summer and autumn. The earliest arrival was 28 June (1976) and the latest departure was 26 September (1977), except for 1 individual recorded on 15 December 1975. Successful hunts by a Merlin of barn swallows, a starling and a peep have been observed on the estuary at various times (Dawe 1976, 1980).

The total number of Cooper's Hawks recorded was 10; a single bird was seen on each of the following dates: 19 January 1977, 18 February 1975, 18 February 1976, 25 April 1977, 8 July 1975, 5 August 1977, 9 August 1976, 29 August 1977, 27 September 1976 and 4 October 1976.

The Sharp-shinned Hawk was sighted 8 times, 1 bird on each of the following surveys: 4 January 1977, 6 June 1977, 5 August 1975, 17 August 1976, 23 August 1976, 1 October 1975, 29 November 1976 and 29 December 1978.

We recorded 2 Turkey Vultures: 1 bird on 30 March 1976 and another on 19 June 1978.

Two American Kestrels were reported during the study period: 1 bird on 15 May 1975 and 1 bird on 26 August 1975.

The Red-tailed Hawk was also seen twice: 1 bird on 6 September 1976 and 1 bird on 23 November 1978.

One Northern Harrier was seen on 9 August 1976.

A single Northern Goshawk was sighted on 3 November 1975.

We recorded one Gyrfalcon on 24 November 1975, seconds after it had taken a female or juvenile Bufflehead. The falcon flew out over open water, mobbed by gulls, until it was lost from sight.

Pheasants, Grouse and Quails: Although the Ring-necked Pheasant is an introduced species, it is now a common sight during every season; a total of 237 birds was recorded in the study. Observed numbers were highest in summer (43%) and lowest in winter (7%). The peak number recorded was 16 birds on 3 August 1976. Outside of the surveys, the presence of broods in June and July has confirmed that the species is breeding in the area. Another report involved a female pheasant becoming prey to a juvenile Cooper's Hawk (Dawe 1980).

Two Ruffed Grouse were seen: 1 bird on 27 October 1975 and another on 10 November 1975. Campbell et al. (1990) identify Ruffed Grouse habitat as second growth deciduous and mixed deciduous and coniferous woods or brushy areas with nearby water. Breeding in the forested part of the estuary was confirmed by the presence of young in June and July 1977 (Dawe 1980).

One Blue Grouse was reported on the survey of 27 June 1977.

The California Quail is an introduced gallinaceous bird that, like the Ring-necked Pheasant, has become resident in the area; a total of 12 were counted on the surveys. One or 2 birds were seen occasionally from 29 April 1975 to 14 July 1975 and in the following year 2 birds occurred on 5 April 1976, 1 bird on 12 April 1976 and 1 bird on 7 June 1976. Dawe (1980) noted quail in 1977, 1978 and 1979 (Dawe 1980).

Rails and Coots: The total number of Virginia Rails recorded during the study was 23 birds; most of them were seen in autumn (70%). In the earliest sightings of the season, a single bird was reported on each of the 4 surveys from 15 July to 22 August 1977. The records for autumn were: 1 bird on 4 October 1976, 1 bird on 23 November 1976 and 1 bird on 29 November 1976; 1 bird on 7 September 1977, 1 bird on 26 September 1977, 2 birds on 7 October 1977 and 2 birds on 14 November 1977; a peak of 7 birds was counted on 23 November 1978. In addition, 2 birds were recorded on 6 November 1976 and 1 bird on 13 December 1978.

The American Coot was seen twice: 1 bird on 19 January 1977 and 1 bird on 14 November 1977.

Cranes: We saw 9 Sandhill Cranes on 12 April 1976.

Shorebirds: In total, 4033 shorebirds (2% of all birds) were tallied on the Little Qualicum River estuary during the surveys. This total includes the records of 19 species plus the more than 8% of all shorebirds that were recorded simply as shorebird species. In spring, we saw the highest numbers of shorebirds (33%) inflated by the large numbers of migrating Black Turnstones in April. The shorebird totals for the other seasons were similar to one another. Fluctuations in shorebird numbers are shown in Figure 25.

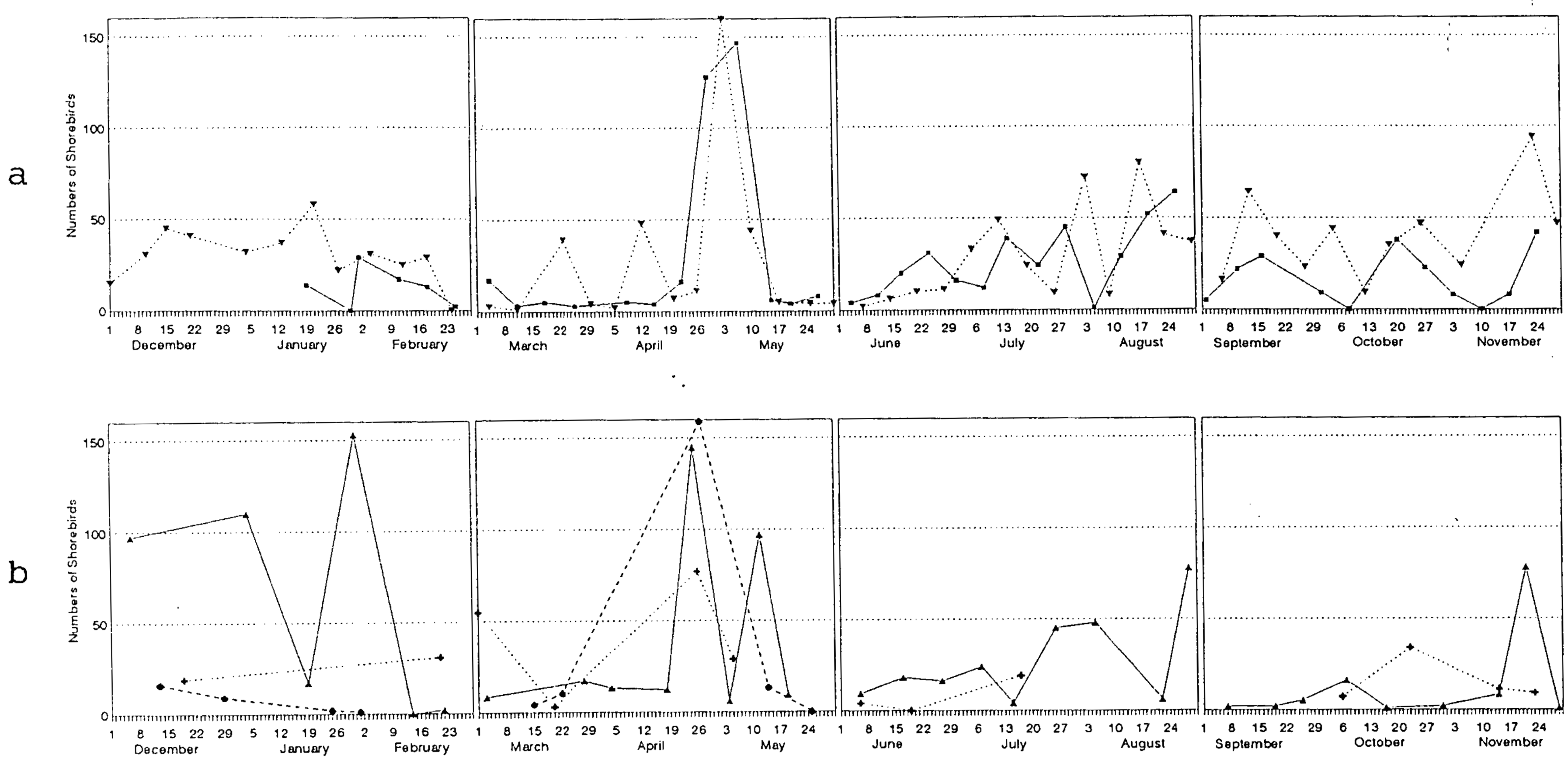

Figure 25. *Seasonal fluctuations in numbers of shorebirds on the Little Qualicum River estuary, winter 1974-1975 through spring 1979: 1975 - solid line(a); 1976 - dotted line(a); 1977 - solid line(b); 1978 - dotted line(b); 1979 - dashed line(b). Note: Each year begins with data from December of previous year.*

The Black Turnstone was the most numerous shorebird; the total counted during the surveys was 1571 birds (39% of all shorebirds). The earliest arrival each year was a record of 2 or 3 birds in late July and August except in 1978 when those weeks were not surveyed. The autumn migration was more clearly defined by arrivals each year starting in the period from 13 September to 31 October and reaching the following maxima: 38 birds on 24 November 1975, 50 birds on 6 December 1976 and 22 birds on 21 November 1977 (Figure 26). The peak numbers from 1975 to 1979 coincided with the latest departure each spring; from 71 to 155 Black Turnstones were counted on one of the days surveyed from 25 April to 7 May and then the species was not seen again on the estuary until July, August or later. Thus the highest seasonal tally was for spring (57%) followed by winter (24%) and autumn (18%). While on the estuary throughout the winter, these birds were often found among the rocks and gravel near the water's edge from Brant Point to the river mouth. However, during this period (from the 13 September to 7 May), the frequency of occurrence was relatively low (58%) which indicates that for a significant portion of the time the wintering population of between 20 and 30 birds might have been using areas outside of those surveyed on the Little Qualicum estuary.

A total of 1022 Killdeer was tallied, ranking it as the second most abundant shorebird (25% of all shorebirds). It was present in every season surveyed but there were fluctuations in both numbers and frequency (Figure 27). The Killdeer is "one of the earliest spring migrants in the province," but "the presence of winter residents on the coast masks the arrival of spring migrants there" (Campbell et al. 1990). Most of the birds (45%) were seen in summer and, not surprisingly, the chance of seeing at least 1 Killdeer on any survey in summer was high (frequency of occurrence = 89%). The number of birds seen in spring was the lowest (16%) but the frequency of occurrence was even higher than in summer (93%); the birds had dispersed on the estuary and elsewhere for breeding. In 1975, several nests on the estuary were monitored (Dawe 1976). The peak numbers usually occurred in summer: 31 birds on 24 June 1975, 55 birds on 3 August 1976 and 39 birds on 5 August 1977.

The Dunlin accounted for a total of 364 birds, 9% of the shorebirds tallied. The pattern of this species' presence on the estuary was not consistent over the years studied. The Dunlin seen in summer were early migrants: a single bird, still with remnants of the dark breast patch, was seen on 17 August 1976 and 10 birds occurred on 26 August 1975. The main autumn migration began each year in the period from the 20 October (1975) to 31 October (1977) except in 1978 when no surveys were taken in October. Autumn peaks included: 21 birds on 5 November 1976 and 37 birds on 21 November 1977. Through the winter, the species was seen several times in 1976-1977 and 1977-1978, but not in the winters 1974-1975, 1975-1976 and 1978-1979. The only spring sighting was of 4 Dunlin in full breeding plumage on 25 April 1977. Most of these gregarious little shorebirds were recorded as part of 3 large counts in one winter: 45 birds on 6 December 1976, 76 birds on 4 January 1977 and a peak of 132 birds on 31 January 1977. Autumn ranked second; 23% of the Dunlin were seen in that season.

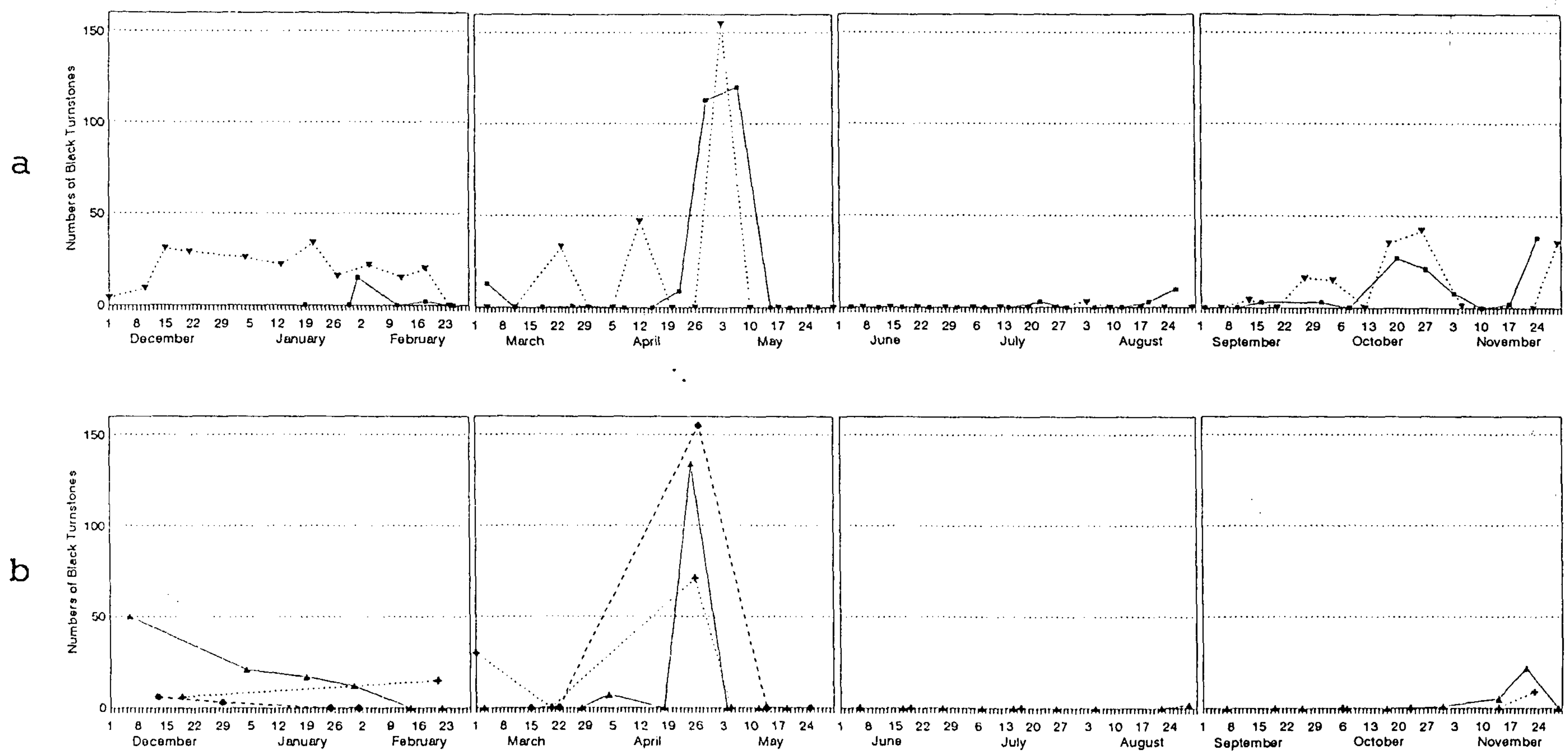

Figure 26. *Seasonal fluctuations in numbers of Black Turnstones on the Little Qualicum River estuary, winter 1974-1975 through spring 1979: 1975 - solid line(a); 1976 - dotted line(a); 1977 - solid line(b); 1978 - dotted line(b); 1979 - dashed line(b). Note: Each year begins with data from December of previous year.*

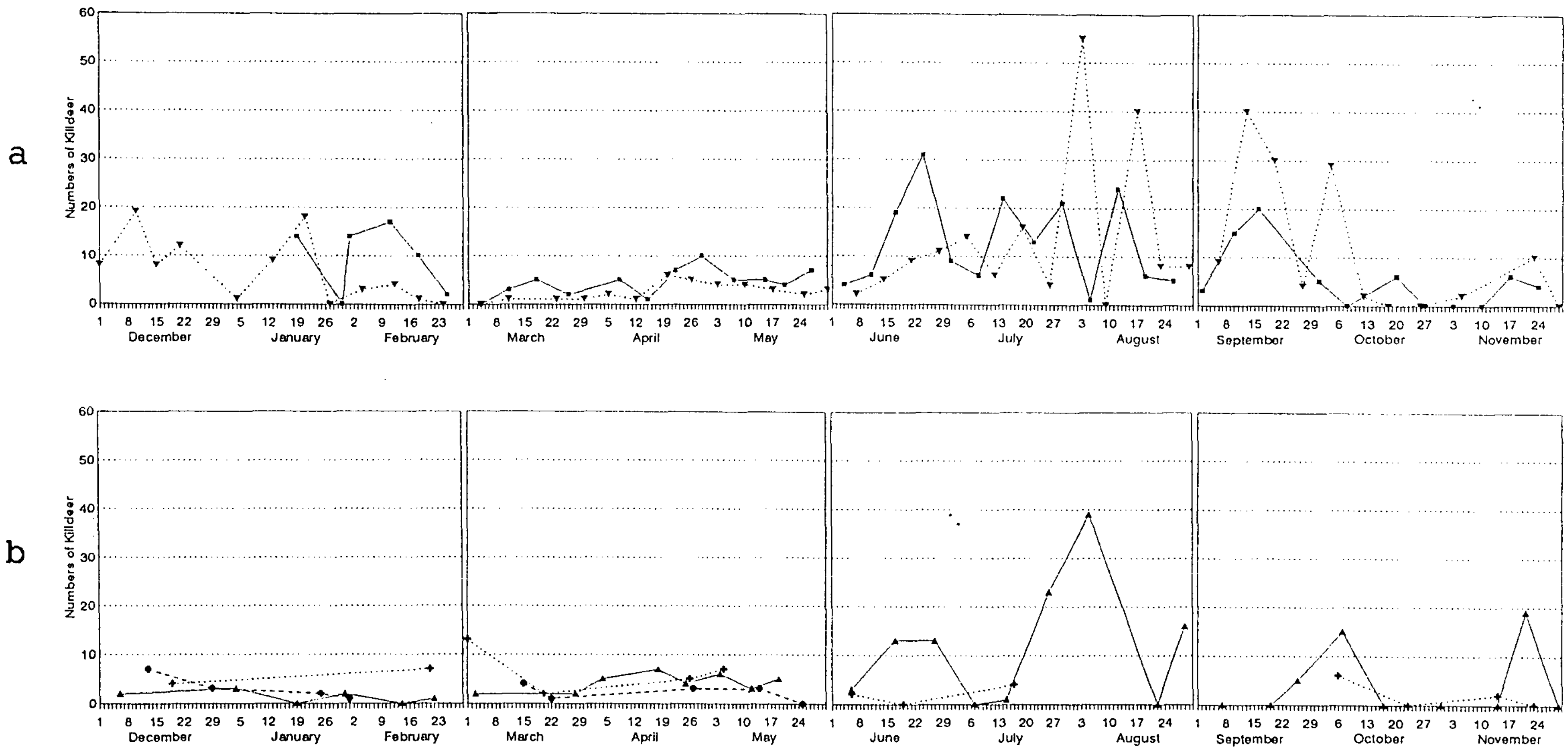

Figure 27. *Seasonal fluctuations in numbers of Killdeer on the Little Qualicum River estuary, winter 1974-1975 through spring 1979: 1975 - solid line(a); 1976 - dotted line(a); 1977 - solid line(b); 1978 - dotted line(b); 1979 - dashed line(b). Note: Each year begins with data from December of previous year.*

The total number of Western Sandpipers reported was 190 birds (5% of all shorebirds); most of the birds were seen in summer (59%) and spring (38%). Although the earliest arrival recorded in the study was 7 birds on 26 July 1977 and the latest departure was 1 bird on 27 September 1976, the southward movement appeared to be centered in August; the highest numbers were: 29 birds on 19 August 1975 and 17 birds on 30 August 1976. Spring migration was marked by only 3 sightings: 72 birds on 12 May 1977, 1 bird on 25 May 1976 and 1 late migrant on 6 June 1978. Nevertheless, it is possible that this species of peep also used the estuary in the spring of other years but it went unreported because the surveys did not happen to coincide with its rapid passage through the area

The only other peep recorded regularly in the surveys was the Least Sandpiper with a total of 107 birds seen (3% of all shorebirds), most of them in summer (63%). The earliest arrival in the autumn migration was 4 birds on 1 July (1975) and the latest departure was 2 birds on 13 September (1976). Adult females travelling south earlier than the adult males and juveniles (Campbell et al. 1990) would explain why peak numbers on the estuary occurred on disparate dates: 15 birds on 14 July 1975, 6 birds on 5 August 1977 and 6 birds on 30 August 1976. The northbound migration was observed: 1 bird on 29 April 1975, 19 birds on 7 May 1975, 9 birds on 12 May 1977 and, as with the Western Sandpiper, 1 late spring migrant noted on 6 June 1978. Dawe (1976) observed the Least Sandpiper most often along the back channel to the estuary flats.

The fifth most abundant shorebird was the Sanderling; a total of 136 birds (3% of all shorebirds) were counted, most of them in winter (53%) and spring (24%). Sightings were intermittent, but over the study period there was a Sanderling record for every month from their earliest arrival, 9 birds seen on 17 August (1976), to the latest departure, 4 birds on 29 April (1975). The winter of 1976 was an exception because Sanderlings were using the estuary almost continuously; 6 birds were seen on 6 of the 12 surveys and the frequency of occurrence for that season was 75%. Other peaks were: 13 birds on 26 August 1975, 10 birds on 4 January 1977 and 9 birds on 22 March 1979. The Sanderlings recorded by Dawe (1976) were found from Brant Point to the mouth of the Little Qualicum River, always in association with Black Turnstones.

We saw a total of 75 Spotted Sandpipers, most of them in summer (77%). The earliest arrival occurred from 12 May to 27 May and the latest departure by the end of August, except for 3 isolated sightings: 2 birds on 16 September, 1 bird on 31 January 1977 and 1 bird on 26 April 1978. Through the summers of 1975, 1976 and 1977, the species was seen often (frequency of occurrence = 69%); it is known to have bred near the river mouth in 1975, 1976 and 1977 (Dawe 1980). The highest count on a single day was 6 Spotted Sandpipers on 6 June 1977.

We also saw a total of 75 Common Snipes; the snipe was seen most in spring (59%) and autumn (27%) and not at all in summer. Earliest arrival was 16 September 1975 and latest departure 19 May 1977. Peak numbers occurred during the migrations: 7 birds on 12 October 1976, 7 birds on 1 March 1978, 15 birds on 28 March 1977. The Common Snipe was often seen using the estuary flats or the northeast marsh.

Of the 59 dowitchers seen, 27 birds were identified as Long-billed and 7 were recognized as Short-billed; the remainder (25 birds) were simply recorded as dowitcher species. Existing records of habitat use suggest that all dowitchers prefer to use the estuary flats (Dawe 1976).

All of the records for the Long-billed Dowitcher were from the period 12 July to 3 August except for a single spring migrant on 7 May 1975 and 2 isolated records of migrants in autumn: 5 birds on 20 September 1976 and 1 bird on 1 October 1975. Other peak numbers were: 6 birds on 12 July 1976 and 5 birds on 22 July 1975.

Short-billed Dowitcher records were: 1 bird on 17 July 1978, 3 birds on 17 August 1976, 1 bird on 23 August 1976 and 2 birds on 13 December 1978.

A total of 29 Greater Yellowlegs was seen during the study but none of the observations involved more than 3 birds. The spring migration was marked by 6 records (9 birds in total) from 15 April to 19 May. Most of the southbound migration occurred from 12 July to 19 August (8 records for a total of 14 birds) but there were also 4 records (5 birds in total) of birds passing through from 2 September to 23 October. The only winter sighting was 1 bird on 21 February 1978.

During the study a total of 11 Lesser Yellowlegs were counted: 7 birds on 9 August 1976, 2 birds on 22 August 1977, 1 bird on 30 August 1976 and 1 bird on 20 September 1976.

Twenty seven Red-necked Phalaropes were seen on 29 August 1977. All were seen off Brant Point.

One survey recorded 17 Whimbrels on 23 August 1976.

Six Semipalmated Plovers were observed: 1 bird on 17 August 1976, 1 bird just over a year later on 22 August 1977 and 4 birds on 23 October 1978.

The Pectoral Sandpiper was reported twice: 2 birds on 16 September 1975 and 2 birds just over a year later on 20 September 1976.

Two Black-bellied Plovers were seen on 19 September 1977.

The only survey record of Baird's Sandpiper was 2 birds on 17 August 1976.

One Wilson's Phalarope female was recorded on 21 June 1976.

Gulls, Terns and Jaegers: Seven species of gulls, 2 species of terns and 1 species of jaeger were recorded on the Little Qualicum River estuary during the surveys; the combined total was 70,384 gulls (36% of all birds). Of the gulls identified, Bonaparte's Gull, Glaucous-winged Gull, Mew Gull and Thayer's Gull were the most numerous; California Gull, Herring Gull and Ring-billed Gull were also noted.

The majority of gulls (64%) were reported simply as gull species, therefore analysis of gull use on the estuary requires consideration of the numbers of all gulls combined. Seasonal cycles in the combined numbers of gulls were consistent over the years surveyed (Figure 28). Each year the peak occurred in March when between 450 and 13,500 gulls gathered at about the time of the Pacific Herring spawn. By May the numbers had plunged below 100; nevertheless, spring accounted for 74% of all gulls seen. During summer, gull use of the estuary was at its lowest (6% of the total); the numbers climbed gradually above 100 and then remained relatively steady (between 100 and 400 birds) in autumn (11% of the total). Through winter (9% of the total) numbers were generally seen to decline until the herring spawn but there were several significant winter peaks recorded: 826 gulls (including 340 Bonaparte's) on 13 December 1978 and 1272 gulls (including 960 Thayer's Gulls) on 14 February 1977.

Of the identified gulls, Bonaparte's was the most abundant with 8858 birds seen in total (13% of all gulls). In the spring migration, the earliest arrival was 5 April (1976) and the peak (maximum = 1,995 birds) occurred in the period from 12 April to 7 May each year (Figure 29). At that time, these little gulls feed heavily on the salmon smolts leaving the river at low tide. From 25 May to 6 July there were fewer than 13 Bonaparte's Gulls on the estuary but thereafter their numbers swelled with south bound migrants; the following peaks were observed: 123 birds on 7 July 1977, 247 birds on 2 September 1975 and 158 birds on 20 September 1976. In 1978 the peak was 340 birds on 13 December 1978; this was the only record of the Bonaparte's Gull in winter. Most of the birds were seen in spring (54%); the numbers for summer and autumn were equivalent to one another (21% each).

The Glaucous-winged Gull ranked second in abundance of the identified gulls, with a total of 8015 birds (11% of all gulls). The species was present in every season but the numbers were higher in winter (36%) and autumn (34%) and lowest in summer (15%). Although this species is considered *the* "sea gull" of the coast, found in all coastal habitats at all seasons, it is recognized as having a migration; "in summer flocks are usually small except near colonies and garbage dumps" (Campbell et al. 1990). Many of the following peaks probably match the abundance of food sources such as dead salmon: 164 birds on 31 October 1977, 297 birds on 23 November 1978, 227 birds on 24 November 1975, 293 birds on 29 November 1976, 188 birds on 15 December 1975, 337 birds on 29 December 1978 and 276 birds on 14 February 1977. Peak numbers appear much lower than those for Bonaparte's or Mew gulls but this might be misleading. It is likely that many of the birds recorded as "gull species" during the study were the Glaucous-winged Gull. Seasonal fluctuations in the numbers of Glaucous-winged Gulls are shown in Figure 30.

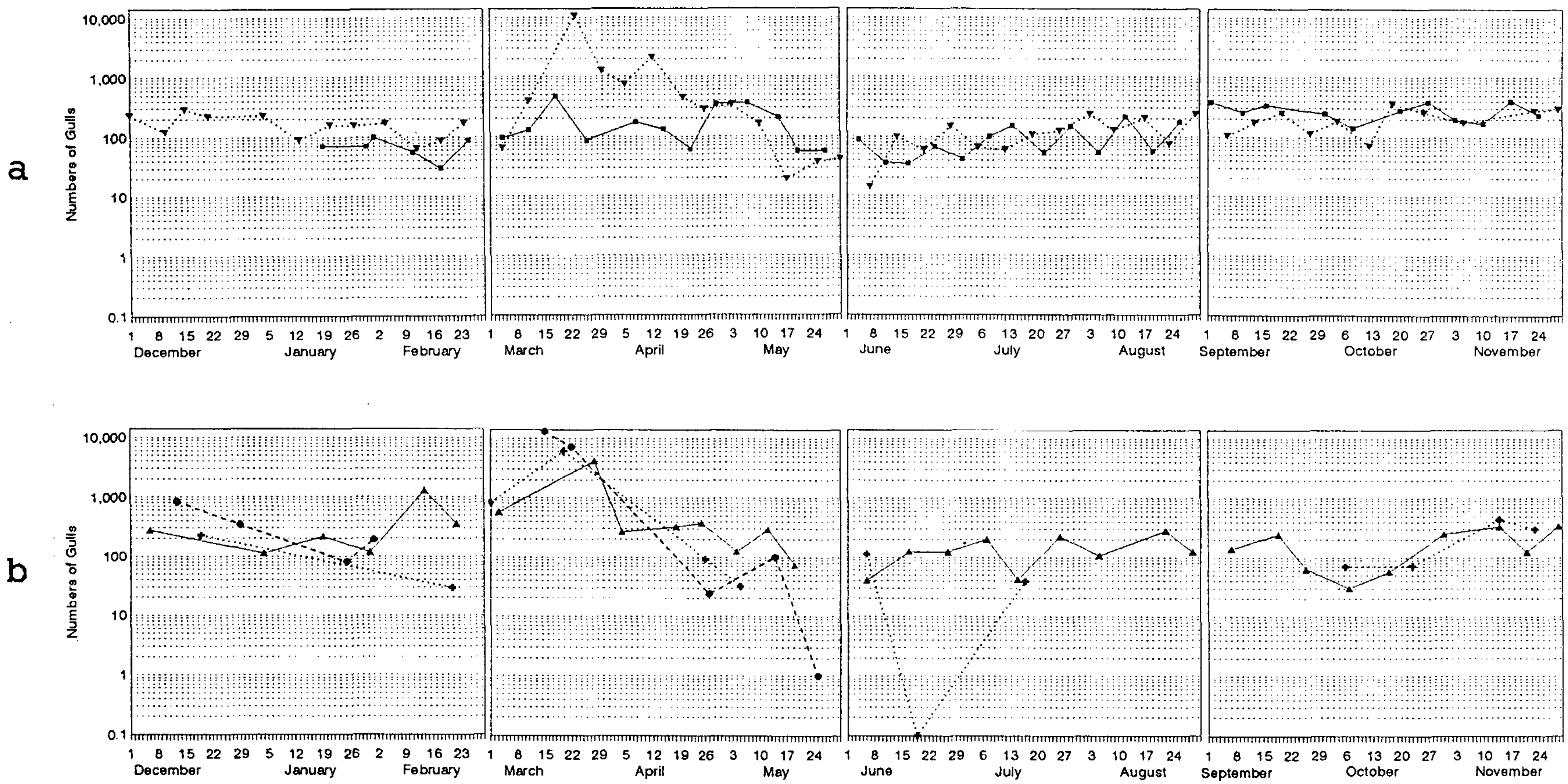

Figure 28. *Seasonal fluctuations in numbers of Gulls on the Little Qualicum River estuary, winter 1974-1975 through spring 1979: 1975 - solid line(a); 1976 - dotted line(a); 1977 - solid line(b); 1978 - dotted line(b); 1979 - dashed line(b). Note: Each year begins with data from December of previous year.*

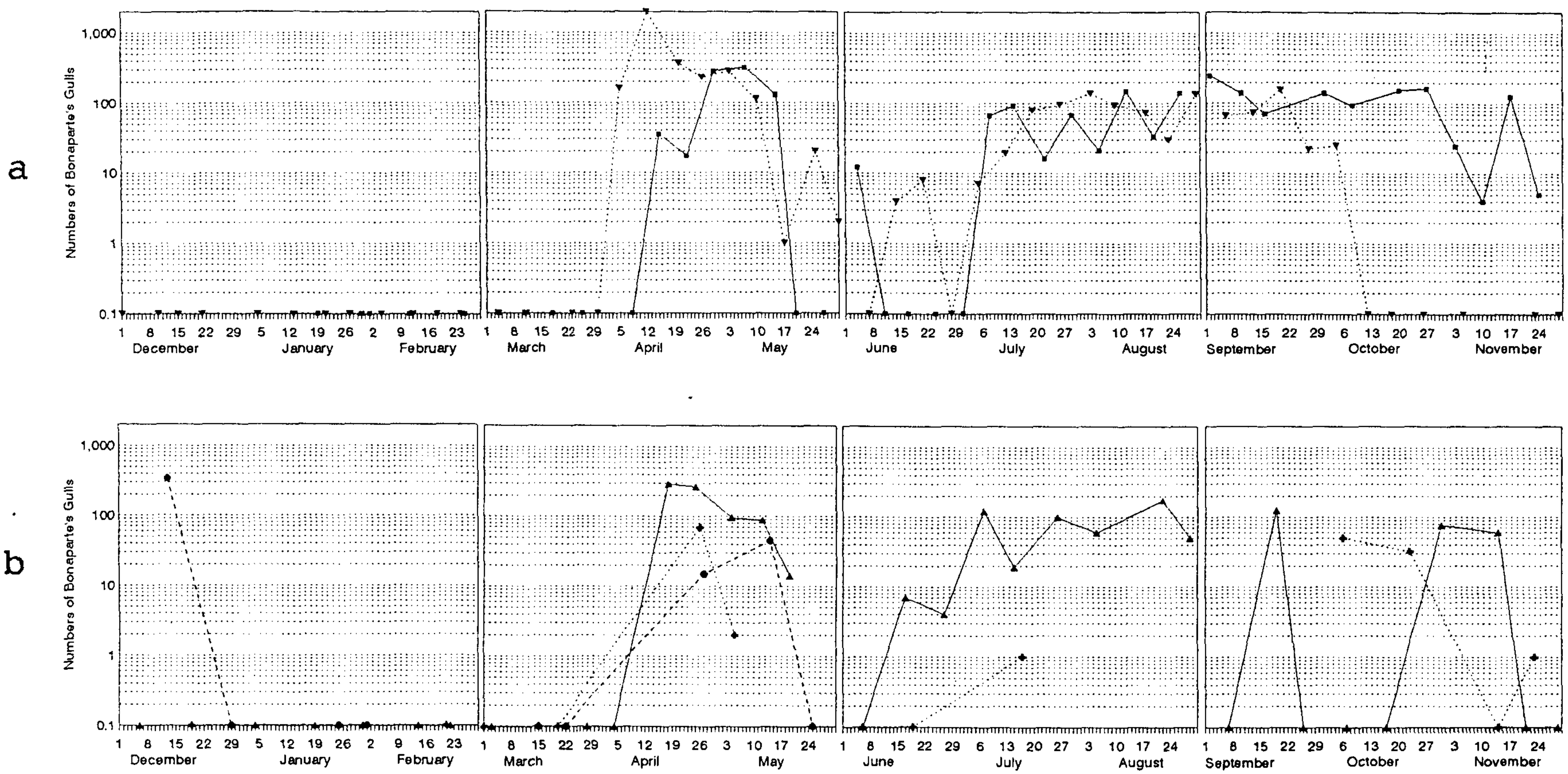

Figure 29. *Seasonal fluctuations in numbers of Bonaparte's Gulls on the Little Qualicum River estuary, winter 1974-1975 through spring 1979: 1975 - solid line(a); 1976 - dotted line(a); 1977 - solid line(b); 1978 - dotted line(b); 1979 - dashed line(b). Note: Each year begins with data from December of previous year.*

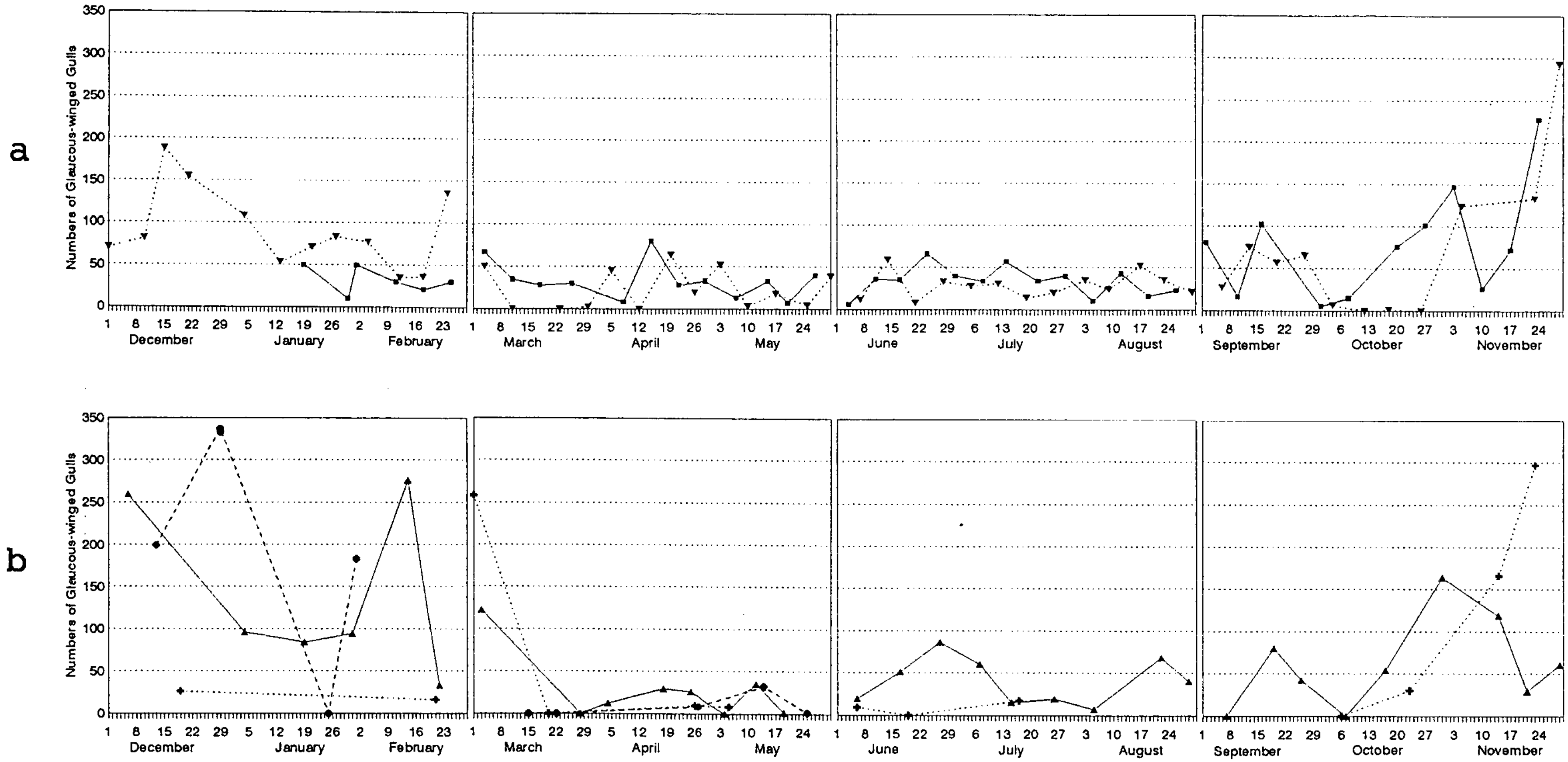

Figure 30. *Seasonal fluctuations in numbers of Glaucous-winged Gulls on the Little Qualicum River estuary, winter 1974-1975 through spring 1979: 1975 - solid line(a); 1976 - dotted line(a); 1977 - solid line(b); 1978 - dotted line(b); 1979 - dashed line(b). Note: Each year begins with data from December of previous year.*

We counted a total of 6556 Mew Gulls (9% of all gulls). They were present almost continuously in every season surveyed except between migrations; from the middle of May to the end of June there were few birds seen (Figure 31). Most of the Mew Gulls in this study were counted on one survey (4000 birds on 23 March 1976), probably because of a large Pacific Herring spawn that year. All other annual peaks for this species were much lower: 131 birds on 17 November 1975, 87 birds on 25 April 1977, 247 birds on 1 March 1978 and 85 birds on 13 December 1979. At the time of the herring spawn on the Little Qualicum estuary in 1975 and in 1977 to 1979, most of the birds must have been elsewhere, possibly exploiting peak spawns at other sites. Next to spring, winter and autumn had the highest seasonal totals; summer had the lowest.

