BIRD USE OF THE ENGLISHMAN RIVER ESTUARY VANCOUVER ISLAND, BRITISH COLUMBIA 1979-1980 AND 1988-1989

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Abstract

Following the breaching of a dyke on the Englishman River estuary in 1979, surveys were begun to determine the distribution and abundance of birds using the estuary. The first surveys took place weekly from 17 June 1979 through 29 June 1980. A second survey was begun because of the controversy over a proposed development on the estuary in 1988. The surveys were conducted at least twice monthly from 3 November 1988 through 24 May 1989. After a large portion of the estuary was purchased in the autumn of 1992 by the Pacific Estuary Conservation Program, a preliminary investigation was also conducted into the passerine use of the upland and forested habitats on the estuary from 8 July 1993 through 27 August 1993.

We found 113 species of birds using the Englishman River estuary during the 1979-1980 and the 1988-1989 study periods; an additional 49 species were added to the avifauna from other sources.

The estuary supported a minimum of over 33,000 birds in 1979-1980; in 1988-1989, a minimum of over 8,000 birds depended on the estuary for at least some stage in their life history. The large number in 1979-1980, was due to a major herring spawn that attracted over 25,000 gulls to the area in the spring of 1980. With the gull figure removed, the reduced total of over 8,000 birds is similar to the 1988-1989 total.

During the 1988-1989 study period, 9 habitat groups were defined. The intertidal zone and river mouth had the highest use (about 39% of all birds), followed by the north-central river and marsh (20%) and the north and west channels (14%).

Spring bird use of the Englishman River estuary in 1980 and 1989 was dominated by gulls and waterfowl. The gull proportion in 1980 was especially high as a result of a major herring spawn in the area. Brant made more use of the foreshore areas off the river mouth in 1980 than they did in 1989.

Bird use of the estuary during the late summer of 1979 and the early summer of 1980 was dominated by passerines followed by gulls and waterfowl. In late summer, the early shorebird migrants appear as a large proportion of the birds seen during that time.

During the autumn of 1979 and 1988 bird use of the estuary was once again dominated by gulls and waterfowl. Shorebird proportions were up in 1988 from those in 1979.

Winter bird use for the 1979-1980 and 1988-1989 periods was again dominated by waterfowl and gulls. Shorebird proportions continued to be higher in the winter of 1988-1989 than in the winter of 1979-1980.

An annotated species list discusses arrival and departure dates, high numbers, and habitat use by the 162 species of birds that are known to use the estuary.

Concluding comments discuss possible solutions for minimizing impacts to birds using the estuary, particularly from direct disturbance, and suggest further studies of the avifauna that would complete the picture of bird use of the Englishman River estuary.

Résumé

Après la rupture d'une digue dans l'estuaire de la rivière Englishman en 1979, on a entrepris des relevés pour déterminer la distribution et l'abondance des oiseaux qui fréquentent l'estuaire. Les premiers relevés ont été effectués sur une base hebdomadaire entre le 17 juin 1979 et le 29 juin 1980. Une deuxième série de relevés a été entreprise en raison de la controverse suscitée par un projet de développement dans l'estuaire en 1988. Ces relevés ont été effectués au moins deux fois par mois, du 3 novembre 1988 au 24 mai 1989. Après l'achat d'une vaste portion de l'estuaire à l'automne de 1992 en vertu du Programme de conservation des estuaires du Pacifique, une première étude portant sur l'utilisation par les passereaux des hautes terres et des terrains boisés de l'estuaire a été faite entre le 8 juillet et le 27 août 1993.

Au cours des périodes d'étude de 1979-1980 et de 1988-1989, 113 espèces d'oiseaux au total ont utilisé l'estuaire de la rivière Englishman; 49 autres espèces ayant fréquenté la région en dehors de ces périodes ont été ajoutées à l'avifaune.

En 1979-1980, plus de 33 000 oiseaux au minimum ont fréquenté l'estuaire; en 1988-1989, plus de 8 000 oiseaux au minimum ont utilisé l'estuaire pendant au moins un stade de leur cycle de vie. La présence d'un grand nombre d'oiseaux en 1979-1980 était attribuable à l'abondance des harengs pendant la période de fraye, laquelle a attiré plus de 25 000 goélands dans la région au printemps de 1980. Si l'on fait abstraction des goélands, l'effectif total de plus de 8 000 oiseaux est semblable à celui de 1988-1989.

Pendant la période d'étude de 1988-1989, neuf groupes d'habitat ont été répertoriés. La zone intertidale et l'embouchure de la rivière étaient fort utilisées par près de 39 % des oiseaux; venaient ensuite la partie centre-nord de la rivière et les marais (20 %). Les chenaux nord et ouest ont également été très fréquentés (14 %).

Au printemps de 1980 et de 1989, l'estuaire de la rivière Englishman a surtout été fréquenté par les goélands et les oiseaux aquatiques. En 1980, la proportion des goélands était particulièrement élevée en raison de la présence d'un grand nombre de harengs en période de fraye. Cette année-là, les bruants ont utilisé davantage les estrans au large de l'embouchure de la rivière.

À la fin de l'été de 1979 et au début de l'été de 1980, les passereaux ont été les principaux oiseaux à fréquenter l'estuaire, suivis des goélands et des oiseaux aquatiques. À la fin de la saison estivale, les oiseaux de rivage migrateurs représentaient une forte proportion des oiseaux observés dans la région.

À l'automne de 1979 et de 1988, les goélands et les oiseaux aquatiques ont de nouveau fréquenté l'estuaire en plus grand nombre. Les oiseaux de rivage étaient plus nombreux en 1988 qu'en 1979.

En 1979-1980 et en 1988-1989, les oiseaux aquatiques et les goélands ont été les principaux oiseaux à fréquenter l'estuaire en hiver. La proportion des oiseaux de rivage a continué d'être plus élevée au cours de l'hiver 1988-1989.

Une liste annotée des espèces précise les dates d'arrivée et de départ des oiseaux, leur abondance et l'utilisation de l'habitat estuarien par 182 espèces d'oiseaux.

Dans la conclusion, on examine les solutions que l'on pourrait adopter pour réduire au minimum les impacts sur les oiseaux qui fréquentent l'estuaire, notamment ceux associés aux perturbations directes, et l'on propose que d'autres études de l'avifaune soient faites afin d'avoir une bonne idée de la fréquentation de l'estuaire de la rivière Englishman par les oiseaux.

Preface

The Englishman River estuary has, for many years, been recognized as important habitat to the well being of a diverse flora and fauna. Despite the considerable impacts that have been thrust upon this ecosystem, it still supports healthy wildlife populations. This report documents only one small part of the biodiversity that can be found on the estuary: the birds. But the importance of this ecosystem does not end with its wildlife.

The Englishman River estuary is, from a human standpoint as well, the most valuable natural asset within the City of Parksville. Fortunate indeed, is a community with an estuary proximate to its boundaries, let alone one adjacent to its downtown core. And fortunate for a number of reasons. First, we share the planet with a myriad of organisms. Here, amid one of the most productive of wildlife ecosystems, we have the opportunity to observe some of this amazing biodiversity that has fascinated and been a part of humankind for centuries. Second, it is quality of life. Material things can be enjoyed anywhere; but, people choose to live in Parksville and come to visit, partly because of the natural beauty of the area, of which the estuary and its green space are a part. Finally, it is our future. Here is a spot where we can return to our roots to spend a bit of time away from the hustle of our all-too-busy lives. In a world that has somehow forgotten that everything we have comes from nature, perhaps on a walk through the estuary, we'll remember.

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Acknowledgements

Michael Wolfe conducted the 1979-1980 surveys and Karen E. Dawe assisted with the 1988-1989 surveys.

Other contributors to this report are listed in Appendix I; we are grateful for their data.

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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, 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 interact on these systems and the productivity of these 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. For example, 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 orders 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 data).

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 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, 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 Englishman River estuary near Parksville, British Columbia over the periods 17 June 1979 through 29 June 1980 and 3 November 1988 through 24 May 1989.

Because of the high profile of this particular system, which resulted in the recent acquisition of most of the estuarine lands by the Pacific Estuary Conservation Program, we have gathered as much existing data on the bird use of this estuary that we could find and have included it 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 Englishman River estuary.

The Study Area

The Englishman River estuary (49°20' N, 124°17' W) is situated on the east coast of Vancouver Island near Parksville, 32 km north of Nanaimo, British Columbia (Figure 1). Mean temperatures (at Nanaimo, B.C.) vary between 3.3°C in January and 18.3°C in July and August. The area has a mean annual precipitation of 929.6 mm (Anonymous 1977). The mean annual discharge of the Englishman River is 14.8 m^3s^{-1}; peak flows occur in December (39.4 m^3s^{-1}), and low flows are during the growing season with the lowest flows in August (1.14 m^3s^{-1}). The river drains an area of 324 km^2 (Anonymous 1983). Channel and floodplain deposits consist largely of sand and gravel although they may be surfaced by silt, clay, or peat (Fyles 1963).

Kennedy (1982) and Dawe and McIntosh (1993) describe some of the estuarine marsh vegetation communities on the Englishman River estuary.

The significance of The Englishman River and its estuary in terms of its environmental and social values and potential impacts to those values has been discussed by Blood, Donald A. and Associates (1976) and LeBaron (1976). Subsequently, because of its significant wildlife values, a conceptual Management Plan was prepared for the area by the Wildlife Branch, Ministry of Environment (Barnard 1990).

In the autumn of 1992, a large portion of the Englishman River estuary was purchased by the Pacific Estuary Conservation Program and is now owned by The Nature Trust of British Columbia. Management of those lands has been undertaken by the Wildlife Branch, Ministry of Environment, Lands and Parks. The Englishman River estuary now forms a part of the largest coastal Wildlife Management Area in British Columbia. A management Plan for the new Wildlife Management Area is currently being prepared (Tim Clermont pers. comm.).

Methods and Limitations

In 1979, following the breaching of a dyke on the estuary (see Tutty et al. 1983, Dawe and McIntosh 1993), surveys were begun to determine the distribution and abundance of birds using the estuary.

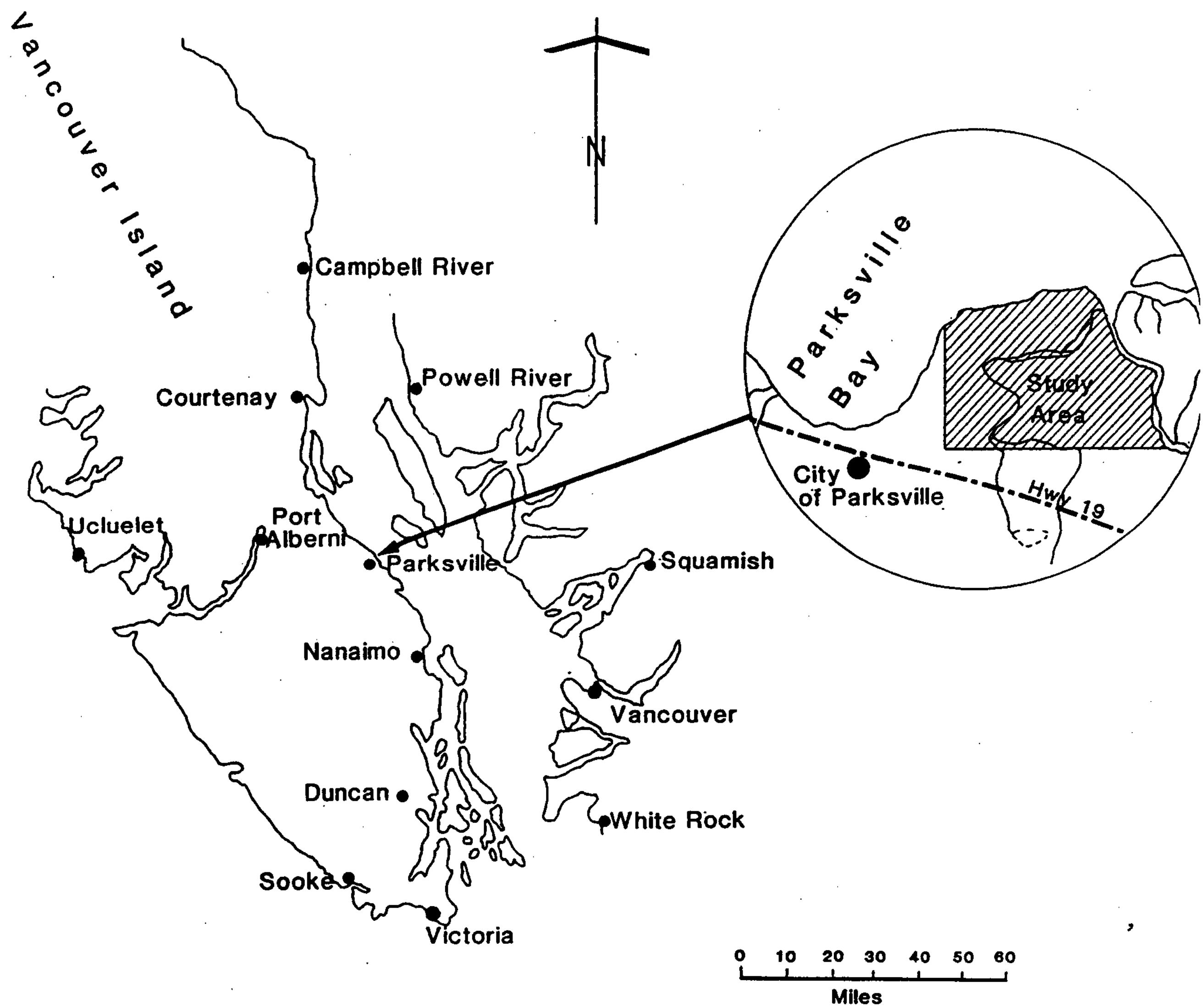

Figure 1. Englishman River estuary, showing the location of the study area.

The study area was divided into 4 stations (Figure 2); however, the stations were not linked to habitat and thus we make little reference to them in the report other than in Appendix IV. Brief descriptions of the stations are as follows: the dyked upland was formerly part of the estuary but has mostly reverted to upland vegetation in nature; this station is part of The Nature Trust holdings. The east marsh and river contains the main marsh, mudflats, and river channels. The west marsh and spit contains the estuarine marsh that was recovering following the breaching of the dyke as well as the spit habitat (campground), and the foreshore includes the river mouth, sand and gravel intertidal, and deeper marine waters.

Weekly surveys in 1979-1980 were conducted by Michael Wolfe through a contract to the CWS under the direction of Donald Trethewey. The observer covered each area on foot and counted and recorded all the birds he saw through binoculars or spotting scope within each station. The surveys covered the period 17 June 1989 through 29 June 1980.

In 1988, because of the controversy over a proposed development on the estuary, a second survey was begun. This survey was conducted at least twice monthly. Their purpose was to provide recent information on distribution and numbers of birds using the Englishman River estuary. Observers on these surveys were Neil K. Dawe and Karen E. Dawe.

In 1988, the study area was divided into 12 habitat units (Figure 3) to get more refined data on the areas of highest bird use within the estuary and are as follows: (1) east marsh and mudflat - consists primarily of mudflats and fringe marsh, (2) east marsh - contains a side channel of the river and extensive intertidal marsh habitat, (3) north central river and marsh - consists of the main river channel, mud and sand flats and accumulated driftlogs, (4) south central river and marsh - consists primarily of estuarine marsh with some back channels, (5) north and (8) west channels - consist of the main dendritic channel and lower elevations in the west marsh, (6) west marsh - includes the higher portions of the west estuarine marsh (see Dawe and McIntosh 1993), (7) west spit (Surfside RV Park) - consists of disturbed spit habitat on the west side of the estuary, (9) dredged channel - includes a canal that connected to the main channel of the west marsh only that winter when the water pushed through a narrow constriction, (10) river mouth - included the sand and gravel flats right at the river mouth, (11) intertidal - includes all the intertidal and deep marine water habitat north of the spits, and (12) east spit (residential) - consists of domestic lawn habitat on the east spit. Subsequently some of the areas were combined because they were similar in habitat structure (see Table 1). Due to time constraints, access was by vehicle to observation points where a majority of each of the areas was visible. The areas were scanned with a spotting scope and all birds counted and recorded.

Figure 2. Englishman River estuary, showing the observation stations used during migratory bird surveys, June 1979 to June 1980. 1 - west marsh and spit, 2 - east marsh, 3 - dyked upland, 4 intertidal.

Habitat Unit	Name	Habitat Description
1	East Marsh and Mudflat	Mudflats, fringe marsh
2 6	East Marsh West Marsh	Intertidal marsh, tidal channels Includes rehabilitated west marsh habitat resulting from breaching the dyke.
3	North-central River and Marsh	Main river channel, mud and sand flats, accumulated driftlogs, small amounts of marsh.
4	South-central River	Main river channel, marsh, back channels.
5 8	North Channel West Channel	Main dendritic channel and low marsh communities of the West Marsh.
7	West Spit	Disturbed spit habitat, RV Park.
9	Dredged Channel	Canal now connected to the West Channel.
10 11	River Mouth Intertidal	Sand and gravel flats, river mouth, deep-water marine.
12	East Spit (residential)	Domestic lawn.

Table 1. *Habitat units used during migratory bird surveys, November 1988 through May 1989 (see also Figure 3). For analysis, habitat units were grouped according to similar habitats.*

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 1982). Poor visibility due to weather, and birds underwater 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 observations were not made when the mudflats and algal beds were exposed, i.e. at times when they would likely be used by birds such as dabbling ducks.

Figure 3. Air photograph of the Englishman River estuary showing the habitat units used during migratory bird surveys, November 1988 through May 1989. See Table 1 for a description of the habitats within each station.

Survey data were summarized using BASIC programs written by Allan Keller, CWS, and modified for seasonal summaries and statistics by the senior author. The summarized data were analysed and much of the first draft of the report written by Terri Martin under contract to the CWS. Her contribution was reviewed and edited by the senior author.

The annotated species list was assembled from the survey data as well as from field notes of the senior author (NKD), Terri Martin (TM), and local Christmas Bird Count data (CBC). In the summer of 1993 (8 July to 27 August), the CWS conducted preliminary investigations into the passerine use of the upland and forested habitats on the estuary and some of these data are included (cited as Martin and Fortune 1993). We have also included information from the Wildlife Records Scheme of the Royal British Columbia Museum. Initials of contributors to the museum files are included with their observations in the body of the report; their full names are in Appendix I).

Results and Discussion

Bird Use of the Estuary

Over the study periods, we identified a total of 113 species of birds during the surveys; an additional 49 species were added to the avifauna of the Englishman River estuary from other sources (see Methods and Limitations). A total of 84,836 birds were recorded during the 1979-1980 survey; 30,596 birds were recorded during the 1988-1989 survey period.

To estimate the minimum number of birds dependent on the Englishman River estuary over the period of a year, the single-day maximum bird number for each species for the periods 1979-1980 and 1988-1989 are shown in Tables 2 and 3, repectively. In 1979-1980 a minimum of over 33,000 birds depended on the habitat of the Englishman River estuary for at least a part of their life history; in 1988-1989 a minimum of just over 8,000 birds were dependent on the estuary. For comparative purposes, the figure of over 25,000 gulls can be removed from the 1979-1980 total, as they were attracted to the area during a major herring spawn that spring which did not occur in the spring of 1989. The reduced total of just over 8,400 birds is similar to the 1988-1989 figure.

Habitat Use

Of the 9 habitat groups (see Table 1) defined during the 1988-1989 survey, the intertidal zone and river mouth were used by 39% of all birds observed, followed by the north-central river and marsh (20%) and the north and west channels (14%).

Species	Number	Season	Species	Number	Season	Species	Number	Season
PALO	9	Aut 79	AMKE	3	Spr 80	BASW	65	Aut 79
COLO	16	Win 79	PEFA	1	Aut 79	NOCR	250	Win 79
HOGR	8	Aut 79	RNPH	22	Sum 79	CORA	4	Aut 79
RNGR	3	Win 79	BBPL	13	Aut 79	CBCH	10	Sum 80
EAGR	17	Spr 80	SEPL	6	Sum 79	BUSH	14	Sum 79
WEGR	15	Win 79	KILL	63	Aut 79	RBNU	2	Spr 80
PECO	8	Aut 79	GRYE	4	Sum 79	BRCR	1	Aut 79
GBHE	13	Sum 79	LEYE	18	Sum 79	BEWR	1	Sum 79
TRUS	10	Win 79	SPSA	1	Spr 80	GCKI	1	Aut 79
BRAN	2505	Spr 80	BLTU	8	Win 79	SWTH	1	Sum 79
CAGO	8	Spr 80	SAND	10	Sum 79	AMRO	14	Spr 80
GWTE	1127	Win 79	WESA	64	Sum 79	WAPI	13	Spr 80
MALL	193	Win 79	LESA	62	Sum 79	CEWA	2	Sum 79
NOPI	70	Aut 79	PESA	7	Aut 79	NOSH	1	Aut 79
BWTE	33	Spr 80	DUNL	50	Aut 79	EUST	383	Sum 79
NOSL	6	Spr 80	DOWI	14	Sum 79	WARB	2	Sum 79
GADW	1	Spr 80	LBDO	23	Sum 79	OCWA	2	Spr 80
EUWI	3	Spr 80	COSN	2	Win 79	YEWA	1	Sum 79
AMWI	770	Spr 80	SHOR	439	Sum 79	RSTO	1	Sum 79
SCAU	37	Aut 79	GULL	25044	Spr 80	SPAR	11	Aut 79
HADU	60	Spr 80	BOGU	500	Aut 79	SAVS	258	Aut 79
OLDS	15	Spr 80	PIGU	4	Aut 79	FOSP	1	Win 79
SCOT	60	Win 79	MAMU	8	Spr 80	SOSP	12	Aut 79
BLSC	5	Aut 79	RODO	25	Aut 79	LISP	17	Sum 79
SUSC	120	Spr 80	BTPI	33	Sum 80	WTSP	1	Sum 79
WWSC	33	Aut 79	SEOW	1	Spr 80	GCSP	7	Win 79
COGO	92	Spr 80	CONI	1	Sum 79	WCSP	4	Sum 79
BUFF	86	Spr 80	RUHU	4	Spr 80	DEJU	64	Aut 79
HOME	17	Aut 79	BEKI	5	Aut 79	RWBL	11	Sum 79
COME	70	Spr 80	HAWO	2	Sum 79	WEME	12	Aut 79
RBME	33	Win 79	NOFL	8	Sum 79	BRBL	19	Spr 80
BAEA	8	Win 79	WIFL	5	Sum 79	PUFI	10	Aut 79
NOHA	1	Aut 79	TRSW	1	Spr 80	HOFI	34	Win 79
COHA	4	Aut 79	VGSW	29	Sum 79	PISI	100	Aut 79
NOGO	1	Win 79	NRWS	19	Sum 79	AMGO	192	Sum 79
RTHA	1	Aut 79	CLSW	2	Sum 79	Total	33462	

Table 2. Estimated minimum numbers of birds dependent on the Englishman River estuary, 17 June 1979 through 29 June 1980, based on the maximum numbers of each species observed on migratory bird surveys. For species names see Appendix II.

Species	Number	Season	Species	Number	Season	Species	Number	Season
LOON	1	Spr 89	OLDS	5	Spr 89	MEGU	113	Spr 89
RTLO	1	Aut 88	SCOT	80	Aut 88	CAGU	12	Aut 88
PALO	5	Spr 89	BLSC	23	Spr 89	HEGU	1	Aut 88
COLO	16	Spr 89	SUSC	79	Spr 89	THGU	1	Spr 89
GREB	3	Spr 89	WWSC	80	Win 88	GWGU	106	Spr 89
PBGR	1	Aut 88	COGO	48	Aut 88	PIGU	1	Spr 89
HOGR	14	Spr 89	BAGO	8	Spr 89	MAMU	1	Spr 89
RNGR	4	Win 88	BUFF	69	Aut 88	RODO	1	Spr 89
WEGR	296	Spr 89	HOME	7	Win 88	BEKI	1	Aut 88
CORM	2	Spr 89	COME	27	Spr 89	NOFL	1	Win 88
DCCO	2	Spr 89	RBME	46	Win 88	VGSW	12	Spr 89
PECO	3	Win 88	DUCK	30	Aut 88	NRWS	4	Spr 89
GBHE	4	Aut 88	BAEA	9	Spr 89	BASW	2	Spr 89
TRUS	2	Aut 88	NOHA	1	Aut 88	NOCR	148	Spr 89
SNGO	4	Aut 88	COHA	1	Aut 88	GCKI	1	Spr 89
BRAN	756	Spr 89	AMKE	1	Spr 89	MOBL	4	Spr 89
CAGO	233	Aut 88	RNPH	3	Spr 89	AMRO	4	Spr 89
DABL	40	Aut 88	CAQU	1	Spr 89	WAPI	13	Aut 88
GWTE	182	Aut 88	BBPL	32	Aut 88	NOSH	1	Aut 88
MALL	371	Aut 88	SEPL	2	Spr 89	EUST	200	Spr 89
NOPI	98	Aut 88	KILL	17	Spr 89	OCWA	1	Spr 89
BWTE	5	Spr 89	GRYE	2	Spr 89	YRWA	1	Spr 89
NOSL	3	Win 88	BLTU	30	Spr 89	SAVS	18	Spr 89
GADW	8	Win 88	SAND	10	Win 88	SOSP	1	Win 88
EUWI	7	Spr 89	WESA	100	Spr 89	DEJU	1	Win 88
AMWI	1070	Aut 88	LESA	4	Spr 89	RWBL	1	Spr 89
DIVE	3	Spr 89	DUNL	730	Aut 88	WEME	5	Aut 88
CANV	1	Win 88	DOWI	1	Win 88	HOFI	20	Aut 88
SCAU	26	Aut 88	LBDO	1	Aut 88	PISI	40	Spr 89
GRSC	19	Win 88	GULL	2486	Spr 89	AMGO	1	Spr 89
HADU	41	Aut 88	BOGU	512	Spr 89	Total	8382	

Table 3. Estimated minimum numbers of birds dependent on the Englishman River estuary, 3 November 1988 through 24 May 1989, based on the maximum numbers of each species observed on migratory bird surveys. For species names see Appendix II.

Seasonal Numbers

Spring: Figure 4 shows the ratio of species group use of the estuary for spring 1980 and spring 1989. Spring numbers on the estuary were dominated by gulls and waterfowl. The high proportion of gulls in 1980 was due to a major herring spawn in the area which did not occur in the spring of 1989. Brant made more use of the foreshore areas off the river mouth in 1980 than they did in 1989.

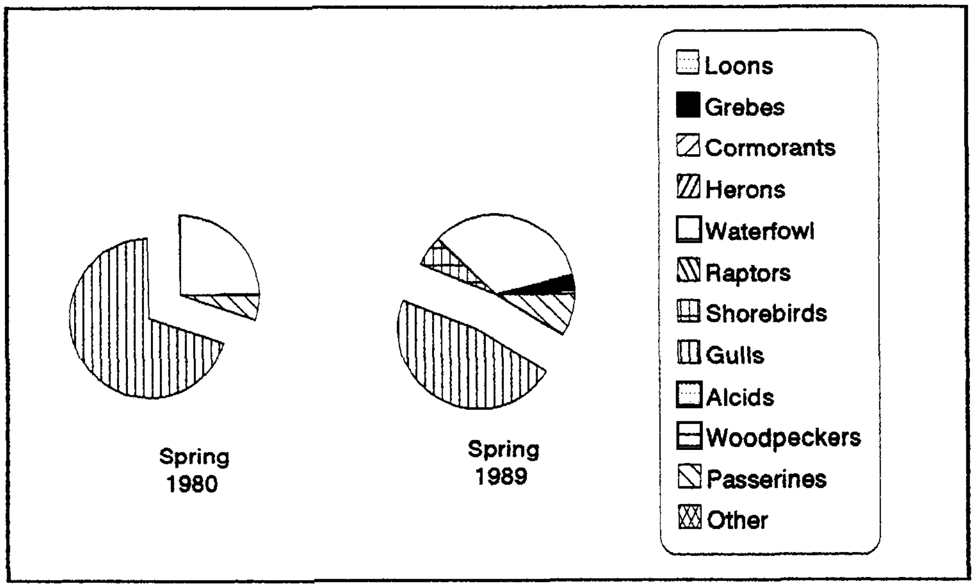

Figure 4. *Proportional species group use of the Englishman River estuary, spring 1980 and spring 1989.*

Summer: Figure 5 shows the ratio of species group use of the estuary for late summer 1979 and early summer 1980. Passerine numbers dominate followed by gulls and waterfowl. In late summer 1979, the early shorebird migrants appear as a large proportion of that period. Summer bird use was not studied during the 1988-1989 survey.

Autumn: Figure 6 shows the ratio of species group use of the estuary for autumn 1979 and autumn 1988. Autumn bird use is dominated by waterfowl and gulls. Shorebird proportions were up in 1988 from those in 1979.

Winter: Figure 7 shows the ratio of species group use of the estuary for winter 1979-1980 and winter 1988-1989. Waterfowl and gulls again dominated the winter bird use at the estuary. Shorebird use in the winter of 1988-1989 was considerably higher than that in the winter of 1979-1980.

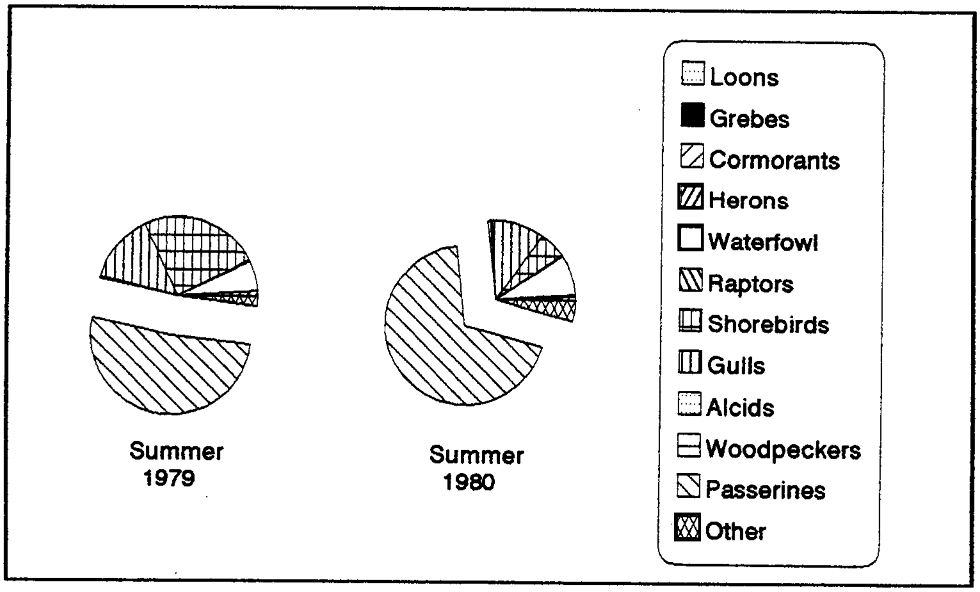

Figure 5. *Proportional species group use of the Englishman River estuary, late summer, 1979 and early summer, 1980.*

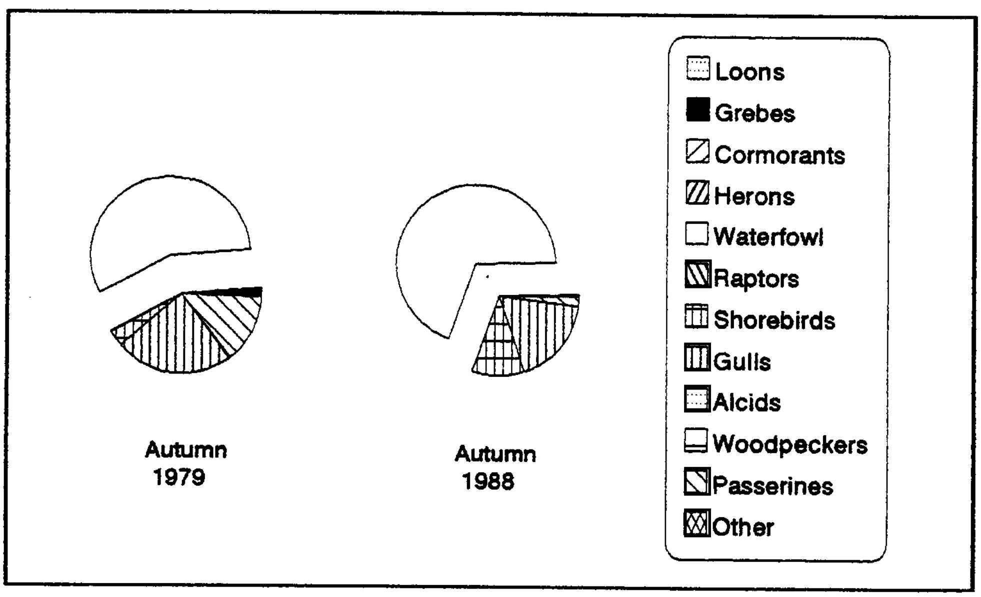

Figure 6. *Proportional species group use of the Englishman River estuary, autumn, 1979 and autumn, 1989.*

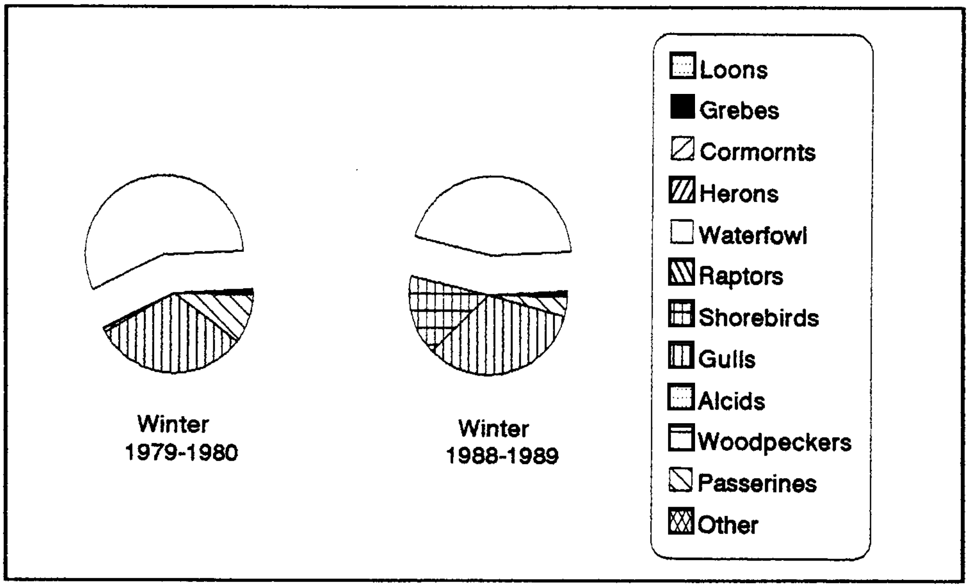

Figure 7. *Proportional species group use of the Englishman River estuary, winter, 1979 and winter, 1988.*

Species Composition

The following annotated species list is organized taxonomically according to bird families as shown in Figures 4,5,6, and 7. It includes summarized data from the two survey periods, as well as additional data from those sources noted in the methods. Within families, species are discussed in decreasing order of highest use of the estuary during the surveys, followed by those species for which we have additional information. A taxonomic checklist of the birds of the Englishman River estuary can be found in Appendix II.

Loons: Three species of loons were observed in the study area: Common, Pacific and Red-throated. The Common Loon accounted for 71% of all loon sightings over the 2 study periods and was recorded in every season. Peak numbers occurred during the winter of 1979 when 55 birds were seen; 52 birds were seen in the spring of 1989. The Pacific Loon ranked 2nd most abundant overall, accounting for 12% of the total loon sightings. All of the observations for that species were from the autumn and spring seasons. However, 39 unidentified loons seen during the winter of 1979 could have been Pacific Loons, which are common on the local Christmas Bird Count. Earliest arrival date was 9 October 1979; latest departure was 25 May 1979. The Red-throated Loon was the rarest of the loons at <1% of the total loon numbers; it was not recorded during the first study period. Two sightings of 1 bird each were reported in the second study period; 3 November 1988 and 13 April 1989. Ninety-eight percent of all loons sighted were from the intertidal area; most of the remainder were found using the river mouth.

Grebes: Five species of grebes were recorded over the 2 study periods: Western Grebe (69% of all grebes sighted), Horned Grebe (19%), Red-necked Grebe (5%), Eared Grebe (4%) and Pied-billed Grebe (1 record). The Western Grebe was the most abundant of the grebes and 94% of the sightings of this species were from the spring of 1989. Their maximum daily total of 269 birds occurred on 16 March 1989. Horned Grebe numbers were similar over the 2 study periods: 57 and 70 birds respectively; lowest numbers were noted during the summer. The Red-necked Grebe was reported in numbers less than 10 in all seasons except summer when birds were absent. All 26 Eared Grebes were observed in 1980; it is possible that these birds were misidentified Horned Grebes as the Eared Grebe is considered to be very rare locally (Dawe and Ostling, 1993). A Pied-billed Grebe was observed in the north channel on 30 November 1988, our only record for that species. Over 95% of all grebes sighted, were using the intertidal area. Horned Grebes, observed in the northern part of the river and river mouth, accounted for the remaining sightings.

Cormorants: Pelagic and Double-crested Cormorants were seen in small numbers during both study periods with a combined total of 55 birds reported. The Pelagic Cormorant was the most abundant of the 2 species, comprising 84% of all observations. Double-crested Cormorants accounted for 5% of the total cormorants and were only noted in the 1988-1989 survey period. Brandt's Cormorants were not reported although they have been observed in the area. Cormorants used the intertidal area almost exclusively; 1 Double-crested Cormorant was found in the east marsh and mudflat area on 6 December 1988.

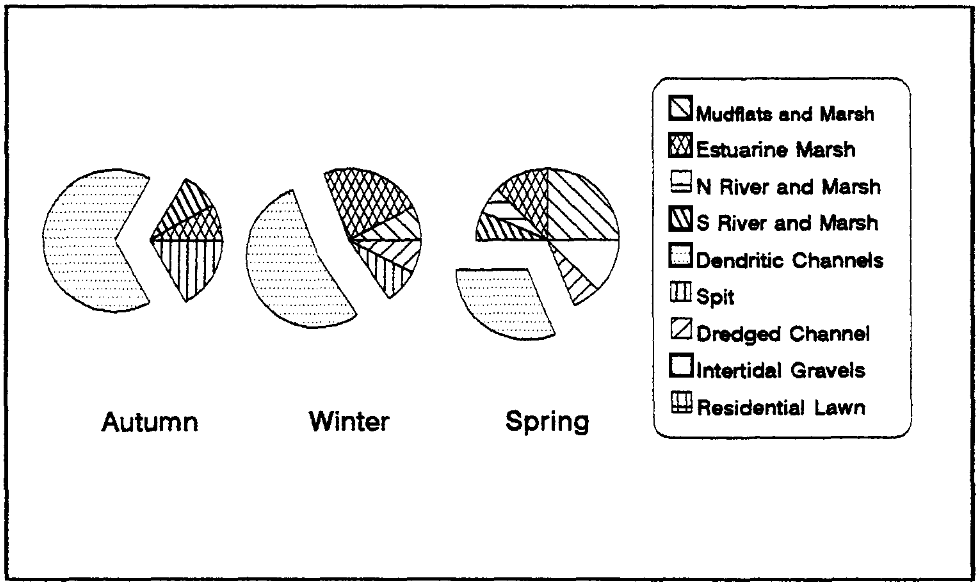

Figure 8. *Seasonal habitat use by the Great Blue Heron on the Englishman River estuary, autumn through spring,1988-1989.*

Herons: Over the course of the 2 surveys, 227 Great-blue Herons were reported. Although 85% of the sightings were from the 1979-1980 survey, their distribution on the estuary over both survey periods was similar. All habitat units were used by herons except the residential lawn; however, herons used the north and west dendritic channels most through all 3 seasons in 1988-1989 (Figure 8). The highest concentrations occurred in the west and north channels and west marsh. Intertidal use was low at 5% and 10% for the 2 survey periods respectively. We have 1 record of the Green-backed Heron on the estuary: 3 October 1993, 1 bird was observed perched on a log along the edge of the north channel. Later that morning it was seen fishing and eating a sculpin along the edge of the same channel (TM).

Swans: Overwintering Trumpeter Swan numbers were low. Of the 69 swans reported, 81% were observed in the winter of 1979. During that season, numbers ranged from 2 to 10 birds (1, 3 and 21 January), and it is likely that the same individuals were observed from week to week. Preferred swan habitat for both surveys was the north-central river and marsh.

Geese: There was only 1 observation of the Snow Goose on the estuary: 3 November 1988-4 birds were observed on the north-central river and marsh.

Brant are an abundant spring migrant to the Parksville-Qualicum Beach area. Earliest arrival date on the estuary was 8 March 1980. Numbers build thereafter, peaking in the first two weeks of April with the last migrants recorded at the end of April and early May (Figure 9); latest departure was 5 May 1989. Peak daily numbers of about 2,500 birds in 1980 are slightly less than half of the total daily maximum found staging in the Parksville-Qualicum Beach area in 1994 (TM). Not every year sees heavy Brant use at the estuary, however, and during the second study period a maximum of only 756 birds was observed. The Englishman River estuary is situated between Parksville Bay and Craig Bay, 2 areas heavily used by Brant for feeding, loafing, and maintenance activities.