We saw 1956 Thayer's Gulls in total (3% of all gulls). This bird winters on the Pacific Coast and breeds in the arctic islands of Canada (Campbell et al. 1990). Its use of the estuary during migrations was not consistent over the years studied; however, it is likely that part of the story is hidden among the large numbers of birds recorded as "gull species" (included in Figure 28). In the first year of study the spring migration was observable over 8 surveys; the earliest arrival was a peak of 117 birds on 18 March 1975 and the latest departure was 15 May 1975. In 1977, spring migration was defined by 3 records: 960 birds on 14 February 1977, 280 birds on 22 February 1977 and 327 birds on 3 March 1977. Mainly as a result of these records, 69% of all Thayer's Gulls in this study were tallied in spring.

The earliest arrival in the southbound migration was 1 Thayer's Gull on 22 July 1975 and later 6 birds were seen on 2 September 1975, but most of the birds that season occurred from 8 October 1975 to the latest departure on 11 March 1976; 1975-1976 was the only winter when the species occurred often (frequency of occurrence = 65% over 20 surveys). Peaks were: 23 birds on 27 October 1975, 25 birds on 10 December 1975 and 29 Birds on 4 February 1976. The next period when the birds were seen was from 30 August 1976 until 23 November 1976 (4 records for a total of 8 birds). No Thayer's Gulls were seen in the autumn of 1977, only 1 bird total in 1978 (on 23 November) and a total of 4 birds in 1979, all in December.

The total number of California Gulls seen was 95 birds; most of them in the autumn (73%). Although the birds seen on Vancouver Island are primarily transients moving to and from breeding colonies in the interior of the continent (Campbell et al. 1990), a few individuals were sometimes noted on the estuary in July or August. In 1975 and 1976 (when all but 3 of the birds were seen), the timing of the peak movements were not close; 17 birds on 20 October 1975 and 11 birds on 3 November 1975 contrasts with 9 birds on 13 September 1976 and 16 birds on 27 September 1976.

A total of 25 Herring Gulls was counted, at least 3 birds in each season: 3 birds on 18 March 1975, 1 bird on 8 April 1975, 1 bird on 20 October 1975 and 1 bird on 27 October 1975; 1 bird on 11 March 1976 and 1 bird on 23 November 1976; 1 bird on 4 January 1977, 6 birds on 14 February 1977 and the peak of 10 birds on 26 July 1977. No Herring Gulls were recorded in 1978 or 1979.

Five Ring-billed Gulls were seen, all in the first year of study: 1 bird on 24 June 1975, 3 birds on 1 October 1975 and 1 bird on 20 October 1975.

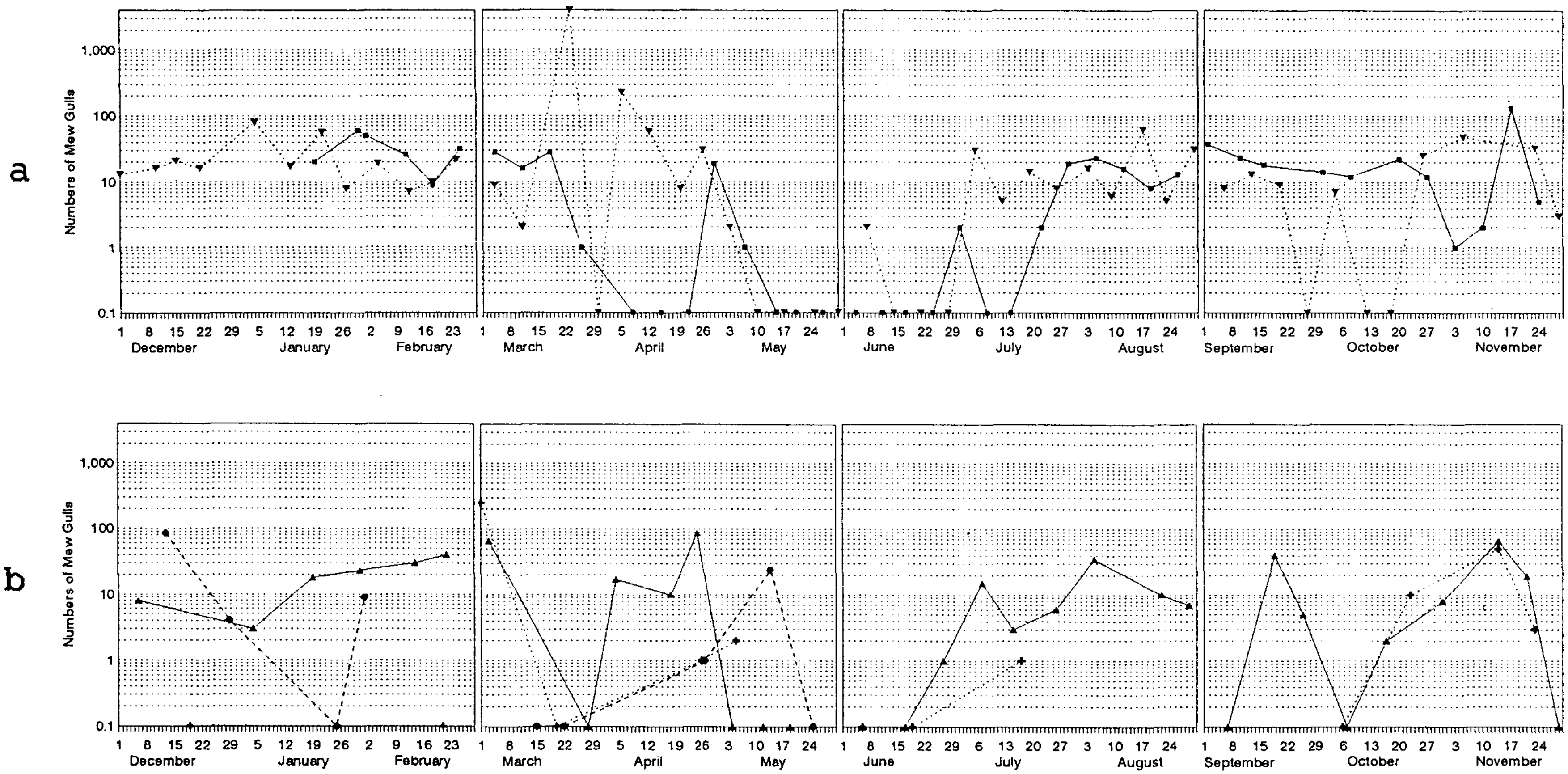

Figure 31. *Seasonal fluctuations in numbers of Mew Gulls on the Little Qualicum River estuary, winter 1974-1975 through spring 1979: 1975 - solid line(a); 1976 - dotted line(a);*
1977 - solid line(b); 1978 - dotted line(b); 1979 - dashed line(b).
Note: Each year begins with data from December of previous year.

The gull family was also represented by 2 species of terns and 1 jaeger recorded during the study period. Their numbers are not included with the gull totals.

The Common Tern was reported 3 times in a period of 4 weeks for a total of 15 birds over the study period: 4 birds on 17 August 1976, 6 birds on 30 August 1976 and 5 birds on 13 September 1976.

Two Caspian Terns were seen on 14 July 1975.

We also saw 1 Parasitic Jaeger on 30 August 1976.

Alcids: A total of 774 alcids (<1% of all birds) were recorded representing 3 species; the total also includes 90 birds that were reported simply as alcid species.

The most numerous alcid was the Marbled Murrelet with a total of 499 birds tallied. The species inhabits protected coastal waters throughout the year; "the centre of the wintering population is the Strait of Georgia, Howe Sound and Juan de Fuca Strait" (Campbell et al. 1990). Nevertheless, there were only 2 winter records from this study: 3 birds on 15 December 1975 and 10 birds on 13 January 1976. Most of the birds were seen in spring (62%) and summer (26%) starting on 4 March. Records of 1 or more birds were sometimes regular (frequency of occurrence = 57% for the 51 surveys in spring and summer of 1975 and 1976) and sometimes intermittent; they continued right through autumn. Peaks were: 214 birds on 5 April 1976, 10 birds on 27 April 1978, 19 birds on 3 May 1976, 16 birds on 5 July 1976 and 29 birds on 10 September 1975.

A total of 158 Pigeon Guillemots was seen; records were from every month except December. The species was most numerous in autumn (39%), less so in summer and spring (30% in each season) and lowest in winter (3 birds). The frequency of occurrence for spring, summer and autumn over the entire study was relatively high (43%). These statistics support Campbell et al. (1990) in stating that the species is mostly reported from April through September when it can be locally numerous. In contrast with the Marbled Murrelet, the Pigeon Guillemot was not seen on the estuary in large groups; the peak numbers recorded in various months of the study showed only slight fluctuations: 6 birds on 20 March 1978, 6 birds on 5 April 1976 and 12 birds on 20 May 1975; 7 birds on 14 June 1976, 11 birds on 10 September 1975, 10 birds on 4 October 1976 and 9 birds on 17 of October 1977.

We saw a total of 27 Common Murres: 18 birds on 21 February 1978, 2 birds on 22 March 1979, 1 bird on 6 June 1977, 2 birds on 15 July 1977, 2 birds on 3 August 1976, 1 bird on 9 August 1976 and 1 bird on 18 October 1976.

Doves and Pigeons: This group was represented by three species with a combined total of 137 birds. The total count of Band-tailed Pigeons was 109 birds. The earliest arrival was 8 birds on 26 April 1976 and the latest departure was 1 bird on 10 September 1975. Other maxima occurred as follows: 10 birds on 9 May 1977, 11 birds on 19 June 1978, 7 birds on 8 July 1975, 9 birds on 26 July 1977 and a peak of 29 birds on 17 August 1976. Most of the Band-tailed Pigeons were seen in summer (73%) and spring (26%).

A total of 26 Rock Doves was seen: 1 bird on each of 5 surveys from 4 March 1975 to 27 May 1975, 5 birds on 10 September 1975, 9 birds on 10 December 1975, 4 birds on 11 March 1976 and 3 birds on 15 March 1979.

Two Mourning Doves were seen: 1 bird on 27 May 1975 and 1 bird on 29 August 1977.

Owls: Three species of owls were recorded during the surveys; the combined total was 8 birds. Four Short-eared Owls were reported: 1 bird on 3 November 1975, 1 bird on 12 February 1976, 1 bird on 18 February 1976 and 1 bird on 29 November 1976.

We reported 3 Western Screech Owls: 1 bird on 12 February 1976 and 2 birds on 25 April 1977.

One Great Horned Owl was recorded on 3 November 1975.

Nighthawks: This group was represented by a total of 67 Common Nighthawks. The earliest arrival was 11 birds on 6 June 1978 and the latest departure a single bird on 10 September 1975. The species was seen in small groups throughout each summer until larger groups began to assemble towards the end of August in preparation for their long migration: 20 birds on 26 August 1975, 9 birds 17 August 1976 and 7 birds on 29 August 1977.

Swifts: The Black Swift was seen in 3 of the 4 summers surveyed; the total was 237 birds over the study. The earliest arrival was 2 birds on 31 May 1976 and the latest departure was a peak of 200 birds seen on 26 August 1975. Other records were: 18 birds on 4 June 1975, 16 birds on 6 June 1978 and 1 bird on 12 July 1976.

We also recorded Vaux's Swift; 2 birds were seen on the survey of 12 August 1975.

Hummingbirds: We saw a total of 192 Rufous Hummingbirds. From the earliest arrival on 5 April (1976) to the latest departure on 20 September (1976), the frequency of occurrence was high (78%); most of the birds were seen in spring (56%) and summer (43%). The peaks for each year was observed in spring: 7 birds on 20 May 1975, 6 birds on each of 3 surveys in April and May 1976, 9 birds on 19 May 1977, 4 birds on 26 April 1978, 3 birds on each of 2 surveys in April and May 1979.

Kingfishers: A total of 234 Belted Kingfishers was seen. This species is a resident; it was present in every season with a high frequency of occurrence (84% over the study). The numbers of birds was highest in summer (38% of the all kingfishers) and autumn (25%) when a peak of 5 birds was recorded on 15 July 1977 and 17 August 1976 and again on 10 September 1975.

Woodpeckers: Five species were recorded in this group with a combined total of 235 birds.

The Northern Flicker, with a total of 206 birds, accounted for the majority (88%) of the woodpeckers seen. This species was noted in every season surveyed but most of the birds occurred in summer (31%) and spring (28%); numbers peaked at 8 birds on 17 August 1976. The frequency of occurrence over the study period was 64%.

We saw 12 Downy Woodpeckers. All reports were of single birds; they occurred in every year surveyed: 1 report in February, 3 reports in April, 1 report in May, 2 reports in June, 2 reports in July, 2 reports in September and 1 report in November.

A total of 4 Hairy Woodpeckers was seen, one third as many as the Downy Woodpecker. Hairy Woodpeckers occurred as follows: 1 bird on 4 February 1976, 2 birds on 3 May 1976 and 1 bird on 23 November 1978.

Eleven Pileated Woodpeckers were tallied over the study period: 1 bird on 4 February 1976, 1 bird on 14 February 1977, 2 birds 5 April 1976, 1 bird 8 April 1975, 1 bird on 24 June 1975, 1 bird on 28 June 1976, 1 bird on 17 August 1976, 1 bird on 30 August 1976 and 1 bird on 12 October 1976. Note that most of reports occurred in 1976, including the only record of 2 birds.

We saw 2 Red-breasted Sapsuckers on 4 January 1977.

Passerines: Seventeen families representing 68 species and 26,402 birds were tallied (13% of all the birds seen during the study) which ranks the passerines as third in abundance over the study period (after the waterfowl and gulls). Each summer, the passerines accounted for approximately half of all birds seen (Figure 6). Fluctuations in the numbers of passerines over time are shown in Figure 32. Each year the highest seasonal total was in summer except in 1977 when more than half of the passerines counted that year occurred in autumn because of a single survey that reported 4000 European Starlings. The seasonal totals were lowest in winter during 1975, 1977 and 1978.

Flycatchers: Five species of flycatchers were recorded with a combined total of 176 birds including 7 individuals that were recorded simply as flycatcher species.

The Pacific-slope Flycatcher was the most abundant with a total of 108 birds seen (61% of flycatchers). The earliest arrival was 25 April (1977) and the latest departure was 29 August (1977). In each of the years fully surveyed, the peak occurred in July: 4 birds on 8 July 1975, 5 birds on 12 July 1976, 5 birds again on 19 July 1976, 6 birds on 7 July 1977 and 6 birds again on 26 July 1977. These might represent successful family groups. Other years the peaks were: 4 birds on 19 June 1978 and 7 birds on 25 May 1979.

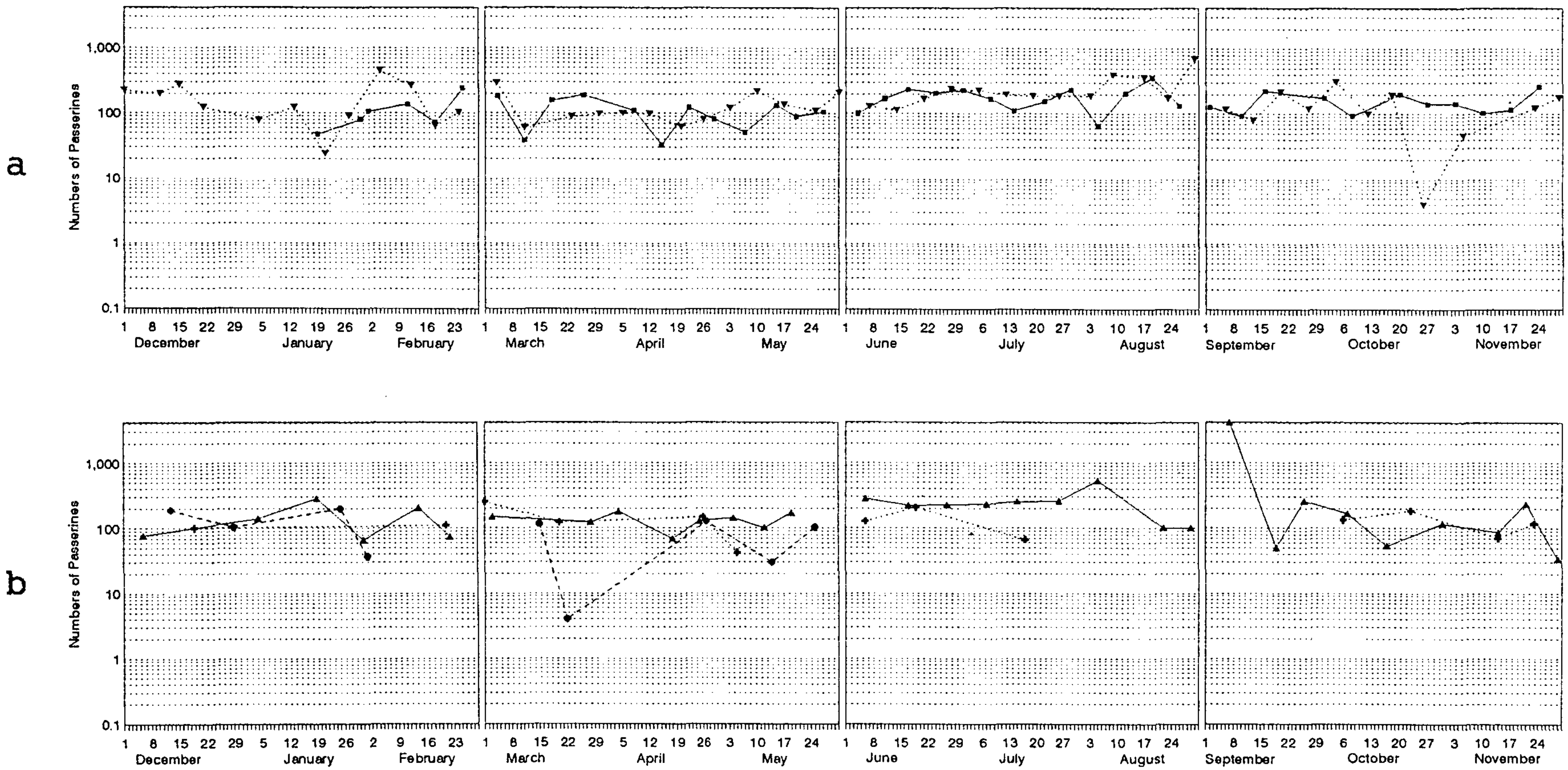

Figure 32. *Seasonal fluctuations in numbers of Passerines on the Little Qualicum River estuary, winter 1974-1975 through spring 1979: 1975 - solid line(a); 1976 - dotted line(a); 1977 - solid line(b); 1978 - dotted line(b); 1979 - dashed line(b). Note: Each year begins with data from December of previous year.*

The second most numerous species in this group was the Willow Flycatcher; a total of 47 birds (27% of all flycatchers) was tallied during the study. The earliest arrival was 2 birds on 25 May 1979 and the latest departure 1 bird on 17 August 1976. Each year the peak usually occurred from late June to mid July: 5 birds on 24 June 1975, 4 birds on 27 June 1977, 5 birds on 12 July 1976 and 5 birds again on 19 July 1976. The only record in 1979 was 2 birds on 25 May.

A total of 12 Western Wood-Pewees was seen. In the first year of study, 7 birds were counted on 4 surveys from 14 July 1975 to 5 August 1975; the most seen was 3 birds. Thereafter, all records were of single birds: 17 May 1976, 25 May 1976, 15 July 1977, 5 August 1977 and 29 August 1977.

We saw 1 Western Kingbird on 25 April 1977.

One Say's Phoebe was seen on 6 September 1976.

***Swallows*:** The swallows were represented by 5 species over the study with a combined total of 1728 birds (7% of the passerines); this number includes 60 individuals (5% of swallows) recorded simply as swallow species.

The Barn Swallow was the most abundant of this group with a total of 1210 birds counted (70% of all swallows). Seasonal fluctuations in the numbers of Barn Swallows is shown in Figure 33. The earliest arrival was recorded each year from 22 April to 27 April and the latest departure was 7 September to 13 September in those years when this period was surveyed (1975-1977). Between its punctual arrival and departure, which generally occurred later in the season than the other swallows, the presence of the Barn Swallow was almost continuous (frequency of occurrence = 98%). Most of the birds were seen in summer (73%) when the following peaks were recorded: 84 birds on 26 July 1977, 90 birds on 29 July 1975 and 56 birds on 17 August 1976.

Second in abundance among the swallows was the Violet-green; 353 birds were recorded (20% of all swallows) during the study. The earliest arrival each year occurred from 11 March and 4 April except in 1978 when the earliest arrival was 26 April. The latest departure occurred from 3 August to 29 August in the years when that period was surveyed (1975 to 1977). Peaks observed in spring were: 25 birds on 22 April 1975, 4 birds on 26 April 1978, 15 birds on 19 May 1977, 11 birds on 25 May 1979. The only survey when the peak number of the year occurred in summer was 22 birds on 15 July 1977. The frequency of occurrence for spring and summer was 66% over the study period. In contrast with the Barn Swallow, the Violet-green Swallow was seen mostly in the spring (61%).

A total of 50 Northern Rough-winged Swallows was observed; the numbers were equivalent in summer and spring. Earliest arrival was 2 birds on 22 April 1975 and latest departure was 1 bird on 19 August 1975. The peak number for each year was a record of 3 to 5 swallows in April or May, except when 9 swallows were seen on 29 July 1975.

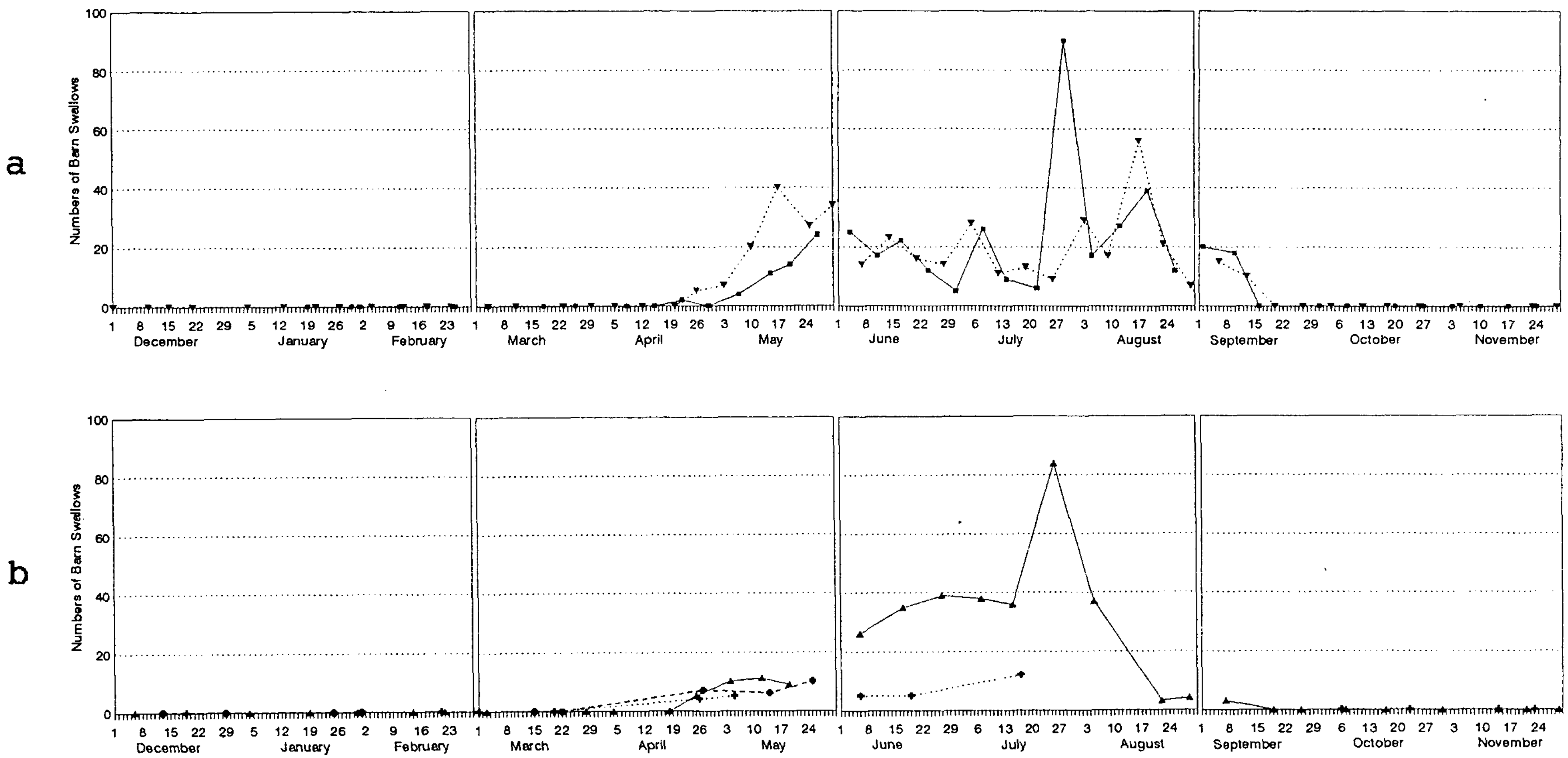

Figure 33. *Seasonal fluctuations in numbers of Barn Swallows on the Little Qualicum River estuary, winter 1974-1975 through spring 1979: 1975 - solid line(a); 1976 - dotted line(a); 1977 - solid line(b); 1978 - dotted line(b); 1979 - dashed line(b). Note: Each year begins with data from December of previous year.*

We saw a total of 48 Cliff Swallows, approximately half of them in spring and half in summer. Earliest arrival was 2 birds on 18 April 1977 and latest departure was 2 birds on 9 August 1976. The observed: 5 birds on 29 April 1975 and 6 birds on 1 July 1975 and 4 birds on 31 May 1976.

Seven Tree Swallows were seen: 2 birds on 22 April 1975, 2 birds on 26 April 1976, 2 birds on 29 April 1975 and 1 bird on 5 May 1978.

Crows and Jays: Three species of corvids with a combined total of 4653 birds accounted for 18% of the passerine total, ranking them as the third most abundant passerine family. Most were the Northwestern Crow (4487 birds; 96% of the corvid total). Crows were present in every season (frequency of occurrence = 96% over the study period) but the numbers recorded were slightly higher in autumn (32%) and winter (27%) and the lowest numbers occurred in summer (19%). Each year the peak of between 47 and 129 crows was seen in autumn or winter.

Although the Common Raven was seen in all 4 seasons for a total count of 141 birds (3% of corvids), sightings were intermittent (frequency of occurrence = 36% over the study period). The number of ravens seen on a survey ranged from 1 to 7 birds except on 23 October 1978 when 37 ravens were observed. Over the survey, most of the birds were seen in autumn (38%) and summer (27%).

Twenty five Steller's Jays were observed in total; records occurred in every season except summer. Most of the birds were seen in autumn (64%) when a maximum of 3 jays was counted on 4 October 1976.

Chickadees: The observed number of Chestnut-backed Chickadees was 505 birds in total. The species was seen in every season but not on every survey; the frequency of occurrence varied from 17% in winter to 79% in summer perhaps because of seasonal changes in their flocking behaviour. Most of the birds were seen in summer (52%); the lowest seasonal count was in spring (10%). Peaks of 20 or more birds occurred at various times of the year: 30 birds on 4 February 1976, 25 birds on 25 February 1975, 20 birds on 4 March 1975, 29 birds on 7 September 1977 and 30 birds on 1 December 1975.

Bushtits: A total of 122 Bushtits was seen; 51% were tallied in autumn and 46% in summer. Although the bird is considered resident over all of its range, the Bushtit was not reported in winter and only 4 birds were seen in spring (8 March 1977 and 18 April 1977). The frequency of occurrence was variable but generally low (13% over the study). Numbers in excess of 8 birds were seen on only 3 surveys, all in the same year: 18 birds on 19 August 1975, 20 birds on 2 September 1975 and 20 birds on 10 September 1975.

Nuthatches: The numbers of the Red-breasted Nuthatch totalled 55 birds. They were reported in each season but the majority occurred in summer (53%). All of our records are of 1 or 2 birds except 4 birds seen on 15 July 1977 and 3 birds on 7 September 1977. The frequency of occurrence was high (27%) relative to the total number of birds seen.

Creepers: We saw 32 Brown Creepers, most of them in summer (56%) and spring (34%); the species was not seen in winter. Of the 24 records from this study, 17 were of single birds, 6 records were of 2 birds each and the peak was 3 birds on 20 March 1978. The frequency of occurrence was 17%.

Wrens: Four species of wrens totalling 333 birds were reported during the study period.

We saw a total of 195 Winter Wrens (59% of all wrens). The species was seen in every month except December and January; the majority occurred in summer (46%) and spring (34%). As a result the frequency of occurrence ranged from 82% in summer and 67% in spring to 20% in winter. The maximum numbers were 8 birds on 17 August 1976 and 6 birds on 28 March 1977.

The Bewick's Wren, with a total of 88 birds, was the second most abundant wren (26% of wrens). It was seen in every month of the year; the largest proportion of the birds was seen in autumn (34%) and summer (31%); the lowest occurred in winter (14%). Most of the records were of 1 bird the maximum number counted in a survey was 4 individuals: 4 birds on 26 September 1977 and 4 birds on 27 April 1979.

The total number of Marsh Wrens counted was 49 birds; they were seen in summer (19 birds), autumn (24 birds) and winter (6 birds) but not in spring. Earliest arrival occurred from 26 July (1977) to 23 August (1976); over the study period the bird was recorded in every month thereafter until December 15 (1976). In addition, 1 individual was recorded on 14 February (1977). A peak of 8 birds was seen on 5 August 1977.

One House Wren was seen on 15 July 1977.

Kinglets and Thrushes: The muscicapid family was represented by 9 species with a cumulative total of 1463 birds (6% of all passerines). The American Robin was the most abundant member of the group (67%); a total of 979 birds was seen. Highest numbers were seen in spring (44% of all robins) and summer (31%); the seasonal total for winter was the lowest (10%). Peak numbers of robins were recorded at various times of year: 50 birds on 25 February 1975, 44 birds on 1 March 1978, 19 birds on 4 March 1976, 40 birds on 15 March 1979, 26 birds on 26 July 1977 and 66 birds on 23 October 1978. Continuous periods of absence also occurred at different seasons: 5 surveys between 29 July and 10 September 1975; 4 surveys between 27 October 1975 and 1 December 1975; and 5 surveys between 23 October 1978 and 1 February 1979. In addition, 8 surveys between 18 October 1976 and 14 February 1977 had only 1 record - 2 robins on 29 November 1976. The continuous periods of absence are significant considering the number of birds seen over the study and the overall high frequency of occurrence (67%).

The Golden-crowned Kinglet was the second most abundant muscicapid, with a total of 249 birds seen. Seasonal totals for the whole study period were similar; the highest was autumn (29%) and the lowest was spring (21%), but the pattern changed. The Golden-crowned Kinglet was not seen from the end of November until 4 February. Then, from that time until 26 March, all 5 records were of 20 to 25 birds. For the remainder of the year most of the sightings involved only

1 bird each. The peaks for the summer-autumn period of each year were: 20 birds on 26 August 1975, 14 birds on 7 September 1977, 10 birds on 12 October 1976 and 12 birds on 23 October 1978. Thus the frequency of occurrence fluctuated from 10% in winter to 46% in autumn. The limited data of this study indicates that there was a gradual decline in the number of Golden-crowned Kinglets on the estuary from an average of 3.02 birds per survey in 1975 to 1.23 birds per survey in 1978.

We saw a total of 44 Ruby-crowned Kinglets: 18 birds in autumn (41%), 10 birds in winter, 10 birds in spring and 6 birds in summer. This species is known to breed on Vancouver Island (Campbell et al. In prep.). Most of the sightings were of single birds but there were 2 notable peaks: 7 birds on 23 October 1978 and 5 birds on 22 July 1975. The frequency of occurrence was 17% over the study period.

The Swainson's Thrush tally was 135 birds in total; most of them were seen in summer (90%). Earliest arrival occurred from 19 May (1977) to 27 May (1975) except in 1978 when the earliest arrival recorded was 19 June. Latest departure was from 29 July (1975) to 5 August (1977). From arrival to departure the species was noted on almost every survey; peaks were: 7 birds on 14 June 1976, 13 birds on 17 June 1977 and 6 birds on 22 July 1975.

We saw a total of 50 Varied Thrushes; most of the birds were seen in winter (44%) and spring (42%). From the earliest arrival on 1 October (1975) to the latest departure on 27 April (1979), the frequency of occurrence was 26%. A peak of 13 birds was observed on 4 March 1976.

Two Hermit Thrushes were seen: 1 bird on 15 December 1975 and 1 bird on 30 March 1976.

We saw 2 Western Bluebirds on 30 March 1976.

One Mountain Bluebird was recorded on the same survey as the Western Bluebirds - 30 March 1976.

Townsend's Solitaire was seen once, a single bird on 18 April 1977.