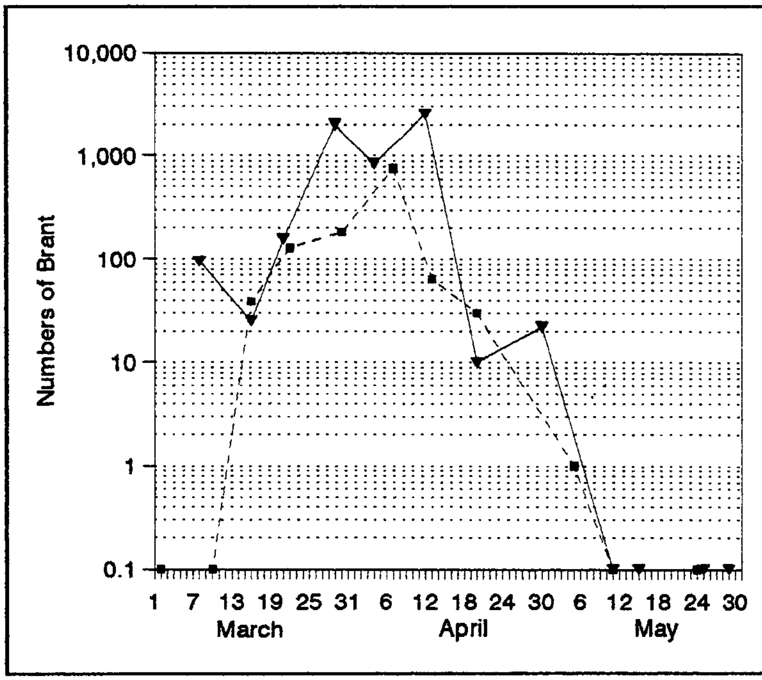

Figure 9. *Seasonal fluctuations in numbers of Brant on the Englishman River estuary, spring 1980 (solid line) and spring, 1989 (dashed line).*

In 1979-1980, the Canada Goose was reported only occassionally with a peak of 8 birds noted on 29 May 1980; the probability that an observer would see this bird on the estuary over the 1979-1980 study period was about 8%. By the 1988-1989 survey, their numbers peaked at 233 birds on 16 November 1988 and the

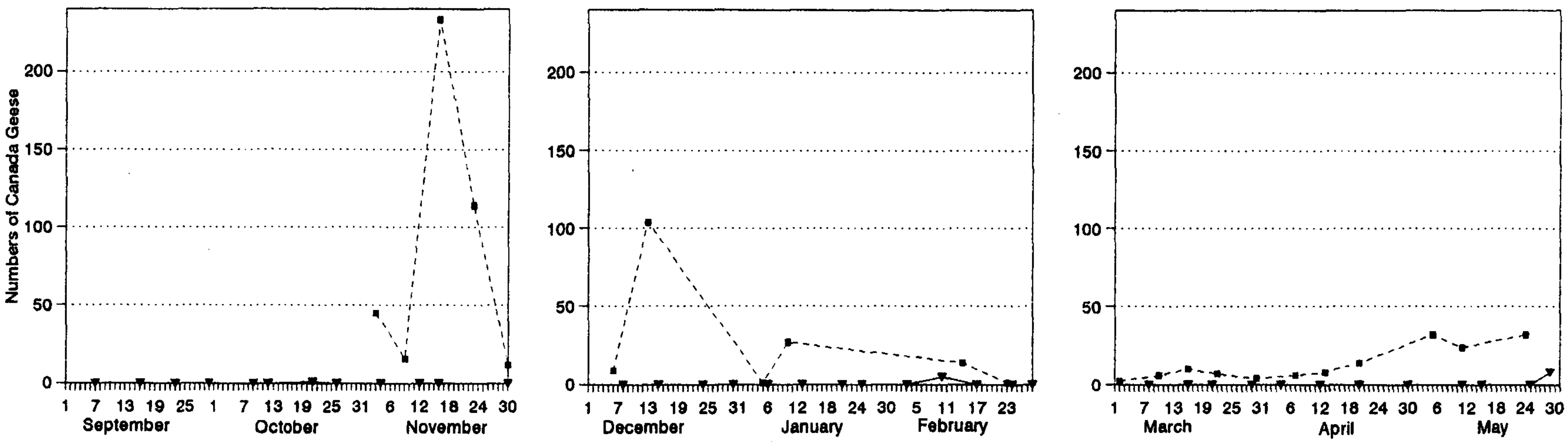

Figure 10. Seasonal fluctuations in numbers of Canada Geese on the Englishman River estuary during autumn, winter and spring, 1979-1980 (solid line) and 1988-1989 (dashed line).

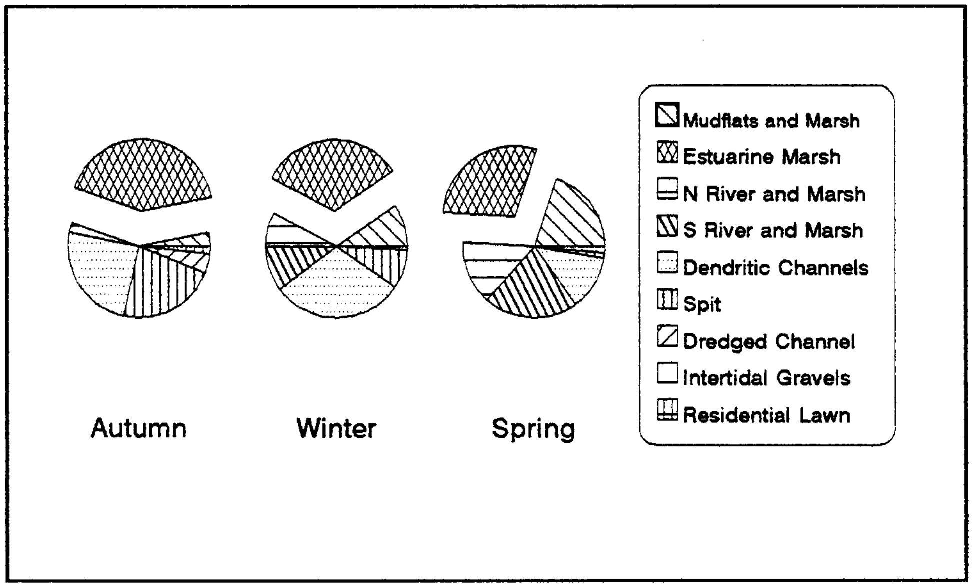

Figure 11. *Seasonal habitat use by the Canada Goose on the Englishman River estuary, autumn through spring, 1988-1989.*

probability of seeing a Canada Goose on the estuary was 100%. Seasonal fluctuations in Canada Goose numbers are shown in Figure 10. Results from the annual Vancouver Island Canada Goose Survey, started in 1989 and conducted late each November, indicates that resident populations have been on the rise in most areas along the east coast of Vancouver Island since 1970 (Dawe and Morrison 1989). The Parksville-Qualicum Beach population numbered close to 1,000 birds in 1993 and has increased in numbers each year since the start of the surveys (Dawe et al. 1994). Preferred habitat for the Canada Goose was the east marsh and north and west channels (Figure 11). The Canada Goose breeds on the estuary.

We have only 1 record of the White-fronted Goose on the estuary: 1 bird was seen in October 1964 (FW).

Dabbling Ducks: Over the 2 study periods, 8 species of dabbling ducks were noted; American Wigeon, Green-winged Teal and Mallard were the most abundant. The proportions of dabbling ducks recorded were 25% and 35% of all birds seen over the 2 study periods respectively. Seasonal fluctuations in dabbling duck numbers for the survey periods are shown in Figure 12. Peak numbers for the first survey period occurred in the winter of 1979 when 43% of all the dabbling ducks were recorded; autumn numbers were close behind at 37%. The 1988-1989 study period showed a different trend with peak numbers reported during the autumn of 1989: 55% of the total dabbling ducks. Winter numbers dropped to 17%. During the 1988-1989 period, dabbling duck preferred habitat included the north and west channels where 36% of all the dabblers were recorded, followed by the north and south-central river and marsh (23%; Figure 13). Although intertidal use was low, except in the spring, Eamer (1985) found that both marine deltas and beaches were important refuges from disturbance for

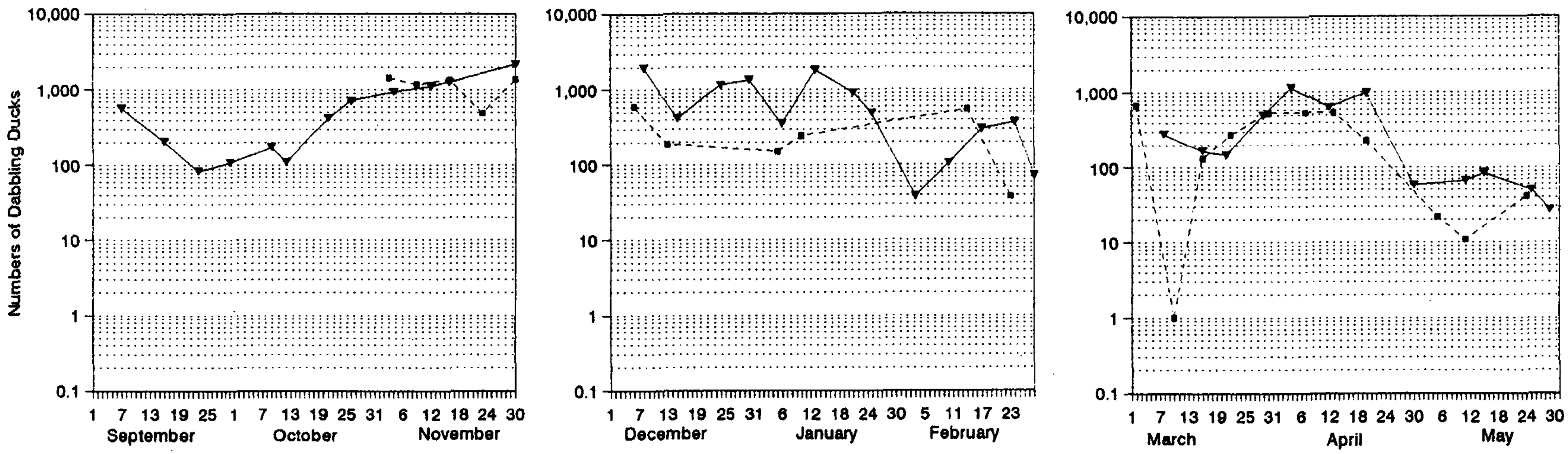

Figure 12. Seasonal fluctuations in numbers of Dabbling Ducks on the Englishman River estuary during autumn, winter and spring, 1979-1980 (solid line) and 1988-1989 (dashed line).

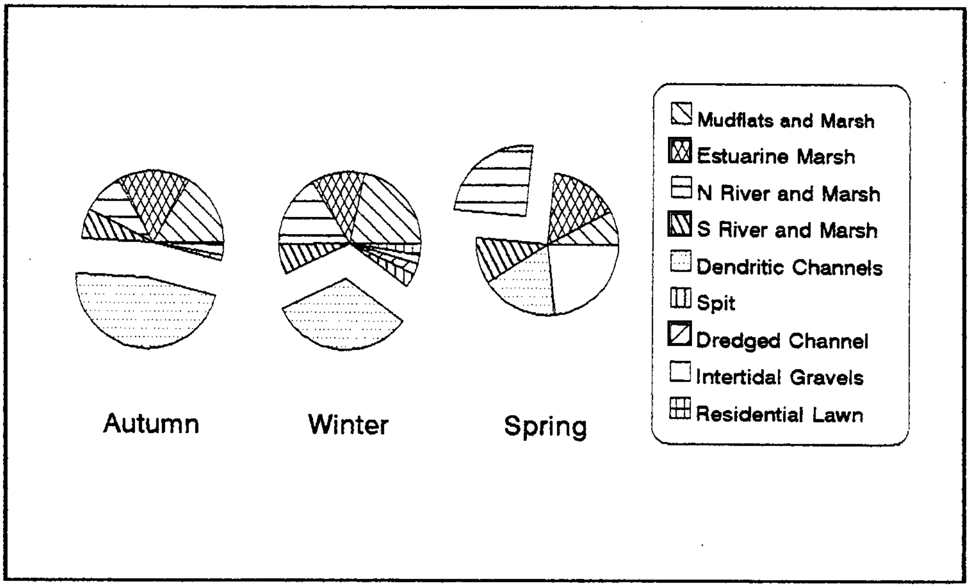

Figure 13. *Seasonal habitat use by dabbling ducks on the Englishman River estuary, autumn through spring, 1988-1989.*

Mallard and American Wigeon, as was the north channel in this study. They formed an integral part of dabbler coastal habitat. Use of the intertidal zone may become increasingly important if the RV park, situated close to prime dabbler habitat, remains busy throughout the off season when dabblers are present. Because most feeding occurs in shallow water, habitat use by dabbling ducks in estuaries is influenced by tides and weather conditions. At "high" and "very high" tides, more of the estuarine marsh becomes available for feeding and at low tides tidelines are preferred. American Wigeon and Mallard displayed a stronger tendency to feed on land at flooded farm sites than at coastal sites in Eamer's (1985) study.

The American Wigeon was the most numerous dabbler making up 38% of the dabbler total over the combined study periods; they ranked second most abundant in 1979-1980 (25% of all dabbling ducks) and first in 1988-1989 (65%). Peak numbers for American Wigeon were 770 birds on 4 April 1980 and 1,070 birds on 6 November 1988. For seasonal fluctuations in American Wigeon numbers, see Figure 14. Although numbers varied between years, the trend in their fluctuations are quite similar. Eamer (1985) counted a peak of 608 wigeon on 4 November 1980. Earliest arrival date was 7 September 1979 and the latest departure date was 11 May in both 1980 and 1989. In 1988-1989 the north and south-central river and marsh were used the most (26%), followed closely by the north and west channels (25%), east marsh (18%), east marsh and mudflat (17%) and the intertidal area including the river mouth (11%). Intertidal use by the American Wigeon was considerably higher during the 1979-1980 period at 38%. Figure 15 shows seasonal habitat use by the American Wigeon with the mudflats, east marsh, and north and west channels seeing heavy use in autumn; wigeon used the mudlat and the north-central river proportionately more in winter, and the north-central river and intertidal areas were preferred in spring.

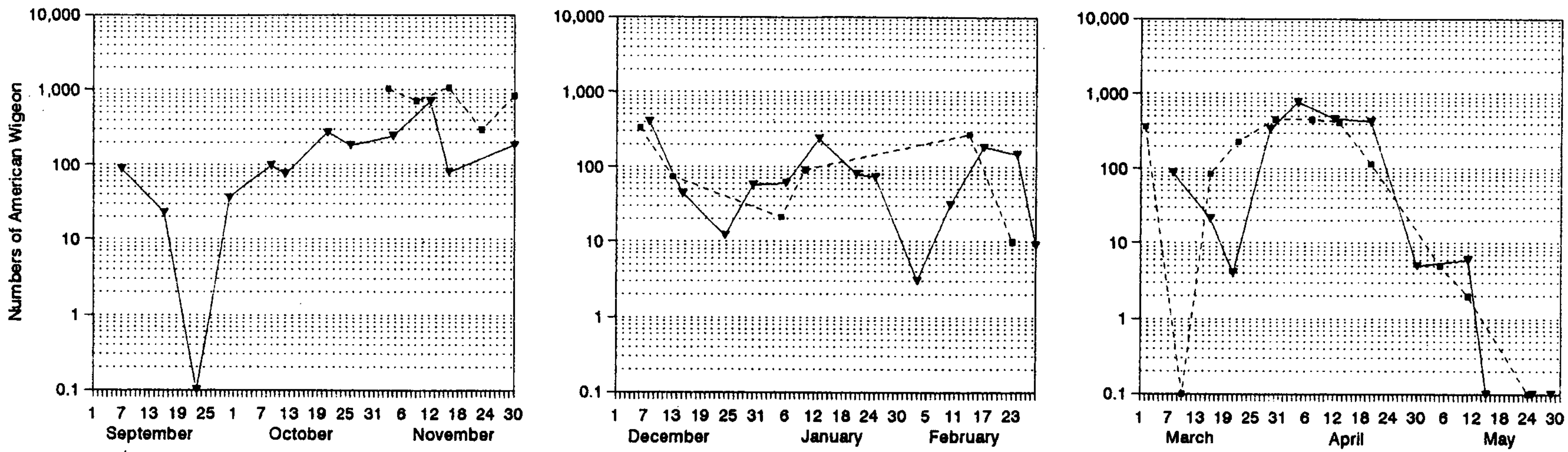

Figure 14. Seasonal fluctuations in numbers of American Wigeon on the Englishman River estuary during autumn, winter and spring, 1979-1980 (solid line) and 1988-1989 (dashed line).

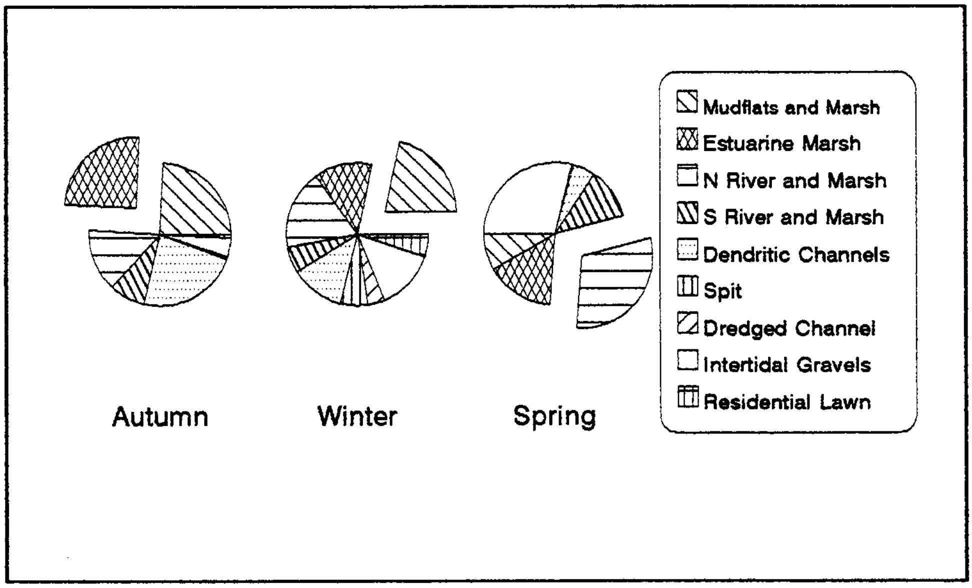

Figure 15. *Seasonal habitat use by American Wigeon on the Englishman River estuary, autumn through spring, 1988-1989.*

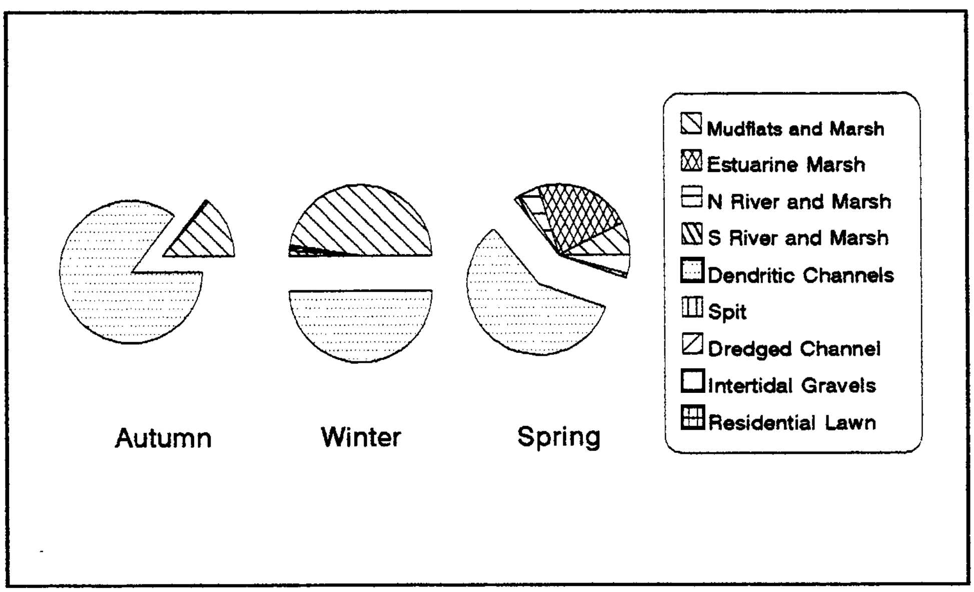

Figure 16. *Seasonal habitat use by Green-winged Teal on the Englishman River estuary, autumn through spring, 1988-1989.*

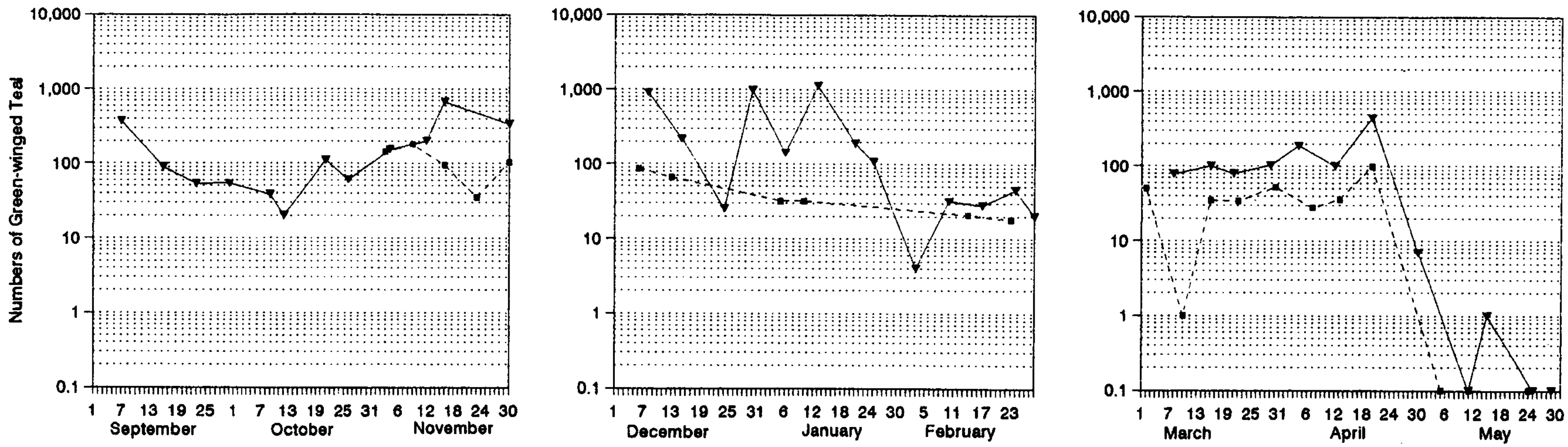

Figure 17. Seasonal fluctuations in numbers of Green-winged Teal on the Englishman River estuary during autumn, winter and spring, 1979-1980 (solid line) and 1988-1989 (dashed line).

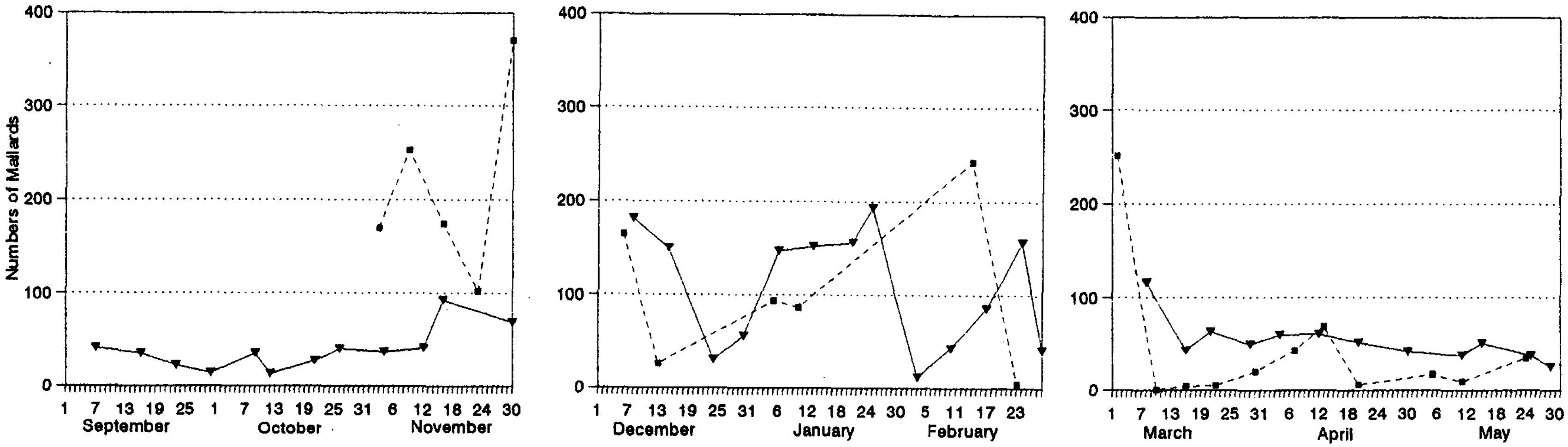

Figure 18. Seasonal fluctuations in numbers of Mallards on the Englishman River estuary during autumn, winter and spring, 1979-1980 (solid line) and 1988-1989 (dashed line).

The Green-winged Teal was the second most abundant dabbler over both study periods (26%); in 1979-1980 it was the most abundant dabbler (33%). Its proportion dropped to third place in 1988-1989 at 11%. The maximum daily total was 1,127 Green-winged Teal recorded on 13 January 1980. Although a few birds can be found on the estuary throughout the summer, autumn migrants don't begin to arrive until about the end of August (30 August 1979-38); most birds have gone by the end of April. The higher numbers of Green-winged Teal in 1979-1980 were likely due to the breaching of a dyke in March 1979, which allowed tidal inundation to once again take place on the west marsh and in the north and west channels. The western portions of the estuarine marsh contained habitat that had reverted to upland vegetation following the construction of the dyke in 1969. Death of the upland plants, due to the salt water inundation, resulted in extensive areas of open mud for the 2 years following the breaching of the dyke until halophytic plants became established (see Dawe and McIntosh 1993). This newly created tidal mudflat was immediately used by Green-winged Teal, attracting 73% of their 1979-1980 numbers. Tidal mudflats are used more by this species than any other duck (Campbell et al. 1990). The mud areas of the north and west channels were used by 70% of the teal in 1988-1989 followed by the east mudflat (19%; Figure 16). For seasonal fluctuations in Green-winged Teal numbers, see Figure 17.

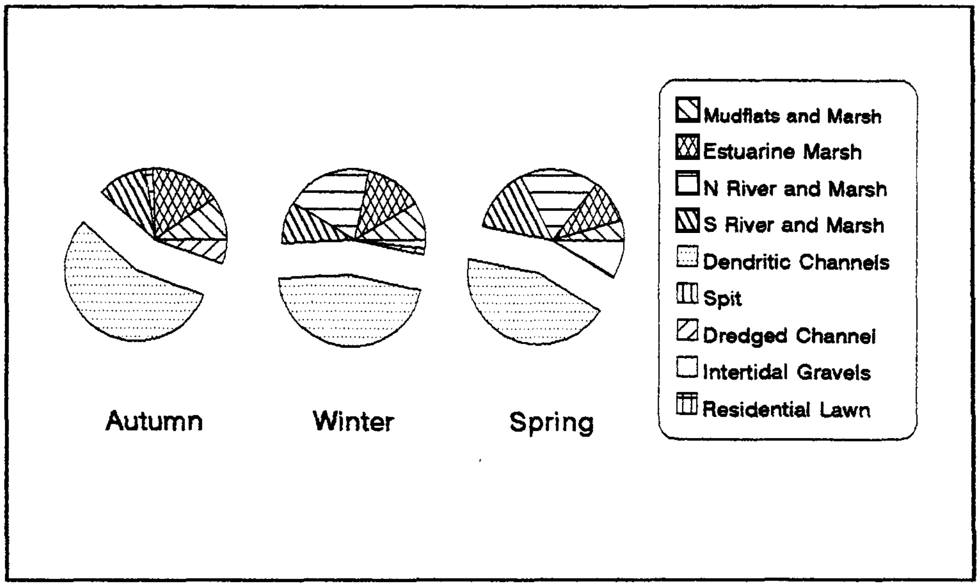

Figure 19. *Seasonal habitat use by Mallard on the Englishman River estuary, autumn through spring, 1988-1989.*

The Mallard was the third most abundant dabbling duck over the two study periods comprising 15% of total dabbling ducks; they ranked third (12%) in 1979-1980 and second (20%) in 1988-1989. Peak numbers of 371 birds were observed on 30 November 1988. For seasonal fluctuations in Mallard numbers, see Figure 18. Eamer (1985) had a high count of 490 Mallards on 8 December 1980, during a period of freezing weather. Figure 19 shows seasonal habitat use by the Mallard. In 1988-1989, Mallard use of the north and west channels was highest at 51% and remained the area of highest use by mallards throughout all the seasons, followed by the north and south-central river and marsh (21%), and east marsh (14%). Although American Wigeon and Mallard used the same habitats, their distribution within these habitats was different; Mallard loafed higher on the banks than American Wigeon which were usually closer to the water's edge. Eamer (1985) also found that dry banks of channels are especially used by Mallards for resting.

The remaining dabbling ducks (Northern Pintail, Blue-winged Teal, Gadwall, Eurasian Wigeon, and Northern Shoveler) were seen during both study periods in small numbers and collectively accounted for <2% of the dabbling duck total.

Over the 2 study periods, a total of 482 Northern Pintail were seen; roughly equal numbers were noted each period with a maximum of 98 birds on 3 November 1988. Earliest arrival was on 11 August 1979 and latest departure was 30 April 1980. In 1988-1989 Northern Pintail used the north and west channels the most (54%) with 35% of the pintail numbers using the north-central river and marsh.

Blue-winged Teal had a combined total of 87 birds over the 2 study periods; 94% were seen in 1979-1980 when a maximum of 33 was recorded on 15 May 1980. Earliest arrival date was 11 May 1980 and the latest departure was 19 August 1979. The dyked upland surveyed in 1979-1980, was used by 24% of the Blue-winged Teal where they were most often found in the small backwater slough. The remaining data generated for this period do not give a clear indication of habitat use by this species. In 1988-1989 when habitat use was recorded more accurately, only 5 birds were seen. Two of the teal were in the east marsh and 3 birds were observed in the north channel.

Sixty-eight Gadwall were seen over the 2 study periods; 99% were noted in the 1988-1989 survey with a maximum of 8 birds on 6 December 1988. The increase in Gadwall numbers is likely a reflection of their recent range expansion in the Pacific Northwest (Campbell et al. 1990). Earliest arrival was 9 November 1988 and the latest departure was 20 April 1989. The north and west channels saw the heaviest Gadwall use in 1988-1989 (64%), followed by the east marsh (21%) and the river mouth (12%).

We recorded a total of 47 Eurasian Wigeon over the study periods; 81% were recorded in 1988-1989, with a maximum of 7 birds seen near the river mouth on 7 April 1989. Campbell et al. (1990) and Edgell (1984) have documented dramatic increases in Eurasian Wigeon numbers on the south coast of British Columbia since 1965 based on annual Christmas Bird Counts. Earliest arrival was 3 November 1988 and latest departure was 29 April 1980. Eurasian Wigeon are generally seen in mixed flocks with American Wigeon and use the same habitat.

There is 1 record of the Wood Duck on the Englishman River Estuary from outside of the study period; 2 birds were seen on 23 January 1973 (RF).

Diving Ducks: We recorded a total of 13 species of diving ducks over the course of the 2 study periods; scoters were the most abundant followed by Bufflehead, mergansers, and goldeneye. Overall, 5% of the combined total number of birds recorded were diving ducks: 4% in the 1979-1980 period and 7%

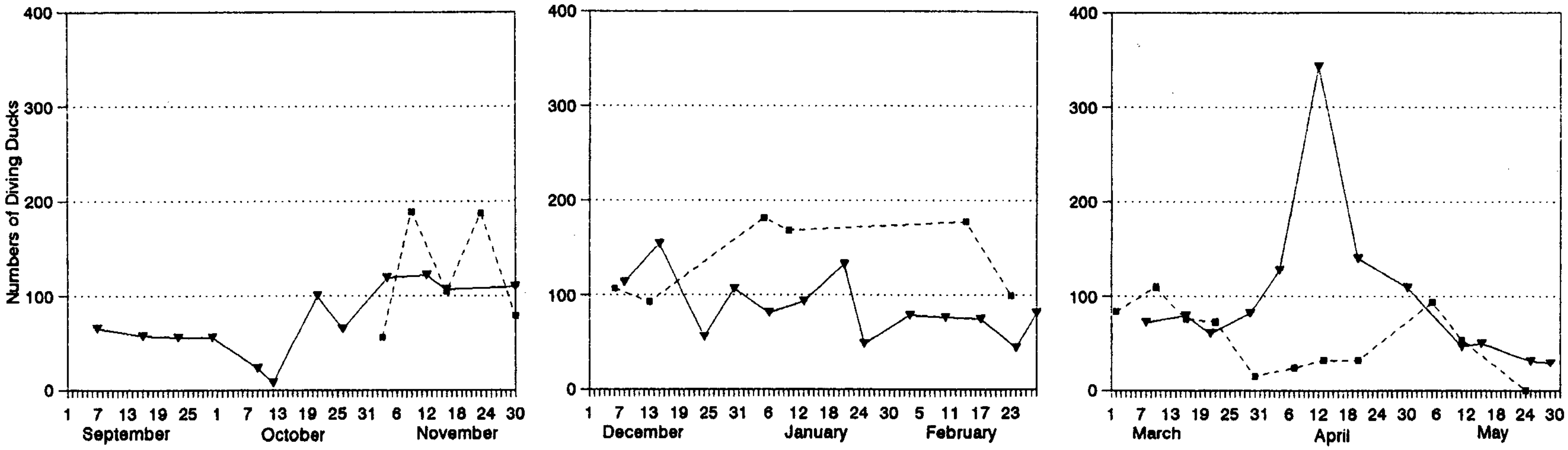

Figure 20. Seasonal fluctuations in numbers of diving ducks on the Englishman River estuary during autumn, winter and spring, 1979-1980 (solid line) and 1988-1989 (dashed line).

in 1988-1989. For seasonal fluctuations in diving duck numbers see Figure 20. Highest diving duck numbers were seen in the winter and spring during the first survey period: 33% and 34% respectively. Winter saw the highest numbers in the second study period (41%). Diving ducks used the intertidal area the most (including the river mouth in 1988-1989) during both of the study periods at 71% and 76% respectively. The river channel in the east marsh was the second preferred habitat being used by 22% of the birds in 1979-1980 and 11% in 1988-1989. Seasonal use of habitat in 1988-1989 is shown in Figure 21.

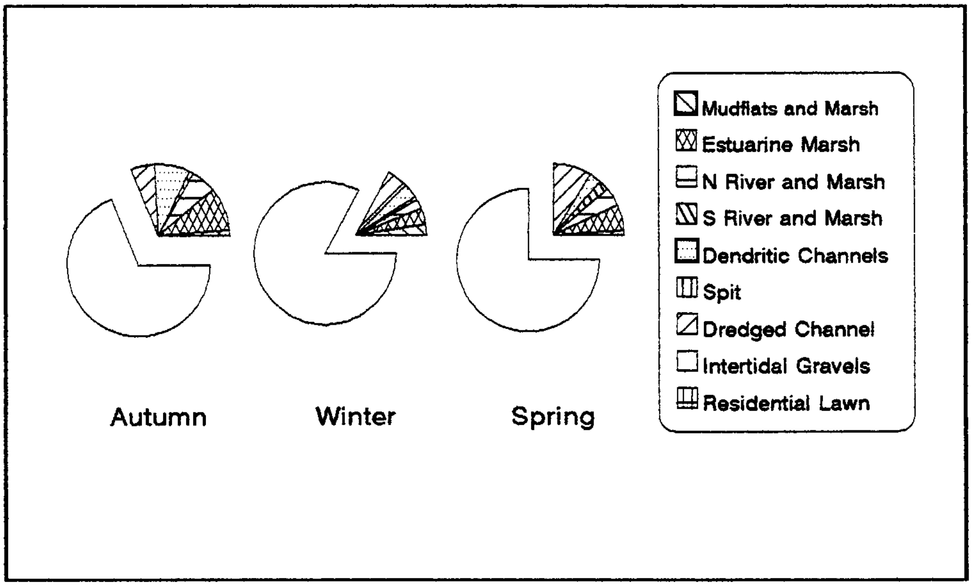

Figure 21. *Seasonal habitat use by Diving Ducks on the Englishman River estuary, autumn through spring, 1988-1989.*

Scoters (Black, Surf and White-winged), were the most abundant group of diving ducks using the Englishman River estuary with a combined ratio of 33% of the diving duck numbers; they had a ratio of 28% in 1979-1980 and 42% in 1988-1989. Parksville-Qualicum Beach was identified by Campbell (1990) as one of the few areas that all 3 wintering scoter species can be reliably seen. The intertidal area was used exclusively by scoters over the course of the 1988-1989 study.

The Surf Scoter was seen more than any of the other scoters in both study periods although their proportions differed significantly: they comprised 70% of the total scoters in 1979-1980 and dropped to 42% in 1988-1989. The frequency of occurence for the Surf Scoter during the winters of 1979-1980 and 1988-1989 was 100%. This scoter in particular, often congregates where Pacific Herring spawn (Campbell et al. 1990); Ehrlich et al. (1988) note that fish eggs occasionally constitute as much as 90% of their diet. The herring spawn during the spring of 1980, most likely accounts for the significant increase in Surf Scoter numbers; the peak was 120 on 12 April of the same year. Earliest arrival was 30 September 1979 and the latest departure was 11 May for both 1980 and 1989. Five percent of the Surf Scoters used the east marsh and river in 1979-1980; this is the only scoter species that was noted outside of the intertidal area.

The White-winged Scoter ranked second among scoter numbers; they occured in 20% of the total in 1979-1980 and 35% in 1988-1989. A peak of 80 birds was recorded on 10 January 1989. The frequency of occurence for this species was 62% during the winter of 1979-1980 and 67% in the winter of 1988-1989. Earliest arrival was 7 September 1979. The latest departure date is difficult to determine but most birds had left by the end of May. Nine birds were seen on 29 June 1989 which is the only summer record of scoters using the Englishman River estuary during the survey; these birds were likely non-breeders that summer in the Strait of Georgia. All White-winged Scoters were observed in the intertidal area.

The Black Scoter was the least frequently seen scoter during the study periods: 3% and 9% respectively. A peak of 23 birds occurred on 10 March 1989. Although the Black Scoter is the least abundant scoter in British Columbia the frequency of occurence during the winter of 1979-1980 was still high at 39% and was the same as White-winged Scoter at 67% in the winter of 1988-1989. Campbell et al. (1990) identifies Qualicum Beach as one of the major wintering areas for this species and the close proximity of the Englishman River estuary is likely responsible for these high frequencies. Earliest arrival was 16 September 1979 and the latest departure was 22 March 1989. Black Scoters used the intertidal area exclusively.

Bufflehead comprised 20% of the diving duck total for each study period with peak numbers recorded during the herring spawn: 86 on 12 April 1980. Earliest arrival was 9 October 1979 and the latest departure was 5 May 1989. Once wintering Bufflehead arrive, their frequency of occurence is 100% until they leave for their breeding grounds. In 1988-1989, the intertidal area and river mouth saw the heaviest Bufflehead use at 36%; the east marsh and dredged channel followed with 22% and 21% respectively. The Bufflehead was the only species that used the dredged channel in significant numbers.

The mergansers (Hooded, Common and Red-breasted), were the third most abundant group comprising 18% of total diving duck numbers; they made up 23% of the diving ducks in 1979-1980 and 10% in 1988-1989. The highest merganser numbers over both study periods was spring when 35% were seen. Habitat use varied significantly between the species.

The Common Merganser was the most frequently seen merganser during both study periods: 79% of the mergansers in 1979-1980 and 56% in 1988-1989. Peak numbers occured on 16 March 1980 when 70 birds were seen. The frequency of occurence for this species differed widely over the 2 study periods. In 1979-1980 the chance of seeing a Common Merganser in winter was 39%, with summer, autumn, and spring frequencies at 90% to 100%, 92%, and 100% respectively. In 1988-1989 the chance of seeing Common Mergansers in winter was 100% while the chance of seeing them in the autumn and spring seasons was high at 60% and 91% respectively. Habitat use by the Common Merganser also differed over the survey periods. The preferred habitat in 1979-1980 was the intertidal area, used by 61% of the mergansers. In 1988-1989, merganser numbers in the intertidal area dropped to 33% (25% of this figure represents numbers using the river mouth specifically), followed by north and south-central river and marsh (30%) and the east marsh (17%). Differences in the numbers of returning salmon and levels of Pacific Herring spawn, favoured foods of the

Common Merganser, may account for these fluctuations in habitat preference.

The Red-breasted Merganser was the second most frequently seen merganser: 11% of the total mergansers in 1979-1980 and 27% in 1988-1989. Numbers peaked at 46 on 6 December 1988. Earliest arrival was 9 November 1988 and the latest departure was 30 April 1980. This species was found to be the most marine of the mergansers in its habits, with 88% of the birds using the intertidal area during the 1979-1980 period and 96% in 1988-1989.

Of all mergansers, the Hooded Merganser was seen the least: 10% of the total mergansers in the first study period and 17% during the second period. Peak numbers of 17 birds were seen on 23 September 1979. Earliest arrival was 17 August 1979 and the latest departure was 20 April 1989. In 1988-1989 the east marsh and mudflat was used by 35% of the birds, followed by the dredged channel (26%), north and west channels (21%), and the east marsh (12%). Two birds were found in the backwater slough of the dyked upland in 1979-1980.

Over the 2 study periods, goldeneye made up 15% of the total diving duck numbers ranking them the fourth most abundant diver. Common Goldeneye were seen 96% of the time, while the Barrow's Goldeneye, accounting for the remaining 4%, was noted only during the second survey.

There were over twice as many Common Goldeneye recorded in 1979-1980 as were noted in 1988-1989. Like many of the other diving ducks, Common Goldeneye numbers peaked on 12 April 1980 during the Pacific Herring spawn when 92 birds were seen. Earliest arrival was 21 October 1979 and the latest departure date was 30 April 1980. The intertidal area was used by most of the Common Goldeneye in both of the study periods: 82% and 71% respectively. In 1988-1989 that was followed by the north and south-central river and marsh (19%); roughly equal bird numbers were reported from the channels, east marsh and mudflat and east marsh respectively.

A total of 29 Barrow's Goldeneye was seen in 1988-1989. A maximum of 8 birds occured on 16 March 1989. Earliest arrival was 5 January 1989 and the latest departure was 22 March 1989. Most Barrow's Goldeneye used the intertidal area (86%); the remaining 4 birds were seen in the south-central river area.

We vrecorded a total of 444 Harlequin Ducks during the combined study periods. This number represents 8% of the diving ducks; 10% of the 1979-1980 total and 5% of the 1988-1989 total. During the spring of 1980, numbers of Harlequin Ducks increased dramatically from 14 birds observed during the winter to 219 birds in the spring; a peak of 60 Harlequins was reported on 30 April 1980, shortly after the Pacific Herring spawn. Harlequin Duck numbers remained fairly constant from the autumn of 1988 to the spring of 1989; range was 25-48 birds. The earliest arrival date was 30 September 1979. The latest departure is unclear with the Harlequin Duck recorded as late as 15 June 1980 when 1 bird was seen. Campbell et al. (1990) note that the onset of spring migration is difficult to determine from coastal data because some nonbreeders remain throughout the summer. Most birds have likely gone by the end of May.