***Pipits*:** The total number of American Pipits seen was 174 birds, most of the them in autumn (60%) and spring (39%). The spring migration was observed from 26 April (1976 and 1978) to 14 May (1979); the peaks were: 50 birds on 26 April 1978 and 12 birds on 3 May 1976. Records of the autumn migration were from 22 August (1977) to 23 November (1976); the southbound peaks were: 60 birds on 16 September 1975 and 34 birds on 27 September 1976.

***Waxwings*:** The Cedar Waxwing total was 294 birds over the study period. The majority was seen in summer (77%) and autumn (23%). Earliest arrival was 2 birds on 25 May 1979 and the latest departure was 15 birds on 12 October 1976. Peaks were observed: 20 birds on 6 June 1977, 22 birds on 26 July 1977, 20 birds on 29 July 1975, 22 birds on 3 August 1976 and 40 birds on 4 October 1976. The frequency of occurrence varied; in 1976 from 14 June to 12 October the Cedar waxwing was observed on 83% of 18 surveys, but in 1975 and 1977 it was seen on only 3 surveys and 1 survey respectively.

***Shrikes*:** The Northern Shrike was seen 3 times over the study period: 1 bird on 4 October 1976, 1 bird just over a year later on 7 October 1977 and 1 bird on 20 March 1978.

***Starlings*:** The gregarious European Starling was the most abundant passerine species with 9027 birds seen, 34% of the passerine total. Flocks of starlings could be seen at any time of the year on the Little Qualicum River estuary but the numbers were highest in autumn (50% of starlings) when a single survey counted 4000 birds on 7 September 1977. Apart from this startling spectacle, summer had the highest proportion (28% of starlings) with peaks: 600 birds on 30 August 1976, 308 birds on 5 August 1977, and 201 birds on 19 August 1975.

***Vireos*:** Hutton's Vireo was recorded 4 times, 1 bird on each of the following surveys: 19 January 1975, 24 February 1975, 30 March 1976, 7 September 1977.

***Wood Warblers, Sparrows and Blackbirds*:** The emberizids are a large and diverse group that ranked as the second most abundant passerine family with a total of 4954 birds (19% of all passerines). Eight species of warblers, 1 species of tanager, 12 species of sparrows and 4 species of blackbirds were recorded over the study. The sparrows were the most abundant of the sub-groups in this family.

Warblers: The Orange-crowned Warbler was the most abundant of this sub-group with a total of 90 birds seen. Earliest arrival was 2 birds on 18 April 1977 and latest departure was 1 bird on 4 October 1976, but most of the birds were tallied in spring (60%). The following peaks were noted: 9 birds on 25 April 1977, 17 birds on 10 May 1976 and 10 birds on 28 June 1976. The frequency of occurrence in summer varied from 8% in 1975 to 39% in 1976 and 33% in 1977.

A total of 77 Common Yellowthroats was seen, most of them in summer (68%). The earliest arrival was 1 bird on 25 April 1977 and latest departure was 6 birds on 16 September 1975; during the summer the frequency of occurrence varied (from 8% in 1975 to 78% in 1977). The 2 highest numbers in the study were in August: 8 birds on 23 August 1976 and 7 birds on 5 August 1977.

We recorded 65 Yellow Warblers in total, most of them in summer (74%). The earliest arrival was 1 bird on 27 April 1979 and the latest departure was 1 bird on 22 August 1977. Like several other warblers, the frequency of occurrence of the Yellow Warbler was sometimes high during the summer but not consistently so (from 78% in summer 1977 to 31% in summer 1975). The highest number on any survey was 7 birds on 5 August 1977 and second highest was 6 birds on 25 May 1979.

The number of Yellow-rumped Warblers recorded was also 65 birds in total, but this species was seen in larger numbers and less frequently than the Yellow Warbler; observations were of the spring and autumn migration. Earliest arrival was 14 birds on 12 April 1976 and the latest departure was 2 birds on 6 June 1978; there were no other records in summer. Other northbound peaks were: 9 birds on 25 April 1977 and 8 birds on 15 May 1975. There were only 2 records from autumn; they accounted for almost half the Yellow-rumped Warblers seen: 25 birds on 7 October 1977 and 4 birds on 17 October 1977.

We saw a total of 52 Townsend's Warblers, all of them in the summer (62%) and spring (32%). Earliest arrival was 4 birds on 25 April 1977 and latest departure was 1 bird on 23 August 1976. Other peaks were: 5 birds on 17 August 1976 and 4 birds on 25 May 1979. During the summer the frequency of occurrence varied from 77% in 1976 to 33% in 1977; the species was not seen at all in 1975.

The total number of Wilson's Warblers counted was also 52 birds. The species was reported in every year surveyed but each year was different; most of the Wilson's Warblers were seen in 1976 when the earliest arrival was recorded: 1 bird on 3 May (1976). The following week the peak of 16 birds was observed (10 May 1976) on their migration; the latest spring departure that year was 4 birds on 25 May 1976. The next period when the species was seen in 1976 was from 28 June until 9 August. In 1977, the species was seen occasionally from 12 May through the likely breeding period in June to 15 July. The only Wilson's Warbler seen in 1975 was a single bird on 2 September 1975. Latest departure in 1976 and 1977 was similar to the record from 1975: 1 bird on 20 September 1976 and 1 bird on 7 September 1977. Peaks not mentioned above include: 5 birds on 25 May 1979 and 5 birds on 17 June 1977.

During the surveys, 24 MacGillivray's Warblers were recorded in total. Earliest arrival was 7 birds seen on 10 May 1976 and latest departure was 1 bird on 27 September 1977. The species was most abundant in 1976; birds occurred in every month from May to September except June. However, there this warbler was observed in June of 1975 and 1977.

One Black-throated Gray Warbler was recorded on 20 September 1976.

Tanagers: The Western Tanager was recorded once: 6 birds on 20 May 1975.

Sparrows: The Dark-eyed Junco was the most abundant sparrow with a total of 1025 birds seen; most of them in winter (46%) and autumn (38%). The earliest arrival was on 8 October in 1975, 27 September 1976 and 26 September 1977. The latest departure also advanced by a few days over those same years: 22 April 1975, 20 April 1976 and 4 April 1977. The species occurred on almost every survey in autumn but in winter the frequency of occurrence varied from zero (1975 and 1978) to 92% (1976); this indicates that the Dark-eyed Junco must have at least one alternative to wintering on the Little Qualicum estuary. Nevertheless, in 1975, 1976, 1977 and 1979 the number of birds on the estuary appeared to reach a peak some time in late autumn or winter; all 7 of the surveys which recorded 30 or more birds occurred in the period from 17 November to 4 February of those 4 years. The maximum one-day count was 64 birds on 15 December 1975. Juncos were seen in every spring surveyed but occurrence was not as frequent as in autumn.

The Song Sparrow, with a total of 613 birds tallied, was the second most abundant sparrow observed. The seasonal total of this resident was highest in summer (31%) and lowest in winter (18%) but the frequency of occurrence was high in every season surveyed (approximately 90% overall). Similarly, the yearly peaks were not confined to any season: 15 birds on 15 December 1975, 12 birds on 5 July 1976, 19 birds on 15 July 1977, 8 birds on 20 March 1978 and 8 birds again on 6 June 1978 and finally, 9 birds on 5 May 1979.

The third most numerous sparrow was the Savannah Sparrows; we saw a total of 396 birds, most of them in autumn (60%) and spring (27%). The start of the spring migration was well defined; every year the earliest arrival occurred from 18 April (1977) to 27 April (1979). Spring peaks were recorded: 11 birds on 15 May 1975, 21 birds on 10 May 1976, 7 birds on 25 April 1977 and 15 birds on 26 April 1978. In 1975 and 1976 the species was not seen from 27 May to 26 July but in 1977 and 1978 we have 4 records of 1 or 2 birds through the June to mid July period. Numbers and frequency of occurrence increased again through August until the following peaks were observed: 18 birds on 10 September 1975, 35 birds on 20 September 1976 and 37 birds on 19 September 1977. The latest departure was 1 bird on 10 November 1975.

A total of 380 Golden-crowned Sparrows were recorded. The species was most abundant in winter (38% of the total); the proportions seen in autumn and spring were equivalent. The only summer record was 3 birds on 19 August 1975, separated from any other sighting. Earliest arrival occurred in the period from 19 September to 20 October and the latest departure occurred from 26 April to 15 May. Peaks in the numbers of Golden-crowned Sparrows were recorded in various seasons: 21 birds on 15 May 1975, 16 birds on 18 October 1976, 12 birds on 26 September 1977 and 12 birds again on 19 December 1977, and 12 birds on 25 January 1979. The frequency of occurrence in winter was usually high (above 67%).

We saw 372 Rufous-sided Towhees in total. Although this species is a resident, the numbers seen varied with the season; most were seen in autumn (40%) and winter (33%). The lowest seasonal totals were tallied in summer (11%) as many of the wintering birds dispersed to their breeding areas. The proportion of surveys that recorded this species varied with the seasons, predictably following the same pattern as the seasonal totals except in winter when the frequency of occurrence was often low (50% in 1977 and 1978). Further study would be required to determine if overwintering birds were sometimes using areas other than the estuary.

Over the study period, we recorded 144 White-crowned Sparrows in total. They were observed in every season but most occurred in spring (51%). The lowest seasonal total was the sum of 14 birds counted in the winters of 1975-1976 and 1978-1979; the other 3 winters of the study recorded no White-crowned Sparrows. The 3 highest records in this study were: 15 birds on 3 May 1976, 9 birds on 6 September 1976 and 8 birds on 25 January 1979. Frequency of occurrence within each year was variable but a comparison of spring seasons over the years of study shows relative constance (from 50% in 1977 to 100% in 1978).

A total of 74 Fox Sparrows was seen, most of them in autumn (53%) and winter (30%); the species was not seen in summer. Earliest arrival occurred in the period from 20 September to 20 October. Latest departure occurred from 30 March to 25 April excluding 1978 and 1979 when no birds were seen in the spring. The only surveys with more than 3 Fox Sparrows were: 16 birds on 27 October 1975 and 4 birds on 4 October 1976.

On the surveys, a total of 48 Lincoln's Sparrows were recorded passing through on their migrations. Spring records were: 2 birds on 25 April 1977, 1 bird on 27 April 1979, 2 birds on 10 May 1976 and 1 bird on 17 May 1976. Records of the southbound migration tallied 42 birds from the earliest arrival of 2 birds on 29 August 1977 to the latest departure of 2 birds on 12 October 1976. The peaks recorded were: 11 birds on 20 September 1976, 8 birds on 26 September 1977 and 6 birds on 1 October 1975.

Five Chipping Sparrows were seen: 3 birds on 3 May 1976 and 2 birds 2 weeks later on 17 May 1976.

We recorded 2 American Tree Sparrows: 1 bird on 25 January 1978 and 1 bird 2 weeks later on 1 February 1978.

One White-throated Sparrow was seen on 7 October 1977.

The Snow Bunting was seen once: a single bird on 21 November 1977.

Blackbirds: The most abundant of this group was the Brewer's Blackbird with a total of 834 individuals seen, most of them in summer (87%). Earliest arrival each year occurred from 20 March to 5 April except in 1979 when the only Brewer's Blackbird seen was on 25 May 1979. The largest number recorded on the spring migration was 20 birds on 26 March 1975; all other spring records were of 6 birds or less. The latest departure was in October except in 1977 when no birds were seen in autumn. The peak number of each year occurred in summer: 63 birds on 17 June 1975, 73 birds on 26 July 1976, 39 birds on 5 August 1977 and 11 birds on 17 July 1978. The frequency of occurrence in summer was relatively constant, dropping from 85% to 67% from 1975 to 1978 but in the same period the average number of Brewer's Blackbirds seen per survey dropped steadily from 8.7 through 6.2 and 4.3 to 1.8 birds per survey in 1978.

The Red-winged Blackbird was the second most abundant of the blackbirds; a total of 524 birds was tallied over the study, most of them in summer (48%) and spring (47%). From the earliest arrival on or after 12 February each year, the species was present on the estuary almost continuously until sometime in July. The peak number of the year was often recorded shortly before the majority of the blackbirds left the area: 27 birds on 14 July 1975, 23 birds on 21 June 1976 and 34 birds on 27 June 1977. Thereafter, low numbers of birds continued to be seen sporadically in some years (1976 and 1977). The only records of the species in the September to January period are from 1977-1978, suggesting that a few blackbirds left very late or overwintered on the estuary that season: 7 birds 26 September 1977, 1 bird on 7 October 1977 and 2 birds on 19 December 1977.

A total of 62 Brown-headed Cowbirds was reported over the study period, most of them in spring (79%). The earliest arrival was 6 birds on 25 April 1977 and the latest departure was 3 birds on 12 July 1976. Other surveys with high counts were: 27 birds on 27 April 1979, 4 birds on 20 May 1975 and 4 birds on 7 July 1977.

During the surveys, a total of 39 Western Meadowlarks were counted, most of them in winter (49%) and autumn (41%). Earliest arrival was 2 birds 23 October (1978) and latest departure was 1 bird on 20 April (1976). The most meadowlarks seen on a single survey was 4 birds on 1 December 1975.

Finches: Seven species of finches were recorded over the study period with a combined total of 2849 birds. The Pine Siskin was the most abundant finch with a total of 1255 birds seen over the study period. They were present in all seasons but the largest numbers were in winter (55%) and autumn (37%). Nevertheless the frequency of occurrence was often relatively low (50% or less) because the bird sometimes forms huge flocks. Described as nomadic in fall and winter and an irruptive species by Ehrlich (1988), the Pine Siskin can be unpredictably observed at any time of year. This is illustrated by a list of the largest numbers reported in each year: 220 birds on 24 November 1975, 240 birds on 4 February 1976, 100 birds on 19 January 1977, 20 birds on 23 November 1978 and 80 birds on 13 December 1979.

The American Goldfinch, with a total of 598 birds seen, ranked second in abundance among the finches. Most of the birds (80%) were seen in summer. The earliest arrival occurred in the period from 25 April (1977) to 15 May (1975). The latest departure in each year surveyed was: 16 September 1975, 19 September 1977 and 12 October 1978. The year 1978 was unusual in that there was only 2 records for the American Goldfinch: 6 birds on 6 June 1978 and 8 birds on 19 June 1978. In most years the frequency of occurrence ranged from 85% to 100% in summer when the peak number of each year was observed in the first 3 weeks of August: 43 birds on 19 August 1975, 106 birds on 17 August 1976 and 75 birds on 5 August 1977.

The House Finch was the third most abundant of the finches with a total of 504 birds tallied. It was common in spring and summer but most of the birds were seen in autumn (43%) and winter (26%). The frequency of occurrence was relatively constant through the seasons but it varied through the years surveyed: in 1975 it was approximately 40%, in 1976 and 1977 it had climbed to almost 65%, in 1978 and 1979 it had fallen back to around 50%. The peak number in each of the years fully surveyed occurred in October or November: 23 birds on 20 October 1975, 25 birds on 31 October 1977 and 25 birds again on 21 November 1977, 22 birds on 23 November 1976 and 35 birds on 23 November 1978.

We saw a total of 302 Red Crossbills. They were seen in every month of the year except November and December but most of the birds in this study (76%) occurred in the summer of 1976; a number of crossbills (up to a maximum of 49 birds) was seen on every survey from 12 July 1976 to 6 September 1976. Sightings of crossbills are variable (Ehrlich 1988) because these birds depend heavily on coniferous cone crop levels. The species was not seen in 1975 and then after the eruption of 1976, the numbers declined steadily over the years until only 1 Red Crossbill was seen in 1979.

During the surveys a total of 121 Evening Grosbeaks were recorded, most of them in spring (52%). The species was not seen in summer. Earliest arrival occurred from 26 September to 20 October and the latest departure was in April or May. This bird's use of the estuary was not consistent; in 1975 they were seen in winter but not spring; in 1977 they were seen in spring but not winter and in 1978 and 1979 only 1 bird was seen each year (in spring). The peak numbers were: 20 birds on 19 January 1975, 13 birds on 12 February 1976 and 35 birds on 3 March 1977.

We saw a total of 66 Purple Finches. The species was seen in every season with the largest proportion seen in autumn (38%) and the smallest in summer

(12%); the species was not observed in the period between 11 June to 26 September. The highest number recorded in a single survey was 10 birds on 12 October 1976. The frequency of occurrence was below 25%.

The Pine Grosbeak was sighted once, 3 birds on 23 October 1978.

Weaver Finches: This group is represented by the introduced House Sparrow; we saw 30 in total over the spring (12 birds), summer (11 birds) and autumn (7 birds). The largest numbers seen on 1 survey were 8 birds o 3 August 1976 and 7 birds on 20 October 1975.

Conclusions

Bird Use and Recreational Activities

The Little Qualicum River estuary is an important area for migratory and resident birds through the seasons. Because the site is within the Marshall-Stevenson Unit of the Qualicum National Wildlife Area, it does not receive the same degree of disturbances noted on the Cluxewe River estuary (see Dawe et. al. 1995), the Campbell River estuary (Dawe et al. in preparation) and some of the other estuaries along the east coast of Vancouver Island. Recreational access is restricted in order for the area to approach its full potential in terms of supporting numbers of birds. Perhaps as a result of this and other factors, the minimum numbers of birds dependent on the estuary of the Little Qualicum are several times higher than the minimum numbers of birds dependent on the Cluxewe or Campbell River estuaries. Bird use on the nearby Englishman River estuary with 170 hectares of floodplain is similar to bird use on the Little Qualicum even though the Little Qualicum River estuary is much smaller (approximately 50 hectares). If the numbers of gulls that arrive with the herring spawn are omitted because of the short time span, the variable size of this resource and the hit-or-miss nature of the surveys with respect to it, then the comparison between the two neighbouring rivers is even more striking.

The Regional District of Nanaimo predicts substantial population growth in the area. Although the present status of the property protects it from urbanization and recreational use, increases in population of the surrounding areas might result in increasing pressure for public access. Any changes to access should be considered carefully with regard to the impact on bird use.

Future Studies

Baseline studies such as this one should be compared to similar studies in the future as part of an effort to monitor the effects of urbanization and other human influences that are increasing in the region are having on the migratory birds resource.

Since estuaries are dependent on the inflow of water from the river and the presence of a high water table, any changes that might affect the flow in the Little Qualicum River should involve further study of its impact on the estuary and its bird life.

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Appendices

Appendix I. *Bird surveys on the Little Qualicum River estuary 19 January 1975 through 25 May 1979, showing number of surveys in each month and year as well as the total number of surveys by season.*

*Note that each year begins with December of the previous calendar year.

Season	Month	Year*					Total number of surveys in each:	
		1975	1976	1977	1978	1979	month	season
WINTER*	December*		4	1	1	2	8	30
	January	2	4	3	0	1	10	
	February	4	4	2	1	1	12	
SPRING	March	4	4	2	2	2	14	42
	April	4	4	3	1	1	13	
	May	4	5	3	1	2	15	
SUMMER	June	4	4	3	2		13	38
	July	5	4	3	1		13	
	August	4	5	3	0		12	
AUTUMN	September	3	4	3	0		10	35
	October	4	4	3	2		13	
	November	4	3	3	2		12	
Total Number of Surveys Each Year		42	49	32	13	9	Grand Total: 145 surveys	

Appendix II. *Total of all birds counted each season and each year on bird surveys of the Little Qualicum River estuary 19 January 1975 through 25 May 1979.*

*Note that each year begins with December of the previous calendar year.

Year*	Season				Yearly Totals
	Winter*	Spring	Summer	Autumn	
1975	3366	11191	4752	9182	28491
1976	10325	32480	6319	11051	60175
1977	6244	11871	4363	14800	37278
1978	1500	17885	735	5365	25485
1979	6423	39305			45728
Seasonal Totals	27858	112732	16169	40398	Grand Total: 197157

Appendix III. *Little Qualicum River estuary* bird check-list.

Species Code	Species Name	Scientific Name
RTLO	Red-throated Loon	*Gavia stellata*
PALO	Pacific Loon	*Gavia pacifica*
COLO	Common Loon	*Gavia immer*
YBLO	Yellow-billed Loon	*Gavia adamsii*
PBGR	Pied-billed Grebe	*Podilymbus podiceps*
HOGR	Horned Grebe	*Podiceps auritus*
RNGR	Red-necked Grebe	*Podiceps grisegena*
WEGR	Western Grebe	*Aechmophorus occidentalis*
DCCO	Double-crested Cormorant	*Phalacrocorax auritus*
PECO	Pelagic Cormorant	*Phalacrocorax pelagicus*
GBHE	Great Blue Heron	*Ardea herodias*
TRUS	Trumpeter Swan	*Cygnus buccinator*
GWFG	Greater White-fronted Goose	*Anser albifrons*
SNGO	Snow Goose	*Chen caerulescens*
BRAN	Brant	*Branta bernicla*
CAGO	Canada Goose	*Branta canadensis*
WODU	Wood Duck	*Aix sponsa*
GWTE	Green-winged Teal	*Anas crecca*
MALL	Mallard	*Anas platyrhyncos*
NOPI	Northern Pintail	*Anas acuta*
BWTE	Blue-winged Teal	*Anas discors*
NOSL	Northern Shoveler	*Anas clypeata*
GADW	Gadwall	*Anas strepera*
EUWI	Eurasian Wigeon	*Anas penelope*
AMWI	American Wigeon	*Anas americana*
RNDU	Ring-necked Duck	*Aythya collaris*
GRSC	Greater Scaup	*Aythya marila*
HADU	Harlequin Duck	*Histrionicus histrionicus*
OLDS	Oldsquaw	*Clangula hyemalis*
BLSC	Black Scoter	*Melanitta nigra*
SUSC	Surf Scoter	*Melanitta perspicillata*
WWSC	White-winged Scoter	*Melanitta fusca*
COGO	Common Goldeneye	*Bucephala clangula*
BAGO	Barrow's Goldeneye	*Bucephala islandica*
BUFF	Bufflehead	*Bucephala albeola*
HOME	Hooded Merganser	*Lophodytes cucullatus*
COME	Common Merganser	*Mergus merganser*
RBME	Red-breasted Merganser	*Mergus serrator*
RUDU	Ruddy Duck	*Oxyura jamaicensis*
TUVU	Turkey Vulture	*Cathartes aura*
OSPR	Osprey	*Pandion haliaetus*
BAEA	Bald Eagle	*Haliaeetus leucocephalus*
NOHA	Northern Harrier	*Circu cyaneus*
SSHA	Sharp-shinned Hawk	*Accipiter stiatus*
COHA	Cooper's Hawk	*Accipter cooperii*
NOGO	Northern Goshawk	*Accipiter gentilis*
RTHA	Red-tailed Hawk	*Buteo jamaicensis*

Little Qualicum River estuary bird check-list (Cont'd).

Species Code	Species Name	Scientific Name
AMKE	American Kestrel	*Falco sparverius*
MERL	Merlin	*Falco columbarius*
GYRF	Gyrfalcon	*Falco rusticolis*
RNPH	Ring-necked Pheasant	*Phasianus colchicus*
BLGR	Blue Grouse	*Dendragapus obscurus*
RUGR	Ruffed Grouse	*Bonasa umbellus*
CAQU	California Quail	*Callipepla claifornica*
VIRA	Virginia Rail	*Rallus limicola*
AMCO	American Coot	*Fulica americana*
SACR	Sandhill Crane	*Grus canadensis*
BBPL	Black-bellied Plover	*Pluvialis squatarola*
SEPL	Semipalmated Plover	*Charadrius semipalmatus*
KILL	Killdeer	*Charadrius vociferus*
GRYE	Greater Yellowlegs	*Tringa melanoleuca*
LEYE	Lesser Yellowlegs	*Tinga flavipes*
SPSA	Spotted Sandpiper	*Actitis macularia*
WHIM	Whimbrel	*Numenius phaeopus*
BLTU	Black Turnstone	*Arenaria melanocephala*
SAND	Sanderling	*Calidris alba*
WESA	Western Sandpiper	*Calidris mauri*
LESA	Least Sandpiper	*Calidris minutilla*
BASA	Baird's Sandpiper	*Calidris bairdii*
PESA	Pectoral Sandpiper	*Calidris melanotos*
DUNL	Dunlin	*Calidris alpina*
SBDO	Short-billed Dowitcher	*Limnodromus griseus*
LBDO	Long-billed Dowitcher	*Limnodromus scolopaceus*
COSN	Common Snipe	*Gallinago gallinago*
WIPH	Wilson's Phalarope	*Phalaropus tricolor*
RNPL	Red-necked Phalarope	*Phalaropus lobatus*
PAJA	Parasitic Jaeger	*Stercorarius parasiticus*
BOGU	Bonaparte's Gull	*Larus philadelphia*
MEGU	Mew Gull	*Larus canus*
RBGU	Ring-billed Gull	*Larus delawarensis*
CAGU	California Gull	*Larus californicus*
HEGU	Herring Gull	*Larus argentatus*
THGU	Thayer's Gull	*Larus thayeri*
GWGU	Glaucous-winged Gull	*Larus glaucescens*
CATE	Caspian Tern	*Sterna caspia*
COTE	Common Tern	*Sterna hirundo*
COMU	Common Murre	*Uria aalga*
PIGU	Pigeon Guillemot	*Cepphus columba*
MAMU	Marblet Murrelet	*Brachyrampus marmoratus*
RODO	Rock Dove	*Columba livia*
BTPI	Band-tailed Pigeon	*Columba fasciata*
MODO	Mourning Dove	*Zenaida macroura*
WSOW	Western Screech-Owl	*Otis kennicottii*
GHOW	Great Horned Owl	*Bubo virginianus*

Little Qualicum River estuary bird check-list (Cont'd).

Species Code	Species Name	Scientific Name
SEOW	Short-eared Owl	*Asio flammeus*
CONI	Common Nighthawk	*Chordeilus minor*
BLSW	Black Swift	*Cypseloides niger*
VASW	Vaux's Swift	*Chautura vauxi*
RUHU	Rufous Hummingbird	*Selasphorus rufous*
BEKI	Belted Kingfisher	*Ceryle alcyon*
RBSA	Red-breasted Sapsucker	*Sphyrapicus ruber*
DOWO	Downy Woodpecker	*Picoides pubescens*
HAWO	Hairy Woodpecker	*Picoides villosus*
NOFL	Northern Flicker	*Colaptes auratus*
PIWO	Pileated Woodpecker	*Dryocopus pileatus*
WWPE	Western Wood-Peewee	*Contopus sordidulus*
WIFL	Willow Flycatcher	*Empidonax traillii*
PSFL	Pacific-slope Flycatcher	*Empidonax difficilis*
SAPH	Say's Phoebe	*Sayornis saya*
WEKI	Western Kingbird	*Tyrannus verticalis*
TRSW	Tree Swallow	*Tachycineta bicolor*
VGSW	Violet-green Swallow	*Tachycinata thalassina*
NRWS	Northern Rough-winged Swallow	*Stelgidopteryx serripennis*
CLSW	Cliff Swallow	*Hirundo pyrrhonota*
BASW	Barn Swallow	*Hirundo rustica*
STJA	Steller's Jay	*Cyanocitta stelleri*
NOCR	Northwestern Crow	*Corvus caurinus*
CORA	Common Raven	*Corvus corax*
CBCH	Chestnut-backed Chickadee	*Parus rufescens*
BUSH	Bushtit	*Psaltriparus minimus*
RBNU	Red-breasted Nuthatch	*Sitta canadensis*
BRCR	Brown Creeper	*Certhia americana*
MAWR	Marsh Wren	*Cistothorus palustris*
BEWR	Bewick's Wren	*Thryomanes bewickii*
HOWR	House Wren	*Troglodytes aedon*
WIWR	Winter Wren	*Troglodytes troglodytes*
GCKI	Golden-crowned Kinglet	*Regulus satrapa*
RCKI	Ruby-crowned Kinglet	*Regulus calendula*
WEBL	Western Bluebird	*Sialia mexicana*
MOBL	Mountain Bluebird	*Sialia currocoides*
TOSO	Townsend's Solitaire	*Myadestes townsendi*
SWTH	Swainson's Thrush	*Catharus ustulatus*
HETH	Hermit Thrush	*Catharus guttatus*
AMRO	American Robin	*Turdus migratorius*
VATH	Varied Thrush	*Ixoreus naevius*
WAPI	American Pipit	*Anthus spinoletta*
CEWA	Cedar Waxwing	*Bombycilla cedrorum*
NOSH	Northern Shrike	*Lanius excubitor*
EUST	European Starling	*Sturnus vulgarus*
HUVI	Hutton's Vireo	*Vireo huttoni*
OCWA	Orange-crowned Warbler	*Vermivora celata*

Little Qualicum River estuary bird check-list (Cont'd).

Species Code	Species Name	Scientific Name
YEWA	Yellow Warbler	*Dendroica petechia*
YRWA	Yellow-rumped Warbler	*Dendroica coronata*
BTGW	Black-throated Gray Warbler	*Dendroica nigrescens*
TOWA	Townsend's Warbler	*Dendroica townsendi*
MGWA	MacGillivray's Warbler	*Oporornis tolmiei*
COYE	Common Yellowthroat	*Geothlypis trichas*
WIWA	Wilson's Warbler	*Wilsonia pusilla*
WETA	Western Tanager	*Piranga ludoviciana*
RSTO	Rufous-sided Towhee	*Pipilo erythrophthalmus*
ATSP	American Tree Sparrow	*Spizella arborea*
CHSP	Chipping Sparrow	*Spizella passerina*
SAVS	Savannah Sparrow	*Passerculus sandwichensis*
FOSP	Fox Sparrow	*Passerella iliaca*
SOSP	Song Sparrow	*Melospiza melodia*
LISP	Lincoln's Sparrow	*Melospiza lincolnii*
WTSP	White-throated Sparrow	*Zonotrichia albicollis*
GCSP	Golden-crowned Sparrow	*Zonotrichia atricapilla*
WCSP	White-crowned Sparrow	*Zonotrichia leucophrys*
DEJU	Dark-eyed Junco	*Junco hyemalis*
SNBU	Snow Bunting	*Plectrophenax nivalis*
RWBL	Red-winged Blackbird	*Agelaius phoeniceus*
WEME	Western Meadowlark	*Sturnella neglecta*
BRBL	Brewer's Blackbird	*Euphagus cyanocephalus*
BHCO	Brown-headed Cowbird	*Molothrus ater*
PIGR	Pine Grosbeak	*Pinicola enucleator*
PUFI	Purple Finch	*Carpodacus purpureus*
HOFI	House Finch	*Carpodacus mexicanus*
RECR	Red Crossbill	*Loxia curvirostra*
PISI	Pine Siskin	*Carduelis pinus*
AMGO	American Goldfinch	*Carduelis tristis*
EVGR	Evening Grosbeak	*Coccothraustes vespertinus*
HOSP	House Sparrow	*Passer domesticus*

Appendix IV.

Little Qualicum River estuary birds surveys: Seasonal bird numbers, 19 January 1975 through 25 May 1979.

Note: In this Appendix, the mean has been calculated as the total number of birds of species-x counted over the season, divided by the total number of counts where species-x occurred. Counts of zero have not been included in the total number of counts nor are they included as minimum values. Thus the last 5 columns in the Appendix summarize the species occurrence on the study area. For example, the probability of seeing a Black Scoter in the winter of 1974-1975 on the Little Qualicum River estuary was about 67%. If you see the species, you are likely to see an average of about 35 birds and more than 46 would be exceptional.

Bird surveys of Little Qualicum River estuary for Winter 1974-1975

Date	19Jan	30Jan	01Feb	11Feb	18Feb	25Feb	Total	Max	Min	Mean	SD	%Freq	Median
#LOO	0	0	0	1	2	9	12	9	1	4.0	4.4	50.0	2.0
PALO	0	0	0	0	2	2	4	2	2	2.0	-	33.3	2.0
COLO	0	0	0	1	0	7	8	7	1	4.0	4.2	33.3	4.0
#GRE	0	0	0	1	2	239	242	239	1	80.7	137.1	50.0	2.0
HOGR	0	0	0	1	1	5	7	5	1	2.3	2.3	50.0	1.0
RNGR	0	0	0	0	0	1	1	1	1	1.0	-	16.7	1.0
WEGR	0	0	0	0	1	233	234	233	1	117.0	164.0	33.3	117.0
#COR	0	0	0	1	0	0	1	1	1	1.0	-	16.7	1.0
DCCO	0	0	0	1	0	0	1	1	1	1.0	-	16.7	1.0
#HER	2	0	2	3	3	4	14	4	2	2.8	0.8	83.3	3.0
GBHE	2	0	2	3	3	4	14	4	2	2.8	0.8	83.3	3.0
#SWA	0	4	4	4	4	0	16	4	4	4.0	-	66.7	4.0
TRUS	0	4	4	4	4	0	16	4	4	4.0	-	66.7	4.0
#DAB	36	51	60	284	152	54	637	284	36	106.2	96.5	100.0	57.0
GWTE	0	0	0	9	13	6	28	13	6	9.3	3.5	50.0	9.0
TEAL	0	0	0	0	0	2	2	2	2	2.0	-	16.7	2.0
MALL	30	50	60	198	93	26	457	198	26	76.2	64.4	100.0	55.0
NOPI	0	0	0	1	2	0	3	2	1	1.5	0.7	33.3	1.5
EUWI	0	0	0	1	0	0	1	1	1	1.0	-	16.7	1.0
AMWI	6	1	0	75	44	20	146	75	1	29.2	30.6	83.3	20.0
#DIV	27	34	170	249	367	379	1226	379	27	204.3	155.3	100.0	209.5
GRSC	3	4	20	14	71	14	126	71	3	21.0	25.3	100.0	14.0
HADU	0	0	0	7	0	17	24	17	7	12.0	7.1	33.3	12.0
OLDS	0	0	0	0	3	0	3	3	3	3.0	-	16.7	3.0
SCOT	0	0	0	130	0	81	211	130	81	105.5	34.6	33.3	105.5
BLSC	10	0	40	0	46	42	138	46	10	34.5	16.5	66.7	41.0
SUSC	0	0	30	0	97	56	183	97	30	61.0	33.8	50.0	56.0
WWSC	0	0	0	0	12	48	60	48	12	30.0	25.5	33.3	30.0
COGO	2	4	50	53	113	57	279	113	2	46.5	40.9	100.0	51.5
BUFF	5	20	25	39	25	60	174	60	5	29.0	18.7	100.0	25.0
HOME	0	0	0	1	0	0	1	1	1	1.0	-	16.7	1.0
COME	7	6	5	5	0	4	27	7	4	5.4	1.1	83.3	5.0
#RAP	10	6	4	0	4	1	25	10	1	5.0	3.3	83.3	4.0
BAEA	10	6	4	0	3	1	24	10	1	4.8	3.4	83.3	4.0
COHA	0	0	0	0	1	0	1	1	1	1.0	-	16.7	1.0
RNPH	1	0	0	4	0	0	5	4	1	2.5	2.1	33.3	2.5
#SHO	14	0	29	17	13	2	75	29	2	15.0	9.7	83.3	14.0
KILL	14	0	14	17	10	2	57	17	2	11.4	5.8	83.3	14.0
BLTU	0	0	15	0	2	0	17	15	2	8.5	9.2	33.3	8.5
COSN	0	0	0	0	1	0	1	1	1	1.0	-	16.7	1.0
#GUL	70	70	100	56	30	88	414	100	30	69.0	24.6	100.0	70.0
GULL	0	0	0	0	0	26	26	26	26	26.0	-	16.7	26.0
MEGU	20	60	50	26	9	32	197	60	9	32.8	19.0	100.0	29.0
GWGU	50	10	50	30	21	30	191	50	10	31.8	15.9	100.0	30.0
BEKI	2	0	3	1	0	2	8	3	1	2.0	0.8	66.7	2.0
#WOO	0	0	0	5	0	1	6	5	1	3.0	2.8	33.3	3.0
DOWO	0	0	0	1	0	0	1	1	1	1.0	-	16.7	1.0
NOFL	0	0	0	4	0	1	5	4	1	2.5	2.1	33.3	2.5
#PAS	47	80	106	137	72	243	685	243	47	114.2	70.2	100.0	93.0
STJA	0	0	1	0	0	0	1	1	1	1.0	-	16.7	1.0
NOCR	20	30	30	45	37	77	239	77	20	39.8	20.0	100.0	33.5

Bird surveys of Little Qualicum River estuary for Winter 1974-1975 (continued)

Date	19Jan	30Jan	01Feb	11Feb	18Feb	25Feb	Total	Max	Min	Mean	SD	%Freq	Median
CORA	0	0	0	0	0	2	2	2	2	2.0	-	16.7	2.0
CBCH	0	0	0	0	0	25	25	25	25	25.0	-	16.7	25.0
BEWR	1	0	0	0	0	0	1	1	1	1.0	-	16.7	1.0
GCKI	0	0	0	0	0	20	20	20	20	20.0	-	16.7	20.0
AMRO	0	0	16	1	0	50	67	50	1	22.3	25.1	50.0	16.0
VATH	0	0	0	1	0	5	6	5	1	3.0	2.8	33.3	3.0
EUST	0	50	50	75	32	50	257	75	32	51.4	15.3	83.3	50.0
HUVI	1	0	0	0	0	0	1	1	1	1.0	-	16.7	1.0
RSTO	3	0	0	1	1	7	12	7	1	3.0	2.8	66.7	2.0
FOSP	0	0	0	2	0	0	2	2	2	2.0	-	16.7	2.0
SOSP	2	0	3	5	2	2	14	5	2	2.8	1.3	83.3	2.0
WEME	0	0	1	1	0	0	2	1	1	1.0	-	33.3	1.0
PUFI	0	0	5	6	0	0	11	6	5	5.5	0.7	33.3	5.5
HOFI	0	0	0	0	0	5	5	5	5	5.0	-	16.7	5.0
EVGR	20	0	0	0	0	0	20	20	20	20.0	-	16.7	20.0
#TOT	209	245	478	763	649	1022	3366	1022	209	561.0	313.6	100.0	563.5

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Bird surveys of Little Qualicum River estuary for Spring 1975

Date	04Mar	11Mar	18Mar	26Mar	08Apr	15Apr	22Apr	29Apr	07May	15May	20May	27May	Total	Max	Min	Mean	SD	%Freq	Median
#LOO	3	36	3	5	6	7	12	6	5	4	2	22	111	36	2	9.3	10.0	100.0	5.5
RTLO	2	34	0	0	0	0	0	0	0	0	0	0	36	34	2	18.0	22.6	16.7	18.0
PALO	1	0	0	0	0	0	0	0	0	0	0	20	21	20	1	10.5	13.4	16.7	10.5
COLO	0	2	3	5	6	7	12	6	5	4	2	2	54	12	2	4.9	2.9	91.7	5.0
#GRE	1	27	1	114	48	10	133	14	2	1	1	1	353	133	1	29.4	46.4	100.0	6.0
HOGR	1	7	1	4	8	7	4	9	2	0	1	0	44	9	1	4.4	3.1	83.3	4.0
RNGR	0	2	0	0	1	0	0	2	0	1	0	0	6	2	1	1.5	0.6	33.3	1.5
WEGR	0	18	0	110	39	3	129	3	0	0	0	1	303	129	1	43.3	54.0	58.3	18.0
#COR	0	0	0	0	0	0	1	0	0	0	0	2	3	2	1	1.5	0.7	16.7	1.5
DCCO	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	1.0	-	8.3	1.0
PECO	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2.0	-	8.3	2.0
#HER	4	0	0	0	3	3	2	2	2	2	1	6	25	6	1	2.8	1.5	75.0	2.0
GBHE	4	0	0	0	3	3	2	2	2	2	1	6	25	6	1	2.8	1.5	75.0	2.0
#SWA	7	0	0	0	0	0	0	0	0	0	0	0	7	7	7	7.0	-	8.3	7.0
SWAN	7	0	0	0	0	0	0	0	0	0	0	0	7	7	7	7.0	-	8.3	7.0
#GEE	1	23	530	72	191	657	197	97	0	40	0	0	1808	657	1	200.9	234.9	75.0	97.0
BRAN	1	23	530	72	191	657	197	97	0	40	0	0	1808	657	1	200.9	234.9	75.0	97.0
#DAB	37	22	32	1	1	1	5	2	3	2	0	0	106	37	1	10.6	14.1	83.3	2.5
GWTE	2	2	0	0	0	0	0	0	0	0	0	0	4	2	2	2.0	-	16.7	2.0
MALL	0	0	0	0	1	1	5	2	3	2	0	0	14	5	1	2.3	1.5	50.0	2.0
AMWI	35	20	32	1	0	0	0	0	0	0	0	0	88	35	1	22.0	15.4	33.3	26.0
#DIV	208	315	394	450	50	1257	579	358	485	531	52	129	4808	1257	50	400.7	324.2	100.0	376.0
GRSC	21	47	25	179	0	0	0	0	0	0	0	0	272	179	21	68.0	74.9	33.3	36.0
HADU	0	0	4	15	0	2	0	27	0	10	32	76	166	76	2	23.7	25.6	58.3	15.0
OLDS	2	4	0	7	0	61	0	0	0	0	0	0	74	61	2	18.5	28.4	33.3	5.5
SCOT	0	50	0	0	0	0	0	0	400	0	0	0	450	400	50	225.0	247.5	16.7	225.0
BLSC	34	72	94	109	0	8	201	78	0	103	4	32	735	201	4	73.5	58.9	83.3	75.0
SUSC	32	17	41	12	7	1147	376	98	4	410	6	4	2154	1147	4	179.5	337.3	100.0	24.5
WWSC	12	21	118	15	0	0	0	33	10	0	7	15	231	118	7	28.9	36.9	66.7	15.0
COGO	40	58	69	72	0	9	0	59	26	5	0	0	338	72	5	42.3	26.4	66.7	49.0
BUFF	66	45	38	38	36	22	0	52	37	1	0	0	335	66	1	37.2	18.2	75.0	38.0

Bird surveys of Little Qualicum River estuary for Spring 1975 (continued)

Date	04Mar	11Mar	18Mar	26Mar	08Apr	15Apr	22Apr	29Apr	07May	15May	20May	27May	Total	Max	Min	Mean	SD	%Freq	Median
COME	1	1	5	3	4	6	2	11	8	2	3	2	48	11	1	4.0	3.0	100.0	3.0
RBME	0	0	0	0	3	2	0	0	0	0	0	0	5	3	2	2.5	0.7	16.7	2.5
#RAP	2	1	2	0	1	0	2	1	2	1	1	0	13	2	1	1.4	0.5	75.0	1.0
BAEA	2	1	2	0	1	0	2	1	2	0	1	0	12	2	1	1.5	0.5	66.7	1.5
AMKE	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1.0	-	8.3	1.0
RNPH	0	0	2	1	0	0	1	0	4	1	1	0	10	4	1	1.7	1.2	50.0	1.0
CAQU	0	0	0	0	0	0	0	1	2	0	2	1	6	2	1	1.5	0.6	33.3	1.5
#SHO	17	3	5	3	5	4	16	128	147	6	4	8	346	147	3	28.8	51.1	100.0	5.5
KILL	0	3	5	2	5	1	7	10	5	5	4	7	54	10	1	4.9	2.5	91.7	5.0
GRYE	0	0	0	0	0	3	0	0	1	0	0	0	4	3	1	2.0	1.4	16.7	2.0
SPSA	0	0	0	0	0	0	0	0	0	1	0	1	2	1	1	1.0	-	16.7	1.0
BLTU	13	0	0	1	0	0	9	113	120	0	0	0	256	120	1	51.2	59.8	41.7	13.0
SAND	4	0	0	0	0	0	0	4	0	0	0	0	8	4	4	4.0	-	16.7	4.0
LESA	0	0	0	0	0	0	0	1	19	0	0	0	20	19	1	10.0	12.7	16.7	10.0
LBDO	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	-	8.3	1.0
COSN	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	-	8.3	1.0
#GUL	95	127	468	85	172	130	60	348	362	210	57	57	2171	468	57	180.9	138.7	100.0	128.5
GULL	0	76	280	20	152	0	15	0	0	46	50	17	656	280	15	82.0	91.8	66.7	48.0
BOGU	0	0	0	0	0	35	17	281	325	130	0	0	788	325	17	157.6	140.4	41.7	130.0
MEGU	28	16	28	1	0	0	0	19	1	0	0	0	93	28	1	15.5	12.2	50.0	17.5
CAGU	0	0	12	0	0	0	0	0	3	0	0	0	15	12	3	7.5	6.4	16.7	7.5
HEGU	0	0	3	0	1	0	0	0	0	0	0	0	4	3	1	2.0	1.4	16.7	2.0
THGU	0	0	117	34	11	15	0	15	20	1	0	0	213	117	1	30.4	39.4	58.3	15.0
GWGU	67	35	28	30	8	80	28	33	13	33	7	40	402	80	7	33.5	21.7	100.0	31.5
#ALC	0	2	0	6	0	0	1	3	0	5	17	19	53	19	1	7.6	7.3	58.3	5.0
PIGU	0	0	0	2	0	0	1	0	0	0	12	4	19	12	1	4.8	5.0	33.3	3.0
MAMU	0	2	0	4	0	0	0	3	0	5	5	15	34	15	2	5.7	4.7	50.0	4.5
RODO	1	0	0	0	0	0	1	1	0	0	1	1	5	1	1	1.0	-	41.7	1.0
MODO	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1.0	-	8.3	1.0
RUHU	0	0	0	0	1	2	3	4	2	2	7	3	24	7	1	3.0	1.9	66.7	2.5
BEKI	2	2	2	2	1	0	2	2	1	2	1	3	20	3	1	1.8	0.6	91.7	2.0
#WOO	1	3	3	0	2	3	1	2	1	1	2	1	20	3	1	1.8	0.9	91.7	2.0
DOWO	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1.0	-	8.3	1.0
NOFL	1	3	3	0	1	3	1	1	1	1	2	1	18	3	1	1.6	0.9	91.7	1.0
PIWO	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1.0	-	8.3	1.0
#PAS	186	38	157	190	111	33	123	82	51	134	90	106	1301	190	33	108.4	53.0	100.0	108.5
FLYC	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1.0	-	8.3	1.0
PSFL	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1.0	-	8.3	1.0
TRSW	0	0	0	0	0	0	2	2	0	0	0	0	4	2	2	2.0	-	16.7	2.0
VGSW	0	2	0	0	4	2	25	18	7	7	10	4	79	25	2	8.8	7.9	75.0	7.0
NRWS	0	0	0	0	0	0	2	0	2	1	1	1	7	2	1	1.4	0.5	41.7	1.0
CLSW	0	0	0	0	0	0	2	5	3	1	2	0	13	5	1	2.6	1.5	41.7	2.0
BASW	0	0	0	0	0	0	2	0	4	11	14	24	55	24	2	11.0	8.8	41.7	11.0
NOCR	82	29	50	18	32	7	14	25	13	25	26	18	339	82	7	28.3	20.2	100.0	25.0
CORA	1	1	0	0	0	0	1	1	0	0	0	0	4	1	1	1.0	-	33.3	1.0
CBCH	20	0	0	0	0	0	10	0	0	2	0	2	34	20	2	8.5	8.5	33.3	6.0
RBNU	0	0	0	0	0	0	1	0	0	0	0	1	2	1	1	1.0	-	16.7	1.0
BEWR	0	0	1	0	0	0	1	0	0	0	0	1	3	1	1	1.0	-	25.0	1.0
WIWR	3	0	0	0	0	4	2	0	0	0	0	4	13	4	2	3.3	1.0	33.3	3.5
GCKI	20	0	0	20	0	0	0	0	0	0	0	0	40	20	20	20.0	-	16.7	20.0
RCKI	0	0	0	1	0	0	0	0	0	0	0	0	1	1	1	1.0	-	8.3	1.0

Bird surveys of Little Qualicum River estuary for Spring 1975 (continued)

Date	04Mar	11Mar	18Mar	26Mar	08Apr	15Apr	22Apr	29Apr	07May	15May	20May	27May	Total	Max	Min	Mean	SD	%Freq	Median
SWTH	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3.0	-	8.3	3.0
AMRO	14	5	0	5	6	2	22	5	2	4	5	14	84	22	2	7.6	6.3	91.7	5.0
AMPI	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1.0	-	8.3	1.0
EUST	10	0	90	100	62	10	9	2	10	13	13	11	330	100	2	30.0	35.9	91.7	11.0
OCWA	0	0	0	0	0	0	0	0	0	5	0	0	5	5	5	5.0	-	8.3	5.0
YEWA	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1.0	-	8.3	1.0
YRWA	0	0	0	0	0	0	0	0	0	8	0	0	8	8	8	8.0	-	8.3	8.0
MGWA	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1.0	-	8.3	1.0
WETA	0	0	0	0	0	0	0	0	0	0	6	0	6	6	6	6.0	-	8.3	6.0
RSTO	2	0	5	2	0	0	2	2	1	2	1	0	17	5	1	2.1	1.2	66.7	2.0
SAVS	0	0	0	0	0	0	2	2	0	11	4	3	22	11	2	4.4	3.8	41.7	3.0
FOSP	2	0	1	2	0	0	2	0	0	0	0	0	7	2	1	1.8	0.5	33.3	2.0
SOSP	1	1	3	3	2	3	2	2	0	2	3	2	24	3	1	2.2	0.8	91.7	2.0
GCSP	3	0	2	5	0	0	9	2	5	21	0	0	47	21	2	6.7	6.8	58.3	5.0
WCSP	5	0	5	5	0	0	2	1	2	4	0	1	25	5	1	3.1	1.8	66.7	3.0
DEJU	20	0	0	6	0	0	3	0	0	0	0	0	29	20	3	9.7	9.1	25.0	6.0
RWBL	0	0	0	0	3	4	2	7	1	5	0	4	26	7	1	3.7	2.0	58.3	4.0
BRBL	0	0	0	20	0	1	2	3	1	0	0	0	27	20	1	5.4	8.2	41.7	2.0
BHCO	0	0	0	0	0	0	0	0	0	1	4	1	6	4	1	2.0	1.7	25.0	1.0
PUFI	3	0	0	0	0	0	0	2	0	0	0	0	5	3	2	2.5	0.7	16.7	2.5
HOFI	0	0	0	3	0	0	4	2	0	1	0	1	11	4	1	2.2	1.3	41.7	2.0
AMGO	0	0	0	0	0	0	0	0	0	10	0	8	18	10	8	9.0	1.4	16.7	9.0
HOSP	0	0	0	0	2	0	0	0	0	0	0	0	2	2	2	2.0	-	8.3	2.0
#TOT	565	599	1599	929	592	2107	1139	1051	1069	942	239	360	11191	2107	239	932.6	528.3	100.0	935.5

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Bird surveys of Little Qualicum River estuary for Summer 1975

Date	04Jun	11Jun	17Jun	24Jun	01Jul	08Jul	14Jul	22Jul	29Jul	05Aug	12Aug	19Aug	26Aug	Total	Max	Min	Mean	SD	%Freq	Median
#LOO	3	2	1	6	0	2	0	0	0	0	0	0	0	14	6	1	2.8	1.9	38.5	2.0
PALO	0	2	1	2	0	0	0	0	0	0	0	0	0	5	2	1	1.7	0.6	23.1	2.0
COLO	3	0	0	4	0	2	0	0	0	0	0	0	0	9	4	2	3.0	1.0	23.1	3.0
#GRE	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1.0	-	7.7	1.0
PBGR	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1.0	-	7.7	1.0
#COR	1	0	2	8	0	3	0	1	0	2	0	1	0	18	8	1	2.6	2.5	53.8	2.0
DCCO	1	0	2	8	0	0	0	1	0	2	0	0	0	14	8	1	2.8	2.9	38.5	2.0
PECO	0	0	0	0	0	3	0	0	0	0	0	1	0	4	3	1	2.0	1.4	15.4	2.0
#HER	2	1	2	4	6	3	1	2	1	0	0	3	0	25	6	1	2.5	1.6	76.9	2.0
GBHE	2	1	2	4	6	3	1	2	1	0	0	3	0	25	6	1	2.5	1.6	76.9	2.0
#DAB	6	1	0	3	0	0	0	0	0	0	1	3	32	46	32	1	7.7	12.1	46.2	3.0
GWTE	0	0	0	0	0	0	0	0	0	0	0	2	1	3	2	1	1.5	0.7	15.4	1.5
TEAL	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1.0	-	7.7	1.0
MALL	6	1	0	3	0	0	0	0	0	0	1	0	12	23	12	1	4.6	4.6	38.5	3.0
NOPI	0	0	0	0	0	0	0	0	0	0	0	0	19	19	19	19	19.0	-	7.7	19.0
#DIV	25	2	13	51	67	13	34	38	13	0	0	1	11	268	67	1	24.4	21.0	84.6	13.0
HADU	0	0	2	0	0	0	0	0	0	0	0	1	0	3	2	1	1.5	0.7	15.4	1.5
SCOT	24	0	0	0	0	0	0	0	0	0	0	0	0	24	24	24	24.0	-	7.7	24.0
SUSC	0	0	0	8	11	0	0	0	0	0	0	0	0	19	11	8	9.5	2.1	15.4	9.5
WWSC	1	0	8	33	55	0	0	0	0	0	0	0	0	97	55	1	24.3	24.7	30.8	20.5
COME	0	2	3	10	1	13	34	38	13	0	0	0	11	125	38	1	13.9	13.4	69.2	11.0
#RAP	1	1	3	3	1	2	2	2	1	3	1	1	4	25	4	1	1.9	1.0	100.0	2.0
OSPR	0	1	2	1	1	0	1	1	0	1	0	0	1	9	2	1	1.1	0.4	61.5	1.0

Bird surveys of Little Qualicum River estuary for Summer 1975 (continued)

Date	04Jun	11Jun	17Jun	24Jun	01Jul	08Jul	14Jul	22Jul	29Jul	05Aug	12Aug	19Aug	26Aug	Total	Max	Min	Mean	SD	%Freq	Median
BAEA	1	0	1	2	0	1	1	1	1	1	1	1	1	12	2	1	1.1	0.3	84.6	1.0
SSHA	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	-	7.7	1.0
COHA	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1.0	-	7.7	1.0
AMKE	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1.0	-	7.7	1.0
MERL	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1.0	-	7.7	1.0
RNPH	1	0	1	8	0	0	1	6	6	1	0	7	0	31	8	1	3.9	3.1	61.5	3.5
CAQU	0	0	1	0	0	0	1	0	0	0	0	0	0	2	1	1	1.0	-	15.4	1.0
#SHO	4	8	20	31	16	12	39	24	45	1	29	52	64	345	64	1	26.5	19.3	100.0	24.0
KILL	4	6	19	31	9	6	22	13	21	1	24	6	5	167	31	1	12.8	9.5	100.0	9.0
GRYE	0	0	0	0	0	0	1	0	2	0	0	1	1	5	2	1	1.3	0.5	30.8	1.0
SPSA	0	2	1	0	3	3	1	3	1	0	0	2	1	17	3	1	1.9	0.9	69.2	2.0
BLTU	0	0	0	0	0	0	0	3	0	0	0	3	10	16	10	3	5.3	4.0	23.1	3.0
SAND	0	0	0	0	0	0	0	0	0	0	0	0	13	13	13	13	13.0	-	7.7	13.0
WESA	0	0	0	0	0	0	0	0	9	0	1	29	24	63	29	1	15.8	13.0	30.8	16.5
LESA	0	0	0	0	4	3	15	0	10	0	4	11	0	47	15	3	7.8	4.9	46.2	7.0
DUNL	0	0	0	0	0	0	0	0	0	0	0	0	10	10	10	10	10.0	-	7.7	10.0
LBDO	0	0	0	0	0	0	0	5	2	0	0	0	0	7	5	2	3.5	2.1	15.4	3.5
#GUL	88	36	35	67	42	101	151	53	149	54	215	57	176	1224	215	35	94.2	59.6	100.0	67.0
GULL	70	0	0	0	0	0	0	0	20	0	7	0	0	97	70	7	32.3	33.3	23.1	20.0
BOGU	12	0	0	0	0	67	92	16	68	21	149	33	140	598	149	12	66.4	51.9	69.2	67.0
MEGU	0	0	0	0	2	0	0	2	19	23	16	8	13	83	23	2	11.9	8.2	53.8	13.0
RBGU	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1.0	-	7.7	1.0
CAGU	0	0	0	0	0	0	2	0	2	0	0	0	0	4	2	2	2.0	-	15.4	2.0
THGU	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	1.0	-	7.7	1.0
GWGU	6	36	35	66	40	34	57	34	40	10	43	16	23	440	66	6	33.8	17.1	100.0	35.0
CATE	0	0	0	0	0	0	2	0	0	0	0	0	0	2	2	2	2.0	-	7.7	2.0
#ALC	12	1	5	15	1	11	0	11	0	0	1	0	0	57	15	1	7.1	5.8	61.5	8.0
PIGU	6	1	0	4	0	2	0	2	0	0	1	0	0	16	6	1	2.7	2.0	46.2	2.0
MAMU	6	0	5	11	1	9	0	9	0	0	0	0	0	41	11	1	6.8	3.6	46.2	7.5
BTPI	0	0	0	0	3	7	0	0	2	0	0	0	0	12	7	2	4.0	2.6	23.1	3.0
CONI	0	0	1	3	0	0	0	0	0	6	0	0	20	30	20	1	7.5	8.6	30.8	4.5
BLSW	18	0	0	0	0	0	0	0	0	0	0	0	200	218	200	18	109.0	128.7	15.4	109.0
VASW	0	0	0	0	0	0	0	0	0	0	2	0	0	2	2	2	2.0	-	7.7	2.0
RUHU	0	3	1	5	4	2	2	0	2	1	0	0	0	20	5	1	2.5	1.4	61.5	2.0
BEKI	1	2	1	1	2	4	2	1	2	2	2	2	2	24	4	1	1.8	0.8	100.0	2.0
#WOO	0	0	0	3	0	0	0	0	0	0	1	2	0	6	3	1	2.0	1.0	23.1	2.0
DOWO	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1.0	-	7.7	1.0
NOFL	0	0	0	1	0	0	0	0	0	0	1	2	0	4	2	1	1.3	0.6	23.1	1.0
PIWO	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1.0	-	7.7	1.0
#PAS	101	171	237	206	228	170	112	154	236	65	207	362	133	2382	362	65	183.2	76.5	100.0	171.0
WWPE	0	0	0	0	0	0	1	3	2	1	0	0	0	7	3	1	1.8	1.0	30.8	1.5
WIFL	1	0	2	5	2	1	0	0	0	0	0	0	0	11	5	1	2.2	1.6	38.5	2.0
PSFL	0	0	1	2	2	4	0	0	0	0	0	0	0	9	4	1	2.3	1.3	30.8	2.0
VGSW	5	2	6	4	8	7	5	0	9	0	0	1	0	47	9	1	5.2	2.6	69.2	5.0
NRWS	0	0	1	0	1	0	0	6	9	0	0	1	0	18	9	1	3.6	3.7	38.5	1.0
CLSW	2	2	4	2	6	2	0	0	1	0	0	0	0	19	6	1	2.7	1.7	53.8	2.0
BASW	25	17	22	12	5	26	9	6	90	17	27	39	12	307	90	5	23.6	22.2	100.0	17.0
NOCR	29	15	21	24	25	20	12	36	41	2	34	16	35	310	41	2	23.8	11.1	100.0	24.0
CORA	0	0	5	0	0	0	0	0	2	1	0	0	0	8	5	1	2.7	2.1	23.1	2.0
CBCH	0	0	3	33	15	3	0	10	20	0	20	12	12	128	33	3	14.2	9.4	69.2	12.0
BUSH	0	0	0	0	0	0	0	0	2	0	0	18	0	20	18	2	10.0	11.3	15.4	10.0

Bird surveys of Little Qualicum River estuary for Summer 1975 (continued)

Date	04Jun	11Jun	17Jun	24Jun	01Jul	08Jul	14Jul	22Jul	29Jul	05Aug	12Aug	19Aug	26Aug	Total	Max	Min	Mean	SD	%Freq	Median
RBNU	0	0	0	2	2	0	0	0	0	1	0	0	1	6	2	1	1.5	0.6	30.8	1.5
BRCR	0	0	0	0	0	0	0	1	1	0	1	0	0	3	1	1	1.0	-	23.1	1.0
BEWR	0	0	0	2	2	0	0	0	2	0	0	0	0	6	2	2	2.0	-	23.1	2.0
WIWR	0	0	2	4	2	3	3	3	1	0	0	1	0	19	4	1	2.4	1.1	61.5	2.5
MAWR	0	0	0	0	0	0	0	0	0	0	2	0	0	2	2	2	2.0	-	7.7	2.0
GCKI	0	0	0	2	1	0	0	0	0	0	10	7	20	40	20	1	8.0	7.6	38.5	7.0
RCKI	0	0	0	0	0	0	0	5	0	0	0	0	0	5	5	5	5.0	-	7.7	5.0
SWTH	0	1	3	5	3	2	1	6	2	0	0	0	0	23	6	1	2.9	1.8	61.5	2.5
AMRO	10	8	12	6	12	3	8	3	2	0	0	0	0	64	12	2	7.1	3.9	69.2	8.0
CEWA	0	0	0	0	0	0	0	9	20	0	0	2	0	31	20	2	10.3	9.1	23.1	9.0
EUST	23	105	73	46	58	70	12	0	2	0	93	201	20	703	201	2	63.9	56.5	84.6	58.0
OCWA	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	1	1.0	-	7.7	1.0
YEWA	1	1	1	0	0	0	1	0	0	0	0	0	0	4	1	1	1.0	-	30.8	1.0
MGWA	0	0	0	2	0	0	0	0	0	0	0	0	0	2	2	2	2.0	-	7.7	2.0
COYE	0	0	0	0	0	0	0	0	0	0	4	0	0	4	4	4	4.0	-	7.7	4.0
RSTO	0	0	0	0	0	0	0	0	2	0	0	0	0	2	2	2	2.0	-	7.7	2.0
SAVS	0	0	0	0	0	0	0	0	0	0	0	4	2	6	4	2	3.0	1.4	15.4	3.0
SOSP	1	0	2	4	3	4	2	2	1	0	0	3	0	22	4	1	2.4	1.1	69.2	2.0
GCSP	0	0	0	0	0	0	0	0	0	0	0	3	0	3	3	3	3.0	-	7.7	3.0
WCSP	0	0	0	0	0	2	0	0	0	0	2	0	0	4	2	2	2.0	-	15.4	2.0
RWBL	4	12	10	17	4	7	27	3	0	0	0	0	0	84	27	3	10.5	8.2	61.5	8.5
BRBL	0	5	63	22	38	12	28	50	18	40	0	3	31	310	63	3	28.2	18.7	84.6	28.0
BHCO	0	0	2	0	1	1	0	0	0	0	0	0	0	4	2	1	1.3	0.6	23.1	1.0
PUFI	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	-	7.7	1.0
HOFI	0	0	0	3	12	0	0	2	2	0	5	5	0	29	12	2	4.8	3.8	46.2	4.0
PISI	0	0	0	0	0	0	0	5	2	0	5	3	0	15	5	2	3.8	1.5	30.8	4.0
AMGO	0	2	4	9	25	3	3	4	5	3	4	43	0	105	43	2	9.5	12.9	84.6	4.0
#TOT	263	228	323	414	370	330	347	292	457	135	459	492	642	4752	642	135	365.5	130.2	100.0	347.0

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Bird surveys of Little Qualicum River estuary for Autumn 1975

Date	02Sep	10Sep	16Sep	01Oct	08Oct	20Oct	27Oct	03Nov	10Nov	17Nov	24Nov	Total	Max	Min	Mean	SD	%Freq	Median
#LOO	13	6	6	8	7	3	4	1	1	2	0	51	13	1	5.1	3.7	90.9	5.0
RTLO	0	0	0	1	5	0	0	0	0	0	0	6	5	1	3.0	2.8	18.2	3.0
PALO	11	0	0	0	1	0	0	0	0	0	0	12	11	1	6.0	7.1	18.2	6.0
COLO	2	6	6	7	1	3	4	1	1	2	0	33	7	1	3.3	2.3	90.9	2.5
#GRE	0	9	26	19	0	9	7	3	74	33	2	182	74	2	20.2	22.8	81.8	9.0
HOGR	0	0	14	2	0	5	6	2	1	2	2	34	14	1	4.3	4.3	72.7	2.0
RNGR	0	9	12	17	0	4	1	0	1	3	0	47	17	1	6.7	6.1	63.6	4.0
WEGR	0	0	0	0	0	0	0	1	72	28	0	101	72	1	33.7	35.8	27.3	28.0
#COR	3	5	2	5	0	0	0	0	1	0	0	16	5	1	3.2	1.8	45.5	3.0
DCCO	3	4	0	3	0	0	0	0	1	0	0	11	4	1	2.8	1.3	36.4	3.0
PECO	0	1	2	2	0	0	0	0	0	0	0	5	2	1	1.7	0.6	27.3	2.0
#HER	5	5	3	4	0	3	2	2	1	2	0	27	5	1	3.0	1.4	81.8	3.0
GBHE	5	5	3	4	0	3	2	2	1	2	0	27	5	1	3.0	1.4	81.8	3.0
#SWA	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2.0	-	9.1	2.0
TRUS	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2.0	-	9.1	2.0
#GEE	0	0	3	0	0	1	21	0	0	0	0	25	21	1	8.3	11.0	27.3	3.0
GWFG	0	0	3	0	0	0	0	0	0	0	0	3	3	3	3.0	-	9.1	3.0
SNGO	0	0	0	0	0	1	1	0	0	0	0	2	1	1	1.0	-	18.2	1.0
CAGO	0	0	0	0	0	0	20	0	0	0	0	20	20	20	20.0	-	9.1	20.0

Bird surveys of Little Qualicum River estuary for Autumn 1975 (continued)

Date	02Sep	10Sep	16Sep	01Oct	08Oct	20Oct	27Oct	03Nov	10Nov	17Nov	24Nov	Total	Max	Min	Mean	SD	%Freq	Median
#DAB	19	22	32	52	748	85	127	69	27	24	47	1252	748	19	113.8	212.9	100.0	47.0
GWTE	8	8	17	25	60	26	0	0	0	0	0	144	60	8	24.0	19.3	54.5	21.0
MALL	0	5	3	12	5	37	13	1	0	17	47	140	47	1	15.6	16.1	81.8	12.0
NOPI	9	3	8	15	45	0	28	0	0	0	0	108	45	3	18.0	15.8	54.5	12.0
AMWI	2	6	4	0	638	22	86	68	27	7	0	860	638	2	95.6	205.6	81.8	22.0
#DIV	18	83	76	55	132	172	322	301	362	580	488	2589	580	18	235.4	188.0	100.0	172.0
GRSC	0	0	0	0	19	5	0	0	0	0	1	25	19	1	8.3	9.5	27.3	5.0
HADU	0	9	14	28	11	21	13	6	28	9	7	146	28	6	14.6	8.2	90.9	12.0
OLDS	0	0	0	0	0	2	1	0	0	8	0	11	8	1	3.7	3.8	27.3	2.0
SCOT	0	0	0	0	25	0	0	90	0	0	0	115	90	25	57.5	46.0	18.2	57.5
BLSC	0	0	0	0	14	67	137	56	84	80	172	610	172	14	87.1	52.4	63.6	80.0
SUSC	0	10	9	14	52	26	16	48	38	44	28	285	52	9	28.5	16.2	90.9	27.0
WWSC	3	36	8	13	0	38	109	33	55	182	122	599	182	3	59.9	58.8	90.9	37.0
COGO	0	0	0	0	0	0	0	18	54	135	92	299	135	18	74.8	50.3	36.4	73.0
BUFF	0	0	0	0	0	0	27	33	85	106	42	293	106	27	58.6	34.9	45.5	42.0
HOME	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1.0	-	9.1	1.0
COME	15	12	25	0	11	9	4	17	2	11	24	130	25	2	13.0	7.5	90.9	11.5
RBME	0	0	0	0	0	4	14	0	16	5	0	39	16	4	9.8	6.1	36.4	9.5
DUCK	0	16	20	0	0	0	0	0	0	0	0	36	20	16	18.0	2.8	18.2	18.0
#RAP	1	3	1	1	0	0	0	1	0	1	4	12	4	1	1.7	1.3	63.6	1.0
OSPR	1	1	0	0	0	0	0	0	0	0	0	2	1	1	1.0	-	18.2	1.0
BAEA	0	1	0	0	0	0	0	0	0	1	3	5	3	1	1.7	1.2	27.3	1.0
SSHA	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1.0	-	9.1	1.0
NOGO	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	-	9.1	1.0
MERL	0	1	1	0	0	0	0	0	0	0	0	2	1	1	1.0	-	18.2	1.0
GYRF	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1.0	-	9.1	1.0
RNPH	0	7	5	2	0	1	3	4	1	2	0	25	7	1	3.1	2.1	72.7	2.5
RUGR	0	0	0	0	0	0	1	0	1	0	0	2	1	1	1.0	-	18.2	1.0
#SHO	5	22	29	9	0	38	23	8	0	8	42	184	42	5	20.4	13.8	81.8	22.0
KILL	3	15	20	5	0	6	0	0	0	6	4	59	20	3	8.4	6.5	63.6	6.0
GRYE	1	1	0	0	0	0	0	0	0	0	0	2	1	1	1.0	-	18.2	1.0
SPSA	0	0	2	0	0	0	0	0	0	0	0	2	2	2	2.0	-	9.1	2.0
BLTU	0	0	3	3	0	27	21	8	0	2	38	102	38	2	14.6	14.2	63.6	8.0
SAND	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1.0	-	9.1	1.0
LESA	1	6	1	0	0	0	0	0	0	0	0	8	6	1	2.7	2.9	27.3	1.0
PESA	0	0	2	0	0	0	0	0	0	0	0	2	2	2	2.0	-	9.1	2.0
DUNL	0	0	0	0	0	5	0	0	0	0	0	5	5	5	5.0	-	9.1	5.0
LBDO	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1.0	-	9.1	1.0
COSN	0	0	1	0	0	0	1	0	0	0	0	2	1	1	1.0	-	18.2	1.0
#GUL	374	255	340	246	141	277	384	196	171	402	237	3023	402	141	274.8	89.3	100.0	255.0
GULL	0	75	150	80	12	0	82	0	139	74	0	612	150	12	87.4	46.0	63.6	80.0
BOGU	247	141	70	141	94	154	165	24	4	125	5	1170	247	4	106.4	75.7	100.0	125.0
MEGU	37	23	18	14	12	22	12	1	2	131	5	277	131	1	25.2	36.6	100.0	14.0
RBGU	0	0	0	3	0	1	0	0	0	0	0	4	3	1	2.0	1.4	18.2	2.0
CAGU	4	0	0	3	6	17	0	11	0	0	0	41	17	3	8.2	5.8	45.5	6.0
HEGU	0	0	0	0	0	1	1	0	0	0	0	2	1	1	1.0	-	18.2	1.0
THGU	6	0	0	0	2	6	23	13	0	0	0	50	23	2	10.0	8.3	45.5	6.0
GWGU	80	16	102	5	15	76	101	147	26	72	227	867	227	5	78.8	66.3	100.0	76.0
#ALC	0	40	3	5	0	1	0	0	0	0	0	49	40	1	12.3	18.6	36.4	4.0
PIGU	0	11	1	5	0	1	0	0	0	0	0	18	11	1	4.5	4.7	36.4	3.0
MAMU	0	29	2	0	0	0	0	0	0	0	0	31	29	2	15.5	19.1	18.2	15.5

Bird surveys of Little Qualicum River estuary for Autumn 1975 (continued)