Scaup accounted for 5% of all diving ducks over the combined study period. In total, 71% (all of the scaup noted in 1979-1980 and half of those in 1988-1989), were not identified to species, simply being recorded as scaup species. The remaining 29% (82 birds) were all Greater Scaup. Greater Scaup peaked on 5 January 1989 with 19 birds. Earliest arrival date was 3 November 1988 and the latest departure was 10 March 1989. In 1979-1980, 80% of the scaup species used the intertidal zone; the remaining 20% were noted in the general area of the east marsh and river. The unidentified scaup in 1988-1989 used the intertidal area 92% of the time; 2 birds were observed in the east marsh. Habitat use by Greater Scaup in 1988-1989 was similar: intertidal (84%), east marsh (10%), and east marsh and mudflat (6%). Although Greater Scaup are known to be attracted to Pacific Herring spawns (Campbell et al. 1990), numbers near the Englishman River estuary were not observed to increase during the spawn of 1980.

Lesser Scaup were not reported during the study. However, 16 Lesser Scaup were observed in the intertidal zone of the Englishman River estuary on 2 January 1994 (CBC; KF).

Oldsquaw were observed during both of the study periods in low numbers: 9 and 24 birds respectively. This species can occur in huge numbers during herring spawns (see Dawe 1980); but, during this study only 15 Oldsquaw were recorded on 30 April 1980. Earliest arrival date was 30 November 1979 and the latest departure was 30 April 1980. Oldsquaw were found to use the intertidal area exclusively.

The Canvasback was seen the least frequently of the divers with only 4 records; weekly sightings of 1 bird each from 23 February 1989 to 22 March 1989 were most likely all of the same individual. Three of the records were from the dredged channel, 1 was from the west channel.

Raptors: Seven species of raptors were recorded, with a combined total of 134 birds of prey seen over the 2 study periods. The Bald Eagle was the most abundant followed by American Kestrel and Cooper's Hawk. The 1979-1980 period had the greatest diversity with all of the species represented while in 1988-1989 only 4 species were noted.

The Bald Eagle was the most abundant raptor on both surveys at 56% and 89% respectively. Every season had records of eagles but highest total numbers were counted during the winter of 1979 with 25 birds and during the spring of 1989 with 28 birds. Peak numbers were seen on 22 March 1989 when 9 birds were recorded. Each winter, large numbers of Bald Eagles are attracted to the Parksville-Qualicum Beach area drawn there by the thousands of salmon spawning in the local rivers. Little Qualicum River experiences runs in excess of 200,000 chum (P Slobodzian pers. comm.), attracting as many as 217 Bald Eagles to the estuary and an additional 95 to the Little Qualicum Spawning Channel and the Waring farm upstream (15 December 1991, CBC). The levels of spawning salmon at the Englishman River are lower: 2,000 to 3,500 Chum on an average year in the lower reaches of the river with 1,000 Coho and 75 to 100 Chinook (B Hurst, pers. comm.). Enhancement for Coho and Chinook Salmon started in 1988 and more recently efforts to get higher numbers of Pink Salmon returning to the Englishman River has brought the remnant population back to between 1,000 and

2,000 fish. Future salmon enhancement programs at the estuary, including the creation of an artificial spawning stream, may result in higher concentrations of wintering Bald Eagles. Favoured perches include veteran Douglas-fir trees along the shoreline, river, and forest edges and on the accummulated stumps and driftlogs on the mud and sand flats by the north-central river. Two Bald Eagle nests are located along the east side of the Englishman River, both outside of the study area. The nest closest to the river mouth, situated in a large Cottonwood tree, is still active. The availability of trees large enough to support Bald Eagle nests (up to 6 metres deep; Campbell et al. 1990), and provide security from disturbance as well as close enough to feeding grounds (usually 100 metres from the water's edge) are the limiting factors for breeding Bald Eagle populations (Blood 1989). However, accelerating land development and logging of small private land parcels are threatening many current and potential nest trees. Therefore, preservation of viable nest trees is of prime importance to maintain the current level of breeding eagles. Summer sightings were most likely of the resident breeding pair(s).

The American Kestrel was the next most abundant raptor over the study periods with 18 birds recorded; 94% were from the 1979-1980 period when from 1 to 2 kestrels (maximum daily total was 3) were noted each season. All habitats were used with the highest number of records from the general area of the west spit. There was only 1 record for the American Kestrel in 1988-1989: 1 bird was observed during the spring migration on 20 April 1989 using the west spit.

The Cooper's Hawk had a combined total of 10 records over the study periods; 8 were seen during autumn migration in 1979 from 30 August to 26 October with a maximum daily total of 4 on 12 October 1979. In 1988-1989, 1 bird was observed over the west spit and 1 bird was observed over the north channel area. On 16 March 1989, a Cooper's Hawk was observed with a European Starling in its talons (NKD).

There were 8 records of an overwintering Peregrine Falcon during 1979-1980; its early arrival date was 26 October 1979 and it was last seen 17 February 1980. It was often observed flying over the west marsh and spit. Isolated trees on the spit and along the edges of the marsh were used as perches. The Peregrine Falcon is not found on the Englishman River estuary every winter although estuaries supporting numbers of shorebirds, waterfowl, and other small birds are preferred habitat for this species (Campbell et al. 1990).

There were 4 records of the Red-tailed Hawk during the 1979-1980 period; each record was of a single bird (likely the same individual) first seen 26 October 1979 then again on 8 and 24 December 1979 and finally on 21 March 1980. Martin and Fortune (1993) recorded a single Red-tailed Hawk 50% of the time on a weekly survey during the summer of 1993: 16 July, 6, 19 and 27 August. On each survey, the hawk was perched overlooking a relatively open area: 75% of the time along the edge of the forest or close to it in the west marsh and once in a snag beside the Englishman River, near the south-central river and marsh.

During the 2 surveys, the Northern Harrier was seen only twice: 1 bird on 9 October 1979 and 1 bird on 3 November 1988. Additional sightings include: 1 bird on 2 October 1991, 2 birds flying low over the west marsh on 2 November 1991 and 1 bird on 3 November 1992 (TM).

A single Northern Goshawk made an appearance on 30 December 1979.

Sharp-shinned Hawk, Osprey, and Merlin were not observed during the 2 study periods but have been observed at the Englishman River estuary. Osprey were seen on several occasions flying from the intertidal zone over the spit and west marsh carrying fish during the month of August 1993 (Martin and Fortune 1993). Merlin have been observed in the dead conifers at the edge of the west marsh and, regularly during the spring of 1994, a pair was heard and seen above the tree tops along the forest edge suggesting a possible nesting site.

Pheasants and Quail: The Ring-necked Pheasant is a resident, and was reported during both study periods. In 1979-1980 when 91% of the total number of pheasants were reported, a peak of 22 birds occured on 11 August 1979. Martin and Fortune (1993) observed that pheasants favoured areas where there was a mix of grass and shrubs, particularly in the west marsh; numerous dust baths were found along the edges of the shrub patches. In 1988-1989, most pheasants were seen on the west spit (67%), followed by the west marsh (33%).

The California Quail was seen only once during the 2 surveys; 1 bird was heard on 11 May 1989 in the shrub upland of the west marsh. However, Martin and Fortune (1993) found the frequency of occurence for California Quail to be 100% between 8 July and 27 August with a peak of 15 birds (5 adults, 10 chicks) on 19 August 1993. The quail were observed in 2 distinct locations. One group was seen in a small cleared area beside one of the old logging roads in the forest on the west side of the river. In this spot during the first part of the survey a male was seen roosting on top of a page wire fence that had been erected around a newly constructed foundation. Chicks were first noted there on 12 August and on 1 occasion the family was encountered in the forest. Quail were also seen on the east side of the Englishman River where they were often observed along the sandy/cobblestone shore close to a vegetated island in the river. Chicks were first noted in this location on 29 July when 2 were seen. Christmas Bird Count results for 2 January 1994 suggest that California Quail move out of the estuary during the winter to take advantage of local backyard feeding stations; no quail were reported using the Englishman River estuary but 15 birds were tallied in the adjacent community of San Pariel and quail are reported to be regular visitors at this time of year (J Hammonds, pers. comm.).

Shorebirds: A total of 14 shorebird species used the Englishman River estuary over the 2 study periods. All 14 species were seen in 1979-1980 while only 10 species were noted in 1988-1989. For seasonal shorebird fluctuations see Figures 22 and 23. The combined shorebird total of 5,042 birds represented 4% of all birds seen, 2.5% of the total in 1979-1980 and 9.5% in 1988-1989. Dunlin were the most abundant shorebird followed by Killdeer and Western Sandpiper. In the autumn of 1988, most shorebirds were found in the east mudflats (70%), while in the winter and spring, the intertidal area was used by 93% and 62% of the birds, respectively (Figure 24).

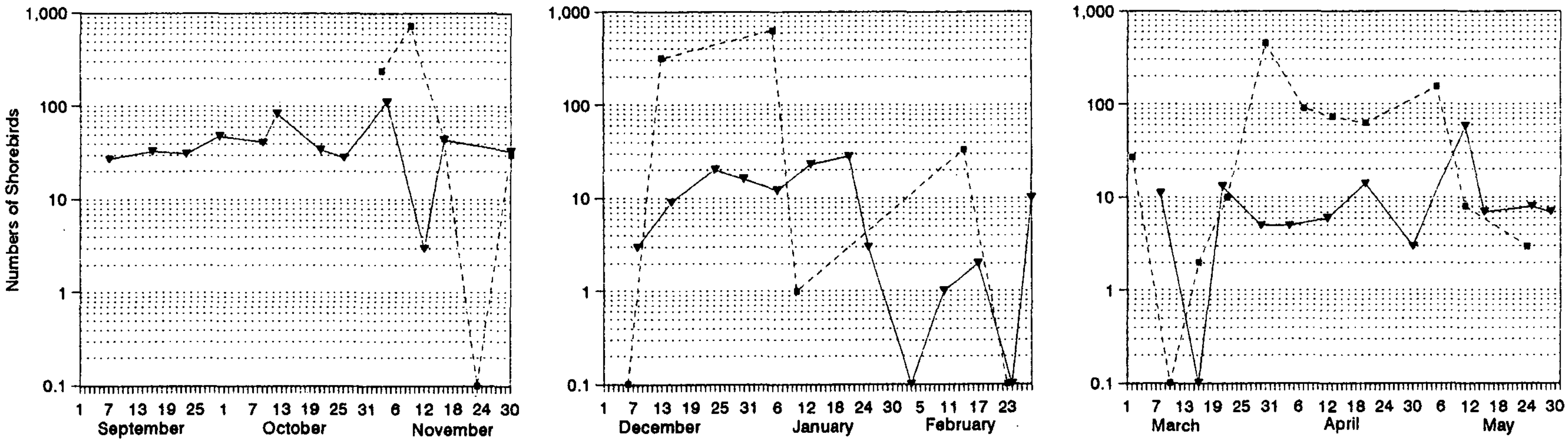

Figure 22. Seasonal fluctuations in numbers of shorebirds on the Englishman River estuary during autumn, winter and spring, 1979-1980 (solid line) and 1988-1989 (dashed line).

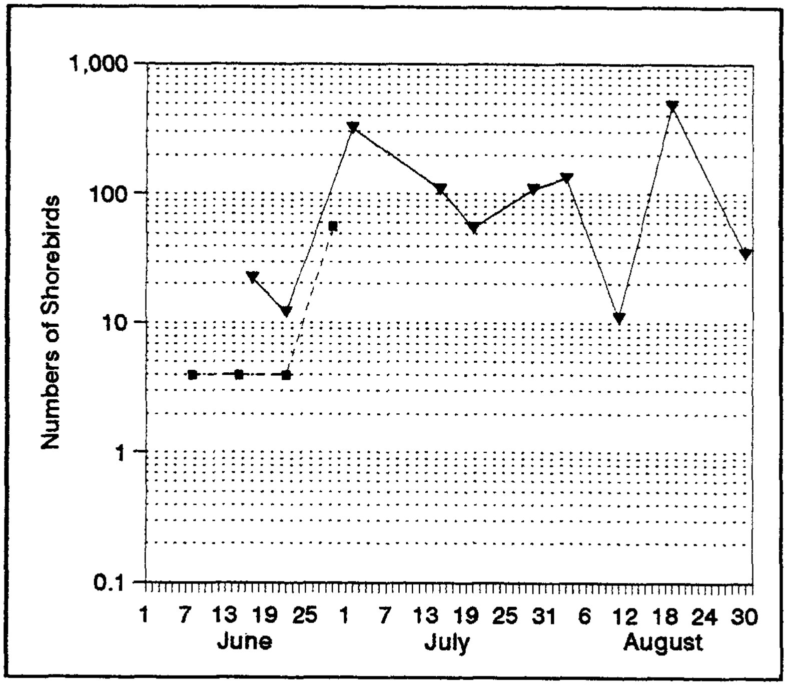

Figure 23. *Fluctuations in shorebirds numbers on the Englishman River estuary, late summer, 1979 (solid line), and early summer, 1980 (dashed line).*

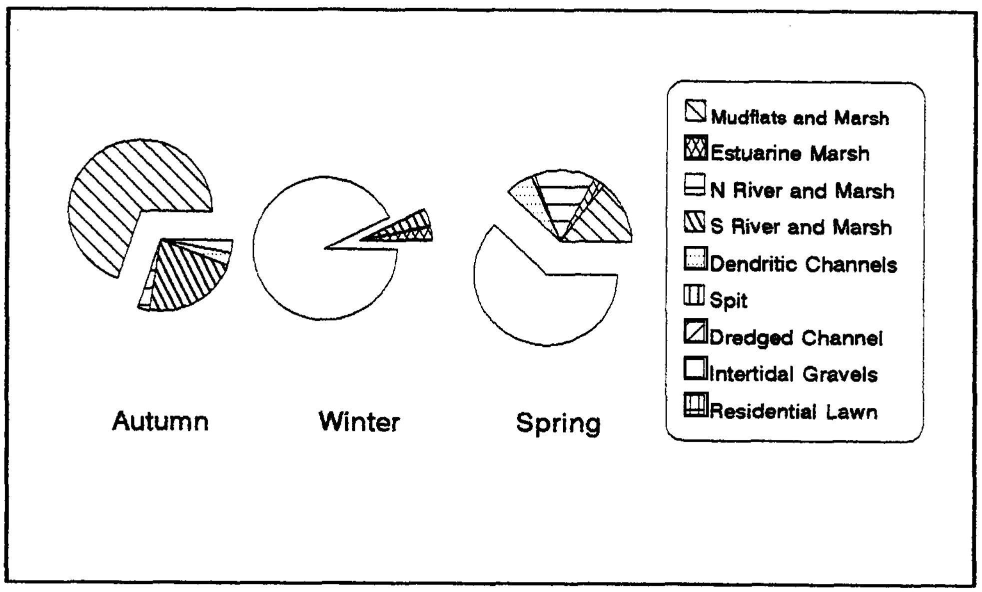

Figure 24. *Seasonal habitat use by Shorebirds on the Englishman River estuary, autumn through spring, 1988-1989.*

Wintering Shorebirds: The Englishman River estuary had 4 species of overwintering shorebirds. Large numbers of Dunlin seen throughout the 1988-1989 study period, ranked this species as the most abundant shorebird at 51% of the combined shorebird total, both for that period and overall. However, low numbers of Dunlin in 1979-1980 ranked them as the fourth most abundant for that study period. Dunlin numbers peaked on 9 November 1988 at 730 birds. Earliest arrival was 26 October 1979 and the latest departure was 30 April 1988. The intertidal zone was used more than any other habitat with 56% of the birds recorded there (4% from the river mouth) in 1988-1989. The next preferred habitat in 1988-1989 was the east mudflat with 30% of the birds found there.

The Black-bellied Plover was reported in small numbers with a combined total of 165 birds over the study periods, 3% of the overall shorebird total. Numbers were higher in 1988-1989 when 88% of the plovers were seen; the peak was 32 birds on 3 November 1988. Earliest arrival was 3 August 1979 and the latest departure was 24 May 1989. In 1988-1989, most plovers were observed in the intertidal area (55%), while the south-central river and marsh followed at 38%. In the latter areas during high tides, the plovers, together with Dunlin, could occasionally be found roosting on the many driftlogs that litter the area.

We recorded a combined total of 62 Black Turnstones over the study periods; most (68%) were observed in 1988-1989. Their numbers peaked at 32 turnstones on 30 March 1989. Earliest arrival was 3 November 1988 and the latest departure was 20 April 1989. All of the 1979-1980 sightings were from the intertidal area while in the 1988-1989 period, 71% of the birds were noted using the north-central river and marsh; followed by the intertidal (26%). According to Paulson (1993), the Black Turnstone prefers rocky beaches where their favourite foods, barnacles, and limpets are found; they will also use mudflats.

A total of 36 Sanderling was seen over the study periods; 72% of them were noted in 1988-1989. Their numbers peaked at 10 Sanderling on 13 December 1988. Earliest arrival was 19 August 1979 (the only record for that year) and the latest departure was on 11 May 1989. Primarily a bird of sandy beaches, the Sanderling will also use gravelly beaches and mudflats and are known to roost and feed in similar habitats (Paulson 1993). In 1988-1989, most birds were observed in the intertidal area (77%), followed by the north channel (23%).

Migrating shorebirds: Nine species of shorebirds totalling 674 birds were seen over the study periods, primarily during spring and autumn migrations. Unlike the overwintering shorebirds, migrant numbers were highest in 1979-1980 when 87% were seen. Peeps accounted for 59% of the combined migrating shorebird total. Unfortunately, numbers of autumn migrants and information on habitat use by this group is incomplete for 2 reasons: most of the autumn migrants were missed in 1988-1989 because the summer season, when the early migrants appear, was not surveyed and in 1979-1980, observation stations did not reflect habitat type.

The Western Sandpiper was the most abundant migrant shorebird comprising 6% (307 birds) of the combined shorebird total; it formed 9.7% of the total shorebird numbers in 1979-1980 and 3.4% in 1988-1989. Spring migration: the earliest arrival date was 20 April 1980 and latest spring departure date was

11 May 1980; a peak number of 100 birds occured on 5 May 1980. Autumn migration: earliest arrival was 17 June 1979 and latest departure was 4 November 1979. The extended autumn migration is due to a differential migration: adults arrive first followed by the juvenilles. The Western Sandpiper is primarily a bird of mudflats, and used the east mudflat and edges of the estuarine channels at low tides; a few were found in the intertidal area. In 1988-1989 the single record of 100 birds was from the east mudflat. Martin and Fortune (1993) found that the Western and Least Sandpipers used the east mudflat and edges of the north and west channels.

The Least Sandpiper was the second most abundant migrant shorebird and comprised 3% (138 birds) of the combined shorebird total; 6.3% of the total shorebirds seen in 1979-1980 and <1% in 1988-1989. There was only 1 spring migration record: 5 May 1989-4 birds. Autumn migration: earliest arrival was 15 July 1979 and the latest date seen was 21 October 1979 when a peak of 62 birds occured. Often in mixed flocks with the Western Sandpiper, the Least Sandpiper also used similar habitat. The single record in the spring of 1989 was from the east mudflat.

We recorded a total of 161 dowitchers (99% during 1979-1980); 121 of the birds were identified as Long-billed Dowitchers (2% of the combined shorebird total), while the remainder went unidentified and were reported as dowitcher species. A Short-billed Dowitcher was reported outside the study periods: 1 bird was seen on 13 July 1974 (SR). Over the study periods there were no records of dowitchers during the spring migration. Autumn migration: the earliest date was 2 July 1979 (primarily adults) and the latest date was 16 November 1979. A peak number of 23 Long-billed Dowitchers occured on 3 August 1979. Campbell et al. (1990) note that the Long-billed and Short-billed Dowitchers often mix together and use similar habitats. Consequently, for this report we have combined them into "dowitcher species" for discussion of habitat use. In 1979-1980, 76% of the dowitchers preferred the west side of the estuary over the east side. The 2 birds seen in 1988-1989 both used the west channel. Martin and Fortune (1993) observed a total of 26 dowitchers over three observation days: 29 and 30 July and 12 August 1993; 87% were observed in the north channel and the remaining birds were found using the east mudflat.

Twenty-five Greater Yellowlegs were recorded in roughly equal proportions over the 2 study periods. Spring migration: earliest arrival was 14 February 1989 and the latest spring departure date was 30 April 1980. Autumn migration: earliest arrival was 29 July and the latest autumn departure was 19 August 1979 (1 bird recorded 8 June 1980 was most likely a nonbreeder). Numbers peaked on 29 July 1979 when 4 birds were seen. During the 1988-1989 study period, 40% of the yellowlegs used the east mudflat and north channel respectively; the remaining 20% were observed using the mouth of the Englishman River.

Lesser Yellowlegs were observed only in the 1979-1980 study period when 21 birds were recorded. All records were from the the autumn migration; earliest arrival date was 29 July 1979 and the latest departure date was 30 August 1979 when a peak number of 18 birds was recorded. Most (90%) of the Lesser Yellowlegs used the west side of the estuary. Martin and Fortune (1993) noted 9 unidentified yellowlegs along the north channel on 30 July 1993 and 8 Lesser Yellowlegs in the same location on 12 August 1993.

The Pectoral Sandpiper was seen during the autumn migration (13 birds) and as with the Least Sandpiper was noted only during the 1979-1980 study period. Autumn migration: earliest arrival date was 23 September 1979 when a peak of 7 birds was seen; latest departure date was 21 October 1979. The west side of the estuary was used by most (77%) of the birds. Paulson (1993) notes that the Pectoral Sandpiper is more prevalent in autumn when it commonly associates with Least Sandpipers. The 2 species have identical habitat preferences.

Of the shorebirds seen primarily during migration, the Semipalmated Plover was observed the most infrequently with a total of 9 birds. Spring migration; only date recorded was 5 May 1989. Autumn migration: earliest date was 29 July 1980 when a maximum of 6 plovers occured; latest date was 3 August 1979. All of the plovers were seen using the east side of the estuary; the 2 birds recorded in 1988-1989 were from the east mudflat specifically. The east mudflat is the largest of this habitat type at the Englishman River estuary and probably the only area open enough for the Semipalmated Plover to frequent.

Other shorebirds: The Killdeer was seen in all seasons with a total of 564 birds recorded over the study periods (95% seen in 1979-1980), ranking them as the second most abundant shorebird at 11% of the combined shorebird total. Although this species is a resident, daily totals in the autumn of 1979 were higher on average than winter and spring daily totals suggesting a small autumn movement. Campbell et al. (1990) note that autumn migration, when birds travel singly, in pairs, or in small flocks, is masked by resident birds. The frequency of occurence for Killdeer in 1979-1980 ranged from 77% during the winter to 100% during both of the summer seasons. In 1988-1989, the chance of seeing a Killdeer dropped to 0% in the autumn and rose to 64% during the spring. Killdeer numbers peaked on 12 October 1979 when 63 birds were seen. In 1988-1989, the north channel was used the most (35% of the killdeer seen), followed by the east mudflat (32%) and the south-central river (23%).

The Common Snipe was seen only during the 1979-1980 study period when a total of 7 birds were recorded; the maximum of 2 birds occurred on 8 December 1979. The earliest sighting of snipe was on 4 November 1979; latest spring record was 20 April 1980. The November through January sightings are of wintering birds while the 2 records from April coincide with the peak spring movement for the coast (Campbell et al. 1990). Most snipe used the west side of the estuary (57% of the birds), dyked upland (29%) and 1 bird was seen on the east side of the estuary.

The Spotted Sandpiper was seen only during the 1979-1980 study period: 1 bird was noted on 29 May 1980 and another on 8 June 1980. Both sightings were from the east marsh/river unit and were likely of the same bird. Martin and Fortune (1993) noted 8 Spotted Sandpipers between 15 July and 27 August 1993 with a peak of 3 birds recorded on 15 July of that year. On every occasion the Spotted Sandpiper was found in the south-central river and marsh close to where the main channel branches to the west. None of the birds seen outside the study period had spotted breasts indicating that they were either juveniles or nonbreeding adults. Four Spotted Sandpipers were observed at Englishman River estuary on 24 May 1974 (SR).

A single Whimbrel was seen by the river mouth on 20 May 1987 (NKD and GT) and 12 Rock Sandpipers were seen in March 1973 (RF).

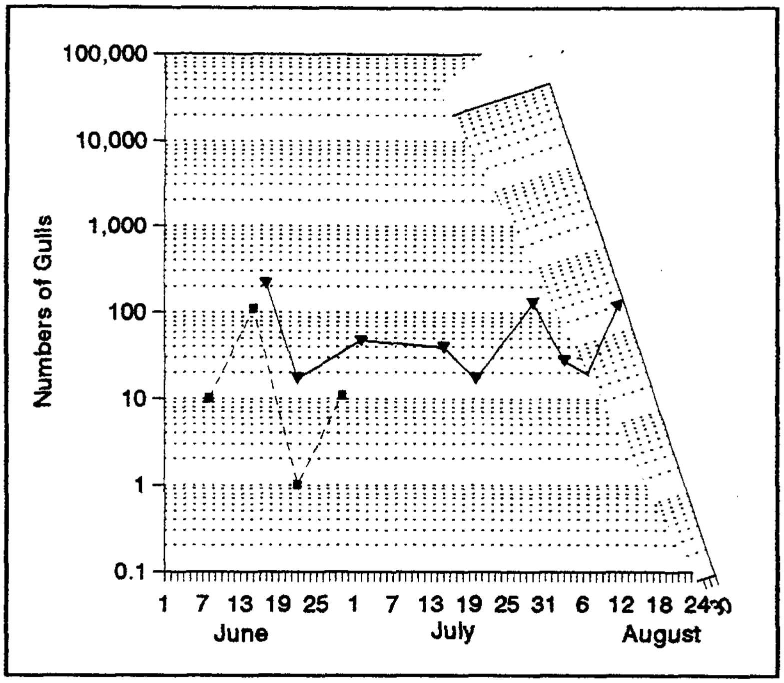

Figure 25. *Seasonal fluctuations in the numbers of gulls on the Englishman River estuary, late summer 1979 (solid line), and early summer, 1980 (dashed line).*

Gulls: We reported a total of 6 gull species over the course of study; 4 of the species were noted in 1979-1980 while 6 were seen in 1988-1989. Gulls comprised 45% of all birds seen; 49% of the total birds in 1979-1980 and 35% in 1988-1989. Of those gulls identified (only 10% of the total gulls observed), the Glaucous-winged Gull was the most abundant, followed by the Bonaparte's Gull and Mew Gull. During both study periods gull numbers were lowest in summer, steadily building to peak numbers during the spring when 73% of all gulls were seen. Slightly over 25,000 gulls congregated off the estuary during a Pacific herring spawn in 1980. For seasonal fluctuations in gull numbers see Figures 25 and 26). Gulls were most often observed using the intertidal area (80% of the total birds). Gravel bars at the river mouth in the intertidal area were used for loafing as the tide dropped. The second most frequently used habitat was in the river and among the logs and gravel in the north-central river area, a preferred loafing and bathing location. Seasonal habitat use for 1988-1989 is shown in Figure 27. In autumn, most gulls made use of the north-central river gradually shifting to to the intertidal and river mouth habitat through winter and into spring.

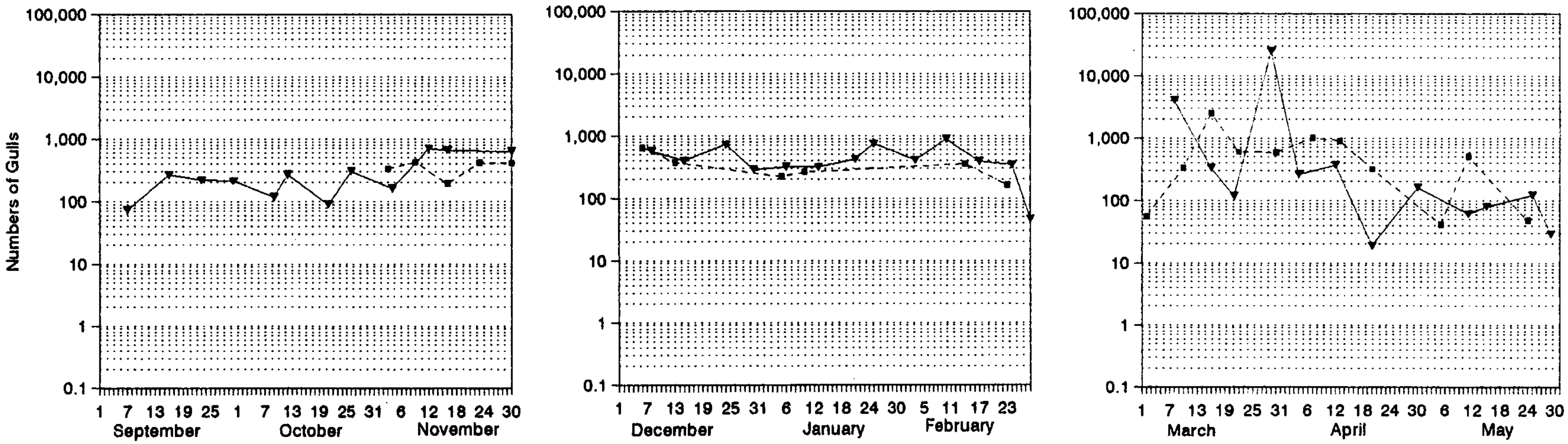

Figure 26. Seasonal fluctuations in numbers of gulls on the Englishman River estuary during autumn, winter and spring, 1979-1980 (solid line) and 1988-1989 (dashed line).

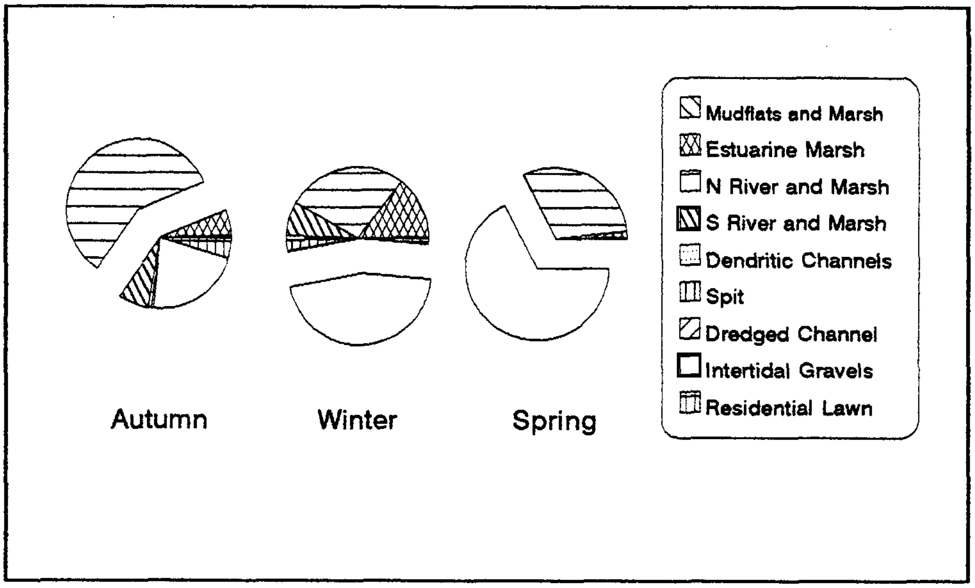

Figure 27. *Seasonal habitat use by gulls on the Englishman River estuary, autumn through spring, 1988-1989.*

The Glaucous-winged Gull accounted for 5% and 4% of the total gull numbers over the study periods respectively and was the most abundant of the gulls. These figures are somewhat misleading as 90% of all the gulls were not identified to species. It is likely that Glaucous-winged and Thayer's gulls made up most of the total gulls. Gull numbers were the highest in spring. Autumn and winter concentrations were similar. Most of the Glaucous-winged Gulls use the intertidal area (67%) followed by the north-central river and east mudflat. Riverine habitat is also used extensively in winter as salmon carcasses become available in late autumn and early winter.

The Bonaparte's Gull was seen roughly in equal numbers each period: 896 birds in 1979-1980 and 880 birds in 1988-1989, ranking them second most abundant (3.4% of all gulls seen). Considered to be an abundant spring and autumn migrant, they are known to congregate during herring spawns. However, this was not found to be case during the spring Pacific herring spawn of 1980 when their numbers dropped to below half of the autumn level. A peak of 512 Bonaparte's Gulls was recorded 13 April 1989 during spring migration. Earliest spring arrival was 7 April 1989, latest departure was 15 May 1980. Autumn migration: earliest arrival was 29 July 79-29 birds, latest departure was 12 November 1979, when 500 were reported. A flock of 110 Bonaparte's Gulls was seen on the east side of the estuary on 2 January 1994 (CBC;JH). In 1988-1989, the north-central river was used by most of these gulls (58%); intertidal use followed at 33%.

The Mew Gull was the third most abundant gull with 698 birds seen (69% were from the 1979-1980 study period). Earliest arrival was 3 August 1979 and the latest departure was 20 April 1980. For both study periods, late summer and autumn numbers were the lowest; numbers increased through the winter and peaked in spring when the daily maximum of 113 birds was noted 7 April 1989. The intertidal area was the preferred habitat for the Mew Gull used by 61% and 86% of the birds over the 2 study periods respectively. In 1988-1989 the east mudflat and the north-central river were used equally. Mew Gulls were also observed flying and dipping into the Englishman River outside of the study area during the salmon spawning period. They were likely gleaning loose salmon eggs washed from the gravels.

The Herring Gull was reported a total of 47 times (98% from 1979-1980). It is primarily a spring and autumn migrant; Herring Gulls were not reported in the winters of the study. There are a few winter records of Herring Gulls in the Parksville-Qualicum Beach area observed during Christmas Bird Counts. There was only 1 record of the Herring Gull observed during spring migration on 29 March 1980 when a peak of 39 birds occured. Autumn migration: earliest arrival was 17 June 1979 and latest departure was 30 November 1988. All of the 46 Herring Gulls seen in 1979-1980 were observed using the intertidal area and the 1 gull seen in 1988-1989 was observed in the dredged channel.

There were 2 records of the California Gull during the 1988-1989 survey totalling 13 birds: 9 November 1988-12 birds and 7 April 1989-1 bird . One hundred California Gulls were tallied on 20 December 1992 (CBC). The north-central river habitat was used by 92% of the birds; 1 bird was noted using the river mouth.

Only 1 Thayer's Gull was reported over the study periods on 2 March 1989, although they do occur in large numbers on the estuary: 746 were counted on 2 January 1994 (CBC). Most of the latter birds were using the intertidal area.

Ring-billed Gulls occurred in a flock of Mew and Glaucous-winged gulls at the river mouth during low tide on 10 March 1989 and again with the same species on 16 March 1989. Numbers were not determined.

Two other gull species have been seen at the Englishman River Estuary outside of the study period. An immature Iceland Gull was observed at the river mouth on 9 April 1994 during the Brant Festival Big Day Birding Competition and 1 second year Glaucous Gull was seen on the shore of Englishman River just downstream of the Island Highway bridge on 20 December 1992 (CBC).

The Caspian Tern was also seen outside of the study period when at least 6 birds were seen in flight over the Englishman River Estuary on 30 June 1993 (NKD).

Alcids: We saw a total of 12 Pigeon Guillemots over the course of the study with sightings in every season. Seventy-five percent of the sightings were of single birds, there was 1 sighting of 2 guillemots, and a peak of 4 was seen on 7 September 1979. All of the Pigeon Guillemot sightings were from the intertidal zone.

The Marbled Murrelet was also seen in small numbers, a total of 11 birds was reported during spring and summer. The 3 records were of 1, 2 and 8 birds (the maximum of 8 birds was on 25 May 1980), all using the intertidal zone.

Doves and Pigeons: A total of 37 Rock Doves was seen (96% of the observations were seen during the 1979-1980 study period). A peak of 25 birds occured on 9 October 1979 and were observed in the west marsh area. Other sightings were from the east marsh and the intertidal area.

The Band-tailed Pigeon was seen exculsively in the 1979-1980 period with a total of 51 birds recorded. A peak number of 49 pigeons was seen in the dyked upland area on 15 June 1980; other sightings were from the general area of the Englishman River.

One Mourning Dove was reported outside of the study period (SL, EK, MM) on 7 May 1980; exact location on the estuary is unknown.

Owls: Only 1 species of owl was reported during the study period. A single Short-eared Owl was seen in the dyked upland during spring migration on 21 March 1980. On 30 November 1988 a Short-eared Owl pellet was found near the north and west channels; it contained the remains of 1 meadow vole (*Microtus townsendii*).

Other records for owls at the Englishman River estuary include 1 Barred Owl spotted in the forested area on 26 October 1993 (KF), 1 Great Horned Owl spotted on 15 December 1991 (CBC) and 1 Snowy Owl was seen perched on a log beside the north channel, directly behind the RV Park on 14 December 1993 (TM, KF).

Nighthawks and Swifts: The Common Nighthawk was recorded once during the study period: 1 bird was seen in flight over the west marsh and spit on 20 July 1979. The Black Swift was observed on 15 July 1993 when 20 were seen overhead on the east side of the estuary (Martin and Fortune 1993).

Hummingbirds: We saw a total of 7 hummingbirds during the 1979-1980 study period (none were reported in 1988-1989); 71% were the Rufous Hummingbird and 29% were left unidentified but they were most likely Rufous Hummingbirds as well. Earliest arrival was 12 April 1980 when a peak of 4 birds was noted; the latest departure was 16 September 1979. Hummingbirds were found throughout the study area except for the intertidal area.

Kingfishers: The Belted Kingfisher, a resident, was seen a total of 64 times; 91% of the birds were noted in 1979-1980. A peak of 5 birds was seen on 21 October 1979. In 1979-1980, most of the kingfishers used the east and west marshes: 50% and 43% respectively, dyked upland (5%) and the intertidal area was used the least by 2% of the birds. All of the Belted Kingfisher sightings in 1988-1989 were from channel habitat on the west side of the estuary. Martin and Fortune (1993) found the frequency of occurence for the Belted Kingfisher to be 100% between 8 July and 27 August. Although kingfishers were reported using most of channel and marsh habitats they were seen most frequently in the vicinity of the south-central river where the main channel branches to the west. At this location, kingfishers were often seen fishing in the river or perched on a log jam at the entrance to the channel.

Woodpeckers: Only 2 species of woodpeckers were seen during the survey with a combined total of 122 birds (96% were recorded in 1979-1980). The Northern Flicker made up 98% of all the woodpeckers seen. They were noted in every season. Numbers peaked on 2 July 1979 when 8 birds were reported; 19 Northern Flickers were counted on 20 December 1992 (CBC). In 1979-1980 the west side of the estuary was used by 60% of the birds; isolated trees in the shrub zone are favoured perches. The east side of estuary was used by 24% of the birds, followed by use of the dyked upland (15%) and 1 bird was observed in the intertidal area. In 1988-1989 the west marsh was used by 60% of the birds, while 1 flicker was observed in both the east mudflat and on the west spit. A Yellow-shafted race and a Yellow-shafted/Red-shafted intergrade have been observed on the Englishman River estuary (DC) and in the adjacent community of San Pariel (JH).

There is 1 record for the Hairy Woodpecker: 11 August 1979 when 2 birds were seen in the north-central river and marsh habitat. Three Hairy Woodpeckers were noted on the estuary on 20 December 1992 (CBC). The Hairy Woodpecker is seen on occasion throughout the year, especially in the Red Alder section along the south edge of the forest close to the residential area.

Three additional species of woodpeckers have been identified on the Englishman River estuary (primarily the forested sections), outside of the survey periods. The Red-breasted Sapsucker is seen on occasion throughout the year. The Pileated Woodpecker is seen regularly throughout the year; the forest component is likely the breeding territory for a pair. A maximum of 3 Pileated Woodpeckers was seen 20 December 1992 (CBC). The Downy Woodpecker is seen the least frequently and is usually found in the Red Alder woods along the south edge of the forest close to the residential area.

Passerines: Both the 1979-1980 and 1988-1989 surveys were conducted primarily to determine waterbird bird use of the estuary from the high water mark down to the intertidal beach and adjacent open waters of the Strait of Georgia. Thus, with the exception of the 1979-1980 survey, which included the dyked upland habitat on the east side of the estuary (owned by The Nature Trust of British Columbia) most of the suitable passerine habitat within the estuary was excluded from the 2 surveys. To describe the bird use of the Englishman River estuary, we have drawn upon as many sources as possible, and the following description of the passerine use of the estuary was derived from those sources. Much of the additional information comes from a preliminary survey of songbird use of the estuary by the CWS in 1993. Passerines accounted for 12% of all birds seen in 1979-1980 and 5.5% of the total birds in 1988-1989. Overall, these figures represent 15 families and 39 bird species. See Figures 28 and 29 for seasonal fluctuations in passerine numbers. For seasonal habitat use by passerines, see Figure 30.

Flycatchers: Of the flycatchers, only the Willow Flycatcher was seen during the 2 survey periods with 9 birds noted over the summer of 1979. A peak of 5 Willow Flycatchers occured on 22 June 1979. Seven birds were recorded on 12 Aug 1993 when the frequency of occurence during weekly songbird surveys from July to mid-August 1993 was 100% (Martin and Fortune 1993). The earliest arrival date was 17 June 1979 and the latest departure date

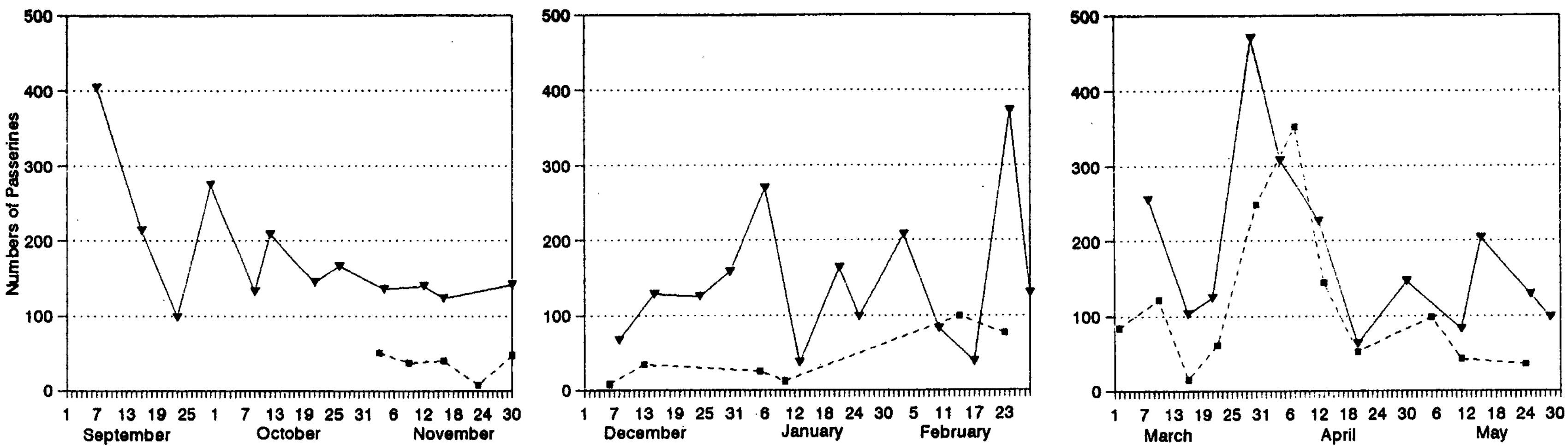

Figure 28. Seasonal fluctuations in numbers of passerines on the Englishman River estuary during autumn, winter and spring, 1979-1980 (solid line) and 1988-1989 (dashed line).

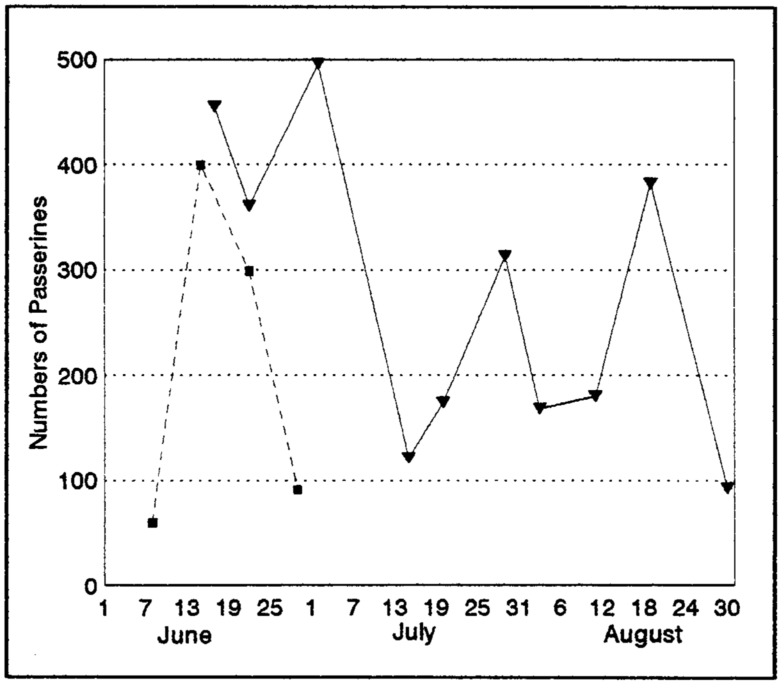

Figure 29. *Seasonal fluctuations in the numbers of passerines on the Englishman River estuary, late summer 1979 (solid line), and early summer, 1980 (dashed line).*

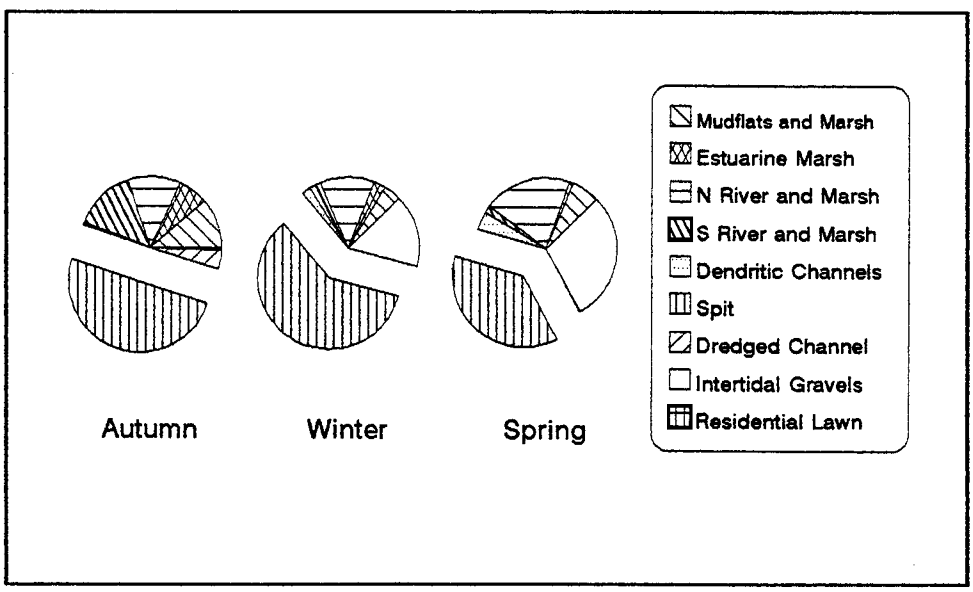

Figure 30. *Seasonal habitat use by passerines on the Englishman River estuary, autumn through spring, 1988-1989.*

was noted outside of the 2 surveys on 12 August 1993. The data generated during the 1979-1980 survey do not give a clear indication of habitat use by this flycatcher with the exception of the dyked upland where 33% of all sightings occurred. However, all of the Willow Flycatchers observed during the 1993 songbird survey were using shrubby areas (Nootka Rose, Pacific Crabapple, blackberry, and thistle) found in the dyked upland and along the forest edges and in one case in willow and cottonwood along the Englishman River.

Three additional species of flycatchers were noted outside of the survey periods. Martin and Fortune (1993) recorded the Hammond's Flycatcher and the Pacific-slope Flycatcher calling regularly from the forest canopy during the summer. There is also 1 record for the Eastern Kingbird: an individual was seen perched on a Douglas-fir tree near the breached dyke on 26 June 1980 (NKD).

Larks: Larks were not seen during the 2 surveys. However, we have 2 records of the Horned Lark at the Englishman River estuary: 1 bird was seen at the river mouth on 12 February 1984 (RI) and 2 unaged males were seen on 30 July 1953 (WEG).

Swallows: Five species of swallows were seen during the 2 surveys. Martin and Fortune (1993) found the frequency occurence for swallows to be 75% during a songbird survey in July and August. At that time, swallows were found hawking primarily over the channels, the east mudflat, and the south-central river habitat.

The Barn Swallow was the most abundant of the swallows in 1979-1980. The earliest arrival date was 30 April 1980 and the latest departure date was 7 September 1979 when a peak of 65 Barn Swallows was recorded. All surveyed stations were used by this species.

The second most frequently seen swallow in 1979-1980 was the Violet-green Swallow. This species was the first of the swallows to arrive (22 March 1989); latest departure was 11 August 1979. A peak of 29 birds occured on 22 June 1979. In 1988-1989, most of the Violet-green swallows were seen over the east marsh and mudflat (45%) and the river mouth (28%).

The Northern Rough-winged Swallow was also recorded in both study periods. The earliest arrival was on 12 April 1980 and the latest departure was on 19 August 1979 when a peak of 19 birds occurred. They were observed flying over only the east marsh and mudflat and north channel in 1988-1989.

The remaining 2 species of swallows were noted only in the 1979-1980 period. The Tree Swallow: 11 May 1980-1 bird and 15 June 1980-1 bird. There was only 1 record for the Cliff Swallow: 2 July 1979-2 birds.

Crows and Jays: Two species of corvids were recorded during the 2 surveys. Large numbers of the Northwestern Crow were observed in every season of the 2 study periods. A peak of 250 crows was recorded on 6 January 1979; in 1988-1989 the greatest numbers were seen in the spring. All stations and habitat units were used by the Northwestern Crow: in 1988-1989, the river mouth and intertidal area was used by 27% of the birds, followed by the North central river (26%) and the west spit (23%). On 21 March 1989, a grey crow (resembling a gull) was seen at the river mouth; this individual was spotted regularly by local naturalists at the Englishman River estuary over the next 2 years.

The Common Raven accounted for <1% of the corvids recorded with only 21 birds seen over all of the seasons in 1979-1980, except during the summer of 1980. Ravens are usually just passing over; those that stop are quickly mobbed by crows.

The Steller's Jay was not recorded during the 2 surveys but has been noted in small numbers (<5 birds) through all seasons. They frequent the forest edge, especially near residential areas (CBC).

Chickadees: During the 2 survey periods, the Chestnut-backed Chickadee was recorded only during the summers of 1979 and 1980 when a total of 14 birds was noted. A peak of 10 birds was seen on 29 June 1980, although higher numbers have been seen on the study site: 2 January 1994-66 birds (CBC). Chickadees are more common in the forested areas and along the edge of the Englishman River where they are regularly heard and seen moving in small flocks (often mixed with other passerines).

Bushtits: During the 1979-1980 survey period there were 3 records for the Bushtit totalling 18 birds. Numbers peaked at 14 birds on 19 August 1980; Martin and Fortune (1993) saw 28 birds on 29 July 1993. The Bushtit is a resident and has been recorded on the estuary throughout the year. The frequency of occurence during the 1993 songbird survey from 8 July to 27 August was 100% (Martin and Fortune 1993). At that time, Bushtit flocks were often seen with other small passerines including Orange-crowned Warblers and Pacific-slope Flycatchers. Shrubby areas were preferred, especially those close to the residential area on the west side of the estuary, the dyked upland, and along the edge of the Englishman River.

Nuthatches: There is only 1 record for the Red-breasted Nuthatch over the study periods: 25 May 1980 when 2 birds were seen. They are primarily a forest dweller on the estuary where they are likely resident. A juvenille nuthatch was observed in a Douglas-fir tree beside the central trail through the forest on the West side of the estuary on 16 July 1993 (Martin and Fortune 1993); frequency of occurence during this songbird survey was 88%.

Creepers: A single Brown Creeper was noted on 12 October 1979. The forest portion of the Englishman River estuary has been selectively logged leaving behind some old growth trees with thick loose bark that creepers use as nest sites. The Brown Creeper is a resident on the estuary.

Wrens: The only wren seen during the 2 surveys was the Bewick's Wren: 1 bird on 7 September, 3 August and 12 October 1979 respectively. This species has been noted at all times of the year in shrubby areas, particularly near the forest edge.

The Winter Wren is a common year-round resident in the forested areas of the Englishman River estuary . On 20 December 1990, 7 Winter Wrens were counted (CBC).

Kinglets, Bluebirds, and Thrushes: The American Robin represented 97% of the total muscicapids in 1979-1980 (when 91% of all the robins were seen) and 56% in 1988-1989. Robins were found at the estuary in every season with highest numbers reported during the spring of both study periods: a peak of 14 birds occurred on 29 March 1980. During the songbird survey of 1993 the American Robin was noted using shrubby areas the most, especially areas with Salmonberry and Elderberry, as well as riparian habitat and deciduous areas of the forest. Juvenille robins were encountered throughout July and most of August with 1 active nest discovered 22 July 1993: it was about 1 meter off the ground in the crotch of a Pacific Crabapple tree. A major spring movement was noted in the Parksville-Qualicum Beach area on 2 March 1989 when many American Robins were observed at the estuary and at Nanoose, Qualicum Beach, and along the Island Highway near Kinkade Road. Autumn flocking behaviour at the Englishman River estuary was observed on 6 August 1993 when 10 robins were observed and heard in the top of a large cottonwood. As the berries on the Arbutus trees in the district start to ripen, robins congregate in large flocks (up to 1,000 birds) along with starlings and Varied Thrush in local groves to take advantage of the abundant food supply.

The remaining species belonging to this group were all seen in small numbers. Two observations of the Mountain Bluebird during the spring migration totalled 7 birds: 4 birds were seen using the West spit on 22 March 1989 and 3 were seen using the area beside the west channel on 7 April 1989. There are 2 other records of the Mountain Bluebird outside of the study period. The first record was 2 November 1991 when 1 was observed, apparently feeding, flying from post tops to the ground on the west spit (NKD, RO, TM, ELN). Exactly 1 year later on 3 November 1992, another bluebird was observed at the same spot on the west spit (TM, KF); this bird, however, now had to deal with an occupied RV park. The west spit, on the Englishman River estuary, was one of the few areas in the district where bluebirds could be found. As the RV park continues to expand and remains busy during the off season, these rare spring and fall migrants will likely no longer be able to use this location.

Only 2 Golden-crowned Kinglets were seen over the study periods: 1 on 4 November 1979 and another on 20 April 1989. They are, however, a common resident of the forested areas on the estuary. A total of 66 Golden-crowned Kinglets was observed on 2 January 1994 (CBC).

The Swainson's Thrush was also reported twice: 1 bird on 17 June 1979 and another on 2 July 1979. This secretive thrush is common in the summer months where it is often heard calling from the forest edge but is rarely seen. Although not recorded during the 2 surveys periods, both the Ruby-crowned Kinglet and the Varied Thrush have been regularly noted in the forest of the Englishman River estuary (TM).

Pipits: The American Pipit was seen only during spring and autumn migrations when a total of 40 birds was reported in 1979-1980. There are

are 2 records during the spring migration: 12 April 1980-13 birds and 5 May 1989-1 bird. American Pipits were also noted during autumn migration: 16 September 1979-7 birds, 12 October 1979-1 bird, and 3 November 1988-13 birds. Outside of the study period, 2 pipits were seen on 11 November 1992 (TM). The west spit was used by most (80%) of the pipits followed by the intertidal area (20%).

Waxwings: The Cedar Waxwing was observed only during the summer of 1979-1980 when 2 birds were noted on 2 July 1979. Martin and Fortune (1993) observed Cedar Waxwings 63% of the time (range of 1-8 birds) for the period 8 July through to 27 August. During this time, 2 areas in particular were frequented by waxwings: the forest edge and immediate surrounding shrubs and pond near the residential area on the southwest side of the estuary, and the dyked upland habitat.

Shrikes: The Northern Shrike was seen infrequently during 1979-1980 and 1988-1989 with a total of 3 records, each of a single bird. Earliest arrival date was 3 October 1993 and the latest date seen was 30 December 1993, although they undoubtedly remain on the area until spring. The habitats frequented by shrikes include the west spit, shrub areas in the west marsh, and the dyked upland.

Starlings: The European Starling was the most frequently seen passerine in both of the study periods. Numbers peaked at 383 birds on 2 July 1979. "Clouds" of European Starlings can be seen at any time of the year, over most of the estuary. In 1988-1989, 54% of the starlings used the west spit, followed by the river mouth (26%), north-central river and marsh (13%), and the intertidal area. Trees along the edge of the west side of the estuary near the residential area were also popular collecting spots for the European Starling (Martin and Fortune, 1993).

Vireos: Vireos were not observed during the 2 study periods. However, 4 species have been recorded using the Englishman River estuary. The Solitary Vireo was recorded (1 to 2 birds) regularly from 15 July to 30 August 1993 (Martin and Fortune 1993). All of the Solitary Vireo sightings were from the forest edge or shrub and riverine habitat close to the edge.

Also during the summer of 1993, there were weekly observations of 1 to 3 Warbling Vireos from 2 June to 19 August. The Warbling Vireo used 2 habitats in particular: they were heard singing from the forest and were also observed in the Red Alders gleaning insects along the edge of Englishman River. In the latter area they were often seen in mixed flocks with Chestnut-backed Chickadees and Black-throated Gray Warblers.

There are 2 records for the Hutton's Vireo outside the survey periods: 1 bird was heard calling from the mixed coniferous/deciduous forest on the east side of the estuary on 19 August 1993 (Martin and Fortune 1993) and 1 bird was noted on 2 January 1994 (CBC).

We have only 1 record for the Red-eyed Vireo: 1 bird was heard and then seen moving through the Red Alder canopy while gleaning insects at the southwest corner of the forest on the west side of the estuary on 8 July 1993 (Martin and Fortune 1993).

Wood Warblers, Sparrows and Blackbirds: The emberizids are a large and diverse group that ranked as the third most common passerine family for each of the 2 study periods. Overall, 3 species of warblers, 9 species of sparrows and 3 species of blackbirds were recorded. For each of the study periods sparrows were the most numerous.

Warblers: The Orange-crowned Warbler was seen a total of 7 times during the 2 survey periods and in 1993, the frequency of occurence for this species was 100% between 8 July and 27 August (Martin and Fortune 1993). The earliest arrival date was 5 May 1989 and the latest departure date recorded for the Orange-crowned Warbler was 27 August 1993. This warbler was found almost exclusively in the shrub zone, generally close to the forest but on a few occassions it was observed at the outer edge of the shrubs bordering the intertidal area.

Only 2 Yellow-rumped Warblers were seen over the study periods: 1 bird on 22 March 1989 and 1 bird on 24 May 1989. Both warblers were noted on the West spit.

The Yellow Warbler was observed once: a single bird on 19 August 1979 in the dyked upland. In 1993, there were 4 records of a single Yellow Warbler: 3 from the shrub/forb area around the channel at the south edge of the west marsh and 1 observation from the dyked upland. Birds were last reported in 1993 on 19 August.

The Black-throated Gray Warbler was noted weekly during the summer of 1993. A forest dweller, the Black-throated Gray Warbler was either observed close to the canopy edge or moving through the Red Alders, often in small, mixed flocks with Chestnut-backed Chickadees, along the banks of the Englishman River. Latest date seen was on 27 August 1993.

The Townsend's Warbler was observed once in the summer of 1993 with a flock of Chestnut-backed Chickadees by the river edge on 19 August.

The MacGillivray's Warbler was observed 100% of the time during the songbird survey of 1993 between 8 July and 27 August (Martin and Fortune 1993). Virtually all of the shrub habitat on the estuary was used by the MacGillivray's Warbler including those areas along the edge of the Englishman River; on 1 occasion it was found in the mixed forest habitat.

The Common Yellowthroat was also seen or heard 100% of the time during the 1993 summer survey (Martin and Fortune 1993). Shrub areas were favoured by it as well. In particular, the Common Yellowthroat was regularly observed close to the artificially created pond on the southwest side of the estuary and amongst the dense thistles and shrubs in the dyked upland.

We have 1 record for the Wilson's Warbler at the Englishman River estuary: 12 August 1993 when 1 female was seen perched in a Pacific Crabapple tree

(Martin and Fortune 1993). A short distance away, a juvenile was also perched in a Pacific Crabapple preening. The warblers were at the edge of the shrub zone where it borders the east marsh.

Sparrows: The Savannah Sparrow was the most common sparrow seen over the study periods. The earliest arrival date for the Savannah Sparrow was 12 April 1980 and the latest departure date was 4 November 1979. Although a summer visitant, the largest number of Savannah Sparrows occurred during the autumn migration when 258 birds were seen on 7 September 1979. Savannah sparrows frequented the west spit, the estuarine marsh on both sides of the river, particularly at the upper elevations of the marsh where the principle vegetation was grass, gumweed and yarrow. A nest with 4 eggs was found on 8 July 1993 in the west marsh (NKD).

The second most common sparrow over the study periods was the Dark-eyed Junco. The highest numbers occured in the autumn and winter: peak number during the 2 surveys was 64 birds on 30 November 1979 and outside of the study period 97 juncos were tallied on 15 December 1994 (CBC). Flocks of Dark-eyed Juncos are often seen mixed with other small birds in the shrub and forested edges of the estuary as well as the west spit; 1 flock of 60 birds was observed in the intertidal zone on 15 December 1979.

The Song Sparrow was the third most frequently seen of the sparrows. Numbers for this resident peak in winter: 25 Song Sparrows were counted on 20 December 1992 (CBC). This species, a habitat generalist, was observed frequenting the intertidal zone, sand and gravel flats with accumulated driftlogs in the north-central river and marsh area, riparian habitat, the forested areas with some understory, along the forest edge and throughout the shrub communities.

The Golden-crowned Sparrow and the White-crowned Sparrow were reported during the 1979-1980 survey period. Small numbers (25 birds) of Golden-crowned Sparrows were seen throughout the survey year, with a peak of 7 birds on 25 January 1979. Their preferred habitat was the dyked upland. A total of 21 White-crowned Sparrows was seen from spring through autumn. Their numbers peaked at 4 birds on 2 July 1979. Martin and Fortune (1993) found this species using the shrub areas in the dyked upland and the estuarine intertidal zone.

There is 1 record of 17 Lincoln's Sparrows on 30 August 1979. Other records for the Lincoln's Sparrow are also during the fall migration: 1 bird seen on 12 August 1993 and 1 bird on 19 August 1993 (Martin and Fortune 1993). Habitats used by this sparrow include the dyked upland and upland estuarine areas.

The Rufous-sided Towhee is a resident on the estuary. The peak number recorded outside of the survey periods was 8 birds on 20 December 1992 (CBC). Based on data collected by Martin and Fortune (1993), the Rufous-sided Towhee prefers shrubby areas, forest edges with understory and riparian habitat.

A single White-throated Sparrow was observed using the dyked upland on 22 June 1979. This is a rare bird in the area (Dawe and Ostling 1993).

Two other sparrows were noted outside of the study periods. The Vesper Sparrow was observed twice on the Englishman River estuary: 1 male was noted on 14 August 1980 (NKD) and another male in full song was seen on 16 June 1981 (NKD). One Lapland Longspur was recorded on 30 April 1981 (AR).

Blackbirds: The Brewer's Blackbird was seen in the highest numbers. In 1979-1980, 5 to 12 birds were seen weekly between 17 June and 29 July 1979; none were observed in autumn or winter. Earliest arrival date for the Brewer's Blackbird was 8 March 1980 and numbers peaked on 4 April 1980 when 19 birds were reported. They were seen 75% of the time through the spring increasing to 100% frequency of occurrence throughout the summer of 1980.

The Western Meadowlark was reported during both of the survey periods. Numbers peaked during the autumn at 12 birds on 4 November 1979; their frequency of occurence was 50%. There was some summer use in 1979: 3 birds were seen and may have nested on the estuary. On 6 July 1977, one of us (NKD) found a Western Meadowlark nest with 4 eggs on the east side of the estuary. The nest was built amongst the *Salicornia* in the higher portion of the estuarine marsh. In 1980, all meadowlarks had left by 29 March 1980 and there have been no summer records since that time. Recent winter use has been low: a flock of 8 Western Meadowlarks was seen during December 1991 and 7 were noted on 3 November 1992. The Western Meadowlark's preferred habitat on the estuary is the west spit where most of the observations were made. The birds were occasionally seen in the open, grassy areas on the west side of estuary and perched on old drift stumps beside the marsh channels.

The Red-winged Blackbird was seen during both study periods. A peak of 11 birds was recorded on 22 June 1979; birds were not reported after 2 July 1979. Spring arrival was noted on 8 March 1980. The west side of the estuary and the dyked upland were most often used by the blackbirds. The Red-winged Blackbird was seen in small numbers (<10 birds) on 8 and 15 July 1993 in the shrubs at the edge of the backwater slough located in the dyked upland (Martin and Fortune 1993).

We have 2 records of the Brown-headed Cowbird: 2 birds were seen in flight across the dyked upland on 8 July 1993 and 3 birds were at the shrub/estuarine intertidal edge on 15 July 1993 (Martin and Fortune 1993).

Finches: The American Goldfinch was recorded in the greatest numbers of all the finches. The earliest arrival for the goldfinch was 20 April 1989 and the latest departure date was 16 September 1979. A peak of 192 birds was recorded on 19 August 1979, all feeding on thistles in the dyked upland. In 1979-1980, 61% of all American Goldfinches observed were found in the dyked upland; they were also noted using shrub areas on the west side of the estuary with high concentrations of thistles (Martin and Fortune 1993).

The Pine Siskin had the second highest numbers of birds recorded in the finch family. 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 the year. A peak of 100 siskins occured on 12 November 1979. All 40 birds from the second survey 7 April 1980 were using the west spit. Generally the Pine Siskin is found moving through the canopy of both deciduous and coniferous trees in the forest or along the forest edge.

The House Finch was the third most abundant finch. It also is a resident on the estuary. Peak numbers were recorded during the winter when 34 birds were seen on 15 December 1979. They were recorded in all stations but the intertidal zone; the forest edge and shrubby areas were found to be preferred (Martin and Fortune 1993). There were only 2 records for the House Finch in 1988-1989, both were seen on the west spit: 20 birds were noted on 16 November 1988 and 4 birds were seen on 10 January 1989.

The Purple Finch was recorded only in 1979-1980 when both records were in the autumn of 1979; a peak of 10 birds occured on 7 September. Generally small numbers (<10 birds) are reported along the forest edge and shrub areas during Christmas Bird Counts.

Two additional finch species were recorded outside of the survey period: a small flock of Evening Grosbeaks was seen during the winter of 1992 (TM, KF) in the forest; unfortunately the exact date was not recorded. The Red Crossbill was recorded twice: 2 birds were noted on 15 December 1991 (CBC) and 1 bird was seen flying over the estuary 12 August 1993 (Martin and Fortune 1993).

Conclusions

The Englishman River estuary has, over the years, been severely compromised through a variety of human activities ranging from dyking of the river, to residential and recreational development on the floodplain, to activities high in the watershed. The full productivity of this once pristine ecosystem, will likely never again be realized; however, what remains is still vitally important habitat to a myriad of resident and migratory birds, as evidenced by this report. That diversity, however, is only likely to remain so long as quality habitat remains.

One aspect that can reduce the quality of the habitat is disturbance. As levels of disruption rise, birds such as waterfowl expend increasing amounts of energy in avoidance behaviour. This behaviour varies from low energy activities such as spending more time remaining alert to possible threats, or swimming or walking away from a source of danger, to activities that demand a high energy expenditure such as making flights to other disturbance-free areas within the estuary or, if the disturbance is too great, taking flight and physically leaving the estuary for safer habitat elsewhere. Those avoidance activities prevent the birds from feeding, loafing, preening or nesting; the very reasons they are drawn to the estuary. Eventually, unchecked disruptions could reach levels that make it too expensive energentically for the birds to remain, and the site could be abandoned; i.e., the birds will use more energy leaving because of disturbances, than energy they gain while feeding at the estuary (see Batten 1977).

Thus any public activities on the estuary should be carefully monitored so that their impacts are minimized. That does not mean the public should be excluded from the estuary. Wise public use of the area is possible through management actions such as controlled access at certain seasons, the construction of blinds or observation towers and other activities that will allow the wildlife and public to interact in a manner that benefits or is benign to them both. For example, canoes and kayaks within the estuary create minimal disturbance during the summer months when waterbird use of the estuary is low. However, the period from September through May, which sees high waterbird use on the estuary, is not the time to encourage canoe or kayak activities there. Similarly, nature trails along some of the sloughs would cause minimal disturbance through the summer months, but not so through the winter. Domestic animals, particularly dogs and cats, running free are invariably a significant threat to wildlife. And power boats, with their attendant noise and potential for polluting, do not belong there at all.

The construction of the RV Park, with its manicured lawns and human activity, has removed one of the rarest habitat types from the system: the west spit (the east spit habitat had been lost to residential development for many years). Although the west spit did not hold huge numbers of birds, it was the major habitat for a few species seldom found elsehere on the estuary, e.g. Western Meadowlark, Mountain Bluebird, American Pipit, and Northern Shrike. We can only hope that these species are not lost from the avifauna of the estuary.

In addition, activities from the RV Park have now increased along the south edge of the spit, adjacent to the north channel, an area that was heavily used by waterfowl as a loafing and feeding site during this study. Constant human activity there could have a serious negative impact to wintering dabbling duck numbers on the estuary. Discussions with the members of the RV Park informing them of activities detrimental to wintering and migrating waterbirds and encouraging them to refrain from indulging in those activities when the birds are present could lead to positive results for the wildlife and the people who want to view them.

Staging Brant in the Parksville-Qualicum Beach area depend on the gently sloping beaches and estuaries as places to loaf, preen, and feed to replenish and build their fat reserves to see them through their northern migration to the breeding grounds. On the staging areas, Brant are particulary intolerant of disturbance. Unfortunately, the habitats that migrating Brant depend on, are areas that also attract humans. The Englishman River estuary is situated between 2 other key areas in Parksville used by Brant (Parksville Bay and Craig Bay). In all of these locations, the geese are subjected to heavy and often continuous disturbance from people. Documented activities that disturb the Brant include people running their dogs on the beach, people walking directly to the Brant for a "closer look," jogging along the beach, commercial clam digging, windsurfing, kayaking, and even kite flying. With the projected increased human population in the area, disturbance to these geese and other waterbirds will increase. Perhaps, during times of high wildlife use, critical habitat areas within the Parksville-Qualicum Beach Wildlife Management Area could be designated as restricted, human-use areas, while other areas that have low wildlife use could be set aside for some of the above-mentioned human activities. It could be one way of ensuring that Brant and other waterbirds remain a common sight along the foreshore.

One outcome of continuous disturbance to the Brant, of course, could be that they leave the area. This has been documented elsewhere in North America (Denson 1964), and does not appear to be uncommon with Brant. An obvious repercussion of Brant leaving Parksville's beaches would be the effect on the community's *Annual Celebration of Nature*, the Brant Festival; it would be decidedly paradoxical if Brant no longer came to the Parksville area.

Commercial shellfish harvesting takes place in areas close to the estuary in the spring. In 1993, daylight harvests took place on 10 May, 24 May and 6 June in the proximity of the Englishman River estuary (B Hurst, pers. comm.). During harvests, diggers remain on the beach for up to a full tidal cycle making it impossible for Brant and other waterbirds to come ashore to feed, loaf, or preen. We also do not know what impact the commercial harvest is having on the food resource of waterbirds such as scoters and other diving ducks. Perhaps shellfish harvesting seasons and quotas that consider waterfowl use of the area are in order. These could be areas for further study.

Passerine use of the estuary, especially in the forested sections, has not been well documented at any time of the year. The songbird survey completed during July and August of 1993 was only a preliminary study to determine songbird use of the estuary. A songbird survey over the period of at least a full year would help complete the picture of the passerine use of the Englishman River estuary and provide for their management into an overall plan.

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Appendices

Appendix I. Contributors to the report and their codes as used in the text.

Alphabetically, by name:

DC	Cecile, Don
NKD	Dawe, Neil K.
ELN	Edward L. Nygren
KF	Fortune, Keith L.
RF	Fryer, Ralph
WEG	Godfrey, W.E.
JH	Hammonds, Jack
RI	Ikona, Rick
EK	Kerr, Elspeth
SL	Lees, Sybil
TM	Martin, Terri D.
MM	Miller, Mike
RO	Ostling, Roy
SR	Robinson, Steve
AR	Routledge, Adele
GT	Townsend, Gerry
FW	White, F.

Alphabetically, by code:

AR	Routledge, Adele
DC	Cecile, Don
EK	Kerr, Elspeth
ELN	Edward L. Nygren
FW	White, F.
GT	Townsend, Gerry
JH	Hammonds, Jack
KF	Fortune, Keith L.
MM	Miller, Mike
NKD	Dawe, Neil K.
RF	Fryer, Ralph
RI	Ikona, Rick
RO	Ostling, Roy
SL	Lees, Sybil
SR	Robinson, Steve
TM	Martin, Terri D.
WEG	Godfrey, W.E.

Appendix II. Englishman 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*
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*
GRHE	Green-backed Heron	*Butorides striatus*
TRUS	Trumpeter Swan	*Cygnus buccinator*
GWFG	Greater White-fronted Goose	*Anser albifrons*
SNGO	Snow Goose	*Chen caerulescens*
BRAN	Brant	*Branta bernicula*
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*
CANV	Canvasback	*Aythya valisineria*
GRSC	Greater Scaup	*Aythya marila*
LESC	Lesser Scaup	*Aythya affinis*
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*
TUVU	Turkey Vulture	*Cathartes aura*
OSPR	Osprey	*Pandion haliaetus*
BAEA	Bald Eagle	*Haliaeetus leucocephalus*
NOHA	Northern Harrier	*Circus cyaneus*
SSHA	Sharp-shinned Hawk	*Accipter striatus*
COHA	Cooper's Hawk	*Accipter cooperii*

NOGO	Northern Goshawk	*Accipiter gentilis*
RTHA	Red-tailed Hawk	*Buteo jamaicensis*
AMKE	American Kestrel	*Falco sparverius*
MERL	Merlin	*Falco columbarius*
PEFA	Peregrine Falcon	*Falco peregrinus*
RNPH	Ring-necked Pheasant	*Phasianus colchicus*
CAQU	California Quail	*Callipepla claifornica*
BBPL	Black-bellied Plover	*Pluvialus squatarola*
SEPL	Semipalmated Plover	*Charadrius semipalmatus*
KILL	Killdeer	*Charadrius vociferus*
GRYE	Greater Yellowlegs	*Tringa melanoleuca*
LEYE	Lesser Yellowlegs	*Tringa flavipes*
SOSA	Solitary Sandpiper	*Tringa solitaria*
SDSA	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*
PESA	Pectoral Sandpiper	*Calidris melanotos*
ROSA	Rock Sandpiper	*Calidris ptilocnemis*
DUNL	Dunlin	*Calidris alpina*
SBDO	Short-billed Dowitcher	*Limnodromus griseus*
LBDO	Long-billed Dowitcher	*Limnodromus scolopaceus*
COSN	Common Snipe	*Gallinago gallinago*
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*
ICGU	Iceland Gull	*Larus glaucoides*
GWGU	Glaucous-winged Gull	*Larus glaucescens*
GLGU	Glaucous Gull	*Larus hyperboreus*
CATE	Caspian Tern	*Sterna caspia*
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*
GHOW	Great Horned Owl	*Bubo virginianus*
SNOW	Snowy Owl	*Nyctea scandiaca*
BAOW	Barred Owl	*Strix varia*
SEOW	Short-eared Owl	*Asio flammeus*
CONI	Common Nighthawk	*Chordeiles minor*
VASW	Vaux's Swift	*Chaetura vauxi*
BLSW	Black Swift	*Cypseloides niger*
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*
WIFL	Willow Flycatcher	*Empidonax traillii*
HAFL	Hammond's Flycatcher	*Empidonax hammondii*
PSFL	Pacific-slope Flycatcher	*Empidonax difficilis*
EAKI	Eastern Kingbird	*Tyrannus tryrannus*
HOLA	Horned Lark	*Eremophila alpestris*
TRSW	Tree Swallow	*Tachycineta bicolor*
VGSW	Violet-green Swallow	*Tachycineta thalassina*
NRSW	N. 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*
BEWR	Bewick's Wren	*Thryomanes bewickii*
WIWR	Winter Wren	*Troglodytes troglodytes*
GCKI	Golden-crowned Kinglet	*Regulus satrapa*
RCKI	Ruby-crowned Kinglet	*Regulus calendula*
MOBL	Mountain Bluebird	*Sialia currucoides*
SWTH	Swainson's Thrush	*Catharus ustulatus*
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*
SOVI	Solitary Vireo	*Vireo solitarius*
WAVI	Warbling Vireo	*Vireo gilvus*
HUVI	Hutton's Vireo	*Vireo huttoni*
REVI	Red-eyed Vireo	*Vireo olivaceus*
OCWA	Orange-crowned Warbler	*Vermivora celata*
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*
RSTO	Rufous-sided Towhee	*Pipilo erythrophthalmus*
VESP	Vesper Sparrow	*Chondestes grammacus*
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*
LALO	Lapland Longspur	*Calcarius lapponicus*
RWBL	Red-winged Blackbird	*Agelaius phoeniceus*
WEME	Western Meadowlark	*Sturnella neglecta*
BRBL	Brewer's Blackbird	*Euphagus cyanocephalus*
BHCO	Brown-headed Cowbird	*Molothrus ater*
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*

Note: In the following Appendices, 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 Appendices summarize the species occurrence on the estuary. For example, the probability of seeing a Great Blue Heron in Summer on the Englishman River estuary is about 100%. If you see the species, you are likely to see an average of about 6 birds and more than 13 would be exceptional.

Appendix III. Seasonal bird numbers on the Englishman River estuary, 1979-1980.

All Station Report for Summer 79

Date	17Jun	22Jun	02Jul	15Jul	20Jul	29Jul	03Aug	11Aug	19Aug	30Aug	Total	Max	Min	Mean	SD	%Freq
#LOO	0	0	0	0	0	0	0	0	2	0	2	2	2	2.0	0.0	10.0
COLO	0	0	0	0	0	0	0	0	2	0	2	2	2	2.0	0.0	10.0
#HER	4	1	4	8	6	3	3	12	8	13	62	13	1	6.2	4.0	100.0
GBHE	4	1	4	8	6	3	3	12	8	13	62	13	1	6.2	4.0	100.0
#DAB	1	11	3	0	15	6	17	46	26	63	188	63	1	20.9	21.0	90.0
DABL	0	0	0	0	0	0	0	0	5	0	5	5	5	5.0	0.0	10.0
GWTE	0	0	2	0	0	0	0	3	3	38	46	38	2	11.5	17.7	40.0
MALL	1	11	1	0	15	6	17	39	4	6	100	39	1	11.1	11.9	90.0
NOPI	0	0	0	0	0	0	0	4	13	19	36	19	4	12.0	7.5	30.0
BWTE	0	0	0	0	0	0	0	0	1	0	1	1	1	1.0	0.0	10.0
#DIV	19	7	11	9	17	12	0	8	18	44	145	44	7	16.1	11.4	90.0
COME	19	7	11	9	17	12	0	8	18	44	145	44	7	16.1	11.4	90.0
#RAP	3	1	2	0	3	1	2	1	0	2	15	3	1	1.9	0.8	80.0
BAEA	1	1	0	0	2	1	2	0	0	0	7	2	1	1.4	0.5	50.0
COHA	1	0	0	0	0	0	0	0	0	1	2	1	1	1.0	0.0	20.0
AMKE	1	0	2	0	1	0	0	1	0	1	6	2	1	1.2	0.4	50.0
RNPH	0	13	0	0	0	9	0	22	0	1	45	22	1	11.3	8.7	40.0
#SHO	22	12	320	108	55	109	133	11	477	35	1282	477	11	128.2	153.4	100.0
BBPL	0	0	0	0	0	0	2	0	1	0	3	2	1	1.5	0.7	20.0
SEPL	0	0	0	0	0	6	1	0	0	0	7	6	1	3.5	3.5	20.0
KILL	19	12	55	17	25	33	38	1	7	1	208	55	1	20.8	17.3	100.0
GRYE	0	0	0	0	0	4	0	0	1	0	5	4	1	2.5	2.1	20.0
LEYE	0	0	0	0	0	1	1	0	1	18	21	18	1	5.3	8.5	40.0
SAND	0	0	0	0	0	0	0	0	10	0	10	10	10	10.0	0.0	10.0
WESA	3	0	64	0	0	0	0	0	0	1	68	64	1	22.7	35.8	30.0
LESA	0	0	0	62	15	45	6	0	0	0	128	62	6	32.0	26.0	40.0
DOWI	0	0	0	0	14	0	0	0	4	0	18	14	4	9.0	7.1	20.0
LBDO	0	0	1	9	0	0	23	3	14	8	58	23	1	9.7	8.0	60.0
SHOR	0	0	200	20	1	20	62	7	439	7	756	439	1	94.5	154.0	80.0
#GUL	218	17	47	39	17	128	28	13	27	201	735	218	13	73.5	79.1	100.0
GULL	0	0	0	0	0	0	0	0	0	93	93	93	93	93.0	0.0	10.0
BOGU	0	0	0	0	0	29	2	0	1	6	38	29	1	9.5	13.2	40.0
MEGU	0	0	0	0	0	0	8	3	2	0	13	8	2	4.3	3.2	30.0
HEGU	3	0	3	0	0	0	0	0	0	0	6	3	3	3.0	0.0	20.0
GWGU	215	17	44	39	17	99	18	10	24	102	585	215	10	58.5	64.3	100.0
RODO	0	0	0	3	0	0	0	5	0	0	8	5	3	4.0	1.4	20.0
BTPI	10	4	3	0	0	0	0	0	1	0	18	10	1	4.5	3.9	40.0
CONI	0	0	0	0	1	0	0	0	0	0	1	1	1	1.0	0.0	10.0
BEKI	0	1	0	2	3	3	2	2	2	3	18	3	1	2.3	0.7	80.0
#WOO	0	5	8	1	0	1	3	4	7	1	30	8	1	3.8	2.8	80.0
HAWO	0	0	0	0	0	0	0	2	0	0	2	2	2	2.0	0.0	10.0
NOFL	0	5	8	1	0	1	3	2	7	1	28	8	1	3.5	2.8	80.0
#PAS	455	361	496	121	174	313	168	180	382	93	2743	496	93	274.3	144.9	100.0
WIFL	1	5	2	0	1	0	0	0	0	0	9	5	1	2.3	1.9	40.0
SWAL	0	0	0	0	0	0	0	0	16	0	16	16	16	16.0	0.0	10.0
VGSW	8	29	26	0	4	1	1	3	0	0	72	29	1	10.3	12.0	70.0
NRWS	4	3	1	1	0	1	0	0	19	0	29	19	1	4.8	7.1	60.0
CLSW	0	0	2	0	0	0	0	0	0	0	2	2	2	2.0	0.0	10.0

All Station Report for Summer 79(Cont'd)

Date	17Jun	22Jun	02Jul	15Jul	20Jul	29Jul	03Aug	11Aug	19Aug	30Aug	Total	Max	Min	Mean	SD	%Freq
BASW	11	9	28	5	20	15	34	13	35	0	170	35	5	18.9	11.0	90.0
NOCR	55	28	6	38	86	81	69	44	58	10	475	86	6	47.5	27.6	100.0
CORA	0	1	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	10.0
CBCH	0	1	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	10.0
BUSH	0	0	0	0	0	0	0	0	14	0	14	14	14	14.0	0.0	10.0
BEWR	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	0.0	10.0
SWTH	1	0	1	0	0	0	0	0	0	0	2	1	1	1.0	0.0	20.0
AMRO	2	7	8	1	0	2	0	0	2	0	22	8	1	3.7	3.0	60.0
CEWA	0	0	2	0	0	0	0	0	0	0	2	2	2	2.0	0.0	10.0
EUST	340	250	383	54	37	186	32	19	34	0	1335	383	19	148.3	145.0	90.0
WARB	0	0	0	0	0	2	0	0	0	0	2	2	2	2.0	0.0	10.0
OCWA	0	1	1	0	0	0	0	0	0	0	2	1	1	1.0	0.0	20.0
YEWA	0	0	0	0	0	0	0	0	1	0	1	1	1	1.0	0.0	10.0
RSTO	0	1	1	0	0	0	0	0	0	0	2	1	1	1.0	0.0	20.0
SPAR	0	0	0	0	0	0	0	2	6	8	16	8	2	5.3	3.1	30.0
SAVS	0	0	0	0	0	0	1	0	1	57	59	57	1	19.7	32.3	30.0
SOSP	1	7	2	1	1	0	1	1	3	0	17	7	1	2.1	2.1	80.0
LISP	0	0	0	0	0	0	0	0	0	17	17	17	17	17.0	0.0	10.0
WTSP	0	1	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	10.0
WCSP	0	2	4	1	0	0	0	0	1	0	8	4	1	2.0	1.4	40.0
DEJU	0	0	3	0	0	0	0	0	0	0	3	3	3	3.0	0.0	10.0
RWBL	11	6	9	0	0	0	0	0	0	0	26	11	6	8.7	2.5	30.0
WEME	0	1	0	0	0	0	0	2	0	0	3	2	1	1.5	0.7	20.0
BRBL	12	8	9	9	9	5	0	0	0	0	52	12	5	8.7	2.3	60.0
HOFI	1	0	3	0	6	0	0	0	0	0	10	6	1	3.3	2.5	30.0
AMGO	8	1	5	11	10	20	29	96	192	1	373	192	1	37.3	61.2	100.0
#TOT	732	433	894	291	291	585	356	304	950	456	5292	950	291	529.2	250.2	100.0