Date	02Sep	10Sep	16Sep	01Oct	08Oct	20Oct	27Oct	03Nov	10Nov	17Nov	24Nov	Total	Max	Min	Mean	SD	%Freq	Median
RODO	0	5	0	0	0	0	0	0	0	0	0	5	5	5	5.0	-	9.1	5.0
BTPI	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1.0	-	9.1	1.0
#OWL	0	0	0	0	0	0	0	2	0	0	0	2	2	2	2.0	-	9.1	2.0
GHOW	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	-	9.1	1.0
SEOW	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	-	9.1	1.0
CONI	7	1	0	0	0	0	0	0	0	0	0	8	7	1	4.0	4.2	18.2	4.0
RUHU	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1.0	-	9.1	1.0
BEKI	3	5	2	4	1	2	3	2	1	1	1	25	5	1	2.3	1.3	100.0	2.0
#WOO	3	3	7	1	1	1	1	0	1	0	1	19	7	1	2.1	2.0	81.8	1.0
DOWO	0	1	0	0	0	0	0	0	1	0	0	2	1	1	1.0	-	18.2	1.0
NOFL	3	2	7	1	1	1	1	0	0	0	1	17	7	1	2.1	2.1	72.7	1.0
#PAS	128	93	227	175	93	200	142	144	104	116	260	1682	260	93	152.9	56.0	100.0	142.0
BASW	20	18	0	0	0	0	0	0	0	0	0	38	20	18	19.0	1.4	18.2	19.0
STJA	0	0	1	1	0	0	1	0	0	0	0	3	1	1	1.0	-	27.3	1.0
NOCR	28	11	72	129	38	84	8	36	9	37	0	452	129	8	45.2	38.9	90.9	36.5
CORA	2	2	1	0	0	1	0	2	0	0	0	8	2	1	1.6	0.5	45.5	2.0
CBCH	5	10	2	0	12	2	8	0	0	0	0	39	12	2	6.5	4.2	54.5	6.5
BUSH	20	20	0	0	0	0	0	0	0	0	0	40	20	20	20.0	-	18.2	20.0
RBNU	0	1	1	0	0	0	0	0	0	0	0	2	1	1	1.0	-	18.2	1.0
BRCR	0	0	1	0	0	0	0	0	0	0	0	1	1	1	1.0	-	9.1	1.0
BEWR	0	0	1	0	0	0	3	0	0	2	0	6	3	1	2.0	1.0	27.3	2.0
WIWR	0	0	0	0	0	0	1	1	0	0	0	2	1	1	1.0	-	18.2	1.0
MAWR	0	0	2	2	0	1	2	0	0	0	0	7	2	1	1.8	0.5	36.4	2.0
GCKI	0	5	5	0	12	0	5	0	0	0	0	27	12	5	6.8	3.5	36.4	5.0
RCKI	0	0	0	0	0	0	1	0	0	0	1	2	1	1	1.0	-	18.2	1.0
AMRO	0	1	3	2	0	1	12	0	0	0	0	19	12	1	3.8	4.7	45.5	2.0
VATH	0	0	0	2	0	0	5	0	0	0	0	7	5	2	3.5	2.1	18.2	3.5
AMPI	0	0	60	6	0	0	0	0	0	0	0	66	60	6	33.0	38.2	18.2	33.0
EUST	0	0	0	5	15	0	0	0	0	0	0	20	15	5	10.0	7.1	18.2	10.0
COYE	2	0	6	0	0	0	0	0	0	0	0	8	6	2	4.0	2.8	18.2	4.0
WIWA	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	-	9.1	1.0
RSTO	1	0	2	3	0	6	8	3	5	8	6	42	8	1	4.7	2.5	81.8	5.0
SAVS	9	18	10	5	7	16	1	2	1	0	0	69	18	1	7.7	6.2	81.8	7.0
FOSP	0	0	0	0	0	2	16	0	1	1	3	23	16	1	4.6	6.4	45.5	2.0
SOSP	2	0	3	3	2	14	14	4	3	3	3	51	14	2	5.1	4.7	90.9	3.0
LISP	2	0	0	6	0	0	0	0	0	0	0	8	6	2	4.0	2.8	18.2	4.0
GCSP	0	0	0	0	0	7	8	15	10	7	1	48	15	1	8.0	4.6	54.5	7.5
WCSP	0	0	2	0	0	1	0	0	0	0	1	4	2	1	1.3	0.6	27.3	1.0
DEJU	0	0	0	0	5	24	42	21	15	55	20	182	55	5	26.0	17.0	63.6	21.0
WEME	0	0	0	0	0	0	3	2	2	0	2	9	3	2	2.3	0.5	36.4	2.0
BRBL	16	0	5	6	2	1	0	0	0	0	0	30	16	1	6.0	6.0	45.5	5.0
PUFI	0	0	0	0	0	0	0	3	3	0	3	9	3	3	3.0	-	27.3	3.0
HOFI	0	7	6	0	0	23	4	0	0	2	0	42	23	2	8.4	8.4	45.5	6.0
PISI	0	0	43	5	0	0	0	55	55	0	220	378	220	5	75.6	83.3	45.5	55.0
AMGO	20	0	1	0	0	0	0	0	0	0	0	21	20	1	10.5	13.4	18.2	10.5
EVGR	0	0	0	0	0	10	0	0	0	1	0	11	10	1	5.5	6.4	18.2	5.5
HOSP	0	0	0	0	0	7	0	0	0	0	0	7	7	7	7.0	-	9.1	7.0
#TOT	579	566	762	586	1123	793	1040	733	745	1171	1084	9182	1171	566	834.7	229.2	100.0	762.0

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Bird surveys of Little Qualicum River estuary for Winter 1975-1976

Date	01Dec	10Dec	15Dec	21Dec	04Jan	13Jan	21Jan	27Jan	04Feb	12Feb	18Feb	24Feb	Total	Max	Min	Mean	SD	%Freq	Median
#LOO	4	2	7	0	1	16	7	2	58	6	5	11	119	58	1	10.8	16.2	91.7	6.0
PALO	0	0	0	0	0	14	1	0	55	0	1	1	72	55	1	14.4	23.4	41.7	1.0
COLO	4	2	7	0	1	2	6	2	3	6	4	10	47	10	1	4.3	2.7	91.7	4.0
#GRE	2	0	7	0	0	3	15	14	5	9	38	22	115	38	2	12.8	11.4	75.0	9.0
HOGR	1	0	6	0	0	1	13	12	4	6	0	3	46	13	1	5.8	4.6	66.7	5.0
RNGR	0	0	1	0	0	2	2	2	0	2	1	4	14	4	1	2.0	1.0	58.3	2.0
WEGR	1	0	0	0	0	0	0	0	1	1	37	15	55	37	1	11.0	15.7	41.7	1.0
#COR	0	0	0	0	0	1	0	0	0	0	0	0	1	1	1	1.0	-	8.3	1.0
PECO	0	0	0	0	0	1	0	0	0	0	0	0	1	1	1	1.0	-	8.3	1.0
#HER	2	1	1	1	2	3	1	0	0	1	0	0	12	3	1	1.5	0.8	66.7	1.0
GBHE	2	1	1	1	2	3	1	0	0	1	0	0	12	3	1	1.5	0.8	66.7	1.0
#SWA	5	4	5	0	4	5	3	2	2	2	2	0	34	5	2	3.4	1.3	83.3	3.5
TRUS	5	4	5	0	4	5	3	2	2	2	2	0	34	5	2	3.4	1.3	83.3	3.5
#DAB	230	53	281	203	19	142	74	17	192	2	3	1	1217	281	1	101.4	102.5	100.0	63.5
GWTE	0	0	10	14	0	8	3	0	31	0	0	0	66	31	3	13.2	10.7	41.7	10.0
MALL	112	53	145	110	17	102	71	15	140	2	2	1	770	145	1	64.2	56.1	100.0	62.0
NOPI	0	0	1	0	0	0	0	1	0	0	0	0	2	1	1	1.0	-	16.7	1.0
GADW	0	0	0	2	0	2	0	0	0	0	0	0	4	2	2	2.0	-	16.7	2.0
EUWI	1	0	1	2	0	1	0	0	0	0	0	0	5	2	1	1.3	0.5	33.3	1.0
AMWI	117	0	124	75	2	29	0	1	21	0	1	0	370	124	1	46.3	51.9	66.7	25.0
#DIV	549	254	596	222	439	243	255	238	330	336	360	281	4103	596	222	341.9	124.8	100.0	305.5
GRSC	6	21	20	2	3	34	13	5	8	17	14	13	156	34	2	13.0	9.2	100.0	13.0
HADU	2	6	15	0	2	12	11	3	9	17	5	3	85	17	2	7.7	5.4	91.7	6.0
OLDS	0	2	13	0	0	0	1	1	2	0	1	1	21	13	1	3.0	4.4	58.3	1.0
SCOT	235	2	126	35	300	25	32	0	82	131	203	120	1291	300	2	117.4	95.9	91.7	120.0
BLSC	66	68	86	53	28	0	42	36	43	41	37	29	529	86	28	48.1	18.2	91.7	42.0
SUSC	20	13	68	7	7	37	23	30	31	16	14	24	290	68	7	24.2	16.7	100.0	21.5
WWSC	65	69	135	75	26	79	84	67	95	60	35	28	818	135	26	68.2	30.4	100.0	68.0
COGO	102	34	75	27	27	39	24	58	29	32	33	27	507	102	24	42.3	24.1	100.0	32.5
BUFF	41	37	50	17	29	11	14	34	20	18	16	25	312	50	11	26.0	12.2	100.0	22.5
HOME	1	0	0	0	0	0	1	0	0	0	0	0	2	1	1	1.0	-	16.7	1.0
COME	11	2	3	6	17	6	5	4	3	4	2	11	74	17	2	6.2	4.6	100.0	4.5
RBME	0	0	5	0	0	0	5	0	8	0	0	0	18	8	5	6.0	1.7	25.0	5.0
#RAP	5	12	50	51	24	22	14	16	4	5	3	4	210	51	3	17.5	17.0	100.0	13.0
BAEA	5	12	49	51	24	22	14	16	4	5	2	4	208	51	2	17.3	16.9	100.0	13.0
COHA	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1.0	-	8.3	1.0
MERL	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1.0	-	8.3	1.0
RNPH	2	0	0	0	0	0	0	0	0	1	0	0	3	2	1	1.5	0.7	16.7	1.5
#SHO	15	31	45	41	32	37	58	22	31	25	29	0	366	58	15	33.3	11.8	91.7	31.0
KILL	8	19	8	12	1	9	18	0	3	4	1	0	83	19	1	8.3	6.5	83.3	8.0
BLTU	4	9	31	29	26	22	34	16	22	15	20	0	228	34	4	20.7	9.2	91.7	22.0
SAND	0	3	5	0	5	6	6	6	6	6	6	0	49	6	3	5.4	1.0	75.0	6.0
COSN	3	0	1	0	0	0	0	0	0	0	2	0	6	3	1	2.0	1.0	25.0	2.0
#GUL	227	122	291	221	227	89	156	155	169	64	85	170	1976	291	64	164.7	68.2	100.0	162.5
GULL	140	0	82	50	38	17	23	53	44	2	39	1	489	140	1	44.5	39.5	91.7	39.0
MEGU	13	16	21	16	81	17	57	8	19	7	10	22	287	81	7	23.9	22.2	100.0	16.5
THGU	4	25	0	0	0	2	5	11	29	20	0	12	108	29	2	13.5	10.1	66.7	11.5
GWGU	70	81	188	155	108	53	71	83	77	35	36	135	1092	188	35	91.0	47.2	100.0	79.0
#ALC	0	0	3	0	0	11	30	2	40	0	9	2	97	40	2	13.9	15.1	58.3	9.0
ALCI	0	0	0	0	0	0	30	2	40	0	9	2	83	40	2	16.6	17.4	41.7	9.0
PIGU	0	0	0	0	0	1	0	0	0	0	0	0	1	1	1	1.0	-	8.3	1.0

Bird surveys of Little Qualicum River estuary for Winter 1975-1976 (continued)

Date	01Dec	10Dec	15Dec	21Dec	04Jan	13Jan	21Jan	27Jan	04Feb	12Feb	18Feb	24Feb	Total	Max	Min	Mean	SD	%Freq	Median
MAMU	0	0	3	0	0	10	0	0	0	0	0	0	13	10	3	6.5	4.9	16.7	6.5
RODO	0	9	0	0	0	0	0	0	0	0	0	0	9	9	9	9.0	-	8.3	9.0
#OWL	0	0	0	0	0	0	0	0	0	2	1	0	3	2	1	1.5	0.7	16.7	1.5
WSOW	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1.0	-	8.3	1.0
SEOW	0	0	0	0	0	0	0	0	0	1	1	0	2	1	1	1.0	-	16.7	1.0
BEKI	2	3	3	1	3	2	1	1	2	2	3	1	24	3	1	2.0	0.9	100.0	2.0
#WOO	0	1	1	0	1	2	3	3	3	0	0	1	15	3	1	1.9	1.0	66.7	1.5
HAWO	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	-	8.3	1.0
NOFL	0	1	1	0	1	2	3	3	1	0	0	1	13	3	1	1.6	0.9	66.7	1.0
PIWO	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	-	8.3	1.0
#PAS	222	201	276	123	78	124	24	90	450	266	64	103	2021	450	24	168.4	120.1	100.0	123.5
STJA	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	1.0	-	8.3	1.0
NOCR	65	55	38	21	46	27	23	0	36	57	41	56	465	65	21	42.3	14.9	91.7	41.0
CORA	1	0	3	0	0	2	0	0	3	1	1	0	11	3	1	1.8	1.0	50.0	1.5
CBCH	30	0	7	0	0	0	0	0	30	10	0	0	77	30	7	19.3	12.5	33.3	20.0
RBNU	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	-	8.3	1.0
BEWR	1	0	1	0	0	0	0	1	0	1	0	0	4	1	1	1.0	-	33.3	1.0
WIWR	0	0	0	0	0	0	0	0	5	5	1	2	13	5	1	3.3	2.1	33.3	3.5
MAWR	1	1	1	0	0	0	0	0	0	0	0	0	3	1	1	1.0	-	25.0	1.0
GCKI	0	0	0	0	0	0	0	0	20	25	0	0	45	25	20	22.5	3.5	16.7	22.5
RCKI	0	0	1	0	0	0	0	1	3	3	1	0	9	3	1	1.8	1.1	41.7	1.0
HETH	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1.0	-	8.3	1.0
AMRO	1	0	1	0	0	0	0	1	0	0	0	4	7	4	1	1.8	1.5	33.3	1.0
VATH	2	0	4	3	0	0	0	3	1	1	0	0	14	4	1	2.3	1.2	50.0	2.5
EUST	64	0	49	8	5	38	0	4	37	63	3	18	289	64	3	28.9	24.4	83.3	27.5
HUVI	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1.0	-	8.3	1.0
RSTO	7	3	9	11	2	15	0	10	7	3	2	0	69	15	2	6.9	4.4	83.3	7.0
FOSP	2	1	3	2	0	0	0	3	3	2	2	1	19	3	1	2.1	0.8	75.0	2.0
SOSP	5	1	15	3	2	2	0	10	8	8	0	1	55	15	1	5.5	4.6	83.3	4.0
GCSP	18	0	15	15	9	3	0	8	0	6	1	2	77	18	1	8.6	6.2	75.0	8.0
WCSP	0	0	0	0	0	0	0	2	0	1	0	0	3	2	1	1.5	0.7	16.7	1.5
DEJU	20	23	64	30	8	25	0	30	50	40	10	17	317	64	8	28.8	16.9	91.7	25.0
RWBL	0	0	0	0	0	0	0	0	0	4	1	0	5	4	1	2.5	2.1	16.7	2.5
WEME	4	0	2	0	2	0	0	2	2	0	0	0	12	4	2	2.4	0.9	41.7	2.0
PUFI	0	0	1	0	0	0	0	0	0	1	1	0	3	1	1	1.0	-	25.0	1.0
HOFI	0	7	1	2	4	2	0	12	4	2	0	0	34	12	1	4.3	3.7	66.7	3.0
PISI	0	110	60	28	0	10	0	3	240	20	0	1	472	240	1	59.0	81.7	66.7	24.0
EVGR	1	0	0	0	0	0	0	0	0	13	0	0	14	13	1	7.0	8.5	16.7	7.0
#TOT	1265	693	1566	863	830	700	641	562	1286	721	602	596	10325	1566	562	860.4	329.0	100.0	710.5

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Bird surveys of Little Qualicum River estuary for Spring 1976

Date	04Mar	11Mar	23Mar	30Mar	05Apr	12Apr	20Apr	26Apr	03May	10May	17May	25May	31May	Total	Max	Min	Mean	SD	%Freq	Median
#LOO	13	6	0	2	9	212	0	1	1	9	0	0	8	261	212	1	29.0	68.7	69.2	8.0
PALO	2	3	0	0	0	210	0	0	0	2	0	0	0	217	210	2	54.3	103.8	30.8	2.5
COLO	10	3	0	2	9	2	0	1	1	7	0	0	8	43	10	1	4.8	3.7	69.2	3.0
YBLO	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	-	7.7	1.0
#GRE	41	28	0	0	149	255	0	3	9	0	0	0	0	485	255	3	80.8	100.6	46.2	34.5
HOGR	2	1	0	0	4	3	0	3	8	0	0	0	0	21	8	1	3.5	2.4	46.2	3.0
RNGR	2	1	0	0	5	0	0	0	0	0	0	0	0	8	5	1	2.7	2.1	23.1	2.0
WEGR	37	26	0	0	140	252	0	0	1	0	0	0	0	456	252	1	91.2	104.4	38.5	37.0

Bird surveys of Little Qualicum River estuary for Spring 1976 (continued)

Date	04Mar	11Mar	23Mar	30Mar	05Apr	12Apr	20Apr	26Apr	03May	10May	17May	25May	31May	Total	Max	Min	Mean	SD	%Freq	Median
#COR	1	0	0	0	0	0	0	0	0	0	0	0	1	2	1	1	1.0	-	15.4	1.0
DCCO	1	0	0	0	0	0	0	0	0	0	0	0	1	2	1	1	1.0	-	15.4	1.0
#HER	1	0	0	1	1	1	1	3	1	2	0	3	2	16	3	1	1.6	0.8	76.9	1.0
GBHE	1	0	0	1	1	1	1	3	1	2	0	3	2	16	3	1	1.6	0.8	76.9	1.0
#SWA	2	2	2	0	0	0	0	0	0	0	0	0	0	6	2	2	2.0	-	23.1	2.0
TRUS	2	2	2	0	0	0	0	0	0	0	0	0	0	6	2	2	2.0	-	23.1	2.0
#GEE	60	0	1359	904	991	750	264	88	74	6	6	0	0	4502	1359	6	450.2	502.0	76.9	176.0
BRAN	60	0	1359	904	991	750	264	88	74	6	6	0	0	4502	1359	6	450.2	502.0	76.9	176.0
#DAB	83	27	1	2	5	0	0	3	4	7	0	0	0	132	83	1	16.5	28.1	61.5	4.5
GWTE	2	0	0	0	1	0	0	0	0	0	0	0	0	3	2	1	1.5	0.7	15.4	1.5
MALL	72	1	0	2	0	0	0	3	4	5	0	0	0	87	72	1	14.5	28.2	46.2	3.5
BWTE	0	0	0	0	0	0	0	0	0	2	0	0	0	2	2	2	2.0	-	7.7	2.0
AMWI	9	26	1	0	4	0	0	0	0	0	0	0	0	40	26	1	10.0	11.2	30.8	6.5
#DIV	334	223	460	27	1160	3372	1379	862	128	188	69	47	6	8255	3372	6	635.0	937.7	100.0	223.0
GRSC	17	34	68	0	900	1840	0	0	0	10	0	0	0	2869	1840	10	478.2	752.3	46.2	51.0
HADU	9	8	0	0	0	23	9	0	12	7	0	0	0	68	23	7	11.3	6.0	46.2	9.0
OLDS	0	0	39	0	0	9	2	0	0	0	0	0	0	50	39	2	16.7	19.7	23.1	9.0
SCOT	89	40	90	2	100	380	0	825	16	81	54	40	2	1719	825	2	143.3	237.0	92.3	67.5
BLSC	53	18	0	0	0	346	263	0	3	0	0	0	0	683	346	3	136.6	157.1	38.5	53.0
SUSC	31	27	170	4	4	189	977	0	34	10	11	0	0	1457	977	4	145.7	300.0	76.9	29.0
WWSC	46	25	54	0	9	9	6	0	16	62	3	6	0	236	62	3	23.6	22.2	76.9	12.5
COGO	54	36	0	0	80	470	80	0	10	0	0	0	0	730	470	10	121.7	172.7	46.2	67.0
BAGO	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	1.0	-	7.7	1.0
BUFF	34	31	2	16	34	97	39	26	34	0	0	0	0	313	97	2	34.8	26.0	69.2	34.0
COME	1	4	37	5	28	6	3	7	3	18	1	1	4	118	37	1	9.1	11.4	100.0	4.0
RBME	0	0	0	0	5	3	0	3	0	0	0	0	0	11	5	3	3.7	1.2	23.1	3.0
#RAP	1	3	12	5	1	0	0	3	1	2	1	1	1	31	12	1	2.8	3.3	84.6	1.0
TUVU	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1.0	-	7.7	1.0
OSPR	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	1.0	-	7.7	1.0
BAEA	1	3	12	4	1	0	0	2	1	2	1	1	1	29	12	1	2.6	3.3	84.6	1.0
RNPH	0	0	0	0	2	0	0	1	1	4	0	4	0	12	4	1	2.4	1.5	38.5	2.0
CAQU	0	0	0	0	2	1	0	0	0	0	0	0	0	3	2	1	1.5	0.7	15.4	1.5
#RAI	0	0	0	0	0	9	0	0	0	0	0	0	0	9	9	9	9.0	-	7.7	9.0
SACR	0	0	0	0	0	9	0	0	0	0	0	0	0	9	9	9	9.0	-	7.7	9.0
#SHO	3	1	39	4	2	48	7	11	160	44	5	4	4	332	160	1	25.5	43.9	100.0	5.0
KILL	0	1	1	1	2	1	6	5	4	4	3	2	3	33	6	1	2.8	1.7	92.3	2.5
GRYE	0	0	0	0	0	0	0	2	1	0	0	0	0	3	2	1	1.5	0.7	15.4	1.5
SPSA	0	0	0	0	0	0	0	0	0	0	2	1	1	4	2	1	1.3	0.6	23.1	1.0
BLTU	0	0	33	0	0	47	0	0	155	0	0	0	0	235	155	33	78.3	66.8	23.1	47.0
SAND	0	0	5	0	0	0	0	0	0	0	0	0	0	5	5	5	5.0	-	7.7	5.0
WESA	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1.0	-	7.7	1.0
COSN	3	0	0	3	0	0	1	4	0	0	0	0	0	11	4	1	2.8	1.3	30.8	3.0
SHOR	0	0	0	0	0	0	0	0	0	40	0	0	0	40	40	40	40.0	-	7.7	40.0
#GUL	64	387	10540	1258	735	2113	442	281	334	161	19	37	41	16412	10540	19	1262.5	2850.9	100.0	334.0
GULL	5	380	6540	1256	300	60	0	0	0	46	0	13	0	8600	6540	5	1075.0	2247.0	61.5	180.0
BOGU	0	0	0	0	160	1995	370	232	280	112	1	20	2	3172	1995	1	352.4	629.5	69.2	160.0
MEGU	9	2	4000	0	230	58	8	30	2	0	0	0	0	4339	4000	2	542.4	1399.2	61.5	19.5
HEGU	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	-	7.7	1.0
THGU	0	4	0	0	0	0	0	0	0	0	0	0	0	4	4	4	4.0	-	7.7	4.0
GWGU	50	0	0	2	45	0	64	19	52	3	18	4	39	296	64	2	29.6	23.1	76.9	29.0

Bird surveys of Little Qualicum River estuary for Spring 1976 (continued)

Date	04Mar	11Mar	23Mar	30Mar	05Apr	12Apr	20Apr	26Apr	03May	10May	17May	25May	31May	Total	Max	Min	Mean	SD	%Freq	Median
#ALC	4	7	0	0	220	1	0	0	19	2	2	0	1	256	220	1	32.0	76.2	61.5	3.0
ALCI	0	5	0	0	0	0	0	0	0	0	0	0	0	5	5	5	5.0	-	7.7	5.0
PIGU	0	0	0	0	6	1	0	0	0	0	0	0	1	8	6	1	2.7	2.9	23.1	1.0
MAMU	4	2	0	0	214	0	0	0	19	2	2	0	0	243	214	2	40.5	85.3	46.2	3.0
RODO	0	4	0	0	0	0	0	0	0	0	0	0	0	4	4	4	4.0	-	7.7	4.0
BTPI	0	0	0	0	0	0	0	8	7	0	0	0	0	15	8	7	7.5	0.7	15.4	7.5
BLSW	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2.0	-	7.7	2.0
RUHU	0	0	0	0	6	5	4	5	6	5	6	0	0	37	6	4	5.3	0.8	53.8	5.0
BEKI	0	0	0	1	1	0	0	0	3	1	0	0	2	8	3	1	1.6	0.9	38.5	1.0
#WOO	0	0	1	0	6	1	0	1	7	3	1	1	0	21	7	1	2.6	2.5	61.5	1.0
HAWO	0	0	0	0	0	0	0	0	2	0	0	0	0	2	2	2	2.0	-	7.7	2.0
NOFL	0	0	1	0	4	1	0	1	5	3	1	1	0	17	5	1	2.1	1.6	61.5	1.0
PIWO	0	0	0	0	2	0	0	0	0	0	0	0	0	2	2	2	2.0	-	7.7	2.0
#PAS	293	60	88	98	100	99	62	80	121	220	138	110	210	1679	293	60	129.2	69.7	100.0	100.0
WWPE	0	0	0	0	0	0	0	0	0	0	1	1	0	2	1	1	1.0	-	15.4	1.0
WIFL	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1.0	-	7.7	1.0
PSFL	0	0	0	0	0	0	0	0	0	3	4	5	4	16	5	3	4.0	0.8	30.8	4.0
SWAL	0	0	0	0	0	0	0	0	0	60	0	0	0	60	60	60	60.0	-	7.7	60.0
TRSW	0	0	0	0	0	0	0	2	0	0	0	0	0	2	2	2	2.0	-	7.7	2.0
VGSW	0	0	0	1	4	6	5	14	7	0	5	4	20	66	20	1	7.3	5.9	69.2	5.0
NRWS	0	0	0	0	0	0	0	3	0	0	0	1	1	5	3	1	1.7	1.2	23.1	1.0
CLSW	0	0	0	0	0	0	0	0	2	0	0	2	4	8	4	2	2.7	1.2	23.1	2.0
BASW	0	0	0	0	0	0	0	5	7	20	40	27	34	133	40	5	22.2	14.2	46.2	23.5
STJA	1	1	0	0	0	0	0	0	0	0	0	0	0	2	1	1	1.0	-	15.4	1.0
NOCR	86	10	27	14	16	12	13	9	16	6	27	9	25	270	86	6	20.8	20.8	100.0	14.0
CORA	0	0	1	1	2	0	0	0	0	1	0	0	0	5	2	1	1.3	0.5	30.8	1.0
CBCH	0	1	0	0	0	0	1	3	1	3	1	1	1	12	3	1	1.5	0.9	61.5	1.0
RBNU	0	0	0	0	2	0	0	0	0	1	1	0	0	4	2	1	1.3	0.6	23.1	1.0
BRCR	0	0	0	0	0	0	0	0	1	0	1	0	0	2	1	1	1.0	-	15.4	1.0
BEWR	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1.0	-	7.7	1.0
WIWR	0	0	1	4	1	1	1	3	4	1	4	3	2	25	4	1	2.3	1.3	84.6	2.0
GCKI	0	1	0	0	0	0	0	0	0	1	1	1	0	4	1	1	1.0	-	30.8	1.0
RCKI	0	0	0	0	0	0	2	0	0	0	0	0	0	2	2	2	2.0	-	7.7	2.0
WEBL	0	0	0	2	0	0	0	0	0	0	0	0	0	2	2	2	2.0	-	7.7	2.0
MOBL	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1.0	-	7.7	1.0
SWTH	0	0	0	0	0	0	0	0	0	0	0	3	2	5	3	2	2.5	0.7	15.4	2.5
HETH	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1.0	-	7.7	1.0
AMRO	19	5	5	4	14	13	17	6	7	2	7	11	3	113	19	2	8.7	5.5	100.0	7.0
VATH	13	0	0	0	0	2	1	1	0	0	0	0	0	17	13	1	4.3	5.9	30.8	1.5
AMPI	0	0	0	0	0	0	0	4	12	0	0	0	0	16	12	4	8.0	5.7	15.4	8.0
EUST	132	14	30	41	34	14	4	11	6	7	6	5	70	374	132	4	28.8	36.5	100.0	14.0
HUVI	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1.0	-	7.7	1.0
OCWA	0	0	0	0	0	0	0	0	2	17	1	4	1	25	17	1	5.0	6.8	38.5	2.0
YEWA	0	0	0	0	0	0	0	0	0	2	0	2	2	6	2	2	2.0	-	23.1	2.0
YRWA	0	0	0	0	0	14	0	0	0	1	0	0	1	16	14	1	5.3	7.5	23.1	1.0
MGWA	0	0	0	0	0	0	0	0	0	7	0	2	0	9	7	2	4.5	3.5	15.4	4.5
COYE	0	0	0	0	0	0	0	0	0	7	0	0	0	7	7	7	7.0	-	7.7	7.0
WIWA	0	0	0	0	0	0	0	0	1	16	1	4	0	22	16	1	5.5	7.1	30.8	2.5
RSTO	5	0	1	2	1	3	2	1	1	0	4	2	1	23	5	1	2.1	1.4	84.6	2.0
CHSP	0	0	0	0	0	0	0	0	3	0	2	0	0	5	3	2	2.5	0.7	15.4	2.5
SAVS	0	0	0	0	0	0	0	3	11	21	4	1	0	40	21	1	8.0	8.2	38.5	4.0

Bird surveys of Little Qualicum River estuary for Spring 1976 (continued)

Date	04Mar	11Mar	23Mar	30Mar	05Apr	12Apr	20Apr	26Apr	03May	10May	17May	25May	31May	Total	Max	Min	Mean	SD	%Freq	Median
FOSP	2	0	1	1	0	0	0	0	0	0	0	0	0	4	2	1	1.3	0.6	23.1	1.0
SOSP	3	4	1	5	5	4	2	2	0	6	0	3	2	37	6	1	3.4	1.6	84.6	3.0
LISP	0	0	0	0	0	0	0	0	0	2	1	0	0	3	2	1	1.5	0.7	15.4	1.5
GCSP	0	0	0	1	0	13	5	0	13	3	2	0	2	39	13	1	5.6	5.2	53.8	3.0
WCSP	0	0	0	0	1	2	1	1	15	1	1	2	0	24	15	1	3.0	4.9	61.5	1.0
DEJU	23	21	10	12	5	5	3	0	0	0	0	0	0	79	23	3	11.3	8.0	53.8	10.0
RWBL	7	1	0	4	3	1	1	4	3	9	4	3	10	50	10	1	4.2	3.0	92.3	3.5
WEME	0	0	1	2	0	0	1	0	0	0	0	0	0	4	2	1	1.3	0.6	23.1	1.0
BRBL	0	0	0	0	5	1	1	6	1	2	4	2	2	24	6	1	2.7	1.9	69.2	2.0
BHCO	0	0	0	0	0	0	0	1	1	2	0	1	0	5	2	1	1.3	0.5	30.8	1.0
PUFI	1	0	0	0	0	0	2	0	0	0	0	0	0	3	2	1	1.5	0.7	15.4	1.5
HOFI	0	2	0	0	5	1	0	1	4	5	3	4	14	39	14	1	4.3	3.9	69.2	4.0
PISI	0	0	10	0	2	5	0	0	0	5	2	0	0	24	10	2	4.8	3.3	38.5	5.0
AMGO	0	0	0	0	0	0	0	0	3	9	10	6	8	36	10	3	7.2	2.8	38.5	8.0
EVGR	1	0	0	0	0	0	0	0	0	0	1	0	0	2	1	1	1.0	-	15.4	1.0
HOSP	0	0	0	0	0	2	0	0	0	0	0	1	0	3	2	1	1.5	0.7	15.4	1.5
#TOT	900	748	12502	2302	3390	6867	2159	1350	876	654	247	207	278	32480	12502	207	2498.5	3515.8	100.0	900.0

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Bird surveys of Little Qualicum River estuary for Summer 1976

Date	07Jun	14Jun	21Jun	28Jun	05Jul	12Jul	19Jul	26Jul	03Aug	09Aug	17Aug	23Aug	30Aug	Total	Max	Min	Mean	SD	%Freq	Median
#LOO	2	2	0	9	0	1	0	0	3	1	3	3	2	26	9	1	2.9	2.4	69.2	2.0
PALO	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	-	7.7	1.0
COLO	1	2	0	9	0	1	0	0	3	1	3	3	2	25	9	1	2.8	2.5	69.2	2.0
#GRE	0	1	0	0	0	0	0	0	0	0	0	3	0	4	3	1	2.0	1.4	15.4	2.0
HOGR	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2	2	2.0	-	7.7	2.0
RNGR	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1.0	-	7.7	1.0
WEGR	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	-	7.7	1.0
#COR	0	1	0	4	1	0	1	0	3	8	1	1	0	20	8	1	2.5	2.5	61.5	1.0
CORM	0	1	0	0	0	0	1	0	0	0	0	0	0	2	1	1	1.0	-	15.4	1.0
DCCO	0	0	0	4	1	0	0	0	3	8	1	0	0	17	8	1	3.4	2.9	38.5	3.0
PECO	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1.0	-	7.7	1.0
#HER	8	0	2	2	0	3	8	5	6	0	8	2	0	44	8	2	4.9	2.7	69.2	5.0
GBHE	8	0	2	2	0	3	8	5	6	0	8	2	0	44	8	2	4.9	2.7	69.2	5.0
#DAB	0	1	3	0	0	0	0	7	6	10	16	27	24	94	27	1	11.8	9.6	61.5	8.5
GWTE	0	0	0	0	0	0	0	0	0	0	10	9	16	35	16	9	11.7	3.8	23.1	10.0
MALL	0	0	3	0	0	0	0	0	0	3	3	0	3	12	3	3	3.0	-	30.8	3.0
NOPI	0	0	0	0	0	0	0	0	0	0	2	10	5	17	10	2	5.7	4.0	23.1	5.0
BWTE	0	1	0	0	0	0	0	7	6	7	0	7	0	28	7	1	5.6	2.6	38.5	7.0
NOSL	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1.0	-	7.7	1.0
AMWI	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1.0	-	7.7	1.0
#DIV	115	140	78	11	6	9	21	8	40	27	50	51	58	614	140	6	47.2	42.3	100.0	40.0
HADU	51	62	14	0	0	0	0	0	0	0	5	4	6	142	62	4	23.7	25.9	46.2	10.0
SCOT	5	74	50	4	0	0	0	0	0	0	0	19	4	156	74	4	26.0	29.5	46.2	12.0
SUSC	0	0	0	0	0	0	0	3	0	0	3	0	0	6	3	3	3.0	-	15.4	3.0
WWSC	51	2	0	0	0	0	0	0	3	0	0	0	0	56	51	2	18.7	28.0	23.1	3.0
COME	8	2	14	7	6	9	21	5	37	27	42	26	48	252	48	2	19.4	15.4	100.0	14.0
DUCK	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2	2	2.0	-	7.7	2.0
#RAP	1	0	0	2	1	1	2	1	0	2	2	3	1	16	3	1	1.6	0.7	76.9	1.5
OSPR	1	0	0	0	0	0	0	0	0	0	0	1	0	2	1	1	1.0	-	15.4	1.0
BAEA	0	0	0	1	1	1	1	1	0	0	1	1	0	7	1	1	1.0	-	53.8	1.0

Bird surveys of Little Qualicum River estuary for Summer 1976 (continued)