All Station Report for Autumn 79

Date	07Sep	16Sep	23Sep	30Sep	09Oct	12Oct	21Oct	26Oct	04Nov	12Nov	16Nov	30Nov	Total	Max	Min	Mean	SD	%Freq
#LOO	8	1	0	3	18	3	2	2	9	7	4	5	62	18	1	5.6	4.9	91.7
PALO	0	0	0	0	9	0	1	0	0	0	0	0	10	9	1	5.0	5.7	16.7
COLO	8	1	0	3	9	3	1	2	9	7	4	5	52	9	1	4.7	3.1	91.7
#GRE	0	4	1	2	13	6	1	3	8	7	1	5	51	13	1	4.6	3.7	91.7
GREB	0	0	0	0	0	3	0	0	0	0	0	0	3	3	3	3.0	0.0	8.3
HOGR	0	0	0	0	8	3	1	2	6	7	1	4	32	8	1	4.0	2.7	66.7
RNGR	0	2	1	2	1	0	0	0	2	0	0	1	9	2	1	1.5	0.5	50.0
WEGR	0	2	0	0	4	0	0	1	0	0	0	0	7	4	1	2.3	1.5	25.0
#COR	2	8	0	1	4	0	3	1	5	0	0	2	26	8	1	3.3	2.4	66.7
CORM	2	0	0	1	0	0	0	0	0	0	0	0	3	2	1	1.5	0.7	16.7
PECO	0	8	0	0	4	0	3	1	5	0	0	2	23	8	1	3.8	2.5	50.0
#HER	13	13	8	3	1	7	5	2	5	4	3	5	69	13	1	5.8	3.9	100.0
GBHE	13	13	8	3	1	7	5	2	5	4	3	5	69	13	1	5.8	3.9	100.0
#SWA	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2.0	0.0	8.3
TRUS	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2.0	0.0	8.3
#GEE	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	1.0	0.0	8.3
CAGO	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	1.0	0.0	8.3
#DAB	568	206	84	109	175	111	419	713	940	1098	1259	2174	7856	2174	84	654.7	630.2	100.0
DABL	0	0	0	0	0	2	0	420	500	150	420	1584	3076	1584	2	512.7	558.1	50.0
GWTE	369	89	53	54	38	20	110	60	155	202	666	336	2152	666	20	179.3	191.3	100.0
MALL	41	35	22	14	35	13	27	40	37	41	93	69	467	93	13	38.9	22.6	100.0
NOPI	70	57	9	4	4	0	10	12	6	2	0	1	175	70	1	17.5	24.7	83.3
NOSL	0	2	0	1	0	0	2	0	0	0	0	0	5	2	1	1.7	0.6	25.0
AMWI	88	23	0	36	98	76	270	181	242	703	80	184	1981	703	23	180.1	191.5	91.7
#DIV	66	57	56	56	23	7	100	65	119	122	107	110	888	122	7	74.0	37.6	100.0
SCAU	0	0	0	0	0	0	19	1	37	0	0	10	67	37	1	16.8	15.4	33.3
HADU	0	0	0	23	4	0	4	2	15	8	3	12	71	23	2	8.9	7.3	66.7
OLDS	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3.0	0.0	8.3
BLSC	0	2	0	5	0	0	4	1	0	0	0	0	12	5	1	3.0	1.8	33.3
SUSC	0	0	0	14	15	3	17	30	16	24	34	5	158	34	3	17.6	10.4	75.0
WWSC	33	0	0	0	0	0	0	30	7	8	19	5	102	33	5	17.0	12.3	50.0
COGO	0	0	0	0	0	0	1	0	0	50	15	33	99	50	1	24.8	21.3	33.3
BUFF	0	0	0	0	2	2	1	0	38	24	25	25	117	38	1	16.7	14.9	58.3
HOME	5	10	17	5	1	0	2	0	5	3	9	9	66	17	1	6.6	4.8	83.3
COME	28	45	39	9	1	2	52	1	1	5	2	0	185	52	1	16.8	20.1	91.7
RBME	0	0	0	0	0	0	0	0	0	0	0	8	8	8	8	8.0	0.0	8.3
#RAP	0	1	0	1	1	5	2	5	2	2	2	5	26	5	1	2.6	1.7	83.3
HAWK	0	0	0	1	0	1	0	0	0	0	0	0	2	1	1	1.0	0.0	16.7
BAEA	0	0	0	0	0	0	2	1	1	1	0	4	9	4	1	1.8	1.3	41.7
NOHA	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1.0	0.0	8.3
COHA	0	0	0	0	0	4	0	2	0	0	0	0	6	4	2	3.0	1.4	16.7
RTHA	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1.0	0.0	8.3
AMKE	0	1	0	0	0	0	0	0	0	0	1	0	2	1	1	1.0	0.0	16.7
PEFA	0	0	0	0	0	0	0	1	1	1	1	1	5	1	1	1.0	0.0	41.7
RNPH	6	1	0	0	0	1	2	0	0	8	7	9	34	9	1	4.9	3.4	58.3
#SHO	27	33	31	48	41	83	34	28	111	3	44	33	516	111	3	43.0	28.2	100.0
BBPL	0	0	0	0	2	0	13	0	0	0	0	0	15	13	2	7.5	7.8	16.7
KILL	11	21	16	26	6	63	14	3	0	2	11	13	186	63	2	16.9	16.9	91.7
GRYE	0	0	0	0	1	0	0	1	0	0	0	0	2	1	1	1.0	0.0	16.7
WESA	1	4	0	0	0	0	0	0	51	0	0	0	56	51	1	18.7	28.0	25.0

All Station Report for Autumn 79 (Cont'd)

Date	07Sep	16Sep	23Sep	30Sep	09Oct	12Oct	21Oct	26Oct	04Nov	12Nov	16Nov	30Nov	Total	Max	Min	Mean	SD	%Freq
LESA	1	0	3	0	0	0	2	0	0	0	0	0	6	3	1	2.0	1.0	25.0
PESA	0	0	7	4	0	0	2	0	0	0	0	0	13	7	2	4.3	2.5	25.0
DUNL	0	0	0	0	0	0	0	4	50	0	0	0	54	50	4	27.0	32.5	16.7
DOWI	6	0	0	0	0	0	0	12	0	0	0	0	18	12	6	9.0	4.2	16.7
LBDO	2	8	5	18	20	8	0	0	0	0	1	0	62	20	1	8.9	7.4	58.3
COSN	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1.0	0.0	8.3
SHOR	6	0	0	0	12	12	3	8	10	0	32	20	103	32	3	12.9	9.2	66.7
#GUL	73	267	218	212	118	270	90	303	161	699	656	630	3697	699	73	308.1	225.3	100.0
GULL	41	250	200	204	114	266	87	251	159	199	650	608	3029	650	41	252.4	188.9	100.0
BOGU	3	0	0	2	2	0	0	44	0	500	0	0	551	500	2	110.2	218.7	41.7
MEGU	5	1	10	4	1	4	2	3	0	0	0	13	43	13	1	4.8	4.1	75.0
HEGU	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1.0	0.0	8.3
GWGU	24	16	8	2	1	0	1	4	2	0	6	9	73	24	1	7.3	7.5	83.3
#ALC	4	0	0	0	1	0	0	0	0	0	0	2	7	4	1	2.3	1.5	25.0
PIGU	4	0	0	0	1	0	0	0	0	0	0	2	7	4	1	2.3	1.5	25.0
RODO	0	0	0	0	25	0	0	0	0	0	0	0	25	25	25	25.0	0.0	8.3
HUMM	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	8.3
BEKI	0	3	0	2	1	1	5	0	0	1	2	3	18	5	1	2.3	1.4	66.7
#WOO	4	5	1	7	6	7	1	3	3	0	0	2	39	7	1	3.9	2.3	83.3
NOFL	4	5	1	7	6	7	1	3	3	0	0	2	39	7	1	3.9	2.3	83.3
#PAS	404	214	98	275	132	209	145	166	136	140	123	142	2184	404	98	182.0	85.2	100.0
BASW	65	0	0	0	0	0	0	0	0	0	0	0	65	65	65	65.0	0.0	8.3
NOCR	28	78	38	142	92	52	59	81	72	10	34	72	758	142	10	63.2	34.9	100.0
CORA	0	1	0	0	0	0	0	0	0	0	4	0	5	4	1	2.5	2.1	16.7
BRCR	0	0	0	0	0	1	0	0	0	0	0	0	1	1	1	1.0	0.0	8.3
BEWR	1	0	0	0	0	1	0	0	0	0	0	0	2	1	1	1.0	0.0	16.7
GCKI	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	0.0	8.3
AMRO	0	0	0	3	0	5	0	0	7	0	0	1	16	7	1	4.0	2.6	33.3
WAPI	0	7	0	0	0	1	0	0	0	0	0	0	8	7	1	4.0	4.2	16.7
NOSH	0	0	0	0	0	1	1	0	0	0	0	0	2	1	1	1.0	0.0	16.7
EUST	0	11	0	31	15	59	76	63	26	0	40	1	322	76	1	35.8	25.7	75.0
WARB	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1.0	0.0	8.3
RSTO	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1.0	0.0	8.3
SPAR	0	5	11	2	1	5	3	1	2	0	0	0	30	11	1	3.8	3.3	66.7
SAVS	258	100	48	70	13	13	3	6	2	0	0	0	513	258	2	57.0	82.9	75.0
SOSP	0	5	1	4	2	12	0	1	4	0	3	4	36	12	1	4.0	3.3	75.0
GCSP	0	0	0	2	1	3	0	0	0	0	3	0	9	3	1	2.3	1.0	33.3
WCSP	3	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3.0	0.0	8.3
DEJU	0	0	0	8	2	51	3	12	10	20	37	64	207	64	2	23.0	22.4	75.0
WEME	0	0	0	11	4	5	0	2	12	0	1	0	35	12	1	5.8	4.6	50.0
PUFI	10	0	0	2	0	0	0	0	0	0	0	0	12	10	2	6.0	5.7	16.7
HOFI	0	0	0	0	1	0	0	0	0	10	0	0	11	10	1	5.5	6.4	16.7
PISI	0	0	0	0	0	0	0	0	0	100	0	0	100	100	100	100.0	0.0	8.3
AMGO	39	7	0	0	0	0	0	0	0	0	0	0	46	39	7	23.0	22.6	16.7
#TOT	1175	814	497	719	559	710	810	1291	1499	2091	2208	3129	15502	3129	497	1291.8	809.4	100.0

All Station Report for Winter 79

Date	08Dec	15Dec	24Dec	30Dec	06Jan	13Jan	21Jan	25Jan	03Feb	10Feb	17Feb	24Feb	28Feb	Total	Max	Min	Mean	SD	%Freq
#LOO	2	3	0	5	5	0	39	0	7	16	9	7	1	94	39	1	9.4	11.2	76.9
LOON	0	0	0	0	0	0	39	0	0	0	0	0	0	39	39	39	39.0	0.0	7.7
COLO	2	3	0	5	5	0	0	0	7	16	9	7	1	55	16	1	6.1	4.5	69.2
#GRE	3	4	2	3	2	0	19	1	3	3	3	0	2	45	19	1	4.1	5.0	84.6
HOGR	2	2	2	3	2	0	4	1	0	3	2	0	2	23	4	1	2.3	0.8	76.9
RNGR	1	2	0	0	0	0	0	0	3	0	1	0	0	7	3	1	1.8	1.0	30.8
WEGR	0	0	0	0	0	0	15	0	0	0	0	0	0	15	15	15	15.0	0.0	7.7
#COR	0	0	0	0	0	0	2	0	0	0	0	0	0	2	2	2	2.0	0.0	7.7
PECO	0	0	0	0	0	0	2	0	0	0	0	0	0	2	2	2	2.0	0.0	7.7
#HER	2	1	4	3	2	1	5	1	0	3	6	2	5	35	6	1	2.9	1.7	92.3
GBHE	2	1	4	3	2	1	5	1	0	3	6	2	5	35	6	1	2.9	1.7	92.3
#SWA	1	5	2	0	2	10	10	8	4	4	4	3	3	56	10	1	4.7	3.1	92.3
TRUS	1	5	2	0	2	10	10	8	4	4	4	3	3	56	10	1	4.7	3.1	92.3
#GEE	0	0	0	0	0	0	0	0	0	5	0	0	0	5	5	5	5.0	0.0	7.7
CAGO	0	0	0	0	0	0	0	0	0	5	0	0	0	5	5	5	5.0	0.0	7.7
#DAB	1940	418	1147	1325	353	1804	905	486	38	106	299	369	72	9262	1940	38	712.5	651.2	100.0
DABL	433	0	1080	230	0	284	480	110	20	0	0	20	0	2657	1080	20	332.1	348.1	61.5
GWTE	902	218	25	980	141	1127	190	108	4	32	28	45	20	3820	1127	4	293.8	412.5	100.0
MALL	182	150	30	56	147	152	156	193	11	43	86	156	41	1403	193	11	107.9	64.5	100.0
NOPI	19	2	0	2	3	1	0	0	0	0	0	1	0	28	19	1	4.7	7.1	46.2
NOSL	0	4	0	0	2	2	0	3	0	0	0	0	2	13	4	2	2.6	0.9	38.5
AMWI	404	44	12	57	60	238	79	72	3	31	185	147	9	1341	404	3	103.2	115.0	100.0
#DIV	113	154	56	107	81	94	132	48	79	76	75	44	81	1140	154	44	87.7	32.1	100.0
SCAU	0	10	0	1	5	13	1	3	3	0	4	1	3	44	13	1	4.4	4.0	76.9
HADU	3	12	2	8	4	0	1	0	2	5	8	0	2	47	12	1	4.7	3.6	76.9
SCOT	0	0	0	0	0	0	60	0	0	0	0	0	0	60	60	60	60.0	0.0	7.7
BLSC	0	0	0	2	2	0	0	0	0	5	3	0	2	14	5	2	2.8	1.3	38.5
SUSC	26	11	26	22	13	43	31	17	27	19	16	15	21	287	43	11	22.1	8.7	100.0
WWSC	16	2	0	10	4	0	2	0	2	0	11	0	12	59	16	2	7.4	5.5	61.5
COGO	32	50	7	22	23	18	14	11	18	16	14	9	16	250	50	7	19.2	11.3	100.0
BUFF	25	27	20	40	28	20	21	16	27	26	19	17	19	305	40	16	23.5	6.4	100.0
HOME	0	5	1	0	1	0	1	0	0	0	0	0	0	8	5	1	2.0	2.0	30.8
COME	7	4	0	0	0	0	0	0	0	2	0	2	5	20	7	2	4.0	2.1	38.5
RBME	4	33	0	2	1	0	1	1	0	3	0	0	1	46	33	1	5.8	11.1	61.5
#RAP	9	4	2	4	0	1	6	3	0	2	2	0	1	34	9	1	3.4	2.5	76.9
BAEA	8	3	0	2	0	1	5	2	0	2	1	0	1	25	8	1	2.8	2.3	69.2
NOGO	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	7.7
RTHA	1	0	1	0	0	0	0	0	0	0	0	0	0	2	1	1	1.0	0.0	15.4
AMKE	0	0	1	1	0	0	0	1	0	0	0	0	0	3	1	1	1.0	0.0	23.1
PEFA	0	1	0	0	0	0	1	0	0	0	1	0	0	3	1	1	1.0	0.0	23.1
RNPH	1	3	0	2	0	0	4	3	0	1	0	0	4	18	4	1	2.6	1.3	53.8
#SHO	3	9	20	16	12	23	28	3	0	1	2	0	10	127	28	1	11.5	9.2	84.6
KILL	1	1	0	4	12	16	7	3	0	1	2	0	10	57	16	1	5.7	5.3	76.9
BLTU	0	6	0	8	0	6	0	0	0	0	0	0	0	20	8	6	6.7	1.2	23.1
DUNL	0	2	20	4	0	0	20	0	0	0	0	0	0	46	20	2	11.5	9.8	30.8
COSN	2	0	0	0	0	1	1	0	0	0	0	0	0	4	2	1	1.3	0.6	23.1
#GUL	568	398	718	288	319	316	422	740	407	887	388	345	47	5843	887	47	449.5	224.5	100.0
GULL	563	397	700	275	250	30	200	718	374	887	367	343	45	5149	887	30	396.1	258.3	100.0
MEGU	4	1	7	0	1	7	103	13	11	0	14	1	0	162	103	1	16.2	30.9	76.9
GWGU	1	0	11	13	68	279	119	9	22	0	7	1	2	532	279	1	48.4	84.7	84.6

All Station Report for Winter 79 (Cont'd)

Date	08Dec	15Dec	24Dec	30Dec	06Jan	13Jan	21Jan	25Jan	03Feb	10Feb	17Feb	24Feb	28Feb	Total	Max	Min	Mean	SD	%Freq
#ALC	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	0.0	7.7
PIGU	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	0.0	7.7
BEKI	2	4	0	2	2	0	1	0	0	0	1	0	0	12	4	1	2.0	1.1	46.2
#WOO	0	2	4	0	0	1	2	0	0	1	0	0	0	10	4	1	2.0	1.2	38.5
NOFL	0	2	4	0	0	1	2	0	0	1	0	0	0	10	4	1	2.0	1.2	38.5
#PAS	67	128	125	158	269	37	163	98	208	82	38	372	129	1874	372	37	144.2	94.7	100.0
NOCR	53	24	56	55	250	25	158	76	166	49	26	24	20	982	250	20	75.5	71.2	100.0
CORA	3	2	0	0	0	0	0	3	0	0	0	2	1	11	3	1	2.2	0.8	38.5
AMRO	1	0	0	0	0	0	0	1	9	0	0	0	0	11	9	1	3.7	4.6	23.1
EUST	3	0	0	80	13	0	0	1	30	29	12	340	108	616	340	1	68.4	108.1	69.2
RSTO	1	0	0	0	1	0	0	0	0	0	0	0	0	2	1	1	1.0	0.0	15.4
FOSP	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	7.7
SOSP	5	6	1	8	4	4	5	2	3	3	0	6	0	47	8	1	4.3	2.0	84.6
GCSP	0	2	0	0	0	0	0	7	0	0	0	0	0	9	7	2	4.5	3.5	15.4
DEJU	0	60	37	15	0	6	0	0	0	0	0	0	0	118	60	6	29.5	24.1	30.8
WEME	0	0	11	0	1	0	0	8	0	1	0	0	0	21	11	1	5.3	5.1	30.8
HOFI	0	34	20	0	0	2	0	0	0	0	0	0	0	56	34	2	18.7	16.0	23.1
#TOT	2711	1133	2080	1913	1047	2287	1738	1391	746	1188	827	1142	355	18558	2711	355	1427.5	676.4	100.0

All Station Report for Spring 80

Date	08Mar	16Mar	21Mar	29Mar	04Apr	12Apr	20Apr	30Apr	11May	15May	25May	29May	Total	Max	Min	Mean	SD	%Freq
#LOO	0	3	0	1	0	3	2	4	2	0	2	0	17	4	1	2.4	1.0	58.3
PALO	0	0	0	0	0	0	0	3	0	0	1	0	4	3	1	2.0	1.4	16.7
COLO	0	3	0	1	0	3	2	1	2	0	1	0	13	3	1	1.9	0.9	58.3
#GRE	5	0	8	1	3	6	11	17	0	0	0	0	51	17	1	7.3	5.4	58.3
GREB	0	0	5	0	3	0	0	0	0	0	0	0	8	5	3	4.0	1.4	16.7
HOGR	5	0	3	1	0	6	0	0	0	0	0	0	15	6	1	3.8	2.2	33.3
EAGR	0	0	0	0	0	0	9	17	0	0	0	0	26	17	9	13.0	5.7	16.7
WEGR	0	0	0	0	0	0	2	0	0	0	0	0	2	2	2	2.0	0.0	8.3
#COR	6	0	0	0	0	0	0	0	1	1	0	1	9	6	1	2.3	2.5	33.3
CORM	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1.0	0.0	8.3
PECO	6	0	0	0	0	0	0	0	1	1	0	0	8	6	1	2.7	2.9	25.0
#HER	1	3	0	1	0	2	2	2	1	0	3	0	15	3	1	1.9	0.8	66.7
GBHE	1	3	0	1	0	2	2	2	1	0	3	0	15	3	1	1.9	0.8	66.7
#SWA	1	1	1	1	2	1	0	0	0	0	0	0	7	2	1	1.2	0.4	50.0
TRUS	1	1	1	1	2	1	0	0	0	0	0	0	7	2	1	1.2	0.4	50.0
#GEE	95	25	155	2000	834	2505	10	22	0	0	0	8	5654	2505	8	628.2	965.2	75.0
BRAN	95	25	155	2000	834	2505	10	22	0	0	0	0	5646	2505	10	705.8	1001.4	66.7
CAGO	0	0	0	0	0	0	0	0	0	0	0	8	8	8	8	8.0	0.0	8.3
#DAB	281	167	147	498	1149	631	983	58	68	85	50	27	4144	1149	27	345.3	387.1	100.0
DABL	0	0	0	0	125	0	50	0	0	0	0	0	175	125	50	87.5	53.0	16.7
GWTE	78	101	79	103	189	101	444	7	0	1	0	0	1103	444	1	122.6	132.8	75.0
MALL	116	43	63	49	60	61	52	42	38	51	38	25	638	116	25	53.2	22.7	100.0
NOPI	0	0	0	4	2	1	8	4	0	0	0	0	19	8	1	3.8	2.7	41.7
BWTE	0	0	0	0	0	0	0	0	18	33	12	2	65	33	2	16.3	13.0	33.3
NOSL	0	2	1	0	0	0	0	0	6	0	0	0	9	6	1	3.0	2.6	25.0
GADW	0	0	0	1	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	8.3
EUWI	0	0	0	2	3	3	1	0	0	0	0	0	9	3	1	2.3	1.0	33.3
AMWI	87	21	4	339	770	465	428	5	6	0	0	0	2125	770	4	236.1	276.9	75.0
#DIV	72	80	61	82	127	343	140	109	47	50	31	29	1171	343	29	97.6	85.0	100.0
SCAU	0	0	0	0	0	4	3	0	0	0	0	0	7	4	3	3.5	0.7	16.7
HADU	0	0	0	0	42	21	6	60	24	31	27	8	219	60	6	27.4	17.6	66.7
OLDS	0	0	0	0	0	2	4	15	0	0	0	0	21	15	2	7.0	7.0	25.0
SUSC	37	0	0	0	30	120	0	0	9	0	0	0	196	120	9	49.0	48.8	33.3
WWSC	1	0	0	2	0	0	0	0	5	0	0	9	17	9	1	4.3	3.6	33.3
COGO	1	1	1	36	12	92	59	11	0	0	0	0	213	92	1	26.6	33.5	66.7
BUFF	2	9	19	32	24	86	60	12	0	0	0	0	244	86	2	30.5	28.6	66.7
HOME	2	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2.0	0.0	8.3
COME	13	70	40	8	18	12	8	7	9	19	4	12	220	70	4	18.3	18.8	100.0
RBME	16	0	1	4	1	6	0	4	0	0	0	0	32	16	1	5.3	5.6	50.0
#RAP	3	2	2	2	4	0	1	1	0	0	1	0	16	4	1	2.0	1.1	66.7
BAEA	3	2	1	1	1	0	0	1	0	0	1	0	10	3	1	1.4	0.8	58.3
RTHA	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	8.3
AMKE	0	0	0	1	3	0	1	0	0	0	0	0	5	3	1	1.7	1.2	25.0
RNPH	3	2	3	2	4	0	4	3	2	2	3	1	29	4	1	2.6	0.9	91.7
#SHO	11	0	13	5	5	6	14	3	58	7	8	7	137	58	3	12.5	15.5	91.7
BBPL	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	0.0	8.3
KILL	11	0	13	5	3	3	5	1	8	7	8	6	70	13	1	6.4	3.6	91.7
GRYE	0	0	0	0	1	3	1	1	1	0	0	0	7	3	1	1.4	0.9	41.7
SDSA	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1.0	0.0	8.3
WESA	0	0	0	0	0	0	4	0	25	0	0	0	29	25	4	14.5	14.8	16.7

All Station Report for Spring 80 (Cont'd)

Date	08Mar	16Mar	21Mar	29Mar	04Apr	12Apr	20Apr	30Apr	11May	15May	25May	29May	Total	Max	Min	Mean	SD	%Freq
DUNL	0	0	0	0	0	0	2	1	0	0	0	0	3	2	1	1.5	0.7	16.7
DOWI	0	0	0	0	0	0	0	0	3	0	0	0	3	3	3	3.0	0.0	8.3
COSN	0	0	0	0	1	0	1	0	0	0	0	0	2	1	1	1.0	0.0	16.7
SHOR	0	0	0	0	0	0	1	0	20	0	0	0	21	20	1	10.5	13.4	16.7
#GUL	4059	332	118	25126	261	371	19	163	61	80	123	29	30742	25126	19	2561.8	7194.8	100.0
GULL	4006	178	0	25044	12	16	0	0	0	0	0	8	29264	25044	8	4877.3	10005.5	50.0
BOGU	0	0	0	0	0	40	0	152	13	4	0	0	209	152	4	52.3	68.2	33.3
MEGU	53	0	0	40	96	52	2	0	0	0	0	0	243	96	2	48.6	33.6	41.7
HEGU	0	0	0	39	0	0	0	0	0	0	0	0	39	39	39	39.0	0.0	8.3
GWGU	0	154	118	3	153	263	17	11	48	76	123	21	987	263	3	89.7	81.1	91.7
#ALC	0	0	0	0	0	0	0	0	0	0	8	0	8	8	8	8.0	0.0	8.3
MAMU	0	0	0	0	0	0	0	0	0	0	8	0	8	8	8	8.0	0.0	8.3
RODO	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3.0	0.0	8.3
#OWL	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	8.3
SEOW	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	8.3
HUMM	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	0.0	8.3
RUHU	0	0	0	0	0	4	0	0	0	0	1	0	5	4	1	2.5	2.1	16.7
BEKI	0	0	0	0	0	3	1	1	1	0	2	1	9	3	1	1.5	0.8	50.0
#WOO	6	2	5	1	4	3	2	0	3	0	3	2	31	6	1	3.1	1.5	83.3
NOFL	6	2	5	1	4	3	2	0	3	0	3	2	31	6	1	3.1	1.5	83.3
#PAS	255	103	124	470	307	226	62	146	82	203	128	97	2203	470	62	183.6	117.4	100.0
SWAL	0	0	0	0	0	0	0	0	0	40	0	0	40	40	40	40.0	0.0	8.3
TRSW	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	0.0	8.3
VGSW	0	0	0	0	0	4	5	5	2	3	5	2	26	5	2	3.7	1.4	58.3
NRWS	0	0	0	0	0	1	1	0	5	1	7	4	19	7	1	3.2	2.6	50.0
BASW	0	0	0	0	0	0	0	6	3	11	10	8	38	11	3	7.6	3.2	41.7
NOCR	87	71	23	205	79	25	16	34	43	80	30	40	733	205	16	61.1	51.7	100.0
CORA	0	0	0	2	1	0	1	0	0	0	0	0	4	2	1	1.3	0.6	25.0
BUSH	0	0	0	0	0	0	0	0	1	0	0	3	4	3	1	2.0	1.4	16.7
RBNU	0	0	0	0	0	0	0	0	0	0	2	0	2	2	2	2.0	0.0	8.3
AMRO	1	4	0	14	2	7	4	4	0	9	1	0	46	14	1	5.1	4.3	75.0
WAPI	0	0	0	0	0	13	0	5	0	0	0	0	18	13	5	9.0	5.7	16.7
EUST	160	24	100	239	200	160	10	69	11	42	54	23	1092	239	10	91.0	79.6	100.0
OCWA	0	0	0	0	0	0	0	0	0	2	1	1	4	2	1	1.3	0.6	25.0
SPAR	0	0	0	0	0	0	2	0	2	0	0	0	4	2	2	2.0	0.0	16.7
SAVS	0	0	0	0	0	1	1	15	4	7	0	0	28	15	1	5.6	5.8	41.7
SOSP	2	4	0	0	4	4	11	0	2	0	0	1	28	11	1	4.0	3.3	58.3
GCSP	0	0	0	0	0	0	2	0	2	1	0	0	5	2	1	1.7	0.6	25.0
WCSP	0	0	0	0	0	0	0	2	0	2	0	4	8	4	2	2.7	1.2	25.0
RWBL	1	0	1	0	1	2	4	0	0	0	0	1	10	4	1	1.7	1.2	50.0
WEME	1	0	0	0	1	0	0	0	0	0	0	0	2	1	1	1.0	0.0	16.7
BRBL	3	0	0	10	19	9	3	6	0	5	18	10	83	19	3	9.2	5.9	75.0
HOFI	0	0	0	0	0	0	2	0	4	0	0	0	6	4	2	3.0	1.4	16.7
AMGO	0	0	0	0	0	0	0	0	2	0	0	0	2	2	2	2.0	0.0	8.3
#TOT	4798	720	638	28190	2700	4104	1251	529	327	428	363	205	44253	28190	205	3687.8	7873.3	100.0

All Station Report for Summer 80

Date	08Jun	15Jun	22Jun	29Jun	Total	Max	Min	Mean	SD	%Freq
#LOO	0	1	0	0	1	1	1	1.0	0.0	25.0
COLO	0	1	0	0	1	1	1	1.0	0.0	25.0
#GRE	0	0	1	0	1	1	1	1.0	0.0	25.0
RNGR	0	0	1	0	1	1	1	1.0	0.0	25.0
#COR	1	0	0	6	7	6	1	3.5	3.5	50.0
PECO	1	0	0	6	7	6	1	3.5	3.5	50.0
#HER	2	1	2	0	5	2	1	1.7	0.6	75.0
GBHE	2	1	2	0	5	2	1	1.7	0.6	75.0
#DAB	3	30	1	1	35	30	1	8.8	14.2	100.0
MALL	2	15	1	1	19	15	1	4.8	6.8	100.0
BWTE	1	15	0	0	16	15	1	8.0	9.9	50.0
#DIV	24	9	22	12	67	24	9	16.8	7.4	100.0
HADU	3	1	0	0	4	3	1	2.0	1.4	50.0
WWSC	0	0	0	9	9	9	9	9.0	0.0	25.0
COME	21	8	22	3	54	22	3	13.5	9.5	100.0
#RAP	1	1	0	1	3	1	1	1.0	0.0	75.0
BAEA	1	1	0	0	2	1	1	1.0	0.0	50.0
AMKE	0	0	0	1	1	1	1	1.0	0.0	25.0
RNPH	2	1	15	0	18	15	1	6.0	7.8	75.0
#SHO	4	4	4	56	68	56	4	17.0	26.0	100.0
KILL	2	4	4	2	12	4	2	3.0	1.2	100.0
GRYE	1	0	0	0	1	1	1	1.0	0.0	25.0
SDSA	1	0	0	0	1	1	1	1.0	0.0	25.0
WESA	0	0	0	54	54	54	54	54.0	0.0	25.0
#GUL	10	110	1	11	132	110	1	33.0	51.5	100.0
GULL	0	0	0	8	8	8	8	8.0	0.0	25.0
BOGU	5	90	0	3	98	90	3	32.7	49.7	75.0
MEGU	0	20	0	0	20	20	20	20.0	0.0	25.0
GWGU	5	0	1	0	6	5	1	3.0	2.8	50.0
#ALC	0	1	0	2	3	2	1	1.5	0.7	50.0
PIGU	0	1	0	0	1	1	1	1.0	0.0	25.0
MAMU	0	0	0	2	2	2	2	2.0	0.0	25.0
BTPI	0	33	0	0	33	33	33	33.0	0.0	25.0
BEKI	0	0	1	0	1	1	1	1.0	0.0	25.0
#WOO	1	1	2	3	7	3	1	1.8	1.0	100.0
NOFL	1	1	2	3	7	3	1	1.8	1.0	100.0
#PAS	60	400	299	91	850	400	60	212.5	164.0	100.0
TRSW	0	1	0	0	1	1	1	1.0	0.0	25.0
VGSW	8	6	4	3	21	8	3	5.3	2.2	100.0
NRWS	1	1	1	2	5	2	1	1.3	0.5	100.0
BASW	8	8	10	16	42	16	8	10.5	3.8	100.0
NOCR	20	41	29	27	117	41	20	29.3	8.7	100.0
CBCH	0	0	3	10	13	10	3	6.5	4.9	50.0
AMRO	1	4	0	1	6	4	1	2.0	1.7	75.0
EUST	12	323	228	6	569	323	6	142.3	158.7	100.0
SPAR	0	0	3	5	8	5	3	4.0	1.4	50.0
SAVS	0	1	0	0	1	1	1	1.0	0.0	25.0
SOSP	0	1	2	0	3	2	1	1.5	0.7	50.0
GCSP	0	0	0	2	2	2	2	2.0	0.0	25.0
WCSP	2	0	0	0	2	2	2	2.0	0.0	25.0

All Station Report for Summer 80 (Cont'd)

Date	08Jun	15Jun	22Jun	29Jun	Total	Max	Min	Mean	SD	%Freq
RWBL	7	1	11	0	19	11	1	6.3	5.0	75.0
BRBL	1	3	4	14	22	14	1	5.5	5.8	100.0
PISI	0	0	0	1	1	1	1	1.0	0.0	25.0
AMGO	0	10	4	4	18	10	4	6.0	3.5	75.0
#TOT	108	592	348	183	1231	592	108	307.8	214.4	100.0

Appendix IV. Seasonal bird numbers by station on the Englishman River estuary, 1979-1980.

Bird surveys of foreshore for Summer 79

Date	17Jun	22Jun	02Jul	15Jul	20Jul	29Jul	03Aug	11Aug	19Aug	30Aug	Total	Max	Min	Mean	SD	%Freq
#LOO	0	0	0	0	0	0	0	0	2	0	2	2	2	2.0	0.0	10.0
COLO	0	0	0	0	0	0	0	0	2	0	2	2	2	2.0	0.0	10.0
#HER	0	0	0	0	2	0	0	0	2	0	4	2	2	2.0	0.0	20.0
GBHE	0	0	0	0	2	0	0	0	2	0	4	2	2	2.0	0.0	20.0
#DAB	0	1	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	10.0
MALL	0	1	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	10.0
#DIV	7	7	7	9	17	8	0	0	18	0	73	18	7	10.4	4.9	70.0
COME	7	7	7	9	17	8	0	0	18	0	73	18	7	10.4	4.9	70.0
#RAP	0	0	0	0	3	0	1	0	0	0	4	3	1	2.0	1.4	20.0
BAEA	0	0	0	0	2	0	1	0	0	0	3	2	1	1.5	0.7	20.0
AMKE	0	0	0	0	1	0	0	0	0	0	1	1	1	1.0	0.0	10.0
#SHO	3	0	3	0	1	0	0	0	128	0	135	128	1	33.8	62.8	40.0
KILL	0	0	0	0	1	0	0	0	0	0	1	1	1	1.0	0.0	10.0
GRYE	0	0	0	0	0	0	0	0	1	0	1	1	1	1.0	0.0	10.0
WESA	3	0	3	0	0	0	0	0	0	0	6	3	3	3.0	0.0	20.0
SHOR	0	0	0	0	0	0	0	0	127	0	127	127	127	127.0	0.0	10.0
#GUL	41	16	41	16	14	97	23	10	17	9	284	97	9	28.4	26.7	100.0
BOGU	0	0	0	0	0	4	2	0	1	3	10	4	1	2.5	1.3	40.0
MEGU	0	0	0	0	0	0	8	3	1	0	12	8	1	4.0	3.6	30.0
HEGU	3	0	3	0	0	0	0	0	0	0	6	3	3	3.0	0.0	20.0
GWGU	38	16	38	16	14	93	13	7	15	6	256	93	6	25.6	26.2	100.0
#PAS	6	3	6	14	19	30	57	8	53	3	199	57	3	19.9	20.3	100.0
VGSW	0	0	0	0	1	0	0	0	0	0	1	1	1	1.0	0.0	10.0
BASW	0	0	0	0	2	2	9	0	19	0	32	19	2	8.0	8.0	40.0
NOCR	6	3	6	9	16	23	48	8	34	1	154	48	1	15.4	15.3	100.0
EUST	0	0	0	5	0	5	0	0	0	0	10	5	5	5.0	0.0	20.0
SPAR	0	0	0	0	0	0	0	0	0	2	2	2	2	2.0	0.0	10.0
#TOT	57	27	57	39	56	135	81	18	220	12	702	220	12	70.2	63.5	100.0

Bird surveys of foreshore for Autumn 79

Date	07Sep	16Sep	23Sep	30Sep	09Oct	12Oct	21Oct	26Oct	04Nov	12Nov	16Nov	30Nov	Total	Max	Min	Mean	SD	%Freq
#LOO	8	1	0	3	18	3	2	2	9	6	4	5	61	18	1	5.5	4.8	91.7
PALO	0	0	0	0	9	0	1	0	0	0	0	0	10	9	1	5.0	5.7	16.7
COLO	8	1	0	3	9	3	1	2	9	6	4	5	51	9	1	4.6	3.0	91.7
#GRE	0	4	0	2	13	0	0	3	8	4	0	5	39	13	2	5.6	3.8	58.3
HOGR	0	0	0	0	8	0	0	2	6	4	0	4	24	8	2	4.8	2.3	41.7
RNGR	0	2	0	2	1	0	0	0	2	0	0	1	8	2	1	1.6	0.5	41.7
WEGR	0	2	0	0	4	0	0	1	0	0	0	0	7	4	1	2.3	1.5	25.0
#COR	2	8	0	1	4	0	3	1	5	0	0	2	26	8	1	3.3	2.4	66.7
CORM	2	0	0	1	0	0	0	0	0	0	0	0	3	2	1	1.5	0.7	16.7
PECO	0	8	0	0	4	0	3	1	5	0	0	2	23	8	1	3.8	2.5	50.0
#HER	4	1	3	0	0	0	1	0	0	0	0	0	9	4	1	2.3	1.5	33.3
GBHE	4	1	3	0	0	0	1	0	0	0	0	0	9	4	1	2.3	1.5	33.3
#DAB	0	13	0	40	0	51	56	139	35	46	39	106	525	139	13	58.3	39.2	75.0
GWTE	0	0	0	4	0	0	0	0	0	0	0	0	4	4	4	4.0	0.0	8.3
MALL	0	1	0	0	0	10	0	0	0	0	21	33	65	33	1	16.3	13.8	33.3
NOPI	0	0	0	0	0	0	0	7	0	0	0	1	8	7	1	4.0	4.2	16.7
NOSL	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	8.3
AMWI	0	11	0	36	0	41	56	132	35	46	18	72	447	132	11	49.7	35.9	75.0
#DIV	61	43	16	50	22	4	98	63	87	103	74	84	705	103	4	58.8	32.6	100.0
SCAU	0	0	0	0	0	0	19	1	37	0	0	10	67	37	1	16.8	15.4	33.3
HADU	0	0	0	23	4	0	4	2	15	8	3	12	71	23	2	8.9	7.3	66.7
OLDS	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3.0	0.0	8.3
BLSC	0	2	0	5	0	0	4	1	0	0	0	0	12	5	1	3.0	1.8	33.3
SUSC	0	0	0	14	15	3	17	28	16	24	34	5	156	34	3	17.3	10.1	75.0
WWSC	33	0	0	0	0	0	0	30	7	8	19	5	102	33	5	17.0	12.3	50.0
COGO	0	0	0	0	0	0	1	0	0	49	15	28	93	49	1	23.3	20.4	33.3
BUFF	0	0	0	0	2	0	1	0	11	10	3	13	40	13	1	6.7	5.2	50.0
COME	28	41	16	8	1	1	52	1	1	4	0	0	153	52	1	15.3	18.8	83.3
RBME	0	0	0	0	0	0	0	0	0	0	0	8	8	8	8	8.0	0.0	8.3
#RAP	0	0	0	0	0	0	1	1	0	1	0	1	4	1	1	1.0	0.0	33.3
BAEA	0	0	0	0	0	0	1	1	0	1	0	1	4	1	1	1.0	0.0	33.3
#SHO	1	0	2	0	0	1	3	1	50	0	0	0	58	50	1	9.7	19.8	50.0
BBPL	0	0	0	0	0	0	3	0	0	0	0	0	3	3	3	3.0	0.0	8.3
KILL	1	0	2	0	0	1	0	1	0	0	0	0	5	2	1	1.3	0.5	33.3
DUNL	0	0	0	0	0	0	0	0	50	0	0	0	50	50	50	50.0	0.0	8.3
#GUL	61	250	205	200	52	204	33	17	151	699	280	104	2256	699	17	188.0	183.5	100.0
GULL	35	250	200	200	52	204	32	9	150	199	280	84	1695	280	9	141.3	94.0	100.0
BOGU	3	0	0	0	0	0	0	0	0	500	0	0	503	500	3	251.5	351.4	16.7
MEGU	4	0	5	0	0	0	0	3	0	0	0	13	25	13	3	6.3	4.6	33.3
HEGU	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1.0	0.0	8.3
GWGU	19	0	0	0	0	0	1	4	1	0	0	7	32	19	1	6.4	7.5	41.7
#ALC	4	0	0	0	1	0	0	0	0	0	0	2	7	4	1	2.3	1.5	25.0
PIGU	4	0	0	0	1	0	0	0	0	0	0	2	7	4	1	2.3	1.5	25.0
#WOO	0	0	0	0	0	1	0	0	0	0	0	0	1	1	1	1.0	0.0	8.3
NOFL	0	0	0	0	0	1	0	0	0	0	0	0	1	1	1	1.0	0.0	8.3
#PAS	85	49	13	40	0	58	5	58	0	10	21	5	344	85	5	34.4	27.6	83.3
BASW	53	0	0	0	0	0	0	0	0	0	0	0	53	53	53	53.0	0.0	8.3
NOCR	27	39	12	40	0	8	3	7	0	10	21	5	172	40	3	17.2	13.8	83.3
WAPI	0	4	0	0	0	0	0	0	0	0	0	0	4	4	4	4.0	0.0	8.3
EUST	0	0	0	0	0	50	2	50	0	0	0	0	102	50	2	34.0	27.7	25.0

Bird surveys of foreshore for Autumn 79 (Cont'd)

Date	07Sep	16Sep	23Sep	30Sep	09Oct	12Oct	21Oct	26Oct	04Nov	12Nov	16Nov	30Nov	Total	Max	Min	Mean	SD	%Freq
SAVS	5	5	1	0	0	0	0	0	0	0	0	0	11	5	1	3.7	2.3	25.0
SOSP	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	8.3
WEME	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1.0	0.0	8.3
#TOT	226	369	239	336	110	322	202	285	345	869	418	314	4035	869	110	336.3	187.3	100.0

Bird surveys of foreshore for Winter 79

Date	08Dec	15Dec	24Dec	30Dec	06Jan	13Jan	21Jan	25Jan	03Feb	10Feb	17Feb	24Feb	28Feb	Total	Max	Min	Mean	SD	%Freq
#LOO	2	3	0	5	5	0	39	0	7	16	9	7	1	94	39	1	9.4	11.2	76.9
LOON	0	0	0	0	0	0	39	0	0	0	0	0	0	39	39	39	39.0	0.0	7.7
COLO	2	3	0	5	5	0	0	0	7	16	9	7	1	55	16	1	6.1	4.5	69.2
#GRE	2	4	1	3	2	0	18	0	3	3	3	0	2	41	18	1	4.1	5.0	76.9
HOGR	1	2	1	3	2	0	3	0	0	3	2	0	2	19	3	1	2.1	0.8	69.2
RNGR	1	2	0	0	0	0	0	0	3	0	1	0	0	7	3	1	1.8	1.0	30.8
WEGR	0	0	0	0	0	0	15	0	0	0	0	0	0	15	15	15	15.0	0.0	7.7
#COR	0	0	0	0	0	0	2	0	0	0	0	0	0	2	2	2	2.0	0.0	7.7
PECO	0	0	0	0	0	0	2	0	0	0	0	0	0	2	2	2	2.0	0.0	7.7
#HER	0	0	0	0	0	0	1	0	0	0	1	0	0	2	1	1	1.0	0.0	15.4
GBHE	0	0	0	0	0	0	1	0	0	0	1	0	0	2	1	1	1.0	0.0	15.4
#SWA	1	0	0	0	2	0	0	0	0	0	0	0	0	3	2	1	1.5	0.7	15.4
TRUS	1	0	0	0	2	0	0	0	0	0	0	0	0	3	2	1	1.5	0.7	15.4
#DAB	90	2	0	2	152	44	108	0	25	0	34	0	0	457	152	2	57.1	54.1	61.5
DABL	15	0	0	0	0	0	20	0	20	0	0	0	0	55	20	15	18.3	2.9	23.1
GWTE	5	0	0	0	0	0	35	0	0	0	0	0	0	40	35	5	20.0	21.2	15.4
MALL	21	2	0	0	95	0	40	0	2	0	19	0	0	179	95	2	29.8	34.9	46.2
NOPI	19	0	0	0	2	0	0	0	0	0	0	0	0	21	19	2	10.5	12.0	15.4
AMWI	30	0	0	2	55	44	13	0	3	0	15	0	0	162	55	2	23.1	20.5	53.8
#DIV	55	116	20	71	51	61	111	23	46	45	49	19	37	704	116	19	54.2	30.6	100.0
SCAU	0	2	0	1	5	10	1	0	0	0	3	1	0	23	10	1	3.3	3.3	53.8
HADU	3	12	2	8	4	0	1	0	2	5	8	0	2	47	12	1	4.7	3.6	76.9
SCOT	0	0	0	0	0	0	60	0	0	0	0	0	0	60	60	60	60.0	0.0	7.7
BLSC	0	0	0	2	2	0	0	0	0	5	3	0	2	14	5	2	2.8	1.3	38.5
SUSC	14	11	15	22	13	39	31	10	22	19	16	13	15	240	39	10	18.5	8.4	100.0
WWSC	16	2	0	10	4	0	2	0	2	0	11	0	12	59	16	2	7.4	5.5	61.5
COGO	17	45	3	19	19	11	11	7	13	9	6	2	4	166	45	2	12.8	11.3	100.0
BUFF	1	7	0	8	3	1	4	6	7	7	2	3	2	51	8	1	4.3	2.6	92.3
COME	0	4	0	0	0	0	0	0	0	0	0	0	0	4	4	4	4.0	0.0	7.7
RBME	4	33	0	1	1	0	1	0	0	0	0	0	0	40	33	1	8.0	14.0	38.5
#RAP	0	2	0	0	0	0	2	0	0	0	0	0	0	4	2	2	2.0	0.0	15.4
BAEA	0	2	0	0	0	0	2	0	0	0	0	0	0	4	2	2	2.0	0.0	15.4
#SHO	1	6	20	8	0	7	0	0	0	0	0	0	0	42	20	1	8.4	7.0	38.5
KILL	1	0	0	0	0	1	0	0	0	0	0	0	0	2	1	1	1.0	0.0	15.4
BLTU	0	6	0	8	0	6	0	0	0	0	0	0	0	20	8	6	6.7	1.2	23.1
DUNL	0	0	20	0	0	0	0	0	0	0	0	0	0	20	20	20	20.0	0.0	7.7
#GUL	4	397	14	100	35	3	412	3	366	600	378	159	45	2516	600	3	193.5	207.4	100.0
GULL	0	397	0	100	0	0	200	0	354	600	357	158	45	2211	600	45	276.4	183.7	61.5
MEGU	4	0	6	0	1	0	101	0	11	0	14	1	0	138	101	1	19.7	36.2	53.8
GWGU	0	0	8	0	34	3	111	3	1	0	7	0	0	167	111	1	23.9	40.1	53.8
#ALC	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	0.0	7.7
PIGU	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	0.0	7.7
BEKI	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	7.7
#PAS	0	62	0	2	9	0	154	0	97	3	20	3	0	350	154	2	43.8	56.3	61.5
NOCR	0	0	0	2	0	0	154	0	86	3	20	3	0	268	154	2	44.7	62.6	46.2
CORA	0	2	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2.0	0.0	7.7
EUST	0	0	0	0	9	0	0	0	10	0	0	0	0	19	10	9	9.5	0.7	15.4
SOSP	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1.0	0.0	7.7
DEJU	0	60	0	0	0	0	0	0	0	0	0	0	0	60	60	60	60.0	0.0	7.7
#TOT	155	592	55	191	257	115	847	26	544	668	494	188	85	4217	847	26	324.4	269.6	100.0

Bird surveys of foreshore for Spring 80

Date	08Mar	16Mar	21Mar	29Mar	04Apr	12Apr	20Apr	30Apr	11May	15May	25May	29May	Total	Max	Min	Mean	SD	%Freq
#LOO	0	3	0	1	0	3	2	4	2	0	2	0	17	4	1	2.4	1.0	58.3
PALO	0	0	0	0	0	0	0	3	0	0	1	0	4	3	1	2.0	1.4	16.7
COLO	0	3	0	1	0	3	2	1	2	0	1	0	13	3	1	1.9	0.9	58.3
#GRE	5	0	8	1	3	6	11	17	0	0	0	0	51	17	1	7.3	5.4	58.3
GREB	0	0	5	0	3	0	0	0	0	0	0	0	8	5	3	4.0	1.4	16.7
HOGR	5	0	3	1	0	6	0	0	0	0	0	0	15	6	1	3.8	2.2	33.3
EAGR	0	0	0	0	0	0	9	17	0	0	0	0	26	17	9	13.0	5.7	16.7
WEGR	0	0	0	0	0	0	2	0	0	0	0	0	2	2	2	2.0	0.0	8.3
#COR	6	0	0	0	0	0	0	0	1	1	0	1	9	6	1	2.3	2.5	33.3
CORM	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1.0	0.0	8.3
PECO	6	0	0	0	0	0	0	0	1	1	0	0	8	6	1	2.7	2.9	25.0
#HER	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	0.0	8.3
GBHE	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	0.0	8.3
#SWA	0	0	0	0	2	1	0	0	0	0	0	0	3	2	1	1.5	0.7	16.7
TRUS	0	0	0	0	2	1	0	0	0	0	0	0	3	2	1	1.5	0.7	16.7
#GEE	95	25	155	2000	834	2505	10	22	0	0	0	0	5646	2505	10	705.8	1001.4	66.7
BRAN	95	25	155	2000	834	2505	10	22	0	0	0	0	5646	2505	10	705.8	1001.4	66.7
#DAB	29	16	1	226	792	498	66	22	7	11	0	24	1692	792	1	153.8	259.4	91.7
DABL	0	0	0	0	0	0	50	0	0	0	0	0	50	50	50	50.0	0.0	8.3
GWTE	0	0	0	0	6	0	0	0	0	0	0	0	6	6	6	6.0	0.0	8.3
MALL	11	8	1	19	13	44	8	19	7	11	0	24	165	44	1	15.0	11.6	91.7
NOPI	0	0	0	4	0	1	8	2	0	0	0	0	15	8	1	3.8	3.1	33.3
GADW	0	0	0	1	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	8.3
EUWI	0	0	0	2	3	3	0	0	0	0	0	0	8	3	2	2.7	0.6	25.0
AMWI	18	8	0	200	770	450	0	1	0	0	0	0	1447	770	1	241.2	312.0	50.0
#DIV	68	20	31	58	111	283	67	99	47	45	27	29	885	283	20	73.8	71.7	100.0
SCAU	0	0	0	0	0	4	0	0	0	0	0	0	4	4	4	4.0	0.0	8.3
HADU	0	0	0	0	42	21	6	60	24	31	27	8	219	60	6	27.4	17.6	66.7
OLDS	0	0	0	0	0	2	4	15	0	0	0	0	21	15	2	7.0	7.0	25.0
SUSC	37	0	0	0	30	120	0	0	9	0	0	0	196	120	9	49.0	48.8	33.3
WWSC	1	0	0	2	0	0	0	0	5	0	0	9	17	9	1	4.3	3.6	33.3
COGO	1	1	1	36	12	86	55	11	0	0	0	0	203	86	1	25.4	31.2	66.7
BUFF	0	2	4	16	21	44	2	9	0	0	0	0	98	44	2	14.0	15.1	58.3
COME	13	17	25	0	5	2	0	2	9	14	0	12	99	25	2	11.0	7.5	75.0
RBME	16	0	1	4	1	4	0	2	0	0	0	0	28	16	1	4.7	5.7	50.0
#RAP	1	1	1	0	1	0	0	0	0	0	0	0	4	1	1	1.0	0.0	33.3
BAEA	1	1	1	0	1	0	0	0	0	0	0	0	4	1	1	1.0	0.0	33.3
#SHO	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1.0	0.0	8.3
KILL	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1.0	0.0	8.3
#GUL	4000	327	115	25078	249	282	15	160	59	77	123	21	30506	25078	15	2542.2	7183.7	100.0
GULL	4000	175	0	25039	0	0	0	0	0	0	0	0	29214	25039	175	9738.0	13388.4	25.0
BOGU	0	0	0	0	0	40	0	150	11	4	0	0	205	150	4	51.3	67.7	33.3
MEGU	0	0	0	0	96	2	0	0	0	0	0	0	98	96	2	49.0	66.5	16.7
HEGU	0	0	0	39	0	0	0	0	0	0	0	0	39	39	39	39.0	0.0	8.3
GWGU	0	152	115	0	153	240	15	10	48	73	123	21	950	240	10	95.0	75.0	83.3
#ALC	0	0	0	0	0	0	0	0	0	0	8	0	8	8	8	8.0	0.0	8.3
MAMU	0	0	0	0	0	0	0	0	0	0	8	0	8	8	8	8.0	0.0	8.3
RODO	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3.0	0.0	8.3
#PAS	230	20	120	71	20	1	0	20	28	70	0	28	608	230	1	60.8	69.2	83.3
SWAL	0	0	0	0	0	0	0	0	0	40	0	0	40	40	40	40.0	0.0	8.3

Bird surveys of foreshore for Spring 80 (cont'd)

Date	08Mar	16Mar	21Mar	29Mar	04Apr	12Apr	20Apr	30Apr	11May	15May	25May	29May	Total	Max	Min	Mean	SD	%Freq
VGSW	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1.0	0.0	8.3
BASW	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1.0	0.0	8.3
NOCR	80	19	20	71	20	1	0	5	28	30	0	26	300	80	1	30.0	25.8	83.3
EUST	150	0	100	0	0	0	0	0	0	0	0	0	250	150	100	125.0	35.4	16.7
SAVS	0	0	0	0	0	0	0	15	0	0	0	0	15	15	15	15.0	0.0	8.3
SOSP	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	8.3
#TOT	4434	412	431	27435	2012	3579	171	344	145	204	160	107	39434	27435	107	3286.2	7747.2	100.0

Bird surveys of foreshore for Summer 80

Date	08Jun	15Jun	22Jun	29Jun	Total	Max	Min	Mean	SD	%Freq
#LOO	0	1	0	0	1	1	1	1.0	0.0	25.0
COLO	0	1	0	0	1	1	1	1.0	0.0	25.0
#GRE	0	0	1	0	1	1	1	1.0	0.0	25.0
RNGR	0	0	1	0	1	1	1	1.0	0.0	25.0
#COR	1	0	0	6	7	6	1	3.5	3.5	50.0
PECO	1	0	0	6	7	6	1	3.5	3.5	50.0
#HER	1	1	1	0	3	1	1	1.0	0.0	75.0
GBHE	1	1	1	0	3	1	1	1.0	0.0	75.0
#DIV	22	9	22	12	65	22	9	16.3	6.8	100.0
HADU	3	1	0	0	4	3	1	2.0	1.4	50.0
WWSC	0	0	0	9	9	9	9	9.0	0.0	25.0
COME	19	8	22	3	52	22	3	13.0	9.0	100.0
#RAP	1	0	0	0	1	1	1	1.0	0.0	25.0
BAEA	1	0	0	0	1	1	1	1.0	0.0	25.0
#GUL	10	110	0	11	131	110	10	43.7	57.4	75.0
GULL	0	0	0	8	8	8	8	8.0	0.0	25.0
BOGU	5	90	0	3	98	90	3	32.7	49.7	75.0
MEGU	0	20	0	0	20	20	20	20.0	0.0	25.0
GWGU	5	0	0	0	5	5	5	5.0	0.0	25.0
#ALC	0	1	0	2	3	2	1	1.5	0.7	50.0
PIGU	0	1	0	0	1	1	1	1.0	0.0	25.0
MAMU	0	0	0	2	2	2	2	2.0	0.0	25.0
#PAS	12	22	4	5	43	22	4	10.8	8.3	100.0
VGSW	2	0	0	0	2	2	2	2.0	0.0	25.0
NRWS	1	0	0	2	3	2	1	1.5	0.7	50.0
BASW	2	0	0	3	5	3	2	2.5	0.7	50.0
NOCR	7	22	4	0	33	22	4	11.0	9.6	75.0
#TOT	47	144	28	36	255	144	28	63.8	54.1	100.0

Bird surveys of west marsh and spit habitat for Summer 79

Date	17Jun	22Jun	02Jul	15Jul	20Jul	29Jul	03Aug	11Aug	19Aug	30Aug	Total	Max	Min	Mean	SD	%Freq
#HER	1	1	2	1	1	0	2	9	4	10	31	10	1	3.4	3.6	90.0
GBHE	1	1	2	1	1	0	2	9	4	10	31	10	1	3.4	3.6	90.0
#DAB	1	1	0	0	15	6	15	16	10	14	78	16	1	9.8	6.3	80.0
GWTE	0	0	0	0	0	0	0	0	3	12	15	12	3	7.5	6.4	20.0
MALL	1	1	0	0	15	6	15	16	4	2	60	16	1	7.5	6.7	80.0
NOPI	0	0	0	0	0	0	0	0	2	0	2	2	2	2.0	0.0	10.0
BWTE	0	0	0	0	0	0	0	0	1	0	1	1	1	1.0	0.0	10.0
#DIV	12	0	0	0	0	0	0	0	0	23	35	23	12	17.5	7.8	20.0
COME	12	0	0	0	0	0	0	0	0	23	35	23	12	17.5	7.8	20.0
#RAP	0	0	0	0	0	0	1	1	0	0	2	1	1	1.0	0.0	20.0
BAEA	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	0.0	10.0
AMKE	0	0	0	0	0	0	0	1	0	0	1	1	1	1.0	0.0	10.0
RNPH	0	7	0	0	0	0	0	6	0	1	14	7	1	4.7	3.2	30.0
#SHO	12	0	34	29	16	19	57	9	141	28	345	141	9	38.3	41.1	90.0
KILL	12	0	23	3	1	6	1	0	0	0	46	23	1	7.7	8.6	60.0
GRYE	0	0	0	0	0	4	0	0	0	0	4	4	4	4.0	0.0	10.0
LEYE	0	0	0	0	0	1	0	0	0	18	19	18	1	9.5	12.0	20.0
SAND	0	0	0	0	0	0	0	0	10	0	10	10	10	10.0	0.0	10.0
WESA	0	0	11	0	0	0	0	0	0	1	12	11	1	6.0	7.1	20.0
LESA	0	0	0	0	0	8	5	0	0	0	13	8	5	6.5	2.1	20.0
DOWI	0	0	0	0	14	0	0	0	0	0	14	14	14	14.0	0.0	10.0
LBDO	0	0	0	6	0	0	23	3	14	7	53	23	3	10.6	8.0	50.0
SHOR	0	0	0	20	1	0	28	6	117	2	174	117	1	29.0	44.4	60.0
#GUL	0	0	2	2	3	10	1	1	0	0	19	10	1	3.2	3.4	60.0
BOGU	0	0	0	0	0	10	0	0	0	0	10	10	10	10.0	0.0	10.0
GWGU	0	0	2	2	3	0	1	1	0	0	9	3	1	1.8	0.8	50.0
RODO	0	0	0	3	0	0	0	0	0	0	3	3	3	3.0	0.0	10.0
BTPI	0	0	0	0	0	0	0	0	1	0	1	1	1	1.0	0.0	10.0
CONI	0	0	0	0	1	0	0	0	0	0	1	1	1	1.0	0.0	10.0
BEKI	0	0	0	0	0	0	2	1	1	1	5	2	1	1.3	0.5	40.0
#WOO	0	5	4	0	0	0	3	2	0	1	15	5	1	3.0	1.6	50.0
HAWO	0	0	0	0	0	0	0	2	0	0	2	2	2	2.0	0.0	10.0
NOFL	0	5	4	0	0	0	3	0	0	1	13	5	1	3.3	1.7	40.0
#PAS	191	209	43	24	40	33	26	73	102	66	807	209	24	80.7	67.4	100.0
VGSW	3	22	7	0	0	0	1	3	0	0	36	22	1	7.2	8.6	50.0
NRWS	4	3	0	0	0	1	0	0	0	0	8	4	1	2.7	1.5	30.0
CLSW	0	0	2	0	0	0	0	0	0	0	2	2	2	2.0	0.0	10.0
BASW	4	6	2	0	4	11	4	11	9	0	51	11	2	6.4	3.5	80.0
NOCR	15	12	0	13	24	20	11	24	12	0	131	24	11	16.4	5.5	80.0
BEWR	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	0.0	10.0
AMRO	0	0	4	0	0	1	0	0	0	0	5	4	1	2.5	2.1	20.0
CEWA	0	0	2	0	0	0	0	0	0	0	2	2	2	2.0	0.0	10.0
EUST	151	156	15	4	3	0	0	19	0	0	348	156	3	58.0	74.2	60.0
RSTO	0	0	1	0	0	0	0	0	0	0	1	1	1	1.0	0.0	10.0
SPAR	0	0	0	0	0	0	0	2	1	6	9	6	1	3.0	2.6	30.0
SAVS	0	0	0	0	0	0	1	0	0	43	44	43	1	22.0	29.7	20.0
SOSP	1	4	2	0	1	0	1	0	0	0	9	4	1	1.8	1.3	50.0
LISP	0	0	0	0	0	0	0	0	0	17	17	17	17	17.0	0.0	10.0
WCSP	0	2	4	0	0	0	0	0	0	0	6	4	2	3.0	1.4	20.0
DEJU	0	0	3	0	0	0	0	0	0	0	3	3	3	3.0	0.0	10.0

Bird surveys of west marsh and spit habitat for Summer 79 (cont'd)

Date	17Jun	22Jun	02Jul	15Jul	20Jul	29Jul	03Aug	11Aug	19Aug	30Aug	Total	Max	Min	Mean	SD	%Freq
RWBL	5	0	0	0	0	0	0	0	0	0	5	5	5	5.0	0.0	10.0
WEME	0	1	0	0	0	0	0	2	0	0	3	2	1	1.5	0.7	20.0
BRBL	8	2	0	7	8	0	0	0	0	0	25	8	2	6.3	2.9	40.0
AMGO	0	1	1	0	0	0	7	12	80	0	101	80	1	20.2	33.7	50.0
#TOT	217	223	85	59	76	68	107	118	259	144	1356	259	59	135.6	72.4	100.0

Bird surveys of west marsh and spit habitat for Autumn 79

Date	07Sep	16Sep	23Sep	30Sep	09Oct	12Oct	21Oct	26Oct	04Nov	12Nov	16Nov	30Nov	Total	Max	Min	Mean	SD	%Freq
#GRE	0	0	1	0	0	0	0	0	0	1	1	0	3	1	1	1.0	0.0	25.0
HOGR	0	0	0	0	0	0	0	0	0	1	1	0	2	1	1	1.0	0.0	16.7
RNGR	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	8.3
#HER	6	9	2	2	1	4	1	2	4	1	2	3	37	9	1	3.1	2.4	100.0
GBHE	6	9	2	2	1	4	1	2	4	1	2	3	37	9	1	3.1	2.4	100.0
#DAB	361	93	13	35	8	11	102	298	149	228	566	877	2741	877	8	228.4	265.8	100.0
DABL	0	0	0	0	0	2	0	200	0	0	50	604	856	604	2	214.0	273.3	33.3
GWTE	235	39	4	34	8	9	87	55	110	202	500	236	1519	500	4	126.6	146.2	100.0
MALL	26	17	4	0	0	0	3	27	33	19	16	35	180	35	3	20.0	11.5	75.0
NOPI	29	31	5	0	0	0	10	5	6	2	0	0	88	31	2	12.6	12.1	58.3
NOSL	0	1	0	1	0	0	2	0	0	0	0	0	4	2	1	1.3	0.6	25.0
AMWI	71	5	0	0	0	0	0	11	0	5	0	2	94	71	2	18.8	29.4	41.7
#DIV	5	10	1	2	0	0	2	0	8	10	7	16	61	16	1	6.8	4.9	75.0
BUFF	0	0	0	0	0	0	0	0	5	6	7	7	25	7	5	6.3	1.0	33.3
HOME	5	10	1	2	0	0	2	0	3	3	0	9	35	10	1	4.4	3.4	66.7
COME	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1.0	0.0	8.3
#RAP	0	1	0	1	1	1	0	0	1	1	2	2	10	2	1	1.3	0.5	66.7
HAWK	0	0	0	1	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	8.3
BAEA	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1.0	0.0	8.3
NOHA	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1.0	0.0	8.3
COHA	0	0	0	0	0	1	0	0	0	0	0	0	1	1	1	1.0	0.0	8.3
AMKE	0	1	0	0	0	0	0	0	0	0	1	0	2	1	1	1.0	0.0	16.7
PEFA	0	0	0	0	0	0	0	0	1	1	1	1	4	1	1	1.0	0.0	33.3
RNPH	0	1	0	0	0	0	1	0	0	8	7	9	26	9	1	5.2	3.9	41.7
#SHO	4	9	11	22	22	0	2	19	1	3	2	1	96	22	1	8.7	8.5	91.7
KILL	0	5	0	3	1	0	2	2	0	2	2	1	18	5	1	2.3	1.3	66.7
GRYE	0	0	0	0	1	0	0	1	0	0	0	0	2	1	1	1.0	0.0	16.7
WESA	1	4	0	0	0	0	0	0	1	0	0	0	6	4	1	2.0	1.7	25.0
LESA	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	8.3
PESA	0	0	6	4	0	0	0	0	0	0	0	0	10	6	4	5.0	1.4	16.7
DUNL	0	0	0	0	0	0	0	4	0	0	0	0	4	4	4	4.0	0.0	8.3
DOWI	0	0	0	0	0	0	0	12	0	0	0	0	12	12	12	12.0	0.0	8.3
LBDO	2	0	5	15	20	0	0	0	0	0	0	0	42	20	2	10.5	8.4	33.3
COSN	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1.0	0.0	8.3
#GUL	3	4	4	2	0	0	0	9	5	0	12	4	43	12	2	5.4	3.4	66.7
GULL	3	0	0	0	0	0	0	9	5	0	10	2	29	10	2	5.8	3.6	41.7
GWGU	0	4	4	2	0	0	0	0	0	0	2	2	14	4	2	2.8	1.1	41.7
RODO	0	0	0	0	25	0	0	0	0	0	0	0	25	25	25	25.0	0.0	8.3
HUMM	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	8.3
BEKI	0	1	0	2	1	1	2	0	0	1	1	0	9	2	1	1.3	0.5	58.3
#WOO	4	1	1	5	3	4	0	1	0	0	0	1	20	5	1	2.5	1.7	66.7
NOFL	4	1	1	5	3	4	0	1	0	0	0	1	20	5	1	2.5	1.7	66.7
#PAS	70	103	39	102	92	87	8	54	10	130	45	69	809	130	8	67.4	37.8	100.0
BASW	5	0	0	0	0	0	0	0	0	0	0	0	5	5	5	5.0	0.0	8.3
NOCR	0	7	2	21	80	7	3	35	6	0	0	7	168	80	2	18.7	25.3	75.0
CORA	0	1	0	0	0	0	0	0	0	0	4	0	5	4	1	2.5	2.1	16.7
BRCR	0	0	0	0	0	1	0	0	0	0	0	0	1	1	1	1.0	0.0	8.3
BEWR	0	0	0	0	0	1	0	0	0	0	0	0	1	1	1	1.0	0.0	8.3
AMRO	0	0	0	3	0	0	0	0	0	0	0	0	3	3	3	3.0	0.0	8.3
WAPI	0	0	0	0	0	1	0	0	0	0	0	0	1	1	1	1.0	0.0	8.3

Bird surveys of west marsh and spit habitat for Autumn 79 (Cont'd)

Date	07Sep	16Sep	23Sep	30Sep	09Oct	12Oct	21Oct	26Oct	04Nov	12Nov	16Nov	30Nov	Total	Max	Min	Mean	SD	%Freq
NOSH	0	0	0	0	0	1	0	0	0	0	0	0	1	1	1	1.0	0.0	8.3
EUST	0	8	0	1	0	0	0	0	0	0	0	0	9	8	1	4.5	4.9	16.7
WARB	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1.0	0.0	8.3
SPAR	0	5	0	2	0	0	0	0	2	0	0	0	9	5	2	3.0	1.7	25.0
SAVS	30	72	37	52	8	13	2	6	2	0	0	0	222	72	2	24.7	24.9	75.0
SOSP	0	3	0	2	0	8	0	1	0	0	0	1	15	8	1	3.0	2.9	41.7
GCSP	0	0	0	2	0	0	0	0	0	0	3	0	5	3	2	2.5	0.7	16.7
DEJU	0	0	0	8	2	50	3	12	0	20	37	61	193	61	2	24.1	22.5	66.7
WEME	0	0	0	11	0	5	0	0	0	0	1	0	17	11	1	5.7	5.0	25.0
HOFI	0	0	0	0	1	0	0	0	0	10	0	0	11	10	1	5.5	6.4	16.7
PISI	0	0	0	0	0	0	0	0	0	100	0	0	100	100	100	100.0	0.0	8.3
AMGO	35	7	0	0	0	0	0	0	0	0	0	0	42	35	7	21.0	19.8	16.7
#TOT	453	233	72	173	153	108	118	383	178	383	645	982	3881	982	72	323.4	268.6	100.0

Bird surveys of west marsh and spit habitat for Winter 79

Date	08Dec	15Dec	24Dec	30Dec	06Jan	13Jan	21Jan	25Jan	03Feb	10Feb	17Feb	24Feb	28Feb	Total	Max	Min	Mean	SD	%Freq
#GRE	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	7.7
HOGR	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	7.7
#HER	0	0	0	1	0	0	2	0	0	0	1	2	2	8	2	1	1.6	0.5	38.5
GBHE	0	0	0	1	0	0	2	0	0	0	1	2	2	8	2	1	1.6	0.5	38.5
#DAB	1369	225	681	862	44	1548	445	199	8	0	7	46	23	5457	1548	7	454.8	546.8	92.3
DABL	352	0	630	30	0	174	400	20	0	0	0	0	0	1606	630	20	267.7	237.7	46.2
GWTE	894	158	25	822	21	1119	31	89	1	0	0	0	0	3160	1119	1	351.1	454.5	69.2
MALL	122	65	26	9	22	142	12	82	7	0	7	46	21	561	142	7	46.8	46.5	92.3
NOPI	0	2	0	1	1	1	0	0	0	0	0	0	0	5	2	1	1.3	0.5	30.8
AMWI	1	0	0	0	0	112	2	8	0	0	0	0	2	125	112	1	25.0	48.7	38.5
#DIV	17	6	7	22	11	7	4	1	4	5	6	3	4	97	22	1	7.5	5.9	100.0
COGO	0	0	0	1	0	1	0	0	1	0	0	0	0	3	1	1	1.0	0.0	23.1
BUFF	10	3	6	21	11	6	4	1	3	5	6	3	4	83	21	1	6.4	5.2	100.0
HOME	0	3	1	0	0	0	0	0	0	0	0	0	0	4	3	1	2.0	1.4	15.4
COME	7	0	0	0	0	0	0	0	0	0	0	0	0	7	7	7	7.0	0.0	7.7
#RAP	4	1	2	2	0	1	4	1	0	0	1	0	1	17	4	1	1.9	1.3	69.2
BAEA	4	0	0	0	0	1	3	1	0	0	0	0	1	10	4	1	2.0	1.4	38.5
NOGO	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	7.7
RTHA	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	7.7
AMKE	0	0	1	1	0	0	0	0	0	0	0	0	0	2	1	1	1.0	0.0	15.4
PEFA	0	1	0	0	0	0	1	0	0	0	1	0	0	3	1	1	1.0	0.0	23.1
RNPH	1	3	0	2	0	0	4	3	0	1	0	0	4	18	4	1	2.6	1.3	53.8
#SHO	0	0	0	0	0	2	6	0	0	0	2	0	7	17	7	2	4.3	2.6	30.8
KILL	0	0	0	0	0	1	5	0	0	0	2	0	7	15	7	1	3.8	2.8	30.8
COSN	0	0	0	0	0	1	1	0	0	0	0	0	0	2	1	1	1.0	0.0	15.4
#GUL	3	0	4	3	0	8	4	44	1	7	1	1	2	78	44	1	7.1	12.5	84.6
GULL	3	0	0	0	0	0	0	32	0	7	1	1	0	44	32	1	8.8	13.2	38.5
MEGU	0	0	1	0	0	7	0	12	0	0	0	0	0	20	12	1	6.7	5.5	23.1
GWGU	0	0	3	3	0	1	4	0	1	0	0	0	2	14	4	1	2.3	1.2	46.2
BEKI	1	2	0	2	0	0	1	0	0	0	1	0	0	7	2	1	1.4	0.5	38.5
#WOO	0	2	3	0	0	1	2	0	0	0	0	0	0	8	3	1	2.0	0.8	30.8
NOFL	0	2	3	0	0	1	2	0	0	0	0	0	0	8	3	1	2.0	0.8	30.8
#PAS	2	39	76	17	1	14	5	13	9	46	6	15	9	252	76	1	19.4	21.7	100.0
NOCR	2	2	7	0	0	4	3	0	0	17	6	13	0	54	17	2	6.8	5.5	61.5
CORA	0	0	0	0	0	0	0	2	0	0	0	2	1	5	2	1	1.7	0.6	23.1
AMRO	0	0	0	0	0	0	0	0	9	0	0	0	0	9	9	9	9.0	0.0	7.7
EUST	0	0	0	0	0	0	0	0	0	29	0	0	8	37	29	8	18.5	14.8	15.4
SOSP	0	3	1	2	0	4	2	1	0	0	0	0	0	13	4	1	2.2	1.2	46.2
GCSP	0	0	0	0	0	0	0	2	0	0	0	0	0	2	2	2	2.0	0.0	7.7
DEJU	0	0	37	15	0	6	0	0	0	0	0	0	0	58	37	6	19.3	15.9	23.1
WEME	0	0	11	0	1	0	0	8	0	0	0	0	0	20	11	1	6.7	5.1	23.1
HOFI	0	34	20	0	0	0	0	0	0	0	0	0	0	54	34	20	27.0	9.9	15.4
#TOT	1398	278	773	911	56	1581	477	261	22	59	25	67	52	5960	1581	22	458.5	542.9	100.0

Bird surveys of west marsh and spit habitat for Spring 80

Date	08Mar	16Mar	21Mar	29Mar	04Apr	12Apr	20Apr	30Apr	11May	15May	25May	29May	Total	Max	Min	Mean	SD	%Freq
#HER	1	2	0	1	0	2	1	0	0	0	1	0	8	2	1	1.3	0.5	50.0
GBHE	1	2	0	1	0	2	1	0	0	0	1	0	8	2	1	1.3	0.5	50.0
#DAB	50	5	8	89	104	104	220	7	12	8	18	1	626	220	1	52.2	66.4	100.0
GWTE	0	0	0	77	96	93	210	4	0	1	0	0	481	210	1	80.2	76.6	50.0
MALL	50	5	8	12	8	11	6	3	2	1	18	1	125	50	1	10.4	13.5	100.0
BWTE	0	0	0	0	0	0	0	0	10	6	0	0	16	10	6	8.0	2.8	16.7
AMWI	0	0	0	0	0	0	4	0	0	0	0	0	4	4	4	4.0	0.0	8.3
#DIV	2	0	0	0	2	3	2	0	0	0	0	0	9	3	2	2.3	0.5	33.3
COGO	0	0	0	0	0	0	2	0	0	0	0	0	2	2	2	2.0	0.0	8.3
HOME	2	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2.0	0.0	8.3
COME	0	0	0	0	2	3	0	0	0	0	0	0	5	3	2	2.5	0.7	16.7
#RAP	2	1	0	2	1	0	0	1	0	0	0	0	7	2	1	1.4	0.5	41.7
BAEA	2	1	0	1	0	0	0	1	0	0	0	0	5	2	1	1.3	0.5	33.3
AMKE	0	0	0	1	1	0	0	0	0	0	0	0	2	1	1	1.0	0.0	16.7
RNPH	2	1	3	2	2	0	2	1	1	0	0	1	15	3	1	1.7	0.7	75.0
#SHO	2	0	1	1	3	6	10	2	4	4	4	2	39	10	1	3.5	2.6	91.7
KILL	2	0	1	1	3	3	2	0	4	4	4	2	26	4	1	2.6	1.2	83.3
GRYE	0	0	0	0	0	3	1	1	0	0	0	0	5	3	1	1.7	1.2	25.0
WESA	0	0	0	0	0	0	4	0	0	0	0	0	4	4	4	4.0	0.0	8.3
DUNL	0	0	0	0	0	0	2	1	0	0	0	0	3	2	1	1.5	0.7	16.7
COSN	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	1.0	0.0	8.3
#GUL	6	4	3	5	12	0	0	1	0	1	0	0	32	12	1	4.6	3.8	58.3
GULL	6	3	0	5	12	0	0	0	0	0	0	0	26	12	3	6.5	3.9	33.3
GWGU	0	1	3	0	0	0	0	1	0	1	0	0	6	3	1	1.5	1.0	33.3
RUHU	0	0	0	0	0	1	0	0	0	0	1	0	2	1	1	1.0	0.0	16.7
BEKI	0	0	0	0	0	3	1	0	0	0	0	0	4	3	1	2.0	1.4	16.7
#WOO	6	2	5	1	3	1	0	0	1	0	2	1	22	6	1	2.4	1.9	75.0
NOFL	6	2	5	1	3	1	0	0	1	0	2	1	22	6	1	2.4	1.9	75.0
#PAS	4	16	1	61	14	77	20	54	26	65	35	31	404	77	1	33.7	25.1	100.0
TRSW	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	0.0	8.3
VGSW	0	0	0	0	0	0	0	2	0	0	2	0	4	2	2	2.0	0.0	16.7
NRWS	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	0.0	8.3
BASW	0	0	0	0	0	0	0	5	1	2	0	2	10	5	1	2.5	1.7	33.3
NOCR	3	2	0	21	9	12	6	22	7	16	13	13	124	22	2	11.3	6.7	91.7
CORA	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	1.0	0.0	8.3
RBNU	0	0	0	0	0	0	0	0	0	0	2	0	2	2	2	2.0	0.0	8.3
AMRO	0	4	0	1	1	1	2	2	0	1	0	0	12	4	1	1.7	1.1	58.3
WAPI	0	0	0	0	0	13	0	5	0	0	0	0	18	13	5	9.0	5.7	16.7
EUST	0	9	0	39	0	50	4	18	9	40	11	8	188	50	4	20.9	17.3	75.0
SPAR	0	0	0	0	0	0	0	0	2	0	0	0	2	2	2	2.0	0.0	8.3
SAVS	0	0	0	0	0	0	1	0	4	2	0	0	7	4	1	2.3	1.5	25.0
SOSP	1	1	0	0	1	1	3	0	1	0	0	1	9	3	1	1.3	0.8	58.3
WCSP	0	0	0	0	0	0	0	0	0	2	0	2	4	2	2	2.0	0.0	16.7
RWBL	0	0	1	0	0	0	0	0	0	0	0	1	2	1	1	1.0	0.0	16.7
BRBL	0	0	0	0	3	0	3	0	0	2	7	4	19	7	2	3.8	1.9	41.7
#TOT	75	31	21	162	141	197	256	66	44	78	61	36	1168	256	21	97.3	74.6	100.0

Bird surveys of west marsh and spit habitat for Summer 80

Date	08Jun	15Jun	22Jun	29Jun	Total	Max	Min	Mean	SD	%Freq
#HER	1	0	0	0	1	1	1	1.0	0.0	25.0
GBHE	1	0	0	0	1	1	1	1.0	0.0	25.0
#DAB	3	19	0	1	23	19	1	7.7	9.9	75.0
MALL	2	13	0	1	16	13	1	5.3	6.7	75.0
BWTE	1	6	0	0	7	6	1	3.5	3.5	50.0
#DIV	1	0	0	0	1	1	1	1.0	0.0	25.0
COME	1	0	0	0	1	1	1	1.0	0.0	25.0
RNPH	2	1	14	0	17	14	1	5.7	7.2	75.0
#SHO	3	3	3	56	65	56	3	16.3	26.5	100.0
KILL	2	3	3	2	10	3	2	2.5	0.6	100.0
GRYE	1	0	0	0	1	1	1	1.0	0.0	25.0
WESA	0	0	0	54	54	54	54	54.0	0.0	25.0
#WOO	1	1	1	3	6	3	1	1.5	1.0	100.0
NOFL	1	1	1	3	6	3	1	1.5	1.0	100.0
#PAS	44	173	246	32	495	246	32	123.8	103.5	100.0
TRSW	0	1	0	0	1	1	1	1.0	0.0	25.0
VGSW	6	2	2	0	10	6	2	3.3	2.3	75.0
BASW	6	6	6	2	20	6	2	5.0	2.0	100.0
NOCR	12	7	17	12	48	17	7	12.0	4.1	100.0
AMRO	0	2	0	0	2	2	2	2.0	0.0	25.0
EUST	10	150	207	4	371	207	4	92.8	101.7	100.0
SAVS	0	1	0	0	1	1	1	1.0	0.0	25.0
WCSP	2	0	0	0	2	2	2	2.0	0.0	25.0
RWBL	7	0	10	0	17	10	7	8.5	2.1	50.0
BRBL	1	1	3	14	19	14	1	4.8	6.2	100.0
AMGO	0	3	1	0	4	3	1	2.0	1.4	50.0
#TOT	55	197	264	92	608	264	55	152.0	95.9	100.0

Bird surveys of east marsh and river habitats for Summer 79

Date	17Jun	22Jun	02Jul	15Jul	20Jul	29Jul	03Aug	11Aug	19Aug	30Aug	Total	Max	Min	Mean	SD	%Freq
#HER	2	0	2	7	3	2	1	3	2	3	25	7	1	2.8	1.7	90.0
GBHE	2	0	2	7	3	2	1	3	2	3	25	7	1	2.8	1.7	90.0
#DAB	0	8	0	0	0	0	2	27	16	49	102	49	2	20.4	18.5	50.0
DABL	0	0	0	0	0	0	0	0	5	0	5	5	5	5.0	0.0	10.0
GWTE	0	0	0	0	0	0	0	0	0	26	26	26	26	26.0	0.0	10.0
MALL	0	8	0	0	0	0	2	23	0	4	37	23	2	9.3	9.5	40.0
NOPI	0	0	0	0	0	0	0	4	11	19	34	19	4	11.3	7.5	30.0
#DIV	0	0	4	0	0	4	0	8	0	21	37	21	4	9.3	8.1	40.0
COME	0	0	4	0	0	4	0	8	0	21	37	21	4	9.3	8.1	40.0
#RAP	1	1	1	0	0	0	0	0	0	2	5	2	1	1.3	0.5	40.0
BAEA	0	1	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	10.0
COHA	1	0	0	0	0	0	0	0	0	1	2	1	1	1.0	0.0	20.0
AMKE	0	0	1	0	0	0	0	0	0	1	2	1	1	1.0	0.0	20.0
RNPH	0	6	0	0	0	0	0	0	0	0	6	6	6	6.0	0.0	10.0
#SHO	7	12	283	79	38	90	76	2	208	7	802	283	2	80.2	94.8	100.0
BBPL	0	0	0	0	0	0	2	0	1	0	3	2	1	1.5	0.7	20.0
SEPL	0	0	0	0	0	6	1	0	0	0	7	6	1	3.5	3.5	20.0
KILL	7	12	32	14	23	27	37	1	7	1	161	37	1	16.1	12.9	100.0
LEYE	0	0	0	0	0	0	1	0	1	0	2	1	1	1.0	0.0	20.0
WESA	0	0	50	0	0	0	0	0	0	0	50	50	50	50.0	0.0	10.0
LESA	0	0	0	62	15	37	1	0	0	0	115	62	1	28.8	26.7	40.0
DOWI	0	0	0	0	0	0	0	0	4	0	4	4	4	4.0	0.0	10.0
LBDO	0	0	1	3	0	0	0	0	0	1	5	3	1	1.7	1.2	30.0
SHOR	0	0	200	0	0	20	34	1	195	5	455	200	1	75.8	95.0	60.0
#GUL	166	1	4	21	0	19	4	2	10	192	419	192	1	46.6	75.7	90.0
GULL	0	0	0	0	0	0	0	0	0	93	93	93	93	93.0	0.0	10.0
BOGU	0	0	0	0	0	15	0	0	0	3	18	15	3	9.0	8.5	20.0
MEGU	0	0	0	0	0	0	0	0	1	0	1	1	1	1.0	0.0	10.0
GWGU	166	1	4	21	0	4	4	2	9	96	307	166	1	34.1	58.0	90.0
RODO	0	0	0	0	0	0	0	5	0	0	5	5	5	5.0	0.0	10.0
BTPI	0	1	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	10.0
BEKI	0	1	0	2	3	1	0	1	1	2	11	3	1	1.6	0.8	70.0
#WOO	0	0	4	1	0	1	0	2	1	0	9	4	1	1.8	1.3	50.0
NOFL	0	0	4	1	0	1	0	2	1	0	9	4	1	1.8	1.3	50.0
#PAS	162	67	210	71	101	222	63	5	112	23	1036	222	5	103.6	73.9	100.0
WIFL	0	3	2	0	1	0	0	0	0	0	6	3	1	2.0	1.0	30.0
SWAL	0	0	0	0	0	0	0	0	16	0	16	16	16	16.0	0.0	10.0
VGSW	1	0	18	0	3	0	0	0	0	0	22	18	1	7.3	9.3	30.0
NRWS	0	0	0	1	0	0	0	0	18	0	19	18	1	9.5	12.0	20.0
BASW	2	0	19	4	13	2	21	2	3	0	66	21	2	8.3	8.1	80.0
NOCR	26	5	0	16	43	33	10	3	12	9	157	43	3	17.4	13.6	90.0
CORA	0	1	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	10.0
CBCH	0	1	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	10.0
BUSH	0	0	0	0	0	0	0	0	14	0	14	14	14	14.0	0.0	10.0
SWTH	0	0	1	0	0	0	0	0	0	0	1	1	1	1.0	0.0	10.0
AMRO	0	5	2	1	0	1	0	0	0	0	9	5	1	2.3	1.9	40.0
EUST	131	41	165	45	34	181	32	0	33	0	662	181	32	82.8	64.7	80.0
YEWA	0	0	0	0	0	0	0	0	1	0	1	1	1	1.0	0.0	10.0
SAVS	0	0	0	0	0	0	0	0	0	14	14	14	14	14.0	0.0	10.0
SOSP	0	1	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	10.0