Date	07Jun	14Jun	21Jun	28Jun	05Jul	12Jul	19Jul	26Jul	03Aug	09Aug	17Aug	23Aug	30Aug	Total	Max	Min	Mean	SD	%Freq	Median
NOHA	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	-	7.7	1.0
SSHA	0	0	0	0	0	0	0	0	0	0	1	1	0	2	1	1	1.0	-	15.4	1.0
COHA	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	-	7.7	1.0
MERL	0	0	0	1	0	0	1	0	0	0	0	0	1	3	1	1	1.0	-	23.1	1.0
RNPH	0	2	3	0	0	4	1	3	16	0	11	0	8	48	16	1	6.0	5.2	61.5	3.5
CAQU	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	-	7.7	1.0
#SHO	2	6	10	11	33	49	24	9	72	8	80	41	36	381	80	2	29.3	25.6	100.0	24.0
SEPL	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1.0	-	7.7	1.0
KILL	2	5	9	11	14	6	16	4	55	0	40	8	8	178	55	2	14.8	16.1	92.3	8.5
GRYE	0	0	0	0	0	3	0	0	2	0	3	0	0	8	3	2	2.7	0.6	23.1	3.0
LEYE	0	0	0	0	0	0	0	0	0	7	0	0	1	8	7	1	4.0	4.2	15.4	4.0
SPSA	0	1	0	0	2	3	2	3	3	0	1	0	4	19	4	1	2.4	1.1	61.5	2.5
WHIM	0	0	0	0	0	0	0	0	0	0	0	17	0	17	17	17	17.0	-	7.7	17.0
BLTU	0	0	0	0	0	0	0	0	3	0	0	0	0	3	3	3	3.0	-	7.7	3.0
SAND	0	0	0	0	0	0	0	0	0	0	9	0	0	9	9	9	9.0	-	7.7	9.0
WESA	0	0	0	0	0	0	0	0	6	0	0	15	17	38	17	6	12.7	5.9	23.1	15.0
LESA	0	0	0	0	0	0	0	0	0	1	0	0	6	7	6	1	3.5	3.5	15.4	3.5
BASA	0	0	0	0	0	0	0	0	0	0	2	0	0	2	2	2	2.0	-	7.7	2.0
DUNL	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1.0	-	7.7	1.0
SBDO	0	0	0	0	0	0	0	0	0	0	3	1	0	4	3	1	2.0	1.4	15.4	2.0
LBDO	0	0	0	0	0	6	3	0	3	0	0	0	0	12	6	3	4.0	1.7	23.1	3.0
WIPH	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	-	7.7	1.0
SHOR	0	0	0	0	17	31	3	2	0	0	20	0	0	73	31	2	14.6	12.2	38.5	17.0
PAJA	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1.0	-	7.7	1.0
#GUL	14	97	59	146	65	59	107	123	235	127	201	74	236	1543	236	14	118.7	69.8	100.0	107.0
GULL	1	34	43	113	0	1	0	0	45	3	10	5	48	303	113	1	30.3	35.1	76.9	22.0
BOGU	0	4	8	0	7	19	79	95	139	94	74	29	136	684	139	4	62.2	51.2	84.6	74.0
MEGU	2	0	0	0	30	5	14	8	16	6	62	5	31	179	62	2	17.9	18.6	76.9	11.0
CAGU	0	0	0	0	0	3	0	0	0	0	3	0	0	6	3	3	3.0	-	15.4	3.0
THGU	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1.0	-	7.7	1.0
GWGU	11	59	8	33	28	31	14	20	35	24	52	35	20	370	59	8	28.5	15.0	100.0	28.0
COTE	0	0	0	0	0	0	0	0	0	0	4	0	6	10	6	4	5.0	1.4	15.4	5.0
#ALC	5	11	0	18	17	2	3	3	9	8	3	17	0	96	18	2	8.7	6.2	84.6	8.0
COMU	0	0	0	0	0	0	0	0	2	1	0	0	0	3	2	1	1.5	0.7	15.4	1.5
PIGU	1	7	0	3	1	0	1	0	1	0	1	2	0	17	7	1	2.1	2.1	61.5	1.0
MAMU	4	4	0	15	16	2	2	3	6	7	2	15	0	76	16	2	6.9	5.6	84.6	4.0
BTPI	1	0	1	0	0	0	0	0	0	12	29	0	0	43	29	1	10.8	13.2	30.8	6.5
CONI	0	1	0	0	0	0	0	0	0	0	9	0	0	10	9	1	5.0	5.7	15.4	5.0
BLSW	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1.0	-	7.7	1.0
RUHU	2	3	2	4	5	0	3	1	2	1	1	2	0	26	5	1	2.4	1.3	84.6	2.0
BEKI	2	0	2	3	1	2	3	2	4	4	5	4	2	34	5	1	2.8	1.2	92.3	2.5
#WOO	1	1	1	3	1	0	5	5	5	2	9	6	5	44	9	1	3.7	2.6	92.3	4.0
DOWO	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	1	1.0	-	7.7	1.0
NOFL	1	1	1	2	0	0	5	5	5	2	8	6	4	40	8	1	3.6	2.4	84.6	4.0
PIWO	0	0	0	1	0	0	0	0	0	0	1	0	1	3	1	1	1.0	-	23.1	1.0
#PAS	130	114	167	237	229	197	187	188	187	398	361	175	693	3263	693	114	251.0	155.7	100.0	188.0
FLYC	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1.0	-	7.7	1.0
WIFL	2	2	3	4	3	1	0	0	0	0	0	0	0	15	4	1	2.5	1.0	46.2	2.5
PSFL	4	4	0	0	4	5	5	0	0	0	1	0	0	23	5	1	3.8	1.5	46.2	4.0
VGSW	0	2	4	0	1	7	1	2	1	0	0	0	0	18	7	1	2.6	2.2	53.8	2.0
NRWS	1	0	0	0	1	0	0	0	1	1	0	0	0	4	1	1	1.0	-	30.8	1.0

Bird surveys of Little Qualicum River estuary for Summer 1976 (continued)

Date	07Jun	14Jun	21Jun	28Jun	05Jul	12Jul	19Jul	26Jul	03Aug	09Aug	17Aug	23Aug	30Aug	Total	Max	Min	Mean	SD	%Freq	Median
CLSW	0	0	0	0	2	0	0	0	0	2	0	0	0	4	2	2	2.0	-	15.4	2.0
BASW	14	23	16	14	28	11	13	9	29	17	56	21	7	258	56	7	19.8	12.8	100.0	16.0
NOCR	13	15	37	17	25	13	32	26	26	0	16	34	12	266	37	12	22.2	9.0	92.3	21.0
CORA	0	0	6	6	2	3	0	0	1	0	4	0	0	22	6	1	3.7	2.1	46.2	3.5
CBCH	3	5	2	14	10	5	4	0	1	0	1	7	8	60	14	1	5.5	4.0	84.6	5.0
BUSH	0	0	2	7	7	0	0	0	0	0	0	0	2	18	7	2	4.5	2.9	30.8	4.5
RBNU	0	1	0	0	1	1	0	0	0	2	0	2	1	8	2	1	1.3	0.5	46.2	1.0
BRCR	0	0	0	0	1	0	1	0	0	0	0	0	0	2	1	1	1.0	-	15.4	1.0
BEWR	1	0	0	1	1	1	1	0	2	0	0	2	0	9	2	1	1.3	0.5	53.8	1.0
WIWR	4	0	1	1	5	6	6	0	3	2	8	3	1	40	8	1	3.6	2.4	84.6	3.0
MAWR	0	0	0	0	0	0	0	0	0	0	0	1	1	2	1	1	1.0	-	15.4	1.0
GCKI	0	0	0	0	0	0	0	0	0	0	1	0	3	4	3	1	2.0	1.4	15.4	2.0
SWTH	5	7	3	6	6	3	3	1	4	0	0	0	0	38	7	1	4.2	1.9	69.2	4.0
AMRO	5	10	10	13	17	16	12	11	3	1	0	3	1	102	17	1	8.5	5.7	92.3	10.0
CEWA	0	10	16	2	8	5	2	16	22	13	0	12	2	108	22	2	9.8	6.7	84.6	10.0
EUST	9	0	12	96	5	9	58	4	0	250	89	30	600	1162	600	4	105.6	179.3	84.6	30.0
OCWA	0	0	0	10	8	3	0	2	0	0	2	0	0	25	10	2	5.0	3.7	38.5	3.0
YEWA	3	0	1	3	4	3	0	0	0	1	0	0	0	15	4	1	2.5	1.2	46.2	3.0
TOWA	3	4	3	2	3	1	1	0	0	2	5	1	0	25	5	1	2.5	1.4	76.9	2.5
MGWA	0	0	0	0	2	2	0	0	0	0	4	1	0	9	4	1	2.3	1.3	30.8	2.0
COYE	0	0	0	0	0	2	0	0	0	2	5	8	2	19	8	2	3.8	2.7	38.5	2.0
WIWA	0	0	0	2	1	0	0	3	0	1	0	0	0	7	3	1	1.8	1.0	30.8	1.5
RSTO	2	3	6	3	5	3	3	3	3	0	1	0	0	32	6	1	3.2	1.4	76.9	3.0
SAVS	0	0	0	0	0	0	0	2	4	11	7	10	7	41	11	2	6.8	3.4	46.2	7.0
SOSP	0	3	6	7	12	8	5	6	2	10	0	6	2	67	12	2	6.1	3.1	84.6	6.0
WCSP	0	0	0	0	0	0	0	2	0	6	5	0	5	18	6	2	4.5	1.7	30.8	5.0
RWBL	4	15	23	2	18	0	0	0	1	0	0	0	1	64	23	1	9.1	9.3	53.8	4.0
BRBL	20	7	6	15	33	50	9	73	25	20	0	0	16	274	73	6	24.9	20.4	84.6	20.0
BHCO	0	0	0	0	2	3	0	0	0	0	0	0	0	5	3	2	2.5	0.7	15.4	2.5
HOFI	2	0	0	3	0	0	1	10	9	4	0	2	2	33	10	1	4.1	3.4	61.5	2.5
RECR	8	0	3	0	0	30	24	10	30	44	49	30	2	230	49	2	23.0	16.7	76.9	27.0
PISI	25	0	0	0	0	2	0	0	2	0	1	1	2	33	25	1	5.5	9.6	46.2	2.0
AMGO	1	3	7	9	14	3	6	8	10	8	106	0	16	191	106	1	15.9	28.7	92.3	8.0
HOSP	1	0	0	0	0	1	0	0	8	1	0	0	0	11	8	1	2.8	3.5	30.8	1.0
#TOT	284	380	328	450	359	328	365	355	588	608	793	409	1072	6319	1072	284	486.1	227.3	100.0	380.0

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Bird surveys of Little Qualicum River estuary for Autumn 1976

Date	06Sep	13Sep	20Sep	27Sep	04Oct	12Oct	18Oct	26Oct	05Nov	23Nov	29Nov	Total	Max	Min	Mean	SD	%Freq	Median
#LOO	1	11	16	19	29	2	34	0	0	1	7	120	34	1	13.3	12.2	81.8	11.0
PALO	0	8	6	13	16	0	25	0	0	0	0	68	25	6	13.6	7.5	45.5	13.0
COLO	1	3	10	6	13	2	9	0	0	1	7	52	13	1	5.8	4.3	81.8	6.0
#GRE	2	0	50	3	54	1	321	0	0	10	20	461	321	1	57.6	108.5	72.7	15.0
HOGR	1	0	4	1	26	1	15	0	0	8	14	70	26	1	8.8	9.0	72.7	6.0
RNGR	1	0	8	2	11	0	9	0	0	2	4	37	11	1	5.3	4.0	63.6	4.0
WEGR	0	0	38	0	17	0	297	0	0	0	2	354	297	2	88.5	139.8	36.4	27.5
#COR	3	2	1	6	3	1	0	0	0	2	4	22	6	1	2.8	1.7	72.7	2.5
CORM	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1.0	-	9.1	1.0
PECO	3	2	1	6	3	1	0	0	0	2	3	21	6	1	2.6	1.6	72.7	2.5
#HER	4	2	7	1	8	1	4	2	2	3	2	36	8	1	3.3	2.3	100.0	2.0
GBHE	4	2	7	1	8	1	4	2	2	3	2	36	8	1	3.3	2.3	100.0	2.0

Bird surveys of Little Qualicum River estuary for Autumn 1976 (continued)

Date	06Sep	13Sep	20Sep	27Sep	04Oct	12Oct	18Oct	26Oct	05Nov	23Nov	29Nov	Total	Max	Min	Mean	SD	%Freq	Median
#GEE	15	0	0	0	0	128	0	0	0	0	2	145	128	2	48.3	69.3	27.3	15.0
GWFG	1	0	0	0	0	5	0	0	0	0	0	6	5	1	3.0	2.8	18.2	3.0
BRAN	14	0	0	0	0	0	0	0	0	0	0	14	14	14	14.0	-	9.1	14.0
CAGO	0	0	0	0	0	123	0	0	0	0	2	125	123	2	62.5	85.6	18.2	62.5
#DAB	13	18	8	29	27	1	132	360	556	787	576	2507	787	1	227.9	289.5	100.0	29.0
DABL	0	0	0	0	0	0	0	0	0	490	0	490	490	490	490.0	-	9.1	490.0
GWTE	11	10	0	2	0	0	16	57	69	6	50	221	69	2	27.6	26.5	72.7	13.5
MALL	2	8	6	22	3	1	83	107	160	200	167	759	200	1	69.0	77.5	100.0	22.0
NOPI	0	0	2	0	21	0	3	1	0	0	0	27	21	1	6.8	9.5	36.4	2.5
EUWI	0	0	0	0	0	0	0	1	1	0	1	3	1	1	1.0	-	27.3	1.0
AMWI	0	0	0	5	3	0	30	194	326	91	358	1007	358	3	143.9	150.8	63.6	91.0
#DIV	55	44	164	178	323	20	574	30	537	714	781	3420	781	20	310.9	290.4	100.0	178.0
GRSC	0	0	0	14	0	0	0	0	10	7	21	52	21	7	13.0	6.1	36.4	12.0
HADU	8	9	42	4	15	8	22	0	2	30	24	164	42	2	16.4	12.9	90.9	12.0
OLDS	0	0	0	0	0	0	1	0	0	6	21	28	21	1	9.3	10.4	27.3	6.0
SCOT	9	11	57	56	130	0	496	0	460	81	101	1401	496	9	155.7	187.0	81.8	81.0
BLSC	0	0	0	0	99	12	39	0	0	149	163	462	163	12	92.4	66.2	45.5	99.0
SUSC	1	7	8	49	53	0	2	0	0	106	84	310	106	1	38.8	40.7	72.7	28.5
WWSC	2	7	8	38	21	0	2	0	0	139	136	353	139	2	44.1	58.9	72.7	14.5
COGO	0	0	0	0	0	0	0	0	5	123	129	257	129	5	85.7	69.9	27.3	123.0
BUFF	0	0	0	0	0	0	0	30	54	51	90	225	90	30	56.3	24.9	36.4	52.5
HOME	0	0	0	0	0	0	3	0	3	1	3	10	3	1	2.5	1.0	36.4	3.0
COME	35	0	49	17	5	0	9	0	3	17	7	142	49	3	17.8	16.2	72.7	13.0
RBME	0	0	0	0	0	0	0	0	0	4	2	6	4	2	3.0	1.4	18.2	3.0
DUCK	0	10	0	0	0	0	0	0	0	0	0	10	10	10	10.0	-	9.1	10.0
#RAP	3	0	2	1	1	0	2	0	4	4	1	18	4	1	2.3	1.3	72.7	2.0
OSPR	1	0	2	0	0	0	0	0	0	0	0	3	2	1	1.5	0.7	18.2	1.5
BAEA	0	0	0	0	0	0	2	0	4	4	0	10	4	2	3.3	1.2	27.3	4.0
SSHA	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1.0	-	9.1	1.0
COHA	0	0	0	1	1	0	0	0	0	0	0	2	1	1	1.0	-	18.2	1.0
RTHA	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	-	9.1	1.0
MERL	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	-	9.1	1.0
RNPH	3	1	11	2	1	0	1	6	0	0	2	27	11	1	3.4	3.5	72.7	2.0
#RAI	0	0	0	0	1	0	0	0	0	1	1	3	1	1	1.0	-	27.3	1.0
VIRA	0	0	0	0	1	0	0	0	0	1	1	3	1	1	1.0	-	27.3	1.0
#SHO	16	64	40	23	44	9	35	47	24	94	47	443	94	9	40.3	23.9	100.0	40.0
KILL	9	40	30	4	29	2	0	0	2	10	0	126	40	2	15.8	14.9	72.7	9.5
LEYE	0	0	1	0	0	0	0	0	0	0	0	1	1	1	1.0	-	9.1	1.0
BLTU	0	4	0	16	15	0	35	42	1	0	35	148	42	1	21.1	16.2	63.6	16.0
SAND	0	0	0	2	0	0	0	0	0	0	2	4	2	2	2.0	-	18.2	2.0
WESA	0	4	0	1	0	0	0	0	0	0	0	5	4	1	2.5	2.1	18.2	2.5
LESA	0	2	0	0	0	0	0	0	0	0	0	2	2	2	2.0	-	9.1	2.0
PESA	0	0	2	0	0	0	0	0	0	0	0	2	2	2	2.0	-	9.1	2.0
DUNL	0	0	0	0	0	0	0	3	21	4	8	36	21	3	9.0	8.3	36.4	6.0
LBDO	0	0	5	0	0	0	0	0	0	0	0	5	5	5	5.0	-	9.1	5.0
COSN	0	0	0	0	0	7	0	0	0	0	2	9	7	2	4.5	3.5	18.2	4.5
SHOR	7	14	2	0	0	0	0	2	0	80	0	105	80	2	21.0	33.3	45.5	7.0
#GUL	104	172	254	113	183	71	362	255	172	279	296	2261	362	71	205.5	90.9	100.0	183.0
GULL	0	0	29	10	145	71	361	230	0	110	0	956	361	10	136.6	123.7	63.6	110.0
BOGU	66	74	158	22	25	0	0	0	0	0	0	345	158	22	69.0	55.0	45.5	66.0
MEGU	8	13	9	0	7	0	0	25	48	32	3	145	48	3	18.1	15.6	72.7	11.0

Bird surveys of Little Qualicum River estuary for Autumn 1976 (continued)

Date	06Sep	13Sep	20Sep	27Sep	04Oct	12Oct	18Oct	26Oct	05Nov	23Nov	29Nov	Total	Max	Min	Mean	SD	%Freq	Median
CAGU	0	9	1	16	0	0	0	0	0	0	0	26	16	1	8.7	7.5	27.3	9.0
HEGU	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1.0	-	9.1	1.0
THGU	3	1	0	0	0	0	0	0	0	3	0	7	3	1	2.3	1.2	27.3	3.0
GWGU	27	75	57	65	6	0	1	0	124	133	293	781	293	1	86.8	90.1	81.8	65.0
COTE	0	5	0	0	0	0	0	0	0	0	0	5	5	5	5.0	-	9.1	5.0
#ALC	0	0	7	3	13	0	11	0	0	2	10	46	13	2	7.7	4.5	54.5	8.5
ALCI	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2.0	-	9.1	2.0
COMU	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1.0	-	9.1	1.0
PIGU	0	0	6	3	10	0	6	0	0	2	2	29	10	2	4.8	3.1	54.5	4.5
MAMU	0	0	1	0	3	0	4	0	0	0	6	14	6	1	3.5	2.1	36.4	3.5
#OWL	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1.0	-	9.1	1.0
SEOW	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1.0	-	9.1	1.0
RUHU	0	0	1	0	0	0	0	0	0	0	0	1	1	1	1.0	-	9.1	1.0
BEKI	1	2	2	2	1	1	1	1	1	2	2	16	2	1	1.5	0.5	100.0	1.0
#WOO	3	2	3	2	3	2	2	0	2	1	1	21	3	1	2.1	0.7	90.9	2.0
NOFL	3	2	3	2	3	1	2	0	2	1	1	20	3	1	2.0	0.8	90.9	2.0
PIWO	0	0	0	0	0	1	0	0	0	0	0	1	1	1	1.0	-	9.1	1.0
#PAS	119	80	217	120	312	100	197	4	46	123	180	1498	312	4	136.2	85.9	100.0	120.0
SAPH	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	-	9.1	1.0
BASW	15	10	0	0	0	0	0	0	0	0	0	25	15	10	12.5	3.5	18.2	12.5
STJA	1	0	0	2	3	0	0	1	0	0	0	7	3	1	1.8	1.0	36.4	1.5
NOCR	45	13	45	13	116	17	71	0	20	21	61	422	116	13	42.2	33.2	90.9	33.0
CORA	0	2	0	0	0	0	1	0	1	0	0	4	2	1	1.3	0.6	27.3	1.0
CBCH	0	1	1	1	1	1	1	0	0	0	9	15	9	1	2.1	3.0	63.6	1.0
BUSH	0	0	0	0	1	5	8	0	0	0	0	14	8	1	4.7	3.5	27.3	5.0
RBNU	0	0	2	1	0	1	0	0	0	0	2	6	2	1	1.5	0.6	36.4	1.5
BRCR	0	0	1	0	0	0	0	0	0	0	0	1	1	1	1.0	-	9.1	1.0
BEWR	1	2	1	2	0	2	1	0	0	1	1	11	2	1	1.4	0.5	72.7	1.0
WIWR	0	0	3	4	1	0	0	0	0	1	4	13	4	1	2.6	1.5	45.5	3.0
MAWR	0	0	0	0	0	2	0	0	0	0	1	3	2	1	1.5	0.7	18.2	1.5
GCKI	0	1	1	1	1	10	1	0	0	0	1	16	10	1	2.3	3.4	63.6	1.0
RCKI	0	0	0	0	0	1	1	0	0	0	0	2	1	1	1.0	-	18.2	1.0
AMRO	0	0	4	13	10	3	2	0	0	0	2	34	13	2	5.7	4.7	54.5	3.5
AMPI	0	0	0	34	2	0	0	0	1	1	0	38	34	1	9.5	16.3	36.4	1.5
CEWA	0	1	0	11	40	15	0	0	0	0	0	67	40	1	16.8	16.6	36.4	13.0
NOSH	0	0	0	0	1	0	0	0	0	0	0	1	1	1	1.0	-	9.1	1.0
EUST	30	30	92	0	30	9	37	0	0	46	0	274	92	9	39.1	25.8	63.6	30.0
OCWA	0	0	2	0	1	0	0	0	0	0	0	3	2	1	1.5	0.7	18.2	1.5
BTGW	0	0	1	0	0	0	0	0	0	0	0	1	1	1	1.0	-	9.1	1.0
MGWA	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1.0	-	9.1	1.0
COYE	2	3	0	0	0	0	0	0	0	0	0	5	3	2	2.5	0.7	18.2	2.5
WIWA	0	0	1	0	0	0	0	0	0	0	0	1	1	1	1.0	-	9.1	1.0
RSTO	0	0	2	5	2	3	9	0	4	7	8	40	9	2	5.0	2.7	72.7	4.5
SAVS	5	3	35	0	21	3	8	2	0	0	0	77	35	2	11.0	12.4	63.6	5.0
FOSP	0	0	1	1	4	0	1	0	0	2	2	11	4	1	1.8	1.2	54.5	1.5
SOSP	1	6	2	8	12	2	4	0	0	10	7	52	12	1	5.8	3.8	81.8	6.0
LISP	0	3	11	0	4	2	0	0	0	0	0	20	11	2	5.0	4.1	36.4	3.5
GCSP	0	0	3	2	4	1	16	0	0	0	2	28	16	1	4.7	5.6	54.5	2.5
WCSP	9	0	1	0	0	0	0	0	0	0	5	15	9	1	5.0	4.0	27.3	5.0
DEJU	0	0	0	3	4	10	24	0	20	12	38	111	38	3	15.9	12.4	63.6	12.0
WEME	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	-	9.1	1.0

Bird surveys of Little Qualicum River estuary for Autumn 1976 (continued)

Date	06Sep	13Sep	20Sep	27Sep	04Oct	12Oct	18Oct	26Oct	05Nov	23Nov	29Nov	Total	Max	Min	Mean	SD	%Freq	Median
BRBL	0	0	6	0	1	0	0	0	0	0	0	7	6	1	3.5	3.5	18.2	3.5
PUFI	0	0	0	0	0	10	2	0	0	0	2	14	10	2	4.7	4.6	27.3	2.0
HOFI	0	0	1	3	5	0	10	0	0	22	0	41	22	1	8.2	8.4	45.5	5.0
RECR	6	0	0	0	30	0	0	0	0	0	0	36	30	6	18.0	17.0	18.2	18.0
PISI	0	0	0	15	6	2	0	0	0	0	35	58	35	2	14.5	14.7	36.4	10.5
AMGO	3	5	1	0	1	1	0	0	0	0	0	11	5	1	2.2	1.8	45.5	1.0
EVGR	0	0	0	0	11	0	0	0	0	0	0	11	11	11	11.0	-	9.1	11.0
#TOT	342	403	783	502	1003	337	1676	705	1344	2023	1933	11051	2023	337	1004.6	640.6	100.0	783.0

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Bird surveys of Little Qualicum River estuary for Winter 1976-1977

Date	06Dec	04Jan	19Jan	31Jan	14Feb	22Feb	Total	Max	Min	Mean	SD	%Freq	Median
#LOO	5	8	5	44	5	1	68	44	1	11.3	16.2	100.0	5.0
RTLO	0	0	0	0	1	0	1	1	1	1.0	-	16.7	1.0
PALO	4	4	0	44	0	0	52	44	4	17.3	23.1	50.0	4.0
COLO	1	3	5	0	4	1	14	5	1	2.8	1.8	83.3	3.0
YBLO	0	1	0	0	0	0	1	1	1	1.0	-	16.7	1.0
#GRE	4	3	7	0	5	0	19	7	3	4.8	1.7	66.7	4.5
HOGR	4	2	4	0	3	0	13	4	2	3.3	1.0	66.7	3.5
RNGR	0	1	3	0	2	0	6	3	1	2.0	1.0	50.0	2.0
#COR	0	3	0	0	0	0	3	3	3	3.0	-	16.7	3.0
CORM	0	2	0	0	0	0	2	2	2	2.0	-	16.7	2.0
PECO	0	1	0	0	0	0	1	1	1	1.0	-	16.7	1.0
#HER	1	3	1	1	1	1	8	3	1	1.3	0.8	100.0	1.0
GBHE	1	3	1	1	1	1	8	3	1	1.3	0.8	100.0	1.0
#SWA	4	0	5	0	0	0	9	5	4	4.5	0.7	33.3	4.5
TRUS	4	0	5	0	0	0	9	5	4	4.5	0.7	33.3	4.5
#GEE	2	0	0	0	0	0	2	2	2	2.0	-	16.7	2.0
CAGO	2	0	0	0	0	0	2	2	2	2.0	-	16.7	2.0
#DAB	152	402	159	41	5	20	779	402	5	129.8	149.0	100.0	96.5
GWTE	2	118	150	1	0	0	271	150	1	67.8	77.6	66.7	60.0
MALL	95	172	9	27	5	0	308	172	5	61.6	71.5	83.3	27.0
EUWI	0	1	0	0	0	0	1	1	1	1.0	-	16.7	1.0
AMWI	55	111	0	13	0	20	199	111	13	49.8	44.8	66.7	37.5
#DIV	388	263	396	129	237	327	1740	396	129	290.0	101.7	100.0	295.0
GRSC	7	0	18	0	17	0	42	18	7	14.0	6.1	50.0	17.0
HADU	0	24	33	0	13	15	85	33	13	21.3	9.2	66.7	19.5
OLDS	2	5	1	0	4	0	12	5	1	3.0	1.8	66.7	3.0
SCOT	30	51	112	90	135	240	658	240	30	109.7	74.6	100.0	101.0
BLSC	130	55	71	0	11	0	267	130	11	66.8	49.2	66.7	63.0
SUSC	40	22	19	0	5	0	86	40	5	21.5	14.4	66.7	20.5
WWSC	100	31	55	0	8	0	194	100	8	48.5	39.3	66.7	43.0
COGO	20	22	53	16	22	19	152	53	16	25.3	13.7	100.0	21.0
BUFF	54	49	32	17	14	9	175	54	9	29.2	19.0	100.0	24.5
HOME	0	0	0	0	1	0	1	1	1	1.0	-	16.7	1.0
COME	5	3	2	6	7	44	67	44	2	11.2	16.2	100.0	5.5
RBME	0	1	0	0	0	0	1	1	1	1.0	-	16.7	1.0
#RAP	5	7	6	1	0	0	19	7	1	4.8	2.6	66.7	5.5
BAEA	5	6	5	1	0	0	17	6	1	4.3	2.2	66.7	5.0
SSHA	0	1	0	0	0	0	1	1	1	1.0	-	16.7	1.0
COHA	0	0	1	0	0	0	1	1	1	1.0	-	16.7	1.0

Bird surveys of Little Qualicum River estuary for Winter 1976-1977 (continued)

Date	06Dec	04Jan	19Jan	31Jan	14Feb	22Feb	Total	Max	Min	Mean	SD	%Freq	Median
RNPH	0	0	1	2	0	0	3	2	1	1.5	0.7	33.3	1.5
#RAI	2	0	1	0	0	0	3	2	1	1.5	0.7	33.3	1.5
VIRA	2	0	0	0	0	0	2	2	2	2.0	-	16.7	2.0
AMCO	0	0	1	0	0	0	1	1	1	1.0	-	16.7	1.0
#SHO	97	110	17	153	0	2	379	153	2	75.8	64.2	83.3	97.0
KILL	2	3	0	2	0	1	8	3	1	2.0	0.8	66.7	2.0
SPSA	0	0	0	1	0	0	1	1	1	1.0	-	16.7	1.0
BLTU	50	21	17	12	0	0	100	50	12	25.0	17.1	66.7	19.0
SAND	0	10	0	6	0	0	16	10	6	8.0	2.8	33.3	8.0
DUNL	45	76	0	132	0	0	253	132	45	84.3	44.1	50.0	76.0
COSN	0	0	0	0	0	1	1	1	1	1.0	-	16.7	1.0
#GUL	276	112	217	117	1272	353	2347	1272	112	391.2	441.4	100.0	246.5
GULL	9	12	115	0	0	0	136	115	9	45.3	60.4	50.0	12.0
MEGU	8	3	18	23	30	40	122	40	3	20.3	13.8	100.0	20.5
HEGU	0	1	0	0	6	0	7	6	1	3.5	3.5	33.3	3.5
THGU	0	0	0	0	960	280	1240	960	280	620.0	480.8	33.3	620.0
GWGU	259	96	84	94	276	33	842	276	33	140.3	101.3	100.0	95.0
#ALC	0	1	0	0	1	0	2	1	1	1.0	-	33.3	1.0
PIGU	0	1	0	0	1	0	2	1	1	1.0	-	33.3	1.0
BEKI	0	1	1	0	2	1	5	2	1	1.3	0.5	66.7	1.0
#WOO	1	5	1	4	3	1	15	5	1	2.5	1.8	100.0	2.0
RBSA	0	2	0	0	0	0	2	2	2	2.0	-	16.7	2.0
NOFL	1	3	1	4	2	1	12	4	1	2.0	1.3	100.0	1.5
PIWO	0	0	0	0	1	0	1	1	1	1.0	-	16.7	1.0
#PAS	78	141	281	67	202	74	843	281	67	140.5	86.3	100.0	109.5
NOCR	57	27	84	29	81	46	324	84	27	54.0	24.7	100.0	51.5
CORA	1	0	0	0	1	1	3	1	1	1.0	-	50.0	1.0
RBNU	0	0	1	0	1	0	2	1	1	1.0	-	33.3	1.0
BEWR	0	0	0	0	1	1	2	1	1	1.0	-	33.3	1.0
WIWR	0	0	0	0	2	1	3	2	1	1.5	0.7	33.3	1.5
MAWR	0	0	0	0	1	0	1	1	1	1.0	-	16.7	1.0
AMRO	0	0	0	0	1	3	4	3	1	2.0	1.4	33.3	2.0
VATH	0	0	1	0	0	0	1	1	1	1.0	-	16.7	1.0
EUST	1	77	43	25	60	1	207	77	1	34.5	31.2	100.0	34.0
RSTO	0	6	3	0	2	0	11	6	2	3.7	2.1	50.0	3.0
FOSP	0	0	1	0	0	0	1	1	1	1.0	-	16.7	1.0
SOSP	5	3	4	2	4	6	24	6	2	4.0	1.4	100.0	4.0
GCSP	12	0	3	0	10	11	36	12	3	9.0	4.1	66.7	10.5
DEJU	0	22	30	5	10	0	67	30	5	16.8	11.4	66.7	16.0
RWBL	0	0	0	0	7	2	9	7	2	4.5	3.5	33.3	4.5
PUFI	2	0	0	0	1	0	3	2	1	1.5	0.7	33.3	1.5
HOFI	0	6	1	6	0	0	13	6	1	4.3	2.9	50.0	6.0
RECR	0	0	10	0	0	1	11	10	1	5.5	6.4	33.3	5.5
PISI	0	0	100	0	20	1	121	100	1	40.3	52.5	50.0	20.0
#TOT	1015	1059	1098	559	1733	780	6244	1733	559	1040.7	395.9	100.0	1037.0

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Bird surveys of Little Qualicum River estuary for Spring 1977

Date	03Mar	28Mar	04Apr	18Apr	25Apr	04May	12May	19May	Total	Max	Min	Mean	SD	%Freq	Median
#LOO	0	1	4	0	1	1	3	12	22	12	1	3.7	4.3	75.0	2.0
RTLO	0	0	0	0	0	0	3	0	3	3	3	3.0	-	12.5	3.0
PALO	0	0	0	0	0	0	0	11	11	11	11	11.0	-	12.5	11.0
COLO	0	1	4	0	1	1	0	1	8	4	1	1.6	1.3	62.5	1.0
#GRE	0	2	14	3	3	1	0	16	39	16	1	6.5	6.7	75.0	3.0
HOGR	0	0	12	1	2	1	0	2	18	12	1	3.6	4.7	62.5	2.0
RNGR	0	2	1	0	1	0	0	0	4	2	1	1.3	0.6	37.5	1.0
WEGR	0	0	1	2	0	0	0	14	17	14	1	5.7	7.2	37.5	2.0
#HER	1	2	0	0	1	2	1	0	7	2	1	1.4	0.5	62.5	1.0
GBHE	1	2	0	0	1	2	1	0	7	2	1	1.4	0.5	62.5	1.0
#GEE	2	527	416	320	431	0	0	0	1696	527	2	339.2	202.3	62.5	416.0
BRAN	2	527	416	320	431	0	0	0	1696	527	2	339.2	202.3	62.5	416.0
#DAB	24	13	11	6	5	3	18	10	90	24	3	11.3	7.0	100.0	10.5
GWTE	0	0	0	4	2	0	0	2	8	4	2	2.7	1.2	37.5	2.0
MALL	3	4	11	2	3	3	8	0	34	11	2	4.9	3.3	87.5	3.0
BWTE	0	0	0	0	0	0	8	8	16	8	8	8.0	-	25.0	8.0
EUWI	0	1	0	0	0	0	0	0	1	1	1	1.0	-	12.5	1.0
AMWI	21	8	0	0	0	0	2	0	31	21	2	10.3	9.7	37.5	8.0
#DIV	194	54	194	271	1147	124	109	237	2330	1147	54	291.3	353.0	100.0	194.0
GRSC	0	0	0	2	6	0	10	0	18	10	2	6.0	4.0	37.5	6.0
HADU	0	0	6	19	18	2	0	26	71	26	2	14.2	9.9	62.5	18.0
OLDS	0	0	0	34	19	0	12	3	68	34	3	17.0	13.1	50.0	15.5
SCOT	86	0	142	186	0	22	0	199	635	199	22	127.0	73.5	62.5	142.0
BLSC	0	0	0	6	201	0	0	0	207	201	6	103.5	137.9	25.0	103.5
SUSC	0	0	19	2	805	95	50	0	971	805	2	194.2	343.3	62.5	50.0
WWSC	0	0	0	2	30	0	25	0	57	30	2	19.0	14.9	37.5	25.0
COGO	33	0	0	0	40	0	0	0	73	40	33	36.5	4.9	25.0	36.5
BUFF	45	5	12	18	9	0	0	0	89	45	5	17.8	15.9	62.5	12.0
COME	30	49	3	2	11	5	9	9	118	49	2	14.8	16.4	100.0	9.0
RBME	0	0	12	0	8	0	3	0	23	12	3	7.7	4.5	37.5	8.0
#RAP	0	1	1	0	4	1	1	0	8	4	1	1.6	1.3	62.5	1.0
OSPR	0	0	0	0	0	1	0	0	1	1	1	1.0	-	12.5	1.0
BAEA	0	1	1	0	3	0	1	0	6	3	1	1.5	1.0	50.0	1.0
COHA	0	0	0	0	1	0	0	0	1	1	1	1.0	-	12.5	1.0
RNPH	1	1	2	2	4	5	0	0	15	5	1	2.5	1.6	75.0	2.0
#SHO	8	17	13	12	145	6	97	9	307	145	6	38.4	52.7	100.0	12.5
KILL	2	2	5	7	4	6	3	5	34	7	2	4.3	1.8	100.0	4.5
GRYE	0	0	1	0	0	0	0	1	2	1	1	1.0	-	25.0	1.0
SPSA	0	0	0	0	0	0	3	2	5	3	2	2.5	0.7	25.0	2.5
BLTU	0	0	7	0	134	0	0	0	141	134	7	70.5	89.8	25.0	70.5
SAND	6	0	0	0	0	0	0	0	6	6	6	6.0	-	12.5	6.0
WESA	0	0	0	0	0	0	72	0	72	72	72	72.0	-	12.5	72.0
LESA	0	0	0	0	0	0	9	0	9	9	9	9.0	-	12.5	9.0
DUNL	0	0	0	0	4	0	0	0	4	4	4	4.0	-	12.5	4.0
COSN	0	15	0	5	3	0	0	1	24	15	1	6.0	6.2	50.0	4.0
SHOR	0	0	0	0	0	0	10	0	10	10	10	10.0	-	12.5	10.0
#GUL	576	4150	269	325	377	124	293	73	6187	4150	73	773.4	1373.0	100.0	309.0
GULL	61	4150	240	0	0	28	170	58	4707	4150	28	784.5	1650.7	75.0	115.5
BOGU	0	0	0	286	264	96	88	14	748	286	14	149.6	119.1	62.5	96.0
MEGU	66	0	17	10	87	0	0	0	180	87	10	45.0	37.5	50.0	41.5
THGU	327	0	0	0	0	0	0	0	327	327	327	327.0	-	12.5	327.0