Bird surveys of east marsh and river habitats for Summer 79 (Cont'd)

Date	17Jun	22Jun	02Jul	15Jul	20Jul	29Jul	03Aug	11Aug	19Aug	30Aug	Total	Max	Min	Mean	SD	%Freq
WCSP	0	0	0	1	0	0	0	0	0	0	1	1	1	1.0	0.0	10.0
RWBL	0	5	0	0	0	0	0	0	0	0	5	5	5	5.0	0.0	10.0
BRBL	0	5	0	1	1	5	0	0	0	0	12	5	1	3.0	2.3	40.0
HOFI	0	0	3	0	6	0	0	0	0	0	9	6	3	4.5	2.1	20.0
AMGO	2	0	0	2	0	0	0	0	15	0	19	15	2	6.3	7.5	30.0
#TOT	338	97	508	181	145	339	146	55	350	299	2458	508	55	245.8	142.4	100.0

Bird surveys of east marsh and river habitats for Autumn 79

Date	07Sep	16Sep	23Sep	30Sep	09Oct	12Oct	21Oct	26Oct	04Nov	12Nov	16Nov	30Nov	Total	Max	Min	Mean	SD	%Freq
#LOO	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1.0	0.0	8.3
COLO	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1.0	0.0	8.3
#GRE	0	0	0	0	0	6	1	0	0	2	0	0	9	6	1	3.0	2.6	25.0
GREB	0	0	0	0	0	3	0	0	0	0	0	0	3	3	3	3.0	0.0	8.3
HOGR	0	0	0	0	0	3	1	0	0	2	0	0	6	3	1	2.0	1.0	25.0
#HER	3	3	3	1	0	3	3	0	1	3	1	2	23	3	1	2.3	0.9	83.3
GBHE	3	3	3	1	0	3	3	0	1	3	1	2	23	3	1	2.3	0.9	83.3
#SWA	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2.0	0.0	8.3
TRUS	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2.0	0.0	8.3
#GEE	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	1.0	0.0	8.3
CAGO	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	1.0	0.0	8.3
#DAB	207	100	71	34	167	46	261	276	756	824	654	1191	4587	1191	34	382.3	378.6	100.0
DABL	0	0	0	0	0	0	0	220	500	150	370	980	2220	980	150	444.0	328.8	41.7
GWTE	134	50	49	16	30	8	23	5	45	0	166	100	626	166	5	56.9	53.5	91.7
MALL	15	17	18	14	35	3	24	13	4	22	56	1	222	56	1	18.5	15.2	100.0
NOPI	41	26	4	4	4	0	0	0	0	0	0	0	79	41	4	15.8	17.0	41.7
AMWI	17	7	0	0	98	35	214	38	207	652	62	110	1440	652	7	144.0	192.9	83.3
#DIV	0	4	39	4	1	3	0	2	24	9	26	10	122	39	1	12.2	13.0	83.3
SUSC	0	0	0	0	0	0	0	2	0	0	0	0	2	2	2	2.0	0.0	8.3
COGO	0	0	0	0	0	0	0	0	0	1	0	5	6	5	1	3.0	2.8	16.7
BUFF	0	0	0	0	0	2	0	0	22	8	15	5	52	22	2	10.4	8.1	41.7
HOME	0	0	16	3	1	0	0	0	2	0	9	0	31	16	1	6.2	6.3	41.7
COME	0	4	23	1	0	1	0	0	0	0	2	0	31	23	1	6.2	9.5	41.7
#RAP	0	0	0	0	0	4	1	4	1	0	0	2	12	4	1	2.4	1.5	41.7
HAWK	0	0	0	0	0	1	0	0	0	0	0	0	1	1	1	1.0	0.0	8.3
BAEA	0	0	0	0	0	0	1	0	1	0	0	2	4	2	1	1.3	0.6	25.0
COHA	0	0	0	0	0	3	0	2	0	0	0	0	5	3	2	2.5	0.7	16.7
RTHA	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1.0	0.0	8.3
PEFA	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1.0	0.0	8.3
RNPH	6	0	0	0	0	0	0	0	0	0	0	0	6	6	6	6.0	0.0	8.3
#SHO	22	24	18	26	19	82	29	8	60	0	42	32	362	82	8	32.9	21.3	91.7
BBPL	0	0	0	0	2	0	10	0	0	0	0	0	12	10	2	6.0	5.7	16.7
KILL	10	16	14	23	5	62	12	0	0	0	9	12	163	62	5	18.1	17.2	75.0
WESA	0	0	0	0	0	0	0	0	50	0	0	0	50	50	50	50.0	0.0	8.3
LESA	0	0	3	0	0	0	2	0	0	0	0	0	5	3	2	2.5	0.7	16.7
PESA	0	0	1	0	0	0	2	0	0	0	0	0	3	2	1	1.5	0.7	16.7
DOWI	6	0	0	0	0	0	0	0	0	0	0	0	6	6	6	6.0	0.0	8.3
LBDO	0	8	0	3	0	8	0	0	0	0	1	0	20	8	1	5.0	3.6	33.3
SHOR	6	0	0	0	12	12	3	8	10	0	32	20	103	32	3	12.9	9.2	66.7
#GUL	9	13	9	10	66	48	57	277	5	0	354	522	1370	522	5	124.5	177.3	91.7
GULL	3	0	0	4	62	44	55	233	4	0	350	522	1277	522	3	141.9	186.1	75.0
BOGU	0	0	0	2	2	0	0	44	0	0	0	0	48	44	2	16.0	24.2	25.0
MEGU	1	1	5	4	1	4	2	0	0	0	0	0	18	5	1	2.6	1.7	58.3
GWGU	5	12	4	0	1	0	0	0	1	0	4	0	27	12	1	4.5	4.0	50.0
BEKI	0	2	0	0	0	0	3	0	0	0	1	3	9	3	1	2.3	1.0	33.3
#WOO	0	4	0	2	3	2	1	1	1	0	0	1	15	4	1	1.9	1.1	66.7
NOFL	0	4	0	2	3	2	1	1	1	0	0	1	15	4	1	1.9	1.1	66.7
#PAS	42	62	40	102	37	47	126	44	105	0	56	68	729	126	37	66.3	30.8	91.7
BASW	7	0	0	0	0	0	0	0	0	0	0	0	7	7	7	7.0	0.0	8.3
NOCR	1	32	24	81	12	30	49	39	63	0	12	60	403	81	1	36.6	24.7	91.7

Bird surveys of east marsh and river habitats for Autumn 79 (Cont'd)

Date	07Sep	16Sep	23Sep	30Sep	09Oct	12Oct	21Oct	26Oct	04Nov	12Nov	16Nov	30Nov	Total	Max	Min	Mean	SD	%Freq
BEWR	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	8.3
AMRO	0	0	0	0	0	5	0	0	4	0	0	1	10	5	1	3.3	2.1	25.0
WAPI	0	3	0	0	0	0	0	0	0	0	0	0	3	3	3	3.0	0.0	8.3
EUST	0	3	0	0	15	8	74	3	26	0	40	1	170	74	1	21.3	25.2	66.7
RSTO	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1.0	0.0	8.3
SPAR	0	0	6	0	0	0	3	1	0	0	0	0	10	6	1	3.3	2.5	25.0
SAVS	23	23	10	17	5	0	0	0	0	0	0	0	78	23	5	15.6	8.0	41.7
SOSP	0	1	0	2	1	4	0	0	0	0	3	3	14	4	1	2.3	1.2	50.0
DEJU	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3.0	0.0	8.3
WEME	0	0	0	0	4	0	0	1	12	0	0	0	17	12	1	5.7	5.7	25.0
PUFI	10	0	0	2	0	0	0	0	0	0	0	0	12	10	2	6.0	5.7	16.7
#TOT	289	212	180	179	293	241	483	612	953	839	1134	1833	7248	1833	179	604.0	506.8	100.0

Bird surveys of east marsh and river habitats for Winter 79

Date	08Dec	15Dec	24Dec	30Dec	06Jan	13Jan	21Jan	25Jan	03Feb	10Feb	17Feb	24Feb	28Feb	Total	Max	Min	Mean	SD	%Freq
#GRE	0	0	1	0	0	0	1	1	0	0	0	0	0	3	1	1	1.0	0.0	23.1
HOGR	0	0	1	0	0	0	1	1	0	0	0	0	0	3	1	1	1.0	0.0	23.1
#HER	2	1	4	2	2	1	2	1	0	3	4	0	3	25	4	1	2.3	1.1	84.6
GBHE	2	1	4	2	2	1	2	1	0	3	4	0	3	25	4	1	2.3	1.1	84.6
#SWA	0	5	2	0	0	10	10	8	4	4	4	3	3	53	10	2	5.3	2.9	76.9
TRUS	0	5	2	0	0	10	10	8	4	4	4	3	3	53	10	2	5.3	2.9	76.9
#GEE	0	0	0	0	0	0	0	0	0	5	0	0	0	5	5	5	5.0	0.0	7.7
CAGO	0	0	0	0	0	0	0	0	0	5	0	0	0	5	5	5	5.0	0.0	7.7
#DAB	481	191	466	461	157	212	352	287	5	106	258	323	45	3344	481	5	257.2	157.4	100.0
DABL	66	0	450	200	0	110	60	90	0	0	0	20	0	996	450	20	142.3	146.8	53.8
GWTE	3	60	0	158	120	8	124	19	3	32	28	45	16	616	158	3	51.3	53.3	92.3
MALL	39	83	4	47	30	10	104	111	2	43	60	110	20	663	111	2	51.0	39.7	100.0
NOPI	0	0	0	1	0	0	0	0	0	0	0	1	0	2	1	1	1.0	0.0	15.4
NOSL	0	4	0	0	2	2	0	3	0	0	0	0	2	13	4	2	2.6	0.9	38.5
AMWI	373	44	12	55	5	82	64	64	0	31	170	147	7	1054	373	5	87.8	103.6	92.3
#DIV	41	29	29	14	19	26	17	24	27	26	19	22	39	332	41	14	25.5	7.9	100.0
SCAU	0	8	0	0	0	3	0	3	3	0	1	0	3	21	8	1	3.5	2.3	46.2
SUSC	12	0	11	0	0	4	0	7	5	0	0	2	6	47	12	2	6.7	3.6	53.8
COGO	15	5	4	2	4	6	3	4	4	7	8	7	12	81	15	2	6.2	3.7	100.0
BUFF	14	16	14	11	14	13	13	9	15	14	10	11	12	166	16	9	12.8	2.0	100.0
HOME	0	0	0	0	1	0	1	0	0	0	0	0	0	2	1	1	1.0	0.0	15.4
COME	0	0	0	0	0	0	0	0	0	2	0	2	5	9	5	2	3.0	1.7	23.1
RBME	0	0	0	1	0	0	0	1	0	3	0	0	1	6	3	1	1.5	1.0	30.8
#RAP	5	1	0	2	0	0	0	1	0	2	1	0	0	12	5	1	2.0	1.5	46.2
BAEA	4	1	0	2	0	0	0	1	0	2	1	0	0	11	4	1	1.8	1.2	46.2
RTHA	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	7.7
#SHO	0	3	0	8	12	14	22	3	0	1	0	0	3	66	22	1	8.3	7.3	61.5
KILL	0	1	0	4	12	14	2	3	0	1	0	0	3	40	14	1	5.0	5.1	61.5
DUNL	0	2	0	4	0	0	20	0	0	0	0	0	0	26	20	2	8.7	9.9	23.1
#GUL	561	1	700	185	284	305	6	693	40	280	9	185	0	3249	700	1	270.8	257.2	92.3
GULL	560	0	700	175	250	30	0	686	20	280	9	184	0	2894	700	9	289.4	267.4	76.9
MEGU	0	1	0	0	0	0	2	1	0	0	0	0	0	4	2	1	1.3	0.6	23.1
GWGU	1	0	0	10	34	275	4	6	20	0	0	1	0	351	275	1	43.9	94.1	61.5
BEKI	1	1	0	0	1	0	0	0	0	0	0	0	0	3	1	1	1.0	0.0	23.1
#WOO	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	7.7
NOFL	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	7.7
#PAS	39	22	49	99	257	23	4	77	101	32	12	147	108	970	257	4	74.6	70.1	100.0
NOCR	30	22	49	47	250	21	1	75	80	29	0	5	8	617	250	1	51.4	67.5	92.3
CORA	3	0	0	0	0	0	0	1	0	0	0	0	0	4	3	1	2.0	1.4	15.4
AMRO	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	1.0	0.0	7.7
EUST	3	0	0	50	4	0	0	0	20	0	12	136	100	325	136	3	46.4	52.4	53.8
SOSP	3	0	0	2	3	0	3	0	1	2	0	6	0	20	6	1	2.9	1.6	53.8
WEME	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	0.0	7.7
HOFI	0	0	0	0	0	2	0	0	0	0	0	0	0	2	2	2	2.0	0.0	7.7
#TOT	1130	254	1252	771	732	591	414	1095	177	459	307	680	201	8063	1252	177	620.2	364.8	100.0

Bird surveys of east marsh and river habitats for Spring 80

Date	08Mar	16Mar	21Mar	29Mar	04Apr	12Apr	20Apr	30Apr	11May	15May	25May	29May	Total	Max	Min	Mean	SD	%Freq
#HER	0	1	0	0	0	0	1	1	0	0	1	0	4	1	1	1.0	0.0	33.3
GBHE	0	1	0	0	0	0	1	1	0	0	1	0	4	1	1	1.0	0.0	33.3
#SWA	1	1	1	1	0	0	0	0	0	0	0	0	4	1	1	1.0	0.0	33.3
TRUS	1	1	1	1	0	0	0	0	0	0	0	0	4	1	1	1.0	0.0	33.3
#GEE	0	0	0	0	0	0	0	0	0	0	0	8	8	8	8	8.0	0.0	8.3
CAGO	0	0	0	0	0	0	0	0	0	0	0	8	8	8	8	8.0	0.0	8.3
#DAB	202	146	138	183	253	29	697	29	42	62	25	0	1806	697	25	164.2	193.9	91.7
DABL	0	0	0	0	125	0	0	0	0	0	0	0	125	125	125	125.0	0.0	8.3
GWTE	78	101	79	26	87	8	234	3	0	0	0	0	616	234	3	77.0	73.8	66.7
MALL	55	30	54	18	39	6	38	20	29	39	20	0	348	55	6	31.6	15.2	91.7
NOPI	0	0	0	0	2	0	0	2	0	0	0	0	4	2	2	2.0	0.0	16.7
BWTE	0	0	0	0	0	0	0	0	1	23	5	0	29	23	1	9.7	11.7	25.0
NOSL	0	2	1	0	0	0	0	0	6	0	0	0	9	6	1	3.0	2.6	25.0
EUWI	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	1.0	0.0	8.3
AMWI	69	13	4	139	0	15	424	4	6	0	0	0	674	424	4	84.3	145.2	66.7
#DIV	2	60	30	24	14	57	69	10	0	5	4	0	275	69	2	27.5	25.5	83.3
SCAU	0	0	0	0	0	0	3	0	0	0	0	0	3	3	3	3.0	0.0	8.3
COGO	0	0	0	0	0	6	2	0	0	0	0	0	8	6	2	4.0	2.8	16.7
BUFF	2	7	15	16	3	42	58	3	0	0	0	0	146	58	2	18.3	20.8	66.7
COME	0	53	15	8	11	7	6	5	0	5	4	0	114	53	4	12.7	15.5	75.0
RBME	0	0	0	0	0	2	0	2	0	0	0	0	4	2	2	2.0	0.0	16.7
#RAP	0	0	1	0	1	0	0	0	0	0	1	0	3	1	1	1.0	0.0	25.0
BAEA	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1.0	0.0	8.3
RTHA	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	8.3
AMKE	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1.0	0.0	8.3
RNPH	0	0	0	0	1	0	0	1	0	1	0	0	3	1	1	1.0	0.0	25.0
#SHO	9	0	12	4	2	0	4	1	54	3	4	4	97	54	1	9.7	15.9	83.3
BBPL	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	0.0	8.3
KILL	9	0	12	4	0	0	3	1	4	3	4	3	43	12	1	4.8	3.5	75.0
GRYE	0	0	0	0	1	0	0	0	1	0	0	0	2	1	1	1.0	0.0	16.7
SDSA	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1.0	0.0	8.3
WESA	0	0	0	0	0	0	0	0	25	0	0	0	25	25	25	25.0	0.0	8.3
DOWI	0	0	0	0	0	0	0	0	3	0	0	0	3	3	3	3.0	0.0	8.3
COSN	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1.0	0.0	8.3
SHOR	0	0	0	0	0	0	1	0	20	0	0	0	21	20	1	10.5	13.4	16.7
#GUL	53	1	0	43	0	89	4	2	2	2	0	8	204	89	1	22.7	31.7	75.0
GULL	0	0	0	0	0	16	0	0	0	0	0	8	24	16	8	12.0	5.7	16.7
BOGU	0	0	0	0	0	0	0	2	2	0	0	0	4	2	2	2.0	0.0	16.7
MEGU	53	0	0	40	0	50	2	0	0	0	0	0	145	53	2	36.3	23.5	33.3
GWGU	0	1	0	3	0	23	2	0	0	2	0	0	31	23	1	6.2	9.4	41.7
RUHU	0	0	0	0	0	1	0	0	0	0	0	0	1	1	1	1.0	0.0	8.3
BEKI	0	0	0	0	0	0	0	1	1	0	2	1	5	2	1	1.3	0.5	33.3
#WOO	0	0	0	0	0	1	0	0	0	0	0	1	2	1	1	1.0	0.0	16.7
NOFL	0	0	0	0	0	1	0	0	0	0	0	1	2	1	1	1.0	0.0	16.7
#PAS	14	53	3	313	271	26	15	60	17	51	55	9	887	313	3	73.9	104.2	100.0
VGSW	0	0	0	0	0	3	2	3	2	3	1	1	15	3	1	2.1	0.9	58.3
NRWS	0	0	0	0	0	0	0	0	4	1	7	4	16	7	1	4.0	2.4	33.3
BASW	0	0	0	0	0	0	0	0	2	8	8	2	20	8	2	5.0	3.5	33.3
NOCR	1	36	3	103	50	11	8	3	7	32	6	0	260	103	1	23.6	30.9	91.7
CORA	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1.0	0.0	8.3

Bird surveys of east marsh and river habitats for Spring 80 (Cont'd)

Date	08Mar	16Mar	21Mar	29Mar	04Apr	12Apr	20Apr	30Apr	11May	15May	25May	29May	Total	Max	Min	Mean	SD	%Freq
AMRO	0	0	0	0	0	0	0	1	0	1	0	0	2	1	1	1.0	0.0	16.7
EUST	10	15	0	200	200	5	3	51	0	0	27	0	511	200	3	63.9	85.4	66.7
OCWA	0	0	0	0	0	0	0	0	0	0	1	1	2	1	1	1.0	0.0	16.7
SPAR	0	0	0	0	0	0	2	0	0	0	0	0	2	2	2	2.0	0.0	8.3
SAVS	0	0	0	0	0	0	0	0	0	5	0	0	5	5	5	5.0	0.0	8.3
SOSP	0	2	0	0	3	0	0	0	0	0	0	0	5	3	2	2.5	0.7	16.7
WCSP	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1.0	0.0	8.3
RWBL	0	0	0	0	1	1	0	0	0	0	0	0	2	1	1	1.0	0.0	16.7
BRBL	3	0	0	10	16	6	0	2	0	1	5	0	43	16	1	6.1	5.3	58.3
AMGO	0	0	0	0	0	0	0	0	2	0	0	0	2	2	2	2.0	0.0	8.3
#TOT	281	262	185	568	542	203	790	105	116	124	92	31	3299	790	31	274.9	234.7	100.0

Bird surveys of east marsh and river habitats for Summer 80

Date	08Jun	15Jun	22Jun	29Jun	Total	Max	Min	Mean	SD	%Freq
#HER	0	0	1	0	1	1	1	1.0	0.0	25.0
GBHE	0	0	1	0	1	1	1	1.0	0.0	25.0
#DAB	0	11	1	0	12	11	1	6.0	7.1	50.0
MALL	0	2	1	0	3	2	1	1.5	0.7	50.0
BWTE	0	9	0	0	9	9	9	9.0	0.0	25.0
#DIV	1	0	0	0	1	1	1	1.0	0.0	25.0
COME	1	0	0	0	1	1	1	1.0	0.0	25.0
#RAP	0	1	0	1	2	1	1	1.0	0.0	50.0
BAEA	0	1	0	0	1	1	1	1.0	0.0	25.0
AMKE	0	0	0	1	1	1	1	1.0	0.0	25.0
#SHO	1	1	1	0	3	1	1	1.0	0.0	75.0
KILL	0	1	1	0	2	1	1	1.0	0.0	50.0
SDSA	1	0	0	0	1	1	1	1.0	0.0	25.0
#GUL	0	0	1	0	1	1	1	1.0	0.0	25.0
GWGU	0	0	1	0	1	1	1	1.0	0.0	25.0
BEKI	0	0	1	0	1	1	1	1.0	0.0	25.0
#WOO	0	0	1	0	1	1	1	1.0	0.0	25.0
NOFL	0	0	1	0	1	1	1	1.0	0.0	25.0
#PAS	4	142	35	18	199	142	4	49.8	62.8	100.0
VGSW	0	1	1	2	4	2	1	1.3	0.6	75.0
NRWS	0	1	0	0	1	1	1	1.0	0.0	25.0
BASW	0	1	3	9	13	9	1	4.3	4.2	75.0
NOCR	1	10	7	3	21	10	1	5.3	4.0	100.0
AMRO	1	0	0	1	2	1	1	1.0	0.0	50.0
EUST	2	123	21	2	148	123	2	37.0	58.0	100.0
SPAR	0	0	2	0	2	2	2	2.0	0.0	25.0
SOSP	0	1	1	0	2	1	1	1.0	0.0	50.0
BRBL	0	2	0	0	2	2	2	2.0	0.0	25.0
AMGO	0	3	0	1	4	3	1	2.0	1.4	50.0
#TOT	6	155	41	19	221	155	6	55.3	68.1	100.0

Bird surveys of dyked upland habitat for Summer 79

Date	17Jun	22Jun	02Jul	15Jul	20Jul	29Jul	03Aug	11Aug	19Aug	30Aug	Total	Max	Min	Mean	SD	%Freq
#HER	1	0	0	0	0	1	0	0	0	0	2	1	1	1.0	0.0	20.0
GBHE	1	0	0	0	0	1	0	0	0	0	2	1	1	1.0	0.0	20.0
#DAB	0	1	3	0	0	0	0	3	0	0	7	3	1	2.3	1.2	30.0
GWTE	0	0	2	0	0	0	0	3	0	0	5	3	2	2.5	0.7	20.0
MALL	0	1	1	0	0	0	0	0	0	0	2	1	1	1.0	0.0	20.0
#RAP	2	0	1	0	0	1	0	0	0	0	4	2	1	1.3	0.6	30.0
BAEA	1	0	0	0	0	1	0	0	0	0	2	1	1	1.0	0.0	20.0
AMKE	1	0	1	0	0	0	0	0	0	0	2	1	1	1.0	0.0	20.0
RNPH	0	0	0	0	0	9	0	16	0	0	25	16	9	12.5	4.9	20.0
#GUL	11	0	0	0	0	2	0	0	0	0	13	11	2	6.5	6.4	20.0
GWGU	11	0	0	0	0	2	0	0	0	0	13	11	2	6.5	6.4	20.0
BTPI	10	3	3	0	0	0	0	0	0	0	16	10	3	5.3	4.0	30.0
BEKI	0	0	0	0	0	2	0	0	0	0	2	2	2	2.0	0.0	10.0
#WOO	0	0	0	0	0	0	0	0	6	0	6	6	6	6.0	0.0	10.0
NOFL	0	0	0	0	0	0	0	0	6	0	6	6	6	6.0	0.0	10.0
#PAS	96	82	237	12	14	28	22	94	115	1	701	237	1	70.1	72.0	100.0
WIFL	1	2	0	0	0	0	0	0	0	0	3	2	1	1.5	0.7	20.0
VGSW	4	7	1	0	0	1	0	0	0	0	13	7	1	3.3	2.9	40.0
NRWS	0	0	1	0	0	0	0	0	1	0	2	1	1	1.0	0.0	20.0
BASW	5	3	7	1	1	0	0	0	4	0	21	7	1	3.5	2.3	60.0
NOCR	8	8	0	0	3	5	0	9	0	0	33	9	3	6.6	2.5	50.0
SWTH	1	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	10.0
AMRO	2	2	2	0	0	0	0	0	2	0	8	2	2	2.0	0.0	40.0
EUST	58	53	203	0	0	0	0	0	1	0	315	203	1	78.8	86.8	40.0
WARB	0	0	0	0	0	2	0	0	0	0	2	2	2	2.0	0.0	10.0
OCWA	0	1	1	0	0	0	0	0	0	0	2	1	1	1.0	0.0	20.0
RSTO	0	1	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	10.0
SPAR	0	0	0	0	0	0	0	0	5	0	5	5	5	5.0	0.0	10.0
SAVS	0	0	0	0	0	0	0	0	1	0	1	1	1	1.0	0.0	10.0
SOSP	0	2	0	1	0	0	0	1	3	0	7	3	1	1.8	1.0	40.0
WTSP	0	1	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	10.0
WCSP	0	0	0	0	0	0	0	0	1	0	1	1	1	1.0	0.0	10.0
RWBL	6	1	9	0	0	0	0	0	0	0	16	9	1	5.3	4.0	30.0
BRBL	4	1	9	1	0	0	0	0	0	0	15	9	1	3.8	3.8	40.0
HOFI	1	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	10.0
AMGO	6	0	4	9	10	20	22	84	97	1	253	97	1	28.1	36.2	90.0
#TOT	120	86	244	12	14	43	22	113	121	1	776	244	1	77.6	75.4	100.0

Bird surveys of dyked upland habitat for Autumn 79

Date	07Sep	16Sep	23Sep	30Sep	09Oct	12Oct	21Oct	26Oct	04Nov	12Nov	16Nov	30Nov	Total	Max	Min	Mean	SD	%Freq
#DAB	0	0	0	0	0	3	0	0	0	0	0	0	3	3	3	3.0	0.0	8.3
GWTE	0	0	0	0	0	3	0	0	0	0	0	0	3	3	3	3.0	0.0	8.3
RNPH	0	0	0	0	0	1	1	0	0	0	0	0	2	1	1	1.0	0.0	16.7
#GUL	0	0	0	0	0	18	0	0	0	0	10	0	28	18	10	14.0	5.7	16.7
GULL	0	0	0	0	0	18	0	0	0	0	10	0	28	18	10	14.0	5.7	16.7
#WOO	0	0	0	0	0	0	0	1	2	0	0	0	3	2	1	1.5	0.7	16.7
NOFL	0	0	0	0	0	0	0	1	2	0	0	0	3	2	1	1.5	0.7	16.7
#PAS	207	0	6	31	3	17	6	10	21	0	1	0	302	207	1	33.6	65.8	75.0
NOCR	0	0	0	0	0	7	4	0	3	0	1	0	15	7	1	3.8	2.5	33.3
GCKI	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	0.0	8.3
AMRO	0	0	0	0	0	0	0	0	3	0	0	0	3	3	3	3.0	0.0	8.3
NOSH	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	1.0	0.0	8.3
EUST	0	0	0	30	0	1	0	10	0	0	0	0	41	30	1	13.7	14.8	25.0
SPAR	0	0	5	0	1	5	0	0	0	0	0	0	11	5	1	3.7	2.3	25.0
SAVS	200	0	0	1	0	0	1	0	0	0	0	0	202	200	1	67.3	114.9	25.0
SOSP	0	0	1	0	1	0	0	0	4	0	0	0	6	4	1	2.0	1.7	25.0
GCSP	0	0	0	0	1	3	0	0	0	0	0	0	4	3	1	2.0	1.4	16.7
WCSP	3	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3.0	0.0	8.3
DEJU	0	0	0	0	0	1	0	0	10	0	0	0	11	10	1	5.5	6.4	16.7
AMGO	4	0	0	0	0	0	0	0	0	0	0	0	4	4	4	4.0	0.0	8.3
#TOT	207	0	6	31	3	39	7	11	23	0	11	0	338	207	3	37.6	64.7	75.0

Bird surveys of dyked upland habitat for Winter 79

Date	08Dec	15Dec	24Dec	30Dec	06Jan	13Jan	21Jan	25Jan	03Feb	10Feb	17Feb	24Feb	28Feb	Total	Max	Min	Mean	SD	%Freq
#DAB	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	4.0	0.0	7.7
GWTE	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	4.0	0.0	7.7
#DIV	0	3	0	0	0	0	0	0	2	0	1	0	1	7	3	1	1.8	1.0	30.8
BUFF	0	1	0	0	0	0	0	0	2	0	1	0	1	5	2	1	1.3	0.5	30.8
HOME	0	2	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2.0	0.0	7.7
#RAP	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	1.0	0.0	7.7
AMKE	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	1.0	0.0	7.7
#SHO	2	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2.0	0.0	7.7
COSN	2	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2.0	0.0	7.7
BEKI	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	7.7
#WOO	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	0.0	7.7
NOFL	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	0.0	7.7
#PAS	26	5	0	40	2	0	0	8	1	1	0	207	12	302	207	1	33.6	66.4	69.2
NOCR	21	0	0	6	0	0	0	1	0	0	0	3	12	43	21	1	8.6	8.1	38.5
AMRO	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	7.7
EUST	0	0	0	30	0	0	0	1	0	0	0	204	0	235	204	1	78.3	109.8	23.1
RSTO	1	0	0	0	1	0	0	0	0	0	0	0	0	2	1	1	1.0	0.0	15.4
FOSP	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	7.7
SOSP	2	3	0	4	1	0	0	1	1	1	0	0	0	13	4	1	1.9	1.2	53.8
GCSP	0	2	0	0	0	0	0	5	0	0	0	0	0	7	5	2	3.5	2.1	15.4
#TOT	28	9	0	40	2	0	0	9	3	2	1	207	17	318	207	1	31.8	62.9	76.9

Bird surveys of dyked upland habitat for Spring 80

Date	08Mar	16Mar	21Mar	29Mar	04Apr	12Apr	20Apr	30Apr	11May	15May	25May	29May	Total	Max	Min	Mean	SD	%Freq
#HER	0	0	0	0	0	0	0	1	0	0	1	0	2	1	1	1.0	0.0	16.7
GBHE	0	0	0	0	0	0	0	1	0	0	1	0	2	1	1	1.0	0.0	16.7
#DAB	0	0	0	0	0	0	0	0	7	4	7	2	20	7	2	5.0	2.4	33.3
BWTE	0	0	0	0	0	0	0	0	7	4	7	2	20	7	2	5.0	2.4	33.3
#DIV	0	0	0	0	0	0	2	0	0	0	0	0	2	2	2	2.0	0.0	8.3
COME	0	0	0	0	0	0	2	0	0	0	0	0	2	2	2	2.0	0.0	8.3
#RAP	0	0	0	0	1	0	1	0	0	0	0	0	2	1	1	1.0	0.0	16.7
AMKE	0	0	0	0	1	0	1	0	0	0	0	0	2	1	1	1.0	0.0	16.7
RNPH	1	1	0	0	1	0	2	1	1	1	3	0	11	3	1	1.4	0.7	66.7
#OWL	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	8.3
SEOW	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	8.3
HUMM	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	0.0	8.3
RUHU	0	0	0	0	0	2	0	0	0	0	0	0	2	2	2	2.0	0.0	8.3
#WOO	0	0	0	0	1	1	2	0	2	0	1	0	7	2	1	1.4	0.5	41.7
NOFL	0	0	0	0	1	1	2	0	2	0	1	0	7	2	1	1.4	0.5	41.7
#PAS	7	14	0	25	2	122	27	12	11	17	38	29	304	122	2	27.6	33.1	91.7
VGSW	0	0	0	0	0	1	3	0	0	0	2	0	6	3	1	2.0	1.0	25.0
NRWS	0	0	0	0	0	1	1	0	0	0	0	0	2	1	1	1.0	0.0	16.7
BASW	0	0	0	0	0	0	0	1	0	1	2	3	7	3	1	1.8	1.0	33.3
NOCR	3	14	0	10	0	1	2	4	1	2	11	1	49	14	1	4.9	4.9	83.3
CORA	0	0	0	2	0	0	0	0	0	0	0	0	2	2	2	2.0	0.0	8.3
BUSH	0	0	0	0	0	0	0	0	1	0	0	3	4	3	1	2.0	1.4	16.7
AMRO	1	0	0	13	1	6	2	1	0	7	1	0	32	13	1	4.0	4.4	66.7
EUST	0	0	0	0	0	105	3	0	2	2	16	15	143	105	2	23.8	40.3	50.0
OCWA	0	0	0	0	0	0	0	0	0	2	0	0	2	2	2	2.0	0.0	8.3
SAVS	0	0	0	0	0	1	0	0	0	0	0	0	1	1	1	1.0	0.0	8.3
SOSP	1	0	0	0	0	3	8	0	1	0	0	0	13	8	1	3.3	3.3	33.3
GCSP	0	0	0	0	0	0	2	0	2	1	0	0	5	2	1	1.7	0.6	25.0
WCSP	0	0	0	0	0	0	0	2	0	0	0	1	3	2	1	1.5	0.7	16.7
RWBL	1	0	0	0	0	1	4	0	0	0	0	0	6	4	1	2.0	1.7	25.0
WEME	1	0	0	0	1	0	0	0	0	0	0	0	2	1	1	1.0	0.0	16.7
BRBL	0	0	0	0	0	3	0	4	0	2	6	6	21	6	2	4.2	1.8	41.7
HOFI	0	0	0	0	0	0	2	0	4	0	0	0	6	4	2	3.0	1.4	16.7
#TOT	8	15	1	25	5	125	34	14	22	22	50	31	352	125	1	29.3	33.1	100.0

Bird surveys of dyked upland habitat for Summer 80

Date	08Jun	15Jun	22Jun	29Jun	Total	Max	Min	Mean	SD	%Freq
RNPH	0	0	1	0	1	1	1	1.0	0.0	25.0
BTPI	0	33	0	0	33	33	33	33.0	0.0	25.0
#PAS	0	63	14	36	113	63	14	37.7	24.5	75.0
VGSW	0	3	1	1	5	3	1	1.7	1.2	75.0
NRWS	0	0	1	0	1	1	1	1.0	0.0	25.0
BASW	0	1	1	2	4	2	1	1.3	0.6	75.0
NOCR	0	2	1	12	15	12	1	5.0	6.1	75.0
CBCH	0	0	3	10	13	10	3	6.5	4.9	50.0
AMRO	0	2	0	0	2	2	2	2.0	0.0	25.0
EUST	0	50	0	0	50	50	50	50.0	0.0	25.0
SPAR	0	0	1	5	6	5	1	3.0	2.8	50.0
SOSP	0	0	1	0	1	1	1	1.0	0.0	25.0
GCSP	0	0	0	2	2	2	2	2.0	0.0	25.0
RWBL	0	1	1	0	2	1	1	1.0	0.0	50.0
BRBL	0	0	1	0	1	1	1	1.0	0.0	25.0
PISI	0	0	0	1	1	1	1	1.0	0.0	25.0
AMGO	0	4	3	3	10	4	3	3.3	0.6	75.0
#TOT	0	96	15	36	147	96	15	49.0	42.0	75.0

Appendix V. Seasonal bird numbers on the Englishman River estaury, 1988-1989.