Bird surveys of Little Qualicum River estuary for Spring 1977 (continued)

Date	03Mar	28Mar	04Apr	18Apr	25Apr	04May	12May	19May	Total	Max	Min	Mean	SD	%Freq	Median
GWGU	122	0	12	29	26	0	35	1	225	122	1	37.5	43.2	75.0	27.5
#ALC	0	2	3	3	6	0	2	15	31	15	2	5.2	5.0	75.0	3.0
PIGU	0	2	1	3	2	0	0	0	8	3	1	2.0	0.8	50.0	2.0
MAMU	0	0	2	0	4	0	2	15	23	15	2	5.8	6.2	50.0	3.0
BTPI	0	0	0	0	0	0	2	10	12	10	2	6.0	5.7	25.0	6.0
#OWL	0	0	0	0	2	0	0	0	2	2	2	2.0	-	12.5	2.0
WSOW	0	0	0	0	2	0	0	0	2	2	2	2.0	-	12.5	2.0
RUHU	0	0	0	6	4	7	7	9	33	9	4	6.6	1.8	62.5	7.0
BEKI	1	1	2	1	1	1	1	0	8	2	1	1.1	0.4	87.5	1.0
#WOO	3	2	4	0	4	3	2	1	19	4	1	2.7	1.1	87.5	3.0
DOWO	0	0	0	0	1	1	0	0	2	1	1	1.0	-	25.0	1.0
NOFL	3	2	4	0	3	2	2	1	17	4	1	2.4	1.0	87.5	2.0
#PAS	149	122	180	69	129	144	102	170	1065	180	69	133.1	36.2	100.0	136.5
PSFL	0	0	0	0	2	1	4	5	12	5	1	3.0	1.8	50.0	3.0
WEKI	0	0	0	0	1	0	0	0	1	1	1	1.0	-	12.5	1.0
VGSW	0	0	5	2	5	10	8	15	45	15	2	7.5	4.6	75.0	6.5
NRWS	0	0	0	0	0	5	1	0	6	5	1	3.0	2.8	25.0	3.0
CLSW	0	0	0	2	0	0	1	0	3	2	1	1.5	0.7	25.0	1.5
BASW	0	0	0	0	5	10	11	9	35	11	5	8.8	2.6	50.0	9.5
STJA	2	0	1	0	0	0	0	0	3	2	1	1.5	0.7	25.0	1.5
NOCR	38	11	35	11	7	15	22	25	164	38	7	20.5	11.5	100.0	18.5
CORA	0	3	0	0	1	0	0	0	4	3	1	2.0	1.4	25.0	2.0
CBCH	0	1	0	1	1	0	1	1	5	1	1	1.0	-	62.5	1.0
BUSH	0	2	0	2	0	0	0	0	4	2	2	2.0	-	25.0	2.0
RBNU	0	1	0	1	1	1	1	1	6	1	1	1.0	-	75.0	1.0
BRCR	0	0	0	1	0	1	0	2	4	2	1	1.3	0.6	37.5	1.0
BEWR	0	1	0	1	0	1	0	0	3	1	1	1.0	-	37.5	1.0
WIWR	1	6	2	2	1	0	1	1	14	6	1	2.0	1.8	87.5	1.0
GCKI	0	1	4	0	1	0	0	0	6	4	1	2.0	1.7	37.5	1.0
RCKI	0	3	2	0	1	0	0	0	6	3	1	2.0	1.0	37.5	2.0
TOSO	0	0	0	1	0	0	0	0	1	1	1	1.0	-	12.5	1.0
SWTH	0	0	0	0	0	0	0	1	1	1	1	1.0	-	12.5	1.0
AMRO	0	10	21	10	18	20	11	16	106	21	10	15.1	4.8	87.5	16.0
VATH	0	0	0	1	1	0	0	0	2	1	1	1.0	-	25.0	1.0
EUST	30	40	81	13	14	13	2	36	229	81	2	28.6	24.9	100.0	22.0
OCWA	0	0	0	2	9	2	6	0	19	9	2	4.8	3.4	50.0	4.0
YEWA	0	0	0	0	0	0	1	1	2	1	1	1.0	-	25.0	1.0
YRWA	0	0	0	0	9	0	0	0	9	9	9	9.0	-	12.5	9.0
TOWA	0	0	0	0	4	1	3	4	12	4	1	3.0	1.4	50.0	3.5
COYE	0	0	0	0	1	0	0	0	1	1	1	1.0	-	12.5	1.0
WIWA	0	0	0	0	0	0	1	0	1	1	1	1.0	-	12.5	1.0
RSTO	2	2	1	1	0	3	1	1	11	3	1	1.6	0.8	87.5	1.0
SAVS	0	0	0	1	7	6	0	1	15	7	1	3.8	3.2	50.0	3.5
FOSP	0	0	0	0	2	0	0	0	2	2	2	2.0	-	12.5	2.0
SOSP	6	4	9	2	4	11	2	11	49	11	2	6.1	3.8	100.0	5.0
LISP	0	0	0	0	2	0	0	0	2	2	2	2.0	-	12.5	2.0
GCSP	0	0	2	0	3	6	0	0	11	6	2	3.7	2.1	37.5	3.0
WCSP	0	0	0	2	4	3	1	0	10	4	1	2.5	1.3	50.0	2.5
DEJU	23	0	1	0	0	0	0	0	24	23	1	12.0	15.6	25.0	12.0
RWBL	4	7	6	4	9	25	12	19	86	25	4	10.8	7.6	100.0	8.0
BRBL	0	4	0	3	2	0	1	2	12	4	1	2.4	1.1	62.5	2.0

Bird surveys of Little Qualicum River estuary for Spring 1977 (continued)

Date	03Mar	28Mar	04Apr	18Apr	25Apr	04May	12May	19May	Total	Max	Min	Mean	SD	%Freq	Median
BHCO	0	0	0	0	6	0	2	0	8	6	2	4.0	2.8	25.0	4.0
PUFI	0	0	0	0	0	0	0	5	5	5	5	5.0	-	12.5	5.0
HOFI	4	4	2	0	2	0	5	2	19	5	2	3.2	1.3	75.0	3.0
RECR	1	1	5	0	1	0	1	0	9	5	1	1.8	1.8	62.5	1.0
PISI	3	1	1	1	1	7	0	1	15	7	1	2.1	2.3	87.5	1.0
AMGO	0	0	0	0	4	3	3	11	21	11	3	5.3	3.9	50.0	3.5
EVGR	35	20	2	2	0	0	0	0	59	35	2	14.8	15.9	50.0	11.0
HOSP	0	0	0	3	0	0	0	0	3	3	3	3.0	-	12.5	3.0
#TOT	959	4895	1113	1018	2264	422	638	562	11871	4895	422	1483.9	1491.3	100.0	988.5

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Bird surveys of Little Qualicum River estuary for Summer 1977

Date	06Jun	17Jun	27Jun	07Jul	15Jul	26Jul	05Aug	22Aug	29Aug	Total	Max	Min	Mean	SD	%Freq	Median
#LOO	7	4	11	0	0	0	0	1	6	29	11	1	5.8	3.7	55.6	6.0
LOON	0	0	6	0	0	0	0	0	0	6	6	6	6.0	-	11.1	6.0
PALO	5	2	1	0	0	0	0	0	5	13	5	1	3.3	2.1	44.4	3.5
COLO	2	2	4	0	0	0	0	1	1	10	4	1	2.0	1.2	55.6	2.0
#GRE	0	11	1	0	0	0	0	1	0	13	11	1	4.3	5.8	33.3	1.0
RNGR	0	0	0	0	0	0	0	1	0	1	1	1	1.0	-	11.1	1.0
WEGR	0	11	1	0	0	0	0	0	0	12	11	1	6.0	7.1	22.2	6.0
#COR	2	0	1	6	1	2	3	0	0	15	6	1	2.5	1.9	66.7	2.0
CORM	0	0	1	0	0	2	0	0	0	3	2	1	1.5	0.7	22.2	1.5
PECO	2	0	0	6	1	0	3	0	0	12	6	1	3.0	2.2	44.4	2.5
#HER	3	15	5	2	6	0	2	2	3	38	15	2	4.8	4.4	88.9	3.0
GBHE	3	15	5	2	6	0	2	2	3	38	15	2	4.8	4.4	88.9	3.0
#GEE	0	0	0	1	0	0	0	0	0	1	1	1	1.0	-	11.1	1.0
CAGO	0	0	0	1	0	0	0	0	0	1	1	1	1.0	-	11.1	1.0
#DAB	1	0	2	7	0	0	0	1	33	44	33	1	8.8	13.8	55.6	2.0
GWTE	0	0	0	0	0	0	0	0	17	17	17	17	17.0	-	11.1	17.0
MALL	0	0	0	6	0	0	0	0	0	6	6	6	6.0	-	11.1	6.0
NOPI	0	0	0	0	0	0	0	0	16	16	16	16	16.0	-	11.1	16.0
BWTE	1	0	2	1	0	0	0	0	0	4	2	1	1.3	0.6	33.3	1.0
NOSL	0	0	0	0	0	0	0	1	0	1	1	1	1.0	-	11.1	1.0
#DIV	181	46	23	7	0	30	28	7	15	337	181	7	42.1	57.6	88.9	25.5
HADU	62	0	0	0	0	0	0	0	0	62	62	62	62.0	-	11.1	62.0
SCOT	7	28	15	6	0	0	0	0	0	56	28	6	14.0	10.2	44.4	11.0
BLSC	3	0	0	0	0	0	0	0	0	3	3	3	3.0	-	11.1	3.0
SUSC	6	2	1	0	0	0	0	0	0	9	6	1	3.0	2.6	33.3	2.0
WWSC	82	0	0	0	0	0	0	0	0	82	82	82	82.0	-	11.1	82.0
BUFF	1	0	0	0	0	0	0	0	0	1	1	1	1.0	-	11.1	1.0
COME	16	16	7	1	0	30	28	7	15	120	30	1	15.0	10.1	88.9	15.5
RBME	4	0	0	0	0	0	0	0	0	4	4	4	4.0	-	11.1	4.0
#RAP	3	4	0	2	1	2	2	0	1	15	4	1	2.1	1.1	77.8	2.0
OSPR	1	0	0	0	0	1	0	0	0	2	1	1	1.0	-	22.2	1.0
BAEA	1	4	0	1	1	0	0	0	0	7	4	1	1.8	1.5	44.4	1.0
SSHA	1	0	0	0	0	0	0	0	0	1	1	1	1.0	-	11.1	1.0
COHA	0	0	0	0	0	0	1	0	1	2	1	1	1.0	-	22.2	1.0
MERL	0	0	0	1	0	1	1	0	0	3	1	1	1.0	-	33.3	1.0
RNPH	2	2	1	5	0	0	2	1	1	14	5	1	2.0	1.4	77.8	2.0
BLGR	0	0	1	0	0	0	0	0	0	1	1	1	1.0	-	11.1	1.0

Bird surveys of Little Qualicum River estuary for Summer 1977 (continued)

Date	06Jun	17Jun	27Jun	07Jul	15Jul	26Jul	05Aug	22Aug	29Aug	Total	Max	Min	Mean	SD	%Freq	Median
#RAI	0	0	0	0	1	1	1	1	0	4	1	1	1.0	-	44.4	1.0
VIRA	0	0	0	0	1	1	1	1	0	4	1	1	1.0	-	44.4	1.0
#SHO	9	18	16	24	4	45	48	6	78	248	78	4	27.6	24.7	100.0	18.0
SEPL	0	0	0	0	0	0	0	1	0	1	1	1	1.0	-	11.1	1.0
KILL	3	13	13	0	1	23	39	0	16	108	39	1	15.4	12.8	77.8	13.0
GRYE	0	0	0	0	0	0	1	0	0	1	1	1	1.0	-	11.1	1.0
LEYE	0	0	0	0	0	0	0	2	0	2	2	2	2.0	-	11.1	2.0
WATA	0	0	0	0	0	2	0	0	0	2	2	2	2.0	-	11.1	2.0
SPSA	6	3	3	2	3	0	1	0	2	20	6	1	2.9	1.6	77.8	3.0
BLTU	0	0	0	0	0	0	0	0	2	2	2	2	2.0	-	11.1	2.0
WESA	0	0	0	0	0	7	1	2	0	10	7	1	3.3	3.2	33.3	2.0
LESA	0	0	0	5	0	0	6	1	0	12	6	1	4.0	2.6	33.3	5.0
LBDO	0	0	0	0	0	1	0	0	0	1	1	1	1.0	-	11.1	1.0
RNPL	0	0	0	0	0	0	0	0	27	27	27	27	27.0	-	11.1	27.0
SHOR	0	2	0	17	0	12	0	0	31	62	31	2	15.5	12.1	44.4	14.5
#GUL	40	124	123	199	42	226	106	282	123	1265	282	40	140.6	81.1	100.0	123.0
GULL	21	66	32	0	5	91	4	30	26	275	91	4	34.4	29.9	88.9	28.0
BOGU	0	7	4	123	19	100	60	174	50	537	174	4	67.1	60.8	88.9	55.0
MEGU	0	0	1	15	3	6	35	10	7	77	35	1	11.0	11.5	77.8	7.0
CAGU	0	0	0	1	0	0	0	0	0	1	1	1	1.0	-	11.1	1.0
HEGU	0	0	0	0	0	10	0	0	0	10	10	10	10.0	-	11.1	10.0
GWGU	19	51	86	60	15	19	7	68	40	365	86	7	40.6	27.4	100.0	40.0
#ALC	3	8	5	0	3	0	3	2	0	24	8	2	4.0	2.2	66.7	3.0
COMU	1	0	0	0	2	0	0	0	0	3	2	1	1.5	0.7	22.2	1.5
PIGU	0	2	3	0	1	0	3	2	0	11	3	1	2.2	0.8	55.6	2.0
MAMU	2	6	2	0	0	0	0	0	0	10	6	2	3.3	2.3	33.3	2.0
BTPI	0	1	2	0	0	9	0	0	2	14	9	1	3.5	3.7	44.4	2.0
MODO	0	0	0	0	0	0	0	0	1	1	1	1	1.0	-	11.1	1.0
CONI	0	0	0	0	0	0	0	0	7	7	7	7	7.0	-	11.1	7.0
RUHU	8	4	6	1	5	6	0	0	0	30	8	1	5.0	2.4	66.7	5.5
BEKI	2	3	3	3	5	4	3	3	2	28	5	2	3.1	0.9	100.0	3.0
#WOO	0	5	5	4	1	0	1	0	1	17	5	1	2.8	2.0	66.7	2.5
DOWO	0	0	0	0	1	0	0	0	0	1	1	1	1.0	-	11.1	1.0
NOFL	0	5	5	4	0	0	0	0	1	15	5	1	3.8	1.9	44.4	4.5
PIWO	0	0	0	0	0	0	1	0	0	1	1	1	1.0	-	11.1	1.0
#PAS	283	221	226	231	256	258	539	102	102	2218	539	102	246.4	127.6	100.0	231.0
FLYC	0	0	0	0	1	0	0	0	0	1	1	1	1.0	-	11.1	1.0
WWPE	0	0	0	0	1	0	1	0	1	3	1	1	1.0	-	33.3	1.0
WIFL	4	3	4	2	1	3	0	0	0	17	4	1	2.8	1.2	66.7	3.0
PSFL	6	3	4	6	5	6	0	0	1	31	6	1	4.4	1.9	77.8	5.0
VGSW	16	16	7	5	22	6	0	0	1	73	22	1	10.4	7.6	77.8	7.0
NRWS	2	2	0	0	0	0	0	0	0	4	2	2	2.0	-	22.2	2.0
BASW	26	35	39	38	36	84	37	3	4	302	84	3	33.6	23.7	100.0	36.0
NOCR	61	36	34	24	35	19	18	1	6	234	61	1	26.0	18.1	100.0	24.0
CORA	0	0	0	0	3	0	0	3	2	8	3	2	2.7	0.6	33.3	3.0
CBCH	8	7	2	9	11	9	7	16	5	74	16	2	8.2	3.9	100.0	8.0
BUSH	4	4	3	6	1	0	0	0	0	18	6	1	3.6	1.8	55.6	4.0
RBNU	1	2	0	2	4	2	2	1	1	15	4	1	1.9	1.0	88.9	2.0
BRCR	2	2	2	0	2	0	1	1	0	10	2	1	1.7	0.5	66.7	2.0
BEWR	2	0	1	0	1	1	2	0	3	10	3	1	1.7	0.8	66.7	1.5
HOWR	0	0	0	0	1	0	0	0	0	1	1	1	1.0	-	11.1	1.0

Bird surveys of Little Qualicum River estuary for Summer 1977 (continued)

Date	06Jun	17Jun	27Jun	07Jul	15Jul	26Jul	05Aug	22Aug	29Aug	Total	Max	Min	Mean	SD	%Freq	Median
WIWR	3	1	5	3	4	2	3	1	1	23	5	1	2.6	1.4	100.0	3.0
MAWR	0	0	0	0	0	1	8	4	2	15	8	1	3.8	3.1	44.4	3.0
GCKI	1	1	0	0	3	0	6	1	0	12	6	1	2.4	2.2	55.6	1.0
RCKI	0	0	0	1	0	0	0	0	0	1	1	1	1.0	-	11.1	1.0
SWTH	4	13	12	11	12	3	2	0	0	57	13	2	8.1	4.9	77.8	11.0
AMRO	19	23	16	5	15	26	0	3	1	108	26	1	13.5	9.4	88.9	15.5
AMPI	0	0	0	0	0	0	0	1	0	1	1	1	1.0	-	11.1	1.0
CEWA	20	7	4	11	4	22	5	2	1	76	22	1	8.4	7.7	100.0	5.0
EUST	25	0	16	38	33	8	308	50	50	528	308	8	66.0	98.9	88.9	35.5
OCWA	1	0	1	0	0	2	0	0	0	4	2	1	1.3	0.6	33.3	1.0
YEWA	3	6	5	2	0	3	7	1	0	27	7	1	3.9	2.2	77.8	3.0
TOWA	4	1	0	0	1	0	0	0	0	6	4	1	2.0	1.7	33.3	1.0
MGWA	0	3	0	0	1	0	0	0	0	4	3	1	2.0	1.4	22.2	2.0
COYE	0	2	0	2	4	7	9	3	2	29	9	2	4.1	2.8	77.8	3.0
WIWA	1	5	0	1	1	0	0	0	0	8	5	1	2.0	2.0	44.4	1.0
RSTO	1	0	1	0	1	0	0	0	1	4	1	1	1.0	-	44.4	1.0
SAVS	0	1	2	1	0	0	0	2	0	6	2	1	1.5	0.6	44.4	1.5
SOSP	8	16	14	17	19	3	5	2	4	88	19	2	9.8	6.7	100.0	8.0
LISP	0	0	0	0	0	0	0	0	2	2	2	2	2.0	-	11.1	2.0
WCSP	1	2	0	0	1	0	0	0	1	5	2	1	1.3	0.5	44.4	1.0
RWBL	18	0	34	15	0	0	0	0	3	70	34	3	17.5	12.8	44.4	16.5
BRBL	15	1	0	21	10	38	39	0	2	126	39	1	18.0	15.6	77.8	15.0
BHCO	0	0	0	4	0	0	0	0	0	4	4	4	4.0	-	11.1	4.0
PUFI	5	0	0	0	0	0	0	0	0	5	5	5	5.0	-	11.1	5.0
HOFI	4	1	1	0	7	3	1	0	0	17	7	1	2.8	2.4	66.7	2.0
RECR	0	0	10	0	0	0	0	0	0	10	10	10	10.0	-	11.1	10.0
PISI	3	1	2	1	1	0	3	0	0	11	3	1	1.8	1.0	66.7	1.5
AMGO	15	27	7	6	15	10	75	7	8	170	75	6	18.9	22.1	100.0	10.0
#TOT	544	466	431	492	325	583	738	409	375	4363	738	325	484.8	124.4	100.0	466.0

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Bird surveys of Little Qualicum River estuary for Autumn 1977

Date	07Sep	19Sep	26Sep	07Oct	17Oct	31Oct	14Nov	21Nov	29Nov	Total	Max	Min	Mean	SD	%Freq	Median
#LOO	0	0	4	6	11	2	0	5	1	29	11	1	4.8	3.5	66.7	4.5
PALO	0	0	0	0	1	0	0	3	0	4	3	1	2.0	1.4	22.2	2.0
COLO	0	0	4	6	10	2	0	2	1	25	10	1	4.2	3.4	66.7	3.0
#GRE	0	0	3	374	1623	5	0	510	0	2515	1623	3	503.0	665.0	55.6	374.0
HOGR	0	0	2	0	20	3	0	0	0	25	20	2	8.3	10.1	33.3	3.0
RNGR	0	0	1	0	3	2	0	0	0	6	3	1	2.0	1.0	33.3	2.0
WEGR	0	0	0	374	1600	0	0	510	0	2484	1600	374	828.0	672.0	33.3	510.0
#COR	0	0	1	0	0	0	0	0	0	1	1	1	1.0	-	11.1	1.0
PECO	0	0	1	0	0	0	0	0	0	1	1	1	1.0	-	11.1	1.0
#HER	5	0	2	5	0	0	1	1	0	14	5	1	2.8	2.0	55.6	2.0
GBHE	5	0	2	5	0	0	1	1	0	14	5	1	2.8	2.0	55.6	2.0
#SWA	0	0	0	0	0	0	0	9	6	15	9	6	7.5	2.1	22.2	7.5
TRUS	0	0	0	0	0	0	0	9	6	15	9	6	7.5	2.1	22.2	7.5
#DAB	83	139	131	473	259	647	260	816	273	3081	816	83	342.3	251.5	100.0	260.0
DABL	0	0	0	50	0	0	0	0	0	50	50	50	50.0	-	11.1	50.0
WODU	0	0	0	0	2	0	0	0	0	2	2	2	2.0	-	11.1	2.0
GWTE	50	34	28	34	8	55	3	95	0	307	95	3	38.4	29.1	88.9	34.0
MALL	3	35	27	111	66	111	25	463	1	842	463	1	93.6	144.6	100.0	35.0

Bird surveys of Little Qualicum River estuary for Autumn 1977 (continued)

Date	07Sep	19Sep	26Sep	07Oct	17Oct	31Oct	14Nov	21Nov	29Nov	Total	Max	Min	Mean	SD	%Freq	Median
NOPI	27	70	15	6	1	0	1	1	0	121	70	1	17.3	25.2	77.8	6.0
NOSL	0	0	0	0	0	0	0	1	0	1	1	1	1.0	-	11.1	1.0
EUWI	0	0	0	0	0	0	1	0	0	1	1	1	1.0	-	11.1	1.0
AMWI	3	0	61	272	182	481	230	256	272	1757	481	3	219.6	145.8	88.9	243.0
#DIV	0	17	100	579	289	502	506	0	226	2219	579	17	317.0	217.8	77.8	289.0
GRSC	0	0	0	0	3	0	0	0	0	3	3	3	3.0	-	11.1	3.0
HADU	0	0	12	5	16	45	0	0	0	78	45	5	19.5	17.6	44.4	14.0
SCOT	0	0	30	566	94	4	470	0	120	1284	566	4	214.0	241.1	66.7	107.0
BLSC	0	0	16	0	68	217	0	0	20	321	217	16	80.3	94.2	44.4	44.0
SUSC	0	0	16	0	37	84	0	0	0	137	84	16	45.7	34.8	33.3	37.0
WWSC	0	0	25	0	65	86	0	0	0	176	86	25	58.7	31.0	33.3	65.0
COGO	0	0	0	0	0	8	5	0	36	49	36	5	16.3	17.1	33.3	8.0
BUFF	0	0	0	0	0	57	27	0	34	118	57	27	39.3	15.7	33.3	34.0
HOME	0	0	0	4	0	0	1	0	0	5	4	1	2.5	2.1	22.2	2.5
COME	0	0	1	4	4	0	3	0	15	27	15	1	5.4	5.5	55.6	4.0
RBME	0	17	0	0	2	1	0	0	1	21	17	1	5.3	7.8	44.4	1.5
#RAP	0	0	1	1	0	0	1	6	0	9	6	1	2.3	2.5	44.4	1.0
BAEA	0	0	0	1	0	0	1	6	0	8	6	1	2.7	2.9	33.3	1.0
MERL	0	0	1	0	0	0	0	0	0	1	1	1	1.0	-	11.1	1.0
RNPH	2	0	0	0	0	1	4	0	0	7	4	1	2.3	1.5	33.3	2.0
#RAI	1	0	1	2	0	0	3	0	0	7	3	1	1.8	1.0	44.4	1.5
VIRA	1	0	1	2	0	0	2	0	0	6	2	1	1.5	0.6	44.4	1.5
AMCO	0	0	0	0	0	0	1	0	0	1	1	1	1.0	-	11.1	1.0
#SHO	2	2	5	16	1	2	8	78	1	115	78	1	12.8	24.9	100.0	2.0
BBPL	0	2	0	0	0	0	0	0	0	2	2	2	2.0	-	11.1	2.0
KILL	0	0	5	15	0	0	0	19	0	39	19	5	13.0	7.2	33.3	15.0
GRYE	1	0	0	0	0	0	0	0	0	1	1	1	1.0	-	11.1	1.0
BLTU	0	0	0	0	0	1	5	22	0	28	22	1	9.3	11.2	33.3	5.0
SAND	0	0	0	0	1	0	0	0	0	1	1	1	1.0	-	11.1	1.0
LESA	1	0	0	0	0	0	0	0	0	1	1	1	1.0	-	11.1	1.0
DUNL	0	0	0	0	0	1	0	37	0	38	37	1	19.0	25.5	22.2	19.0
COSN	0	0	0	1	0	0	3	0	1	5	3	1	1.7	1.2	33.3	1.0
#GUL	140	245	63	30	57	249	335	123	340	1582	340	30	175.8	119.7	100.0	140.0
GULL	140	0	16	30	0	0	90	75	280	631	280	16	105.2	96.5	66.7	82.5
BOGU	0	125	0	0	0	76	60	0	0	261	125	60	87.0	33.9	33.3	76.0
MEGU	0	40	5	0	2	8	66	19	0	140	66	2	23.3	25.1	66.7	13.5
CAGU	0	0	0	0	1	1	0	0	0	2	1	1	1.0	-	22.2	1.0
GWGU	0	80	42	0	54	164	119	29	60	548	164	29	78.3	47.7	77.8	60.0
#ALC	0	0	1	0	10	2	0	0	0	13	10	1	4.3	4.9	33.3	2.0
PIGU	0	0	1	0	9	2	0	0	0	12	9	1	4.0	4.4	33.3	2.0
MAMU	0	0	0	0	1	0	0	0	0	1	1	1	1.0	-	11.1	1.0
BEKI	3	0	2	0	1	2	2	1	1	12	3	1	1.7	0.8	77.8	2.0
#WOO	2	0	2	4	3	0	0	1	0	12	4	1	2.4	1.1	55.6	2.0
DOWO	1	0	0	0	0	0	0	0	0	1	1	1	1.0	-	11.1	1.0
NOFL	1	0	2	4	3	0	0	1	0	11	4	1	2.2	1.3	55.6	2.0
#PAS	4166	50	258	168	54	117	87	235	34	5169	4166	34	574.3	1349.3	100.0	117.0
BASW	3	0	0	0	0	0	0	0	0	3	3	3	3.0	-	11.1	3.0
STJA	2	0	1	1	1	0	0	0	0	5	2	1	1.3	0.5	44.4	1.0
NOCR	62	0	105	87	3	67	34	54	7	419	105	3	52.4	36.1	88.9	58.0
CORA	0	1	1	0	1	1	0	1	0	5	1	1	1.0	-	55.6	1.0
CBCH	29	0	1	0	0	0	0	1	0	31	29	1	10.3	16.2	33.3	1.0

Bird surveys of Little Qualicum River estuary for Autumn 1977 (continued)

Date	07Sep	19Sep	26Sep	07Oct	17Oct	31Oct	14Nov	21Nov	29Nov	Total	Max	Min	Mean	SD	%Freq	Median
BUSH	8	0	0	0	0	0	0	0	0	8	8	8	8.0	-	11.1	8.0
RBNU	3	0	0	0	0	0	0	0	0	3	3	3	3.0	-	11.1	3.0
BEWR	2	0	4	1	2	0	0	2	0	11	4	1	2.2	1.1	55.6	2.0
WIWR	1	0	2	0	0	0	0	0	0	3	2	1	1.5	0.7	22.2	1.5
MAWR	3	0	1	2	0	0	0	1	0	7	3	1	1.8	1.0	44.4	1.5
GCKI	14	0	1	0	0	1	0	1	0	17	14	1	4.3	6.5	44.4	1.0
RCKI	0	0	2	0	1	2	1	0	0	6	2	1	1.5	0.6	44.4	1.5
AMRO	8	0	22	1	0	0	0	0	0	31	22	1	10.3	10.7	33.3	8.0
NOSH	0	0	0	1	0	0	0	0	0	1	1	1	1.0	-	11.1	1.0
EUST	4000	0	28	0	7	2	0	69	0	4106	4000	2	821.2	1777.2	55.6	28.0
HUVI	1	0	0	0	0	0	0	0	0	1	1	1	1.0	-	11.1	1.0
OCWA	0	0	2	0	0	0	0	0	0	2	2	2	2.0	-	11.1	2.0
YRWA	0	0	0	25	4	0	0	0	0	29	25	4	14.5	14.8	22.2	14.5
COYE	4	0	0	0	0	0	0	0	0	4	4	4	4.0	-	11.1	4.0
WIWA	1	0	0	0	0	0	0	0	0	1	1	1	1.0	-	11.1	1.0
RSTO	1	0	10	8	8	4	4	19	3	57	19	1	7.1	5.7	88.9	6.0
SAVS	10	37	26	5	0	2	0	0	0	80	37	2	16.0	14.9	55.6	10.0
FOSP	0	0	1	0	0	0	0	0	0	1	1	1	1.0	-	11.1	1.0
SOSP	3	0	9	4	6	1	7	18	5	53	18	1	6.6	5.2	88.9	5.5
LISP	3	0	8	1	0	0	0	0	0	12	8	1	4.0	3.6	33.3	3.0
WTSP	0	0	0	1	0	0	0	0	0	1	1	1	1.0	-	11.1	1.0
GCSP	0	10	12	9	5	0	3	6	4	49	12	3	7.0	3.4	77.8	6.0
WCSP	0	0	2	4	2	1	0	0	0	9	4	1	2.3	1.3	44.4	2.0
DEJU	0	0	10	16	4	10	9	36	3	88	36	3	12.6	11.2	77.8	10.0
SNBU	0	0	0	0	0	0	0	1	0	1	1	1	1.0	-	11.1	1.0
RWBL	0	0	7	1	0	0	0	0	0	8	7	1	4.0	4.2	22.2	4.0
WEME	0	0	0	0	0	1	0	1	0	2	1	1	1.0	-	22.2	1.0
PUFI	0	0	2	0	0	0	0	0	0	2	2	2	2.0	-	11.1	2.0
HOFI	3	0	0	0	6	25	23	25	12	94	25	3	15.7	10.0	66.7	17.5
PISI	0	0	0	0	4	0	6	0	0	10	6	4	5.0	1.4	22.2	5.0
AMGO	5	2	0	0	0	0	0	0	0	7	5	2	3.5	2.1	22.2	3.5
EVGR	0	0	1	1	0	0	0	0	0	2	1	1	1.0	-	22.2	1.0
#TOT	4404	453	574	1658	2308	1529	1207	1785	882	14800	4404	453	1644.4	1195.1	100.0	1529.0

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Bird surveys of Little Qualicum River estuary for for Winter 1977-1978

Date	19Dec	21Feb	Total	Max	Min	Mean	SD	%Freq	Median
#LOO	3	6	9	6	3	4.5	2.1	100.0	4.5
COLO	3	6	9	6	3	4.5	2.1	100.0	4.5
#GRE	0	3	3	3	3	3.0	-	50.0	3.0
HOGR	0	3	3	3	3	3.0	-	50.0	3.0
#HER	2	0	2	2	2	2.0	-	50.0	2.0
GBHE	2	0	2	2	2	2.0	-	50.0	2.0
#SWA	5	2	7	5	2	3.5	2.1	100.0	3.5
TRUS	5	2	7	5	2	3.5	2.1	100.0	3.5
#DAB	331	72	403	331	72	201.5	183.1	100.0	201.5
MALL	284	15	299	284	15	149.5	190.2	100.0	149.5
EUWI	1	0	1	1	1	1.0	-	50.0	1.0
AMWI	46	57	103	57	46	51.5	7.8	100.0	51.5

Bird surveys of Little Qualicum River estuary for for Winter 1977-1978 (continued)

Date	19Dec	21Feb	Total	Max	Min	Mean	SD	%Freq	Median
#DIV	230	273	503	273	230	251.5	30.4	100.0	251.5
GRSC	0	11	11	11	11	11.0	-	50.0	11.0
HADU	0	12	12	12	12	12.0	-	50.0	12.0
OLDS	0	1	1	1	1	1.0	-	50.0	1.0
SCOT	185	101	286	185	101	143.0	59.4	100.0	143.0
BLSC	0	35	35	35	35	35.0	-	50.0	35.0
SUSC	0	10	10	10	10	10.0	-	50.0	10.0
WWSC	0	21	21	21	21	21.0	-	50.0	21.0
COGO	28	25	53	28	25	26.5	2.1	100.0	26.5
BUFF	16	37	53	37	16	26.5	14.8	100.0	26.5
COME	1	20	21	20	1	10.5	13.4	100.0	10.5
#RAP	30	2	32	30	2	16.0	19.8	100.0	16.0
BAEA	30	2	32	30	2	16.0	19.8	100.0	16.0
#SHO	19	31	50	31	19	25.0	8.5	100.0	25.0
KILL	4	7	11	7	4	5.5	2.1	100.0	5.5
GRYE	0	1	1	1	1	1.0	-	50.0	1.0
BLTU	6	15	21	15	6	10.5	6.4	100.0	10.5
SAND	0	4	4	4	4	4.0	-	50.0	4.0
DUNL	8	3	11	8	3	5.5	3.5	100.0	5.5
COSN	1	1	2	1	1	1.0	-	100.0	1.0
#GUL	226	29	255	226	29	127.5	139.3	100.0	127.5
GULL	200	13	213	200	13	106.5	132.2	100.0	106.5
GWGU	26	16	42	26	16	21.0	7.1	100.0	21.0
#ALC	0	18	18	18	18	18.0	-	50.0	18.0
COMU	0	18	18	18	18	18.0	-	50.0	18.0
BEKI	1	1	2	1	1	1.0	-	100.0	1.0
#WOO	1	3	4	3	1	2.0	1.4	100.0	2.0
NOFL	1	3	4	3	1	2.0	1.4	100.0	2.0
#PAS	101	111	212	111	101	106.0	7.1	100.0	106.0
NOCR	16	92	108	92	16	54.0	53.7	100.0	54.0
BEWR	0	1	1	1	1	1.0	-	50.0	1.0
AMRO	2	10	12	10	2	6.0	5.7	100.0	6.0
EUST	40	1	41	40	1	20.5	27.6	100.0	20.5
RSTO	2	0	2	2	2	2.0	-	50.0	2.0
SOSP	5	2	7	5	2	3.5	2.1	100.0	3.5
GCSP	12	5	17	12	5	8.5	4.9	100.0	8.5
RWBL	2	0	2	2	2	2.0	-	50.0	2.0
HOFI	22	0	22	22	22	22.0	-	50.0	22.0
#TOT	949	551	1500	949	551	750.0	281.4	100.0	750.0

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Bird surveys of Little Qualicum River estuary for Spring 1978

Date	01Mar	20Mar	26Apr	05May	Total	Max	Min	Mean	SD	%Freq	Median
#LOO	2	267	8	2	279	267	2	69.8	131.5	100.0	5.0
LOON	0	0	6	0	6	6	6	6.0	-	25.0	6.0
RTLO	0	0	0	2	2	2	2	2.0	-	25.0	2.0
PALO	0	227	0	0	227	227	227	227.0	-	25.0	227.0
COLO	2	40	2	0	44	40	2	14.7	21.9	75.0	2.0
#GRE	1	595	10	5	611	595	1	152.8	294.9	100.0	7.5
HOGR	0	8	8	4	20	8	4	6.7	2.3	75.0	8.0
RNGR	1	1	2	0	4	2	1	1.3	0.6	75.0	1.0

Bird surveys of Little Qualicum River estuary for Spring 1978 (continued)

Date	01Mar	20Mar	26Apr	05May	Total	Max	Min	Mean	SD	%Freq	Median
WEGR	0	586	0	1	587	586	1	293.5	413.7	50.0	293.5
#COR	0	8	0	2	10	8	2	5.0	4.2	50.0	5.0
DCCO	0	8	0	0	8	8	8	8.0	-	25.0	8.0
PECO	0	0	0	2	2	2	2	2.0	-	25.0	2.0
#HER	6	4	2	1	13	6	1	3.3	2.2	100.0	3.0
GBHE	6	4	2	1	13	6	1	3.3	2.2	100.0	3.0
#SWA	4	4	0	0	8	4	4	4.0	-	50.0	4.0
TRUS	4	4	0	0	8	4	4	4.0	-	50.0	4.0
#GEE	4	649	444	19	1116	649	4	279.0	320.1	100.0	231.5
BRAN	4	649	444	19	1116	649	4	279.0	320.1	100.0	231.5
#DAB	67	6	23	0	96	67	6	32.0	31.5	75.0	23.0
GWTE	5	5	0	0	10	5	5	5.0	-	50.0	5.0
MALL	2	1	10	0	13	10	1	4.3	4.9	75.0	2.0
AMWI	60	0	13	0	73	60	13	36.5	33.2	50.0	36.5
#DIV	324	6398	910	366	7998	6398	324	1999.5	2944.5	100.0	638.0
GRSC	0	450	0	0	450	450	450	450.0	-	25.0	450.0
HADU	17	0	19	85	121	85	17	40.3	38.7	75.0	19.0
OLDS	5	1290	15	0	1310	1290	5	436.7	739.0	75.0	15.0
SCOT	172	4040	150	207	4569	4040	150	1142.3	1932.0	100.0	189.5
BLSC	0	0	176	47	223	176	47	111.5	91.2	50.0	111.5
SUSC	0	0	466	13	479	466	13	239.5	320.3	50.0	239.5
WWSC	0	0	30	10	40	30	10	20.0	14.1	50.0	20.0
COGO	29	502	30	0	561	502	29	187.0	272.8	75.0	30.0
BUFF	45	50	13	0	108	50	13	36.0	20.1	75.0	45.0
COME	56	53	9	4	122	56	4	30.5	27.8	100.0	31.0
RBME	0	13	2	0	15	13	2	7.5	7.8	50.0	7.5
#RAP	3	0	2	0	5	3	2	2.5	0.7	50.0	2.5
BAEA	3	0	2	0	5	3	2	2.5	0.7	50.0	2.5
RNPH	6	5	1	0	12	6	1	4.0	2.6	75.0	5.0
#SHO	55	3	77	29	164	77	3	41.0	32.0	100.0	42.0
KILL	13	2	5	7	27	13	2	6.8	4.6	100.0	6.0
SPSA	0	0	1	0	1	1	1	1.0	-	25.0	1.0
BLTU	30	0	71	0	101	71	30	50.5	29.0	50.0	50.5
SAND	5	0	0	0	5	5	5	5.0	-	25.0	5.0
COSN	7	1	0	0	8	7	1	4.0	4.2	50.0	4.0
SHOR	0	0	0	22	22	22	22	22.0	-	25.0	22.0
#GUL	821	6040	92	32	6985	6040	32	1746.3	2884.9	100.0	456.5
GULL	316	6040	13	20	6389	6040	13	1597.3	2965.2	100.0	168.0
BOGU	0	0	69	2	71	69	2	35.5	47.4	50.0	35.5
MEGU	247	0	1	2	250	247	1	83.3	141.7	75.0	2.0
GWGU	258	0	9	8	275	258	8	91.7	144.0	75.0	9.0
#ALC	0	6	1	0	7	6	1	3.5	3.5	50.0	3.5
PIGU	0	6	1	0	7	6	1	3.5	3.5	50.0	3.5
RUHU	0	0	4	4	8	4	4	4.0	-	50.0	4.0
BEKI	1	0	1	1	3	1	1	1.0	-	75.0	1.0
#WOO	1	1	2	0	4	2	1	1.3	0.6	75.0	1.0
NOFL	1	1	2	0	4	2	1	1.3	0.6	75.0	1.0
#PAS	253	122	149	42	566	253	42	141.5	87.1	100.0	135.5
TRSW	0	0	0	1	1	1	1	1.0	-	25.0	1.0
VGSW	0	0	4	3	7	4	3	3.5	0.7	50.0	3.5
NRWS	0	0	4	1	5	4	1	2.5	2.1	50.0	2.5

Bird surveys of Little Qualicum River estuary for Spring 1978 (continued)

Date	01Mar	20Mar	26Apr	05May	Total	Max	Min	Mean	SD	%Freq	Median
BASW	0	0	4	5	9	5	4	4.5	0.7	50.0	4.5
NOCR	55	45	28	8	136	55	8	34.0	20.6	100.0	36.5
CORA	4	0	6	7	17	7	4	5.7	1.5	75.0	6.0
BRCR	0	3	0	0	3	3	3	3.0	-	25.0	3.0
BEWR	2	1	0	0	3	2	1	1.5	0.7	50.0	1.5
WIWR	2	4	2	0	8	4	2	2.7	1.2	75.0	2.0
GCKI	1	0	0	0	1	1	1	1.0	-	25.0	1.0
RCKI	1	0	0	0	1	1	1	1.0	-	25.0	1.0
AMRO	44	15	4	1	64	44	1	16.0	19.6	100.0	9.5
AMPI	0	0	50	0	50	50	50	50.0	-	25.0	50.0
NOSH	0	1	0	0	1	1	1	1.0	-	25.0	1.0
EUST	90	30	7	0	127	90	7	42.3	42.9	75.0	30.0
OCWA	0	0	0	2	2	2	2	2.0	-	25.0	2.0
YEWA	0	0	0	1	1	1	1	1.0	-	25.0	1.0
YRWA	0	0	1	0	1	1	1	1.0	-	25.0	1.0
TOWA	0	0	0	1	1	1	1	1.0	-	25.0	1.0
RSTO	2	1	2	0	5	2	1	1.7	0.6	75.0	2.0
SAVS	0	0	15	5	20	15	5	10.0	7.1	50.0	10.0
SOSP	6	8	3	0	17	8	3	5.7	2.5	75.0	6.0
GCSP	0	0	1	0	1	1	1	1.0	-	25.0	1.0
WCSP	1	1	4	3	9	4	1	2.3	1.5	100.0	2.0
DEJU	20	0	0	0	20	20	20	20.0	-	25.0	20.0
RWBL	25	6	11	0	42	25	6	14.0	9.8	75.0	11.0
BRBL	0	4	0	0	4	4	4	4.0	-	25.0	4.0
BHCO	0	0	2	0	2	2	2	2.0	-	25.0	2.0
HOFI	0	0	0	2	2	2	2	2.0	-	25.0	2.0
PISI	0	0	0	2	2	2	2	2.0	-	25.0	2.0
EVGR	0	0	1	0	1	1	1	1.0	-	25.0	1.0
HOSP	0	3	0	0	3	3	3	3.0	-	25.0	3.0
#TOT	1548	14108	1726	503	17885	14108	503	4471.3	6447.1	100.0	1637.0

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Bird surveys of Little Qualicum River estuary for Summer 1978

Date	06Jun	19Jun	17Jul	Total	Max	Min	Mean	SD	%Freq	Median
#LOO	2	0	1	3	2	1	1.5	0.7	66.7	1.5
RTLO	1	0	0	1	1	1	1.0	-	33.3	1.0
COLO	1	0	1	2	1	1	1.0	-	66.7	1.0
#HER	4	0	1	5	4	1	2.5	2.1	66.7	2.5
GBHE	4	0	1	5	4	1	2.5	2.1	66.7	2.5
#DAB	4	0	0	4	4	4	4.0	-	33.3	4.0
MALL	4	0	0	4	4	4	4.0	-	33.3	4.0
#DIV	72	0	5	77	72	5	38.5	47.4	66.7	38.5
HADU	42	0	0	42	42	42	42.0	-	33.3	42.0
SCOT	14	0	1	15	14	1	7.5	9.2	66.7	7.5
SUSC	12	0	0	12	12	12	12.0	-	33.3	12.0
COME	4	0	4	8	4	4	4.0	-	66.7	4.0
#RAP	1	1	1	3	1	1	1.0	-	100.0	1.0
TUVU	0	1	0	1	1	1	1.0	-	33.3	1.0
BAEA	1	0	0	1	1	1	1.0	-	33.3	1.0
MERL	0	0	1	1	1	1	1.0	-	33.3	1.0
RNPH	4	3	1	8	4	1	2.7	1.5	100.0	3.0

Bird surveys of Little Qualicum River estuary for Summer 1978 (continued)

Date	06Jun	19Jun	17Jul	Total	Max	Min	Mean	SD	%Freq	Median
#SHO	4	0	19	23	19	4	11.5	10.6	66.7	11.5
KILL	2	0	4	6	4	2	3.0	1.4	66.7	3.0
SPSA	0	0	2	2	2	2	2.0	-	33.3	2.0
WESA	1	0	0	1	1	1	1.0	-	33.3	1.0
LESA	1	0	0	1	1	1	1.0	-	33.3	1.0
SBDO	0	0	1	1	1	1	1.0	-	33.3	1.0
SHOR	0	0	12	12	12	12	12.0	-	33.3	12.0
#GUL	112	0	39	151	112	39	75.5	51.6	66.7	75.5
GULL	103	0	20	123	103	20	61.5	58.7	66.7	61.5
BOGU	0	0	1	1	1	1	1.0	-	33.3	1.0
MEGU	0	0	1	1	1	1	1.0	-	33.3	1.0
GWGU	9	0	17	26	17	9	13.0	5.7	66.7	13.0
#ALC	3	0	2	5	3	2	2.5	0.7	66.7	2.5
PIGU	3	0	0	3	3	3	3.0	-	33.3	3.0
MAMU	0	0	2	2	2	2	2.0	-	33.3	2.0
BTPI	0	11	0	11	11	11	11.0	-	33.3	11.0
CONI	11	0	1	12	11	1	6.0	7.1	66.7	6.0
BLSW	16	0	0	16	16	16	16.0	-	33.3	16.0
RUHU	4	1	1	6	4	1	2.0	1.7	100.0	1.0
BEKI	1	1	2	4	2	1	1.3	0.6	100.0	1.0
#WOO	1	5	0	6	5	1	3.0	2.8	66.7	3.0
DOWO	0	1	0	1	1	1	1.0	-	33.3	1.0
NOFL	1	4	0	5	4	1	2.5	2.1	66.7	2.5
#PAS	127	207	67	401	207	67	133.7	70.2	100.0	127.0
FLYC	4	0	0	4	4	4	4.0	-	33.3	4.0
WIFL	0	1	0	1	1	1	1.0	-	33.3	1.0
PSFL	0	4	3	7	4	3	3.5	0.7	66.7	3.5
VGSW	1	0	0	1	1	1	1.0	-	33.3	1.0
NRWS	1	0	0	1	1	1	1.0	-	33.3	1.0
BASW	5	5	12	22	12	5	7.3	4.0	100.0	5.0
NOCR	12	4	14	30	14	4	10.0	5.3	100.0	12.0
CBCH	0	3	0	3	3	3	3.0	-	33.3	3.0
BRCR	0	2	1	3	2	1	1.5	0.7	66.7	1.5
BEWR	0	2	0	2	2	2	2.0	-	33.3	2.0
WIWR	4	1	3	8	4	1	2.7	1.5	100.0	3.0
GCKI	0	3	0	3	3	3	3.0	-	33.3	3.0
SWTH	0	3	1	4	3	1	2.0	1.4	66.7	2.0
AMRO	12	10	7	29	12	7	9.7	2.5	100.0	10.0
CEWA	1	7	2	10	7	1	3.3	3.2	100.0	2.0
EUST	53	120	1	174	120	1	58.0	59.7	100.0	53.0
OCWA	0	1	0	1	1	1	1.0	-	33.3	1.0
YEWA	0	2	0	2	2	2	2.0	-	33.3	2.0
YRWA	2	0	0	2	2	2	2.0	-	33.3	2.0
TOWA	0	1	0	1	1	1	1.0	-	33.3	1.0
WIWA	0	3	0	3	3	3	3.0	-	33.3	3.0
RSTO	0	3	0	3	3	3	3.0	-	33.3	3.0
SAVS	1	0	0	1	1	1	1.0	-	33.3	1.0
SOSP	8	3	1	12	8	1	4.0	3.6	100.0	3.0
RWBL	14	11	11	36	14	11	12.0	1.7	100.0	11.0
BRBL	0	6	11	17	11	6	8.5	3.5	66.7	8.5
PUFI	2	0	0	2	2	2	2.0	-	33.3	2.0

Bird surveys of Little Qualicum River estuary for Summer 1978 (continued)

Date	06Jun	19Jun	17Jul	Total	Max	Min	Mean	SD	%Freq	Median
HOFI	0	1	0	1	1	1	1.0	-	33.3	1.0
RECR	0	3	0	3	3	3	3.0	-	33.3	3.0
PISI	1	0	0	1	1	1	1.0	-	33.3	1.0
AMGO	6	8	0	14	8	6	7.0	1.4	66.7	7.0
#TOT	366	229	140	735	366	140	245.0	113.8	100.0	229.0

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Bird surveys of Little Qualicum River estuary for Autumn 1978

Date	06Oct	23Oct	14Nov	23Nov	Total	Max	Min	Mean	SD	%Freq	Median
#LOO	0	0	11	23	34	23	11	17.0	8.5	50.0	17.0
PALO	0	0	0	5	5	5	5	5.0	-	25.0	5.0
COLO	0	0	11	18	29	18	11	14.5	4.9	50.0	14.5
#GRE	0	6	7	24	37	24	6	12.3	10.1	75.0	7.0
HOGR	0	0	4	21	25	21	4	12.5	12.0	50.0	12.5
RNGR	0	1	2	3	6	3	1	2.0	1.0	75.0	2.0
WEGR	0	5	1	0	6	5	1	3.0	2.8	50.0	3.0
#COR	0	0	0	2	2	2	2	2.0	-	25.0	2.0
PECO	0	0	0	2	2	2	2	2.0	-	25.0	2.0
#HER	0	2	0	0	2	2	2	2.0	-	25.0	2.0
GBHE	0	2	0	0	2	2	2	2.0	-	25.0	2.0
#SWA	0	0	7	10	17	10	7	8.5	2.1	50.0	8.5
TRUS	0	0	7	10	17	10	7	8.5	2.1	50.0	8.5
#GEE	0	1	0	0	1	1	1	1.0	-	25.0	1.0
CAGO	0	1	0	0	1	1	1	1.0	-	25.0	1.0
#DAB	0	927	821	611	2359	927	611	786.3	160.8	75.0	821.0
DABL	0	0	140	0	140	140	140	140.0	-	25.0	140.0
GWTE	0	23	16	0	39	23	16	19.5	4.9	50.0	19.5
MALL	0	274	487	423	1184	487	274	394.7	109.3	75.0	423.0
NOPI	0	20	2	6	28	20	2	9.3	9.5	75.0	6.0
EUWI	0	0	1	0	1	1	1	1.0	-	25.0	1.0
AMWI	0	610	175	182	967	610	175	322.3	249.2	75.0	182.0
#DIV	393	84	476	477	1430	477	84	357.5	186.5	100.0	434.5
GRSC	0	1	8	30	39	30	1	13.0	15.1	75.0	8.0
HADU	10	13	0	19	42	19	10	14.0	4.6	75.0	13.0
OLDS	0	0	2	12	14	12	2	7.0	7.1	50.0	7.0
SCOT	381	25	222	85	713	381	25	178.3	158.3	100.0	153.5
BLSC	0	5	22	45	72	45	5	24.0	20.1	75.0	22.0
SUSC	0	11	2	30	43	30	2	14.3	14.3	75.0	11.0
WWSC	0	13	26	66	105	66	13	35.0	27.6	75.0	26.0
COGO	1	0	101	103	205	103	1	68.3	58.3	75.0	101.0
BUFF	0	2	82	64	148	82	2	49.3	42.0	75.0	64.0
HOME	0	2	3	0	5	3	2	2.5	0.7	50.0	2.5
COME	1	6	5	18	30	18	1	7.5	7.3	100.0	5.5
RBME	0	6	3	5	14	6	3	4.7	1.5	75.0	5.0
#RAP	0	1	1	1	3	1	1	1.0	-	75.0	1.0
BAEA	0	1	1	0	2	1	1	1.0	-	50.0	1.0
RTHA	0	0	0	1	1	1	1	1.0	-	25.0	1.0
RNPH	0	3	5	0	8	5	3	4.0	1.4	50.0	4.0
#RAI	0	0	0	7	7	7	7	7.0	-	25.0	7.0
VIRA	0	0	0	7	7	7	7	7.0	-	25.0	7.0

Bird surveys of Little Qualicum River estuary for Autumn 1978 (continued)

Date	06Oct	23Oct	14Nov	23Nov	Total	Max	Min	Mean	SD	%Freq	Median
#SHO	7	34	11	9	61	34	7	15.3	12.6	100.0	10.0
SEPL	0	4	0	0	4	4	4	4.0	-	25.0	4.0
KILL	6	0	2	0	8	6	2	4.0	2.8	50.0	4.0
GRYE	0	2	0	0	2	2	2	2.0	-	25.0	2.0
BLTU	0	0	0	9	9	9	9	9.0	-	25.0	9.0
SAND	0	0	3	0	3	3	3	3.0	-	25.0	3.0
DUNL	0	0	6	0	6	6	6	6.0	-	25.0	6.0
DOWI	0	25	0	0	25	25	25	25.0	-	25.0	25.0
COSN	1	3	0	0	4	3	1	2.0	1.4	50.0	2.0
#GUL	70	72	441	302	885	441	70	221.3	182.5	100.0	187.0
GULL	20	0	225	0	245	225	20	122.5	145.0	50.0	122.5
BOGU	50	32	0	1	83	50	1	27.7	24.8	75.0	32.0
MEGU	0	10	50	3	63	50	3	21.0	25.4	75.0	10.0
THGU	0	0	0	1	1	1	1	1.0	-	25.0	1.0
GWGU	0	30	166	297	493	297	30	164.3	133.5	75.0	166.0
#ALC	1	2	0	1	4	2	1	1.3	0.6	75.0	1.0
PIGU	1	2	0	0	3	2	1	1.5	0.7	50.0	1.5
MAMU	0	0	0	1	1	1	1	1.0	-	25.0	1.0
BEKI	1	3	2	0	6	3	1	2.0	1.0	75.0	2.0
#WOO	1	0	0	1	2	1	1	1.0	-	50.0	1.0
HAWO	0	0	0	1	1	1	1	1.0	-	25.0	1.0
NOFL	1	0	0	0	1	1	1	1.0	-	25.0	1.0
#PAS	134	185	71	117	507	185	71	126.8	47.1	100.0	125.5
STJA	1	0	0	0	1	1	1	1.0	-	25.0	1.0
NOCR	40	22	32	57	151	57	22	37.8	14.8	100.0	36.0
CORA	0	37	0	0	37	37	37	37.0	-	25.0	37.0
CBCH	0	1	0	0	1	1	1	1.0	-	25.0	1.0
BRCR	0	1	0	0	1	1	1	1.0	-	25.0	1.0
BEWR	0	2	0	0	2	2	2	2.0	-	25.0	2.0
WIWR	0	4	0	0	4	4	4	4.0	-	25.0	4.0
MAWR	1	3	1	2	7	3	1	1.8	1.0	100.0	1.5
GCKI	0	12	0	0	12	12	12	12.0	-	25.0	12.0
RCKI	0	7	1	0	8	7	1	4.0	4.2	50.0	4.0
AMRO	0	66	0	0	66	66	66	66.0	-	25.0	66.0
AMPI	1	0	0	0	1	1	1	1.0	-	25.0	1.0
EUST	70	1	24	0	95	70	1	31.7	35.1	75.0	24.0
RSTO	2	4	2	0	8	4	2	2.7	1.2	75.0	2.0
SAVS	9	1	0	0	10	9	1	5.0	5.7	50.0	5.0
FOSP	1	1	2	0	4	2	1	1.3	0.6	75.0	1.0
SOSP	3	4	3	1	11	4	1	2.8	1.3	100.0	3.0
GCSP	3	0	1	0	4	3	1	2.0	1.4	50.0	2.0
WCSP	1	0	0	0	1	1	1	1.0	-	25.0	1.0
DEJU	0	12	0	0	12	12	12	12.0	-	25.0	12.0
WEME	0	2	0	2	4	2	2	2.0	-	50.0	2.0
BRBL	2	0	0	0	2	2	2	2.0	-	25.0	2.0
PIGR	0	3	0	0	3	3	3	3.0	-	25.0	3.0
HOFI	0	0	5	35	40	35	5	20.0	21.2	50.0	20.0
RECR	0	2	0	0	2	2	2	2.0	-	25.0	2.0
PISI	0	0	0	20	20	20	20	20.0	-	25.0	20.0
#TOT	607	1320	1853	1585	5365	1853	607	1341.3	535.7	100.0	1452.5

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Bird surveys of Little Qualicum River estuary for Winter 1978-1979

Date	13Dec	29Dec	25Jan	01Feb	Total	Max	Min	Mean	SD	%Freq	Median
#LOO	7	5	0	8	20	8	5	6.7	1.5	75.0	7.0
COLO	7	5	0	8	20	8	5	6.7	1.5	75.0	7.0
#GRE	5	5	0	2	12	5	2	4.0	1.7	75.0	5.0
HOGR	3	3	0	2	8	3	2	2.7	0.6	75.0	3.0
RNGR	2	2	0	0	4	2	2	2.0	-	50.0	2.0
#COR	1	0	0	1	2	1	1	1.0	-	50.0	1.0
PECO	1	0	0	1	2	1	1	1.0	-	50.0	1.0
#HER	3	1	0	0	4	3	1	2.0	1.4	50.0	2.0
GBHE	3	1	0	0	4	3	1	2.0	1.4	50.0	2.0
#SWA	5	6	14	14	39	14	5	9.8	4.9	100.0	10.0
TRUS	5	6	14	14	39	14	5	9.8	4.9	100.0	10.0
#GEE	0	0	2	2	4	2	2	2.0	-	50.0	2.0
CAGO	0	0	2	2	4	2	2	2.0	-	50.0	2.0
#DAB	919	1113	524	257	2813	1113	257	703.3	385.4	100.0	721.5
GWTE	42	26	19	30	117	42	19	29.3	9.6	100.0	28.0
MALL	640	833	287	195	1955	833	195	488.8	299.1	100.0	463.5
NOPI	1	12	8	0	21	12	1	7.0	5.6	75.0	8.0
EUWI	1	1	0	0	2	1	1	1.0	-	50.0	1.0
AMWI	235	241	210	32	718	241	32	179.5	99.2	100.0	222.5
#DIV	599	327	96	333	1355	599	96	338.8	205.6	100.0	330.0
RNDU	1	1	0	0	2	1	1	1.0	-	50.0	1.0
GRSC	18	23	0	24	65	24	18	21.7	3.2	75.0	23.0
HADU	19	29	0	10	58	29	10	19.3	9.5	75.0	19.0
OLDS	1	2	0	3	6	3	1	2.0	1.0	75.0	2.0
SCOT	116	98	40	32	286	116	32	71.5	41.8	100.0	69.0
BLSC	24	25	5	11	65	25	5	16.3	9.8	100.0	17.5
SUSC	19	12	0	30	61	30	12	20.3	9.1	75.0	19.0
WWSC	30	20	0	29	79	30	20	26.3	5.5	75.0	29.0
COGO	52	27	36	56	171	56	27	42.8	13.6	100.0	44.0
BAGO	1	0	0	0	1	1	1	1.0	-	25.0	1.0
BUFF	48	79	5	56	188	79	5	47.0	30.9	100.0	52.0
HOME	3	0	0	1	4	3	1	2.0	1.4	50.0	2.0
COME	267	10	10	79	366	267	10	91.5	121.4	100.0	44.5
RUDU	0	1	0	2	3	2	1	1.5	0.7	50.0	1.5
#RAP	96	41	21	6	164	96	6	41.0	39.4	100.0	31.0
BAEA	96	40	21	6	163	96	6	40.8	39.4	100.0	30.5
SSHA	0	1	0	0	1	1	1	1.0	-	25.0	1.0
RNPH	2	2	0	2	6	2	2	2.0	-	75.0	2.0
#RAI	1	0	0	0	1	1	1	1.0	-	25.0	1.0
VIRA	1	0	0	0	1	1	1	1.0	-	25.0	1.0
#SHO	16	9	2	1	28	16	1	7.0	7.0	100.0	5.5
KILL	7	3	2	1	13	7	1	3.3	2.6	100.0	2.5
BLTU	6	3	0	0	9	6	3	4.5	2.1	50.0	4.5
SAND	0	3	0	0	3	3	3	3.0	-	25.0	3.0
SBDO	2	0	0	0	2	2	2	2.0	-	25.0	2.0
COSN	1	0	0	0	1	1	1	1.0	-	25.0	1.0
#GUL	826	343	80	192	1441	826	80	360.3	328.7	100.0	267.5
GULL	200	0	80	0	280	200	80	140.0	84.9	50.0	140.0
BOGU	340	0	0	0	340	340	340	340.0	-	25.0	340.0
MEGU	85	4	0	9	98	85	4	32.7	45.4	75.0	9.0
THGU	2	2	0	0	4	2	2	2.0	-	50.0	2.0

Bird surveys of Little Qualicum River estuary for Winter 1978-1979 (continued)

Date	13Dec	29Dec	25Jan	01Feb	Total	Max	Min	Mean	SD	%Freq	Median
GWGU	199	337	0	183	719	337	183	239.7	84.7	75.0	199.0
BEKI	2	1	1	0	4	2	1	1.3	0.6	75.0	1.0
#WOO	1	0	0	0	1	1	1	1.0	-	25.0	1.0
NOFL	1	0	0	0	1	1	1	1.0	-	25.0	1.0
#PAS	189	105	198	37	529	198	37	132.3	76.1	100.0	147.0
STJA	0	0	1	0	1	1	1	1.0	-	25.0	1.0
NOCR	13	47	33	0	93	47	13	31.0	17.1	75.0	33.0
CORA	0	0	1	0	1	1	1	1.0	-	25.0	1.0
BEWR	1	0	2	1	4	2	1	1.3	0.6	75.0	1.0
MAWR	2	0	0	0	2	2	2	2.0	-	25.0	2.0
RCKI	1	0	0	0	1	1	1	1.0	-	25.0	1.0
AMRO	0	0	0	4	4	4	4	4.0	-	25.0	4.0
VATH	0	0	0	1	1	1	1	1.0	-	25.0	1.0
EUST	52	0	53	0	105	53	52	52.5	0.7	50.0	52.5
RSTO	6	7	10	4	27	10	4	6.8	2.5	100.0	6.5
ATSP	0	0	1	1	2	1	1	1.0	-	50.0	1.0
SOSP	1	2	7	1	11	7	1	2.8	2.9	100.0	1.5
GCSP	0	4	12	0	16	12	4	8.0	5.7	50.0	8.0
WCSP	0	3	8	0	11	8	3	5.5	3.5	50.0	5.5
DEJU	30	20	20	22	92	30	20	23.0	4.8	100.0	21.0
WEME	1	2	2	0	5	2	1	1.7	0.6	75.0	2.0
PUFI	1	0	0	0	1	1	1	1.0	-	25.0	1.0
HOFI	1	20	33	3	57	33	1	14.3	15.1	100.0	11.5
PISI	80	0	15	0	95	80	15	47.5	46.0	50.0	47.5
#TOT	2672	1958	938	855	6423	2672	855	1605.8	870.0	100.0	1448.0

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Bird surveys of Little Qualicum River estuary for Spring 1979

Date	15Mar	22Mar	27Apr	14May	25May	Total	Max	Min	Mean	SD	%Freq	Median
#LOO	2	3	2	1	0	8	3	1	2.0	0.8	80.0	2.0
COLO	2	3	2	1	0	8	3	1	2.0	0.8	80.0	2.0
#GRE	0	289	7	3	0	299	289	3	99.7	164.0	60.0	7.0
HOGR	0	3	3	1	0	7	3	1	2.3	1.2	60.0	3.0
RNGR	0	0	0	2	0	2	2	2	2.0	-	20.0	2.0
WEGR	0	286	4	0	0	290	286	4	145.0	199.4	40.0	145.0
#HER	2	4	1	2	0	9	4	1	2.3	1.3	80.0	2.0
GBHE	2	4	1	2	0	9	4	1	2.3	1.3	80.0	2.0
#SWA	0	1	0	0	0	1	1	1	1.0	-	20.0	1.0
TRUS	0	1	0	0	0	1	1	1	1.0	-	20.0	1.0
#GEE	173	513	375	0	0	1061	513	173	353.7	171.0	60.0	375.0
BRAN	173	513	375	0	0	1061	513	173	353.7	171.0	60.0	375.0
#DAB	33	139	64	7	2	245	139	2	49.0	56.0	100.0	33.0
GWTE	15	37	6	0	0	58	37	6	19.3	15.9	60.0	15.0
MALL	15	2	3	7	2	29	15	2	5.8	5.5	100.0	3.0
AMWI	3	100	55	0	0	158	100	3	52.7	48.5	60.0	55.0
#DIV	7214	8764	738	95	0	16811	8764	95	4202.8	4425.3	80.0	3976.0
GRSC	360	0	0	0	0	360	360	360	360.0	-	20.0	360.0
HADU	0	0	9	4	0	13	9	4	6.5	3.5	40.0	6.5
OLDS	2800	3230	1	0	0	6031	3230	1	2010.3	1753.4	60.0	2800.0
SCOT	2413	5050	707	87	0	8257	5050	87	2064.3	2220.2	80.0	1560.0
SUSC	0	9	0	0	0	9	9	9	9.0	-	20.0	9.0

Bird surveys of Little Qualicum River estuary for Spring 1979 (continued)

Date	15Mar	22Mar	27Apr	14May	25May	Total	Max	Min	Mean	SD	%Freq	Median
COGO	1611	310	0	0	0	1921	1611	310	960.5	919.9	40.0	960.5
BUFF	5	150	11	0	0	166	150	5	55.3	82.0	60.0	11.0
COME	22	15	6	4	0	47	22	4	11.8	8.3	80.0	10.5
RBME	3	0	4	0	0	7	4	3	3.5	0.7	40.0	3.5
#RAP	4	2	0	0	1	7	4	1	2.3	1.5	60.0	2.0
BAEA	4	2	0	0	1	7	4	1	2.3	1.5	60.0	2.0
RNPH	0	0	2	0	1	3	2	1	1.5	0.7	40.0	1.5
#SHO	4	10	159	13	0	186	159	4	46.5	75.1	80.0	11.5
KILL	4	1	3	3	0	11	4	1	2.8	1.3	80.0	3.0
SPSA	0	0	0	2	0	2	2	2	2.0	-	20.0	2.0
BLTU	0	0	155	0	0	155	155	155	155.0	-	20.0	155.0
SAND	0	9	0	0	0	9	9	9	9.0	-	20.0	9.0
SHOR	0	0	1	8	0	9	8	1	4.5	4.9	40.0	4.5
#GUL	13036	7100	24	101	1	20262	13036	1	4052.4	5879.0	100.0	101.0
GULL	13036	7100	0	0	0	20136	13036	7100	10068.0	4197.4	40.0	10068.0
BOGU	0	0	15	45	0	60	45	15	30.0	21.2	40.0	30.0
MEGU	0	0	1	24	0	25	24	1	12.5	16.3	40.0	12.5
GWGU	0	0	8	32	1	41	32	1	13.7	16.3	60.0	8.0
#ALC	0	3	13	0	0	16	13	3	8.0	7.1	40.0	8.0
COMU	0	2	0	0	0	2	2	2	2.0	-	20.0	2.0
PIGU	0	1	3	0	0	4	3	1	2.0	1.4	40.0	2.0
MAMU	0	0	10	0	0	10	10	10	10.0	-	20.0	10.0
RODO	3	0	0	0	0	3	3	3	3.0	-	20.0	3.0
BTPI	0	0	0	1	0	1	1	1	1.0	-	20.0	1.0
RUHU	0	0	3	0	3	6	3	3	3.0	-	40.0	3.0
BEKI	0	1	0	0	2	3	2	1	1.5	0.7	40.0	1.5
#WOO	1	0	1	0	1	3	1	1	1.0	-	60.0	1.0
DOWO	0	0	1	0	0	1	1	1	1.0	-	20.0	1.0
NOFL	1	0	0	0	1	2	1	1	1.0	-	40.0	1.0
#PAS	116	4	128	30	103	381	128	4	76.2	55.5	100.0	103.0
WIFL	0	0	0	0	2	2	2	2	2.0	-	20.0	2.0
PSFL	0	0	2	0	7	9	7	2	4.5	3.5	40.0	4.5
VGSW	0	2	0	4	11	17	11	2	5.7	4.7	60.0	4.0
CLSW	0	0	1	0	0	1	1	1	1.0	-	20.0	1.0
BASW	0	0	7	6	10	23	10	6	7.7	2.1	60.0	7.0
STJA	1	0	0	0	0	1	1	1	1.0	-	20.0	1.0
NOCR	36	0	23	3	3	65	36	3	16.3	16.2	80.0	13.0
CORA	1	0	0	1	0	2	1	1	1.0	-	40.0	1.0
CBCH	0	0	0	0	1	1	1	1	1.0	-	20.0	1.0
BRCR	0	0	1	0	1	2	1	1	1.0	-	40.0	1.0
BEWR	2	0	4	0	3	9	4	2	3.0	1.0	60.0	3.0
WIWR	1	0	2	0	4	7	4	1	2.3	1.5	60.0	2.0
GCKI	0	0	1	0	1	2	1	1	1.0	-	40.0	1.0
SWTH	0	0	0	0	4	4	4	4	4.0	-	20.0	4.0
AMRO	40	1	15	0	9	65	40	1	16.3	16.8	80.0	12.0
VATH	0	0	2	0	0	2	2	2	2.0	-	20.0	2.0
AMPI	0	0	0	1	0	1	1	1	1.0	-	20.0	1.0
CEWA	0	0	0	0	2	2	2	2	2.0	-	20.0	2.0
EUST	4	0	0	2	0	6	4	2	3.0	1.4	40.0	3.0
OCWA	0	0	1	1	1	3	1	1	1.0	-	60.0	1.0
YEWA	0	0	1	0	6	7	6	1	3.5	3.5	40.0	3.5

Bird surveys of Little Qualicum River estuary for Spring 1979 (continued)

Date	15Mar	22Mar	27Apr	14May	25May	Total	Max	Min	Mean	SD	%Freq	Median
TOWA	0	0	3	0	4	7	4	3	3.5	0.7	40.0	3.5
WIWA	0	0	0	3	5	8	5	3	4.0	1.4	40.0	4.0
RSTO	1	0	4	1	1	7	4	1	1.8	1.5	80.0	1.0
SAVS	0	0	8	0	1	9	8	1	4.5	4.9	40.0	4.5
SOSP	1	1	7	1	9	19	9	1	3.8	3.9	100.0	1.0
LISP	0	0	1	0	0	1	1	1	1.0	-	20.0	1.0
GCSP	0	0	4	0	0	4	4	4	4.0	-	20.0	4.0
WCSP	0	0	4	1	1	6	4	1	2.0	1.7	60.0	1.0
DEJU	4	0	0	0	0	4	4	4	4.0	-	20.0	4.0
RWBL	24	0	6	1	11	42	24	1	10.5	9.9	80.0	8.5
BRBL	0	0	0	0	1	1	1	1	1.0	-	20.0	1.0
BHCO	0	0	27	0	1	28	27	1	14.0	18.4	40.0	14.0
PUFI	0	0	0	0	2	2	2	2	2.0	-	20.0	2.0
HOFI	0	0	3	0	2	5	3	2	2.5	0.7	40.0	2.5
RECR	0	0	1	0	0	1	1	1	1.0	-	20.0	1.0
AMGO	0	0	0	4	0	4	4	4	4.0	-	20.0	4.0
EVGR	1	0	0	0	0	1	1	1	1.0	-	20.0	1.0
HOSP	0	0	0	1	0	1	1	1	1.0	-	20.0	1.0
#TOT	20588	16833	1517	253	114	39305	20588	114	7861.0	10007.7	100.0	1517.0

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