All Habitat Report for Autumn 88

Date	03Nov	09Nov	16Nov	23Nov	30Nov	Total	Max	Min	Mean	SD	%Freq
#LOO	2	3	0	0	3	8	3	2	2.7	0.6	60.0
RTLO	1	0	0	0	0	1	1	1	1.0	0.0	20.0
COLO	1	3	0	0	3	7	3	1	2.3	1.2	60.0
#GRE	0	5	0	2	6	13	6	2	4.3	2.1	60.0
PBGR	0	0	0	0	1	1	1	1	1.0	0.0	20.0
HOGR	0	0	0	2	2	4	2	2	2.0	0.0	40.0
RNGR	0	0	0	0	3	3	3	3	3.0	0.0	20.0
WEGR	0	5	0	0	0	5	5	5	5.0	0.0	20.0
#COR	0	1	0	0	1	2	1	1	1.0	0.0	40.0
PECO	0	1	0	0	1	2	1	1	1.0	0.0	40.0
#HER	1	2	2	3	4	12	4	1	2.4	1.1	100.0
GBHE	1	2	2	3	4	12	4	1	2.4	1.1	100.0
#SWA	0	0	0	0	2	2	2	2	2.0	0.0	20.0
TRUS	0	0	0	0	2	2	2	2	2.0	0.0	20.0
#GEE	49	16	233	114	12	424	233	12	84.8	92.4	100.0
SNGO	4	0	0	0	0	4	4	4	4.0	0.0	20.0
CAGO	45	16	233	114	12	420	233	12	84.0	92.8	100.0
#DAB	1444	1167	1357	491	1379	5838	1444	491	1167.6	392.0	100.0
DABL	0	0	0	0	40	40	40	40	40.0	0.0	20.0
GWTE	145	182	95	35	105	562	182	35	112.4	55.4	100.0
MALL	170	253	175	102	371	1071	371	102	214.2	102.7	100.0
NOPI	98	10	14	60	20	202	98	10	40.4	37.9	100.0
NOSL	0	1	0	0	0	1	1	1	1.0	0.0	20.0
GADW	0	6	0	0	0	6	6	6	6.0	0.0	20.0
EUWI	1	2	3	1	5	12	5	1	2.4	1.7	100.0
AMWI	1030	713	1070	293	838	3944	1070	293	788.8	312.7	100.0
#DIV	56	189	105	187	79	616	189	56	123.2	61.6	100.0
SCAU	0	14	26	23	0	63	26	14	21.0	6.2	60.0
GRSC	14	0	0	0	0	14	14	14	14.0	0.0	20.0
HADU	0	41	2	0	5	48	41	2	16.0	21.7	60.0
SCOT	0	0	0	80	0	80	80	80	80.0	0.0	20.0
BLSC	0	3	3	0	13	19	13	3	6.3	5.8	60.0
SUSC	3	55	10	0	19	87	55	3	21.8	23.1	80.0
WWSC	0	0	23	0	0	23	23	23	23.0	0.0	20.0
COGO	0	4	5	48	17	74	48	4	18.5	20.5	80.0
BUFF	6	69	33	30	18	156	69	6	31.2	23.7	100.0
HOME	1	1	1	4	6	13	6	1	2.6	2.3	100.0
COME	2	0	0	1	1	4	2	1	1.3	0.6	60.0
RBME	0	2	2	1	0	5	2	1	1.7	0.6	60.0
DUCK	30	0	0	0	0	30	30	30	30.0	0.0	20.0
#RAP	3	0	0	0	2	5	3	2	2.5	0.7	40.0
BAEA	1	0	0	0	2	3	2	1	1.5	0.7	40.0
NOHA	1	0	0	0	0	1	1	1	1.0	0.0	20.0
COHA	1	0	0	0	0	1	1	1	1.0	0.0	20.0
#SHO	237	734	45	0	30	1046	734	30	261.5	328.8	80.0
BBPL	32	0	4	0	30	66	32	4	22.0	15.6	60.0
BLTU	2	4	0	0	0	6	4	2	3.0	1.4	40.0
DUNL	202	730	41	0	0	973	730	41	324.3	360.4	60.0

All Habitat Report for Autumn 88 (Cont'd)

Date	03Nov	09Nov	16Nov	23Nov	30Nov	Total	Max	Min	Mean	SD	%Freq
LBDO	1	0	0	0	0	1	1	1	1.0	0.0	20.0
#GUL	336	424	195	419	411	1785	424	195	357.0	97.4	100.0
GULL	304	216	193	407	400	1520	407	193	304.0	99.9	100.0
BOGU	0	127	0	0	0	127	127	127	127.0	0.0	20.0
MEGU	14	13	0	0	4	31	14	4	10.3	5.5	60.0
CAGU	0	12	0	0	0	12	12	12	12.0	0.0	20.0
HEGU	0	0	0	0	1	1	1	1	1.0	0.0	20.0
GWGU	18	56	2	12	6	94	56	2	18.8	21.7	100.0
BEKI	0	0	0	1	1	2	1	1	1.0	0.0	40.0
#PAS	51	37	40	7	47	182	51	7	36.4	17.3	100.0
NOCR	8	37	20	7	38	110	38	7	22.0	15.0	100.0
WAPI	13	0	0	0	0	13	13	13	13.0	0.0	20.0
NOSH	0	0	0	0	1	1	1	1	1.0	0.0	20.0
EUST	30	0	0	0	3	33	30	3	16.5	19.1	40.0
WEME	0	0	0	0	5	5	5	5	5.0	0.0	20.0
HOFI	0	0	20	0	0	20	20	20	20.0	0.0	20.0
#TOT	2179	2578	1977	1224	1977	9935	2578	1224	1987.0	492.1	100.0

All Habitat Report for Winter 88

Date	06Dec	13Dec	05Jan	10Jan	14Feb	23Feb	Total	Max	Min	Mean	SD	%Freq
#LOO	2	1	1	4	3	6	17	6	1	2.8	1.9	100.0
COLO	2	1	1	4	3	6	17	6	1	2.8	1.9	100.0
#GRE	1	2	1	10	4	3	21	10	1	3.5	3.4	100.0
HOGR	1	1	1	6	4	3	16	6	1	2.7	2.1	100.0
RNGR	0	1	0	4	0	0	5	4	1	2.5	2.1	33.3
#COR	4	0	0	0	0	0	4	4	4	4.0	0.0	16.7
DCCO	1	0	0	0	0	0	1	1	1	1.0	0.0	16.7
PECO	3	0	0	0	0	0	3	3	3	3.0	0.0	16.7
#HER	1	4	3	2	1	2	13	4	1	2.2	1.2	100.0
GBHE	1	4	3	2	1	2	13	4	1	2.2	1.2	100.0
#SWA	0	0	0	0	2	0	2	2	2	2.0	0.0	16.7
TRUS	0	0	0	0	2	0	2	2	2	2.0	0.0	16.7
#GEE	9	104	1	27	14	3	158	104	1	26.3	39.2	100.0
BRAN	0	0	0	0	0	2	2	2	2	2.0	0.0	16.7
CAGO	9	104	1	27	14	1	156	104	1	26.0	39.4	100.0
#DAB	604	189	153	245	545	38	1774	604	38	295.7	227.1	100.0
DABL	0	13	0	19	0	0	32	19	13	16.0	4.2	33.3
GWTE	87	66	32	32	21	18	256	87	18	42.7	27.6	100.0
MALL	165	26	94	87	242	4	618	242	4	103.0	88.6	100.0
NOPI	5	2	0	10	3	0	20	10	2	5.0	3.6	66.7
NOSL	1	1	2	3	2	0	9	3	1	1.8	0.8	83.3
GADW	8	6	4	3	4	6	31	8	3	5.2	1.8	100.0
EUWI	3	1	0	0	1	0	5	3	1	1.7	1.2	50.0
AMWI	335	74	21	91	272	10	803	335	10	133.8	136.4	100.0
#DIV	107	93	181	168	177	100	826	181	93	137.7	41.7	100.0
CANV	0	0	0	0	0	1	1	1	1	1.0	0.0	16.7
SCAU	17	0	0	0	0	2	19	17	2	9.5	10.6	33.3
GRSC	0	16	19	5	15	0	55	19	5	13.8	6.1	66.7
HADU	7	2	1	11	6	3	30	11	1	5.0	3.7	100.0
OLDS	0	1	0	0	2	0	3	2	1	1.5	0.7	33.3
BLSC	0	0	10	8	2	1	21	10	1	5.3	4.4	66.7
SUSC	1	45	69	19	30	11	175	69	1	29.2	24.8	100.0
WWSC	0	0	49	80	57	34	220	80	34	55.0	19.2	66.7
COGO	16	8	8	18	29	15	94	29	8	15.7	7.8	100.0
BAGO	0	0	2	0	4	5	11	5	2	3.7	1.5	50.0
BUFF	13	19	15	18	23	19	107	23	13	17.8	3.5	100.0
HOME	2	0	4	7	2	0	15	7	2	3.8	2.4	66.7
COME	5	1	3	1	7	8	25	8	1	4.2	3.0	100.0
RBME	46	1	1	1	0	1	50	46	1	10.0	20.1	83.3
#RAP	1	0	1	0	1	0	3	1	1	1.0	0.0	50.0
BAEA	1	0	1	0	1	0	3	1	1	1.0	0.0	50.0
RNPH	2	0	0	0	0	0	2	2	2	2.0	0.0	16.7
#SHO	0	315	633	1	33	0	982	633	1	245.5	294.3	66.7
BBPL	0	5	27	0	0	0	32	27	5	16.0	15.6	33.3
KILL	0	0	0	0	2	0	2	2	2	2.0	0.0	16.7
GRYE	0	0	0	0	1	0	1	1	1	1.0	0.0	16.7
SAND	0	10	9	0	0	0	19	10	9	9.5	0.7	33.3
DUNL	0	300	597	0	30	0	927	597	30	309.0	283.6	50.0
DOWI	0	0	0	1	0	0	1	1	1	1.0	0.0	16.7
#GUL	645	376	222	264	356	163	2026	645	163	337.7	170.6	100.0

All Habitat Report for Winter 88 (Cont'd)

Date	06Dec	13Dec	05Jan	10Jan	14Feb	23Feb	Total	Max	Min	Mean	SD	%Freq
GULL	604	342	208	255	354	154	1917	604	154	319.5	159.1	100.0
MEGU	28	10	13	0	2	1	54	28	1	10.8	10.9	83.3
GWGU	13	24	1	9	0	8	55	24	1	11.0	8.5	83.3
BEKI	1	1	0	0	0	1	3	1	1	1.0	0.0	50.0
#WOO	0	0	0	0	1	0	1	1	1	1.0	0.0	16.7
NOFL	0	0	0	0	1	0	1	1	1	1.0	0.0	16.7
#PAS	8	34	25	12	99	76	254	99	8	42.3	36.9	100.0
NOCR	6	24	25	7	44	60	166	60	6	27.7	21.1	100.0
AMRO	0	0	0	1	2	1	4	2	1	1.3	0.6	50.0
EUST	2	10	0	0	52	14	78	52	2	19.5	22.2	66.7
SOSP	0	0	0	0	1	0	1	1	1	1.0	0.0	16.7
DEJU	0	0	0	0	0	1	1	1	1	1.0	0.0	16.7
HOFI	0	0	0	4	0	0	4	4	4	4.0	0.0	16.7
#TOT	1385	1119	1221	733	1236	392	6086	1385	392	1014.3	375.9	100.0

All Habitat Report for Spring 89

Date	02Mar	10Mar	16Mar	22Mar	30Mar	07Apr	13Apr	20Apr	05May	11May	24May	Total	Max	Min	Mean	SD	%Freq
#LOO	4	4	16	22	0	1	3	9	3	5	5	72	22	1	7.2	6.7	90.9
LOON	0	0	0	1	0	0	0	0	1	0	0	2	1	1	1.0	0.0	18.2
RTLO	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1.0	0.0	9.1
PALO	0	0	0	5	0	0	0	1	1	5	5	17	5	1	3.4	2.2	45.5
COLO	4	4	16	16	0	1	2	8	1	0	0	52	16	1	6.5	6.3	72.7
#GRE	0	3	311	78	1	1	15	5	58	0	0	472	311	1	59.0	106.0	72.7
GREB	0	0	0	0	0	0	0	3	0	0	0	3	3	3	3.0	0.0	9.1
HOGR	0	3	11	14	1	0	8	0	0	0	0	37	14	1	7.4	5.4	45.5
RNGR	0	0	4	0	0	0	1	2	0	0	0	7	4	1	2.3	1.5	27.3
WEGR	0	0	296	64	0	1	6	0	58	0	0	425	296	1	85.0	121.4	45.5
#COR	0	0	2	0	0	0	0	1	0	0	2	5	2	1	1.7	0.6	27.3
CORM	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2.0	0.0	9.1
DCCO	0	0	2	0	0	0	0	0	0	0	0	2	2	2	2.0	0.0	9.1
PECO	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	0.0	9.1
#HER	1	1	2	0	2	1	1	1	1	3	3	16	3	1	1.6	0.8	90.9
GBHE	1	1	2	0	2	1	1	1	1	3	3	16	3	1	1.6	0.8	90.9
#SWA	2	0	0	0	0	0	0	0	0	0	0	2	2	2	2.0	0.0	9.1
TRUS	2	0	0	0	0	0	0	0	0	0	0	2	2	2	2.0	0.0	9.1
#GEE	2	6	49	137	184	762	72	44	33	24	32	1345	762	2	122.3	219.3	100.0
BRAN	0	0	39	130	180	756	64	30	1	0	0	1200	756	1	171.4	265.1	63.6
CAGO	2	6	10	7	4	6	8	14	32	24	32	145	32	2	13.2	11.0	100.0
#DAB	672	1	133	274	537	541	534	228	22	11	41	2994	672	1	272.2	254.9	100.0
GWTE	50	1	35	34	52	28	36	100	0	0	0	336	100	1	42.0	28.2	72.7
MALL	251	0	4	5	20	43	69	6	17	9	35	459	251	4	45.9	75.0	90.9
NOPI	0	0	0	0	0	2	0	0	0	0	0	2	2	2	2.0	0.0	9.1
BWTE	0	0	0	0	0	0	0	0	0	0	5	5	5	5	5.0	0.0	9.1
NOSL	3	0	0	0	0	0	0	2	0	0	1	6	3	1	2.0	1.0	27.3
GADW	4	0	8	2	4	6	2	4	0	0	0	30	8	2	4.3	2.1	63.6
EUWI	3	0	1	3	4	7	3	0	0	0	0	21	7	1	3.5	2.0	54.5
AMWI	361	0	85	230	457	455	424	116	5	2	0	2135	457	2	237.2	191.4	81.8
#DIV	84	110	76	73	15	24	32	32	94	54	0	594	110	15	59.4	32.6	90.9
DIVE	0	0	0	0	0	3	0	0	0	0	0	3	3	3	3.0	0.0	9.1
CANV	0	1	1	1	0	0	0	0	0	0	0	3	1	1	1.0	0.0	27.3
GRSC	0	13	0	0	0	0	0	0	0	0	0	13	13	13	13.0	0.0	9.1
HADU	4	2	4	0	0	0	0	7	0	8	0	25	8	2	5.0	2.4	45.5
OLDS	0	5	0	0	0	0	1	0	0	0	0	6	5	1	3.0	2.8	18.2
SCOT	0	4	0	0	0	0	0	2	0	36	0	42	36	2	14.0	19.1	27.3
BLSC	0	23	0	11	0	0	0	0	0	0	0	34	23	11	17.0	8.5	18.2
SUSC	6	2	9	0	0	0	0	0	79	2	0	98	79	2	19.6	33.3	45.5
WWSC	37	13	1	1	0	0	6	3	0	0	0	61	37	1	10.2	13.9	54.5
COGO	9	4	21	14	0	2	0	5	0	0	0	55	21	2	9.2	7.2	54.5
BAGO	4	4	8	2	0	0	0	0	0	0	0	18	8	2	4.5	2.5	36.4
BUFF	16	33	24	17	10	13	18	4	8	0	0	143	33	4	15.9	8.7	81.8
HOME	3	2	0	0	0	0	0	1	0	0	0	6	3	1	2.0	1.0	27.3
COME	5	4	7	27	5	6	7	10	7	8	0	86	27	4	8.6	6.7	90.9
RBME	0	0	1	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	9.1
#RAP	1	1	2	9	6	0	2	5	0	0	4	30	9	1	3.8	2.8	72.7
BAEA	1	0	2	9	6	0	2	4	0	0	4	28	9	1	4.0	2.8	63.6
COHA	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	9.1
AMKE	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	0.0	9.1

All Habitat Report for Spring 89 (Cont'd)

Date	02Mar	10Mar	16Mar	22Mar	30Mar	07Apr	13Apr	20Apr	05May	11May	24May	Total	Max	Min	Mean	SD	%Freq
RNPH	0	0	0	1	1	1	1	2	3	2	2	13	3	1	1.6	0.7	72.7
CAQU	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1.0	0.0	9.1
#SHO	27	0	2	10	453	91	73	63	154	8	3	884	453	2	88.4	137.1	90.9
BBPL	0	0	0	5	22	3	10	1	5	0	2	48	22	1	6.9	7.3	63.6
SEPL	0	0	0	0	0	0	0	0	2	0	0	2	2	2	2.0	0.0	9.1
KILL	17	0	0	1	0	1	0	4	3	2	1	29	17	1	4.1	5.8	63.6
GRYE	0	0	2	1	2	2	2	0	0	0	0	9	2	1	1.8	0.4	45.5
BLTU	0	0	0	0	30	0	0	6	0	0	0	36	30	6	18.0	17.0	18.2
PEEP	0	0	0	0	0	0	0	52	40	0	0	92	52	40	46.0	8.5	18.2
SAND	0	0	0	0	0	1	0	0	0	6	0	7	6	1	3.5	3.5	18.2
WESA	0	0	0	0	0	0	0	0	100	0	0	100	100	100	100.0	0.0	9.1
LESA	0	0	0	0	0	0	0	0	4	0	0	4	4	4	4.0	0.0	9.1
DUNL	10	0	0	3	399	84	61	0	0	0	0	557	399	3	111.4	164.3	45.5
#GUL	56	336	2488	597	583	1014	894	320	42	506	48	6884	2488	42	625.8	698.9	100.0
GULL	0	227	2486	597	580	892	360	68	20	504	19	5753	2486	19	575.3	730.3	90.9
BOGU	0	0	0	0	0	0	512	241	0	0	0	753	512	241	376.5	191.6	18.2
MEGU	12	3	0	0	0	113	4	0	0	0	0	132	113	3	33.0	53.5	36.4
CAGU	0	0	0	0	0	1	0	0	0	0	0	1	1	1	1.0	0.0	9.1
THGU	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	9.1
GWGU	43	106	2	0	3	8	18	11	22	2	29	244	106	2	24.4	31.6	90.9
#ALC	0	0	1	0	0	0	0	1	0	1	1	4	1	1	1.0	0.0	36.4
PIGU	0	0	1	0	0	0	0	1	0	1	0	3	1	1	1.0	0.0	27.3
MAMU	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1.0	0.0	9.1
RODO	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1.0	0.0	9.1
BEKI	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1.0	0.0	9.1
#WOO	0	0	0	0	0	0	0	1	1	1	1	4	1	1	1.0	0.0	36.4
NOFL	0	0	0	0	0	0	0	1	1	1	1	4	1	1	1.0	0.0	36.4
#PAS	84	122	15	61	248	352	144	52	98	42	35	1253	352	15	113.9	102.3	100.0
VGSW	0	0	0	3	0	0	3	0	0	12	11	29	12	3	7.3	4.9	36.4
NRWS	0	0	0	0	0	0	0	1	0	4	0	5	4	1	2.5	2.1	18.2
BASW	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2.0	0.0	9.1
NOCR	32	22	15	22	148	109	29	32	34	21	13	477	148	13	43.4	43.5	100.0
GCKI	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	0.0	9.1
MOBL	0	0	0	4	0	3	0	0	0	0	0	7	4	3	3.5	0.7	18.2
AMRO	4	0	0	1	0	0	0	0	1	0	0	6	4	1	2.0	1.7	27.3
WAPI	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1.0	0.0	9.1
EUST	44	100	0	30	100	200	110	10	42	5	4	645	200	4	64.5	62.6	90.9
OCWA	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1.0	0.0	9.1
YRWA	0	0	0	1	0	0	0	0	0	0	1	2	1	1	1.0	0.0	18.2
SAVS	0	0	0	0	0	0	1	8	18	0	2	29	18	1	7.3	7.8	36.4
SOSP	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	9.1
RWBL	0	0	0	0	0	0	1	0	0	0	1	2	1	1	1.0	0.0	18.2
WEME	3	0	0	0	0	0	0	0	0	0	0	3	3	3	3.0	0.0	9.1
PISI	0	0	0	0	0	40	0	0	0	0	0	40	40	40	40.0	0.0	9.1
AMGO	0	0	0	0	0	0	0	0	1	0	1	2	1	1	1.0	0.0	18.2
#TOT	933	584	3097	1262	2030	2788	1772	764	509	659	177	14575	3097	177	1325.0	970.9	100.0

Appendix VI. Seasonal bird numbers by habitat on the Englishman River estuary, 1988-1989.

Bird survey of east spit (residential) habitat for Autumn 88

Date	03Nov	09Nov	16Nov	23Nov	30Nov	Total	Max	Min	Mean	SD	%Freq
#GEE	0	0	0	0	7	7	7	7	7.0	0.0	20.0
CAGO	0	0	0	0	7	7	7	7	7.0	0.0	20.0
#DAB	0	0	0	0	24	24	24	24	24.0	0.0	20.0
AMWI	0	0	0	0	24	24	24	24	24.0	0.0	20.0
#GUL	0	0	0	0	82	82	82	82	82.0	0.0	20.0
GULL	0	0	0	0	82	82	82	82	82.0	0.0	20.0
#PAS	0	0	0	0	1	1	1	1	1.0	0.0	20.0
NOCR	0	0	0	0	1	1	1	1	1.0	0.0	20.0
#TOT	0	0	0	0	114	114	114	114	114.0	0.0	20.0

Bird survey of east spit (residential) habitat for Winter 88

Date	06Dec	13Dec	05Jan	10Jan	14Feb	23Feb	Total	Max	Min	Mean	SD	%Freq
#GEE	0	0	0	0	1	0	1	1	1	1.0	0.0	16.7
CAGO	0	0	0	0	1	0	1	1	1	1.0	0.0	16.7
#DAB	0	0	0	4	44	0	48	44	4	24.0	28.3	33.3
EUWI	0	0	0	0	1	0	1	1	1	1.0	0.0	16.7
AMWI	0	0	0	4	43	0	47	43	4	23.5	27.6	33.3
#GUL	0	0	0	24	0	0	24	24	24	24.0	0.0	16.7
GULL	0	0	0	24	0	0	24	24	24	24.0	0.0	16.7
#TOT	0	0	0	28	45	0	73	45	28	36.5	12.0	33.3

Bird survey of east spit (residential) habitat for Spring 89

No observations for this station

Bird surveys of intertidal habitat for Autumn 88

Date	03Nov	09Nov	16Nov	23Nov	30Nov	Total	Max	Min	Mean	SD	%Freq
#LOO	0	3	0	0	2	5	3	2	2.5	0.7	40.0
COLO	0	3	0	0	2	5	3	2	2.5	0.7	40.0
#GRE	0	2	0	2	5	9	5	2	3.0	1.7	60.0
HOGR	0	0	0	2	2	4	2	2	2.0	0.0	40.0
RNGR	0	0	0	0	3	3	3	3	3.0	0.0	20.0
WEGR	0	2	0	0	0	2	2	2	2.0	0.0	20.0
#COR	0	1	0	0	1	2	1	1	1.0	0.0	40.0
PECO	0	1	0	0	1	2	1	1	1.0	0.0	40.0
#SWA	0	0	0	0	2	2	2	2	2.0	0.0	20.0
TRUS	0	0	0	0	2	2	2	2	2.0	0.0	20.0
#DAB	0	8	0	0	0	8	8	8	8.0	0.0	20.0
AMWI	0	8	0	0	0	8	8	8	8.0	0.0	20.0
#DIV	17	138	68	119	46	388	138	17	77.6	50.3	100.0
SCAU	0	14	26	23	0	63	26	14	21.0	6.2	60.0
GRSC	14	0	0	0	0	14	14	14	14.0	0.0	20.0
HADU	0	41	0	0	5	46	41	5	23.0	25.5	40.0
SCOT	0	0	0	80	0	80	80	80	80.0	0.0	20.0
BLSC	0	3	3	0	13	19	13	3	6.3	5.8	60.0
SUSC	3	55	10	0	19	87	55	3	21.8	23.1	80.0
WWSC	0	0	23	0	0	23	23	23	23.0	0.0	20.0
COGO	0	4	4	6	5	19	6	4	4.8	1.0	80.0
BUFF	0	20	1	10	4	35	20	1	8.8	8.4	80.0
RBME	0	1	1	0	0	2	1	1	1.0	0.0	40.0
#RAP	1	0	0	0	2	3	2	1	1.5	0.7	40.0
BAEA	1	0	0	0	2	3	2	1	1.5	0.7	40.0
#SHO	0	4	0	0	0	4	4	4	4.0	0.0	20.0
BLTU	0	4	0	0	0	4	4	4	4.0	0.0	20.0
#GUL	46	102	0	228	8	384	228	8	96.0	96.1	80.0
GULL	46	102	0	228	3	379	228	3	94.8	97.6	80.0
MEGU	0	0	0	0	4	4	4	4	4.0	0.0	20.0
GWGU	0	0	0	0	1	1	1	1	1.0	0.0	20.0
#TOT	64	258	68	349	66	805	349	64	161.0	134.0	100.0

Bird surveys of intertidal habitat for Winter 88

Date	06Dec	13Dec	05Jan	10Jan	14Feb	23Feb	Total	Max	Min	Mean	SD	%Freq
#LOO	1	1	1	4	3	6	16	6	1	2.7	2.1	100.0
COLO	1	1	1	4	3	6	16	6	1	2.7	2.1	100.0
#GRE	1	2	1	8	4	2	18	8	1	3.0	2.7	100.0
HOGR	1	1	1	4	4	2	13	4	1	2.2	1.5	100.0
RNGR	0	1	0	4	0	0	5	4	1	2.5	2.1	33.3
#COR	3	0	0	0	0	0	3	3	3	3.0	0.0	16.7
PECO	3	0	0	0	0	0	3	3	3	3.0	0.0	16.7
#GEE	0	0	0	0	0	2	2	2	2	2.0	0.0	16.7
BRAN	0	0	0	0	0	2	2	2	2	2.0	0.0	16.7
#DAB	0	0	0	0	17	0	17	17	17	17.0	0.0	16.7
MALL	0	0	0	0	9	0	9	9	9	9.0	0.0	16.7
AMWI	0	0	0	0	8	0	8	8	8	8.0	0.0	16.7
#DIV	84	69	151	135	149	45	633	151	45	105.5	45.4	100.0
SCAU	17	0	0	0	0	0	17	17	17	17.0	0.0	16.7
GRSC	0	16	10	1	15	0	42	16	1	10.5	6.9	66.7
HADU	7	2	1	11	6	3	30	11	1	5.0	3.7	100.0
OLDS	0	1	0	0	2	0	3	2	1	1.5	0.7	33.3
BLSC	0	0	10	8	2	0	20	10	2	6.7	4.2	50.0
SUSC	1	45	69	12	30	3	160	69	1	26.7	26.7	100.0
WWSC	0	0	49	80	57	34	220	80	34	55.0	19.2	66.7
COGO	7	1	6	15	26	3	58	26	1	9.7	9.3	100.0
BAGO	0	0	0	0	1	0	1	1	1	1.0	0.0	16.7
BUFF	6	3	6	7	10	1	33	10	1	5.5	3.1	100.0
COME	0	0	0	1	0	0	1	1	1	1.0	0.0	16.7
RBME	46	1	0	0	0	1	48	46	1	16.0	26.0	50.0
#RAP	0	0	0	0	1	0	1	1	1	1.0	0.0	16.7
BAEA	0	0	0	0	1	0	1	1	1	1.0	0.0	16.7
#SHO	0	315	594	0	0	0	909	594	315	454.5	197.3	33.3
BBPL	0	5	22	0	0	0	27	22	5	13.5	12.0	33.3
SAND	0	10	9	0	0	0	19	10	9	9.5	0.7	33.3
DUNL	0	300	563	0	0	0	863	563	300	431.5	186.0	33.3
#GUL	35	30	99	37	252	126	579	252	30	96.5	85.8	100.0
GULL	0	0	86	37	250	123	496	250	37	124.0	91.1	66.7
MEGU	28	10	13	0	2	0	53	28	2	13.3	10.9	66.7
GWGU	7	20	0	0	0	3	30	20	3	10.0	8.9	50.0
#PAS	0	0	0	0	3	3	6	3	3	3.0	0.0	33.3
NOCR	0	0	0	0	3	3	6	3	3	3.0	0.0	33.3
#TOT	124	417	846	184	429	184	2184	846	124	364.0	269.0	100.0

Bird surveys of intertidal habitat for Spring 89

Date	02Mar	10Mar	16Mar	22Mar	30Mar	07Apr	13Apr	20Apr	05May	11May	24May	Total	Max	Min	Mean	SD	%Freq
#LOO	4	4	16	22	0	1	3	9	3	5	5	72	22	1	7.2	6.7	90.9
LOON	0	0	0	1	0	0	0	0	1	0	0	2	1	1	1.0	0.0	18.2
RTLO	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1.0	0.0	9.1
PALO	0	0	0	5	0	0	0	1	1	5	5	17	5	1	3.4	2.2	45.5
COLO	4	4	16	16	0	1	2	8	1	0	0	52	16	1	6.5	6.3	72.7
#GRE	0	3	311	78	1	1	15	4	58	0	0	471	311	1	58.9	106.0	72.7
GREB	0	0	0	0	0	0	0	3	0	0	0	3	3	3	3.0	0.0	9.1
HOGR	0	3	11	14	1	0	8	0	0	0	0	37	14	1	7.4	5.4	45.5
RNGR	0	0	4	0	0	0	1	1	0	0	0	6	4	1	2.0	1.7	27.3
WEGR	0	0	296	64	0	1	6	0	58	0	0	425	296	1	85.0	121.4	45.5
#COR	0	0	2	0	0	0	0	0	0	0	2	4	2	2	2.0	0.0	18.2
CORM	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2.0	0.0	9.1
DCCO	0	0	2	0	0	0	0	0	0	0	0	2	2	2	2.0	0.0	9.1
#HER	0	0	0	0	0	0	0	0	1	1	0	2	1	1	1.0	0.0	18.2
GBHE	0	0	0	0	0	0	0	0	1	1	0	2	1	1	1.0	0.0	18.2
#GEE	0	0	39	130	60	176	50	14	0	0	0	469	176	14	78.2	61.7	54.5
BRAN	0	0	39	130	60	176	50	14	0	0	0	469	176	14	78.2	61.7	54.5
#DAB	0	0	0	68	0	0	14	0	0	0	0	82	68	14	41.0	38.2	18.2
EUWI	0	0	0	3	0	0	0	0	0	0	0	3	3	3	3.0	0.0	9.1
AMWI	0	0	0	65	0	0	14	0	0	0	0	79	65	14	39.5	36.1	18.2
#DIV	65	71	31	28	0	5	15	9	82	49	0	355	82	5	39.4	28.4	81.8
DIVE	0	0	0	0	0	3	0	0	0	0	0	3	3	3	3.0	0.0	9.1
GRSC	0	13	0	0	0	0	0	0	0	0	0	13	13	13	13.0	0.0	9.1
HADU	4	2	4	0	0	0	0	4	0	8	0	22	8	2	4.4	2.2	45.5
OLDS	0	5	0	0	0	0	1	0	0	0	0	6	5	1	3.0	2.8	18.2
SCOT	0	4	0	0	0	0	0	2	0	36	0	42	36	2	14.0	19.1	27.3
BLSC	0	23	0	11	0	0	0	0	0	0	0	34	23	11	17.0	8.5	18.2
SUSC	6	2	9	0	0	0	0	0	79	2	0	98	79	2	19.6	33.3	45.5
WWSC	37	13	1	1	0	0	6	3	0	0	0	61	37	1	10.2	13.9	54.5
COGO	5	2	9	9	0	2	0	0	0	0	0	27	9	2	5.4	3.5	45.5
BAGO	0	0	0	2	0	0	0	0	0	0	0	2	2	2	2.0	0.0	9.1
BUFF	8	7	7	5	0	0	8	0	3	0	0	38	8	3	6.3	2.0	54.5
COME	5	0	0	0	0	0	0	0	0	3	0	8	5	3	4.0	1.4	18.2
RBME	0	0	1	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	9.1
#RAP	0	0	0	9	2	0	1	1	0	0	0	13	9	1	3.3	3.9	36.4
BAEA	0	0	0	9	2	0	1	1	0	0	0	13	9	1	3.3	3.9	36.4
#SHO	0	0	0	6	371	0	68	0	0	0	0	445	371	6	148.3	195.3	27.3
BBPL	0	0	0	5	22	0	9	0	0	0	0	36	22	5	12.0	8.9	27.3
DUNL	0	0	0	1	349	0	59	0	0	0	0	409	349	1	136.3	186.4	27.3
#GUL	52	104	1606	343	0	0	19	11	5	356	21	2517	1606	5	279.7	516.5	81.8
GULL	0	0	1606	343	0	0	0	4	0	356	0	2309	1606	4	577.3	704.9	36.4
BOGU	0	0	0	0	0	0	16	1	0	0	0	17	16	1	8.5	10.6	18.2
MEGU	9	0	0	0	0	0	0	0	0	0	0	9	9	9	9.0	0.0	9.1
GWGU	43	104	0	0	0	0	3	6	5	0	21	182	104	3	30.3	39.1	54.5
#ALC	0	0	1	0	0	0	0	1	0	1	1	4	1	1	1.0	0.0	36.4
PIGU	0	0	1	0	0	0	0	1	0	1	0	3	1	1	1.0	0.0	27.3
MAMU	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1.0	0.0	9.1
#PAS	2	0	2	11	0	0	3	0	3	0	1	22	11	1	3.7	3.7	54.5
NOCR	2	0	2	11	0	0	3	0	3	0	1	22	11	1	3.7	3.7	54.5
#TOT	123	182	2008	695	434	183	188	49	152	412	30	4456	2008	30	405.1	566.7	100.0

Bird surveys of river mouth habitat for Autumn 88

Date	03Nov	09Nov	16Nov	23Nov	30Nov	Total	Max	Min	Mean	SD	%Freq
#LOO	2	0	0	0	1	3	2	1	1.5	0.7	40.0
RTLO	1	0	0	0	0	1	1	1	1.0	0.0	20.0
COLO	1	0	0	0	1	2	1	1	1.0	0.0	40.0
#GRE	0	1	0	0	0	1	1	1	1.0	0.0	20.0
WEGR	0	1	0	0	0	1	1	1	1.0	0.0	20.0
#DAB	114	12	0	5	0	131	114	5	43.7	61.0	60.0
AMWI	114	12	0	5	0	131	114	5	43.7	61.0	60.0
#DIV	0	1	10	19	6	36	19	1	9.0	7.6	80.0
HADU	0	0	2	0	0	2	2	2	2.0	0.0	20.0
COGO	0	0	0	12	5	17	12	5	8.5	4.9	40.0
BUFF	0	1	7	6	1	15	7	1	3.8	3.2	80.0
RBME	0	0	1	1	0	2	1	1	1.0	0.0	40.0
#SHO	26	0	0	0	0	26	26	26	26.0	0.0	20.0
BBPL	7	0	0	0	0	7	7	7	7.0	0.0	20.0
BLTU	1	0	0	0	0	1	1	1	1.0	0.0	20.0
DUNL	18	0	0	0	0	18	18	18	18.0	0.0	20.0
#GUL	0	0	1	5	4	10	5	1	3.3	2.1	60.0
GULL	0	0	1	5	4	10	5	1	3.3	2.1	60.0
#TOT	142	14	11	29	11	207	142	11	41.4	56.7	100.0

Bird surveys of river mouth habitat for Winter 88

Date	06Dec	13Dec	05Jan	10Jan	14Feb	23Feb	Total	Max	Min	Mean	SD	%Freq
#LOO	1	0	0	0	0	0	1	1	1	1.0	0.0	16.7
COLO	1	0	0	0	0	0	1	1	1	1.0	0.0	16.7
#GRE	0	0	0	0	0	1	1	1	1	1.0	0.0	16.7
HOGR	0	0	0	0	0	1	1	1	1	1.0	0.0	16.7
#DAB	4	2	0	0	0	10	16	10	2	5.3	4.2	50.0
MALL	0	2	0	0	0	0	2	2	2	2.0	0.0	16.7
AMWI	4	0	0	0	0	10	14	10	4	7.0	4.2	33.3
#DIV	7	2	2	11	3	27	52	27	2	8.7	9.6	100.0
BLSC	0	0	0	0	0	1	1	1	1	1.0	0.0	16.7
SUSC	0	0	0	7	0	8	15	8	7	7.5	0.7	33.3
COGO	7	1	0	3	0	5	16	7	1	4.0	2.6	66.7
BAGO	0	0	2	0	3	5	10	5	2	3.3	1.5	50.0
BUFF	0	0	0	0	0	3	3	3	3	3.0	0.0	16.7
COME	0	1	0	0	0	5	6	5	1	3.0	2.8	33.3
RBME	0	0	0	1	0	0	1	1	1	1.0	0.0	16.7
#GUL	92	0	0	194	59	2	347	194	2	86.8	80.6	66.7
GULL	92	0	0	194	59	0	345	194	59	115.0	70.4	50.0
MEGU	0	0	0	0	0	1	1	1	1	1.0	0.0	16.7
GWGU	0	0	0	0	0	1	1	1	1	1.0	0.0	16.7
#PAS	0	0	0	0	0	36	36	36	36	36.0	0.0	16.7
NOCR	0	0	0	0	0	36	36	36	36	36.0	0.0	16.7
#TOT	104	4	2	205	62	76	453	205	2	75.5	75.2	100.0

Bird surveys of river mouth habitat for Spring 89

Date	02Mar	10Mar	16Mar	22Mar	30Mar	07Apr	13Apr	20Apr	05May	11May	24May	Total	Max	Min	Mean	SD	%Freq
#GRE	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	0.0	9.1
RNGR	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	0.0	9.1
#COR	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	0.0	9.1
PECO	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	0.0	9.1
#GEE	0	0	0	0	0	580	14	18	1	0	0	613	580	1	153.3	284.6	36.4
BRAN	0	0	0	0	0	580	14	16	1	0	0	611	580	1	152.8	284.9	36.4
CAGO	0	0	0	0	0	0	0	2	0	0	0	2	2	2	2.0	0.0	9.1
#DAB	0	0	0	0	0	522	5	77	5	0	0	609	522	5	152.3	248.8	36.4
GWTE	0	0	0	0	0	15	0	0	0	0	0	15	15	15	15.0	0.0	9.1
MALL	0	0	0	0	0	39	0	0	0	0	0	39	39	39	39.0	0.0	9.1
NOPI	0	0	0	0	0	2	0	0	0	0	0	2	2	2	2.0	0.0	9.1
GADW	0	0	0	0	0	6	0	2	0	0	0	8	6	2	4.0	2.8	18.2
EUWI	0	0	0	0	0	7	0	0	0	0	0	7	7	7	7.0	0.0	9.1
AMWI	0	0	0	0	0	453	5	75	5	0	0	538	453	5	134.5	214.9	36.4
#DIV	1	16	23	10	0	3	4	10	11	2	0	80	23	1	8.9	7.3	81.8
HADU	0	0	0	0	0	0	0	3	0	0	0	3	3	3	3.0	0.0	9.1
COGO	1	0	10	5	0	0	0	5	0	0	0	21	10	1	5.3	3.7	36.4
BAGO	0	4	8	0	0	0	0	0	0	0	0	12	8	4	6.0	2.8	18.2
BUFF	0	8	5	0	0	1	2	0	5	0	0	21	8	1	4.2	2.8	45.5
COME	0	4	0	5	0	2	2	2	6	2	0	23	6	2	3.3	1.7	63.6
#SHO	0	0	0	0	0	90	3	7	5	0	0	105	90	3	26.3	42.5	36.4
BBPL	0	0	0	0	0	3	1	1	5	0	0	10	5	1	2.5	1.9	36.4
GRYE	0	0	0	0	0	2	0	0	0	0	0	2	2	2	2.0	0.0	9.1
BLTU	0	0	0	0	0	0	0	6	0	0	0	6	6	6	6.0	0.0	9.1
SAND	0	0	0	0	0	1	0	0	0	0	0	1	1	1	1.0	0.0	9.1
DUNL	0	0	0	0	0	84	2	0	0	0	0	86	84	2	43.0	58.0	18.2
#GUL	0	232	0	0	0	1013	388	309	35	146	8	2131	1013	8	304.4	341.5	63.6
GULL	0	227	0	0	0	892	340	64	20	146	0	1689	892	20	281.5	320.4	54.5
BOGU	0	0	0	0	0	0	32	240	0	0	0	272	240	32	136.0	147.1	18.2
MEGU	0	3	0	0	0	113	4	0	0	0	0	120	113	3	40.0	63.2	27.3
CAGU	0	0	0	0	0	1	0	0	0	0	0	1	1	1	1.0	0.0	9.1
GWGU	0	2	0	0	0	7	12	5	15	0	8	49	15	2	8.2	4.7	54.5
#PAS	0	10	0	0	0	299	8	8	10	13	0	348	299	8	58.0	118.1	54.5
VGSW	0	0	0	0	0	0	0	0	0	8	0	8	8	8	8.0	0.0	9.1
NOCR	0	10	0	0	0	99	8	8	10	5	0	140	99	5	23.3	37.1	54.5
EUST	0	0	0	0	0	200	0	0	0	0	0	200	200	200	200.0	0.0	9.1
#TOT	1	258	23	10	0	2507	422	431	67	161	8	3888	2507	1	388.8	762.7	90.9

Bird surveys of dredged slough habitat for Autumn 88

Date	03Nov	09Nov	16Nov	23Nov	30Nov	Total	Max	Min	Mean	SD	%Freq
#GRE	0	1	0	0	0	1	1	1	1.0	0.0	20.0
WEGR	0	1	0	0	0	1	1	1	1.0	0.0	20.0
#GEE	1	0	0	18	0	19	18	1	9.5	12.0	40.0
CAGO	1	0	0	18	0	19	18	1	9.5	12.0	40.0
#DAB	32	18	10	5	17	82	32	5	16.4	10.2	100.0
MALL	32	10	6	2	11	61	32	2	12.2	11.6	100.0
AMWI	0	8	4	3	6	21	8	3	5.3	2.2	80.0
#DIV	1	4	5	8	15	33	15	1	6.6	5.3	100.0
COGO	0	0	0	0	1	1	1	1	1.0	0.0	20.0
BUFF	0	4	5	6	7	22	7	4	5.5	1.3	80.0
HOME	0	0	0	1	6	7	6	1	3.5	3.5	40.0
COME	1	0	0	1	1	3	1	1	1.0	0.0	60.0
#GUL	0	0	0	0	1	1	1	1	1.0	0.0	20.0
HEGU	0	0	0	0	1	1	1	1	1.0	0.0	20.0
BEKI	0	0	0	0	1	1	1	1	1.0	0.0	20.0
#PAS	5	0	3	0	0	8	5	3	4.0	1.4	40.0
NOCR	5	0	3	0	0	8	5	3	4.0	1.4	40.0
#TOT	39	23	18	31	34	145	39	18	29.0	8.5	100.0

Bird surveys of dredged slough habitat for Winter 88

Date	06Dec	13Dec	05Jan	10Jan	14Feb	23Feb	Total	Max	Min	Mean	SD	%Freq
#HER	1	0	0	0	0	0	1	1	1	1.0	0.0	16.7
GBHE	1	0	0	0	0	0	1	1	1	1.0	0.0	16.7
#DAB	29	4	2	2	9	0	46	29	2	9.2	11.4	83.3
MALL	10	0	0	0	0	0	10	10	10	10.0	0.0	16.7
AMWI	19	4	2	2	9	0	36	19	2	7.2	7.2	83.3
#DIV	10	10	5	4	0	9	38	10	4	7.6	2.9	83.3
COGO	0	1	0	0	0	3	4	3	1	2.0	1.4	33.3
BUFF	4	9	2	4	0	6	25	9	2	5.0	2.6	83.3
HOME	1	0	0	0	0	0	1	1	1	1.0	0.0	16.7
COME	5	0	3	0	0	0	8	5	3	4.0	1.4	33.3
#GUL	0	0	1	1	0	1	3	1	1	1.0	0.0	50.0
GWGU	0	0	1	1	0	1	3	1	1	1.0	0.0	50.0
BEKI	1	1	0	0	0	0	2	1	1	1.0	0.0	33.3
#TOT	41	15	8	7	9	10	90	41	7	15.0	13.0	100.0

Bird surveys of dredged slough habitat for Spring 89

Date	02Mar	10Mar	16Mar	22Mar	30Mar	07Apr	13Apr	20Apr	05May	11May	24May	Total	Max	Min	Mean	SD	%Freq
#HER	0	0	0	0	1	0	0	0	0	0	0	1	1	1	1.0	0.0	9.1
GBHE	0	0	0	0	1	0	0	0	0	0	0	1	1	1	1.0	0.0	9.1
#DAB	6	0	0	0	2	0	0	3	0	0	0	11	6	2	3.7	2.1	27.3
GWTE	0	0	0	0	0	0	0	3	0	0	0	3	3	3	3.0	0.0	9.1
MALL	0	0	0	0	2	0	0	0	0	0	0	2	2	2	2.0	0.0	9.1
AMWI	6	0	0	0	0	0	0	0	0	0	0	6	6	6	6.0	0.0	9.1
#DIV	4	12	8	8	4	4	5	5	0	0	0	50	12	4	6.3	2.9	72.7
CANV	0	1	1	1	0	0	0	0	0	0	0	3	1	1	1.0	0.0	27.3
COGO	0	2	0	0	0	0	0	0	0	0	0	2	2	2	2.0	0.0	9.1
BUFF	3	9	7	7	4	4	4	2	0	0	0	40	9	2	5.0	2.4	72.7
HOME	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	9.1
COME	0	0	0	0	0	0	1	3	0	0	0	4	3	1	2.0	1.4	18.2
#GUL	0	0	2	0	2	0	0	0	0	0	0	4	2	2	2.0	0.0	18.2
GWGU	0	0	2	0	2	0	0	0	0	0	0	4	2	2	2.0	0.0	18.2
#PAS	0	0	0	3	0	0	0	0	0	0	0	3	3	3	3.0	0.0	9.1
VGSW	0	0	0	3	0	0	0	0	0	0	0	3	3	3	3.0	0.0	9.1
#TOT	10	12	10	11	9	4	5	8	0	0	0	69	12	4	8.6	2.8	72.7

Bird surveys of west estuarine channel habitat for Autumn 88

Date	03Nov	09Nov	16Nov	23Nov	30Nov	Total	Max	Min	Mean	SD	%Freq
#HER	0	1	1	1	0	3	1	1	1.0	0.0	60.0
GBHE	0	1	1	1	0	3	1	1	1.0	0.0	60.0
#GEE	0	0	20	20	0	40	20	20	20.0	0.0	40.0
CAGO	0	0	20	20	0	40	20	20	20.0	0.0	40.0
#DAB	200	162	186	89	399	1036	399	89	207.2	115.4	100.0
DABL	0	0	0	0	36	36	36	36	36.0	0.0	20.0
GWTE	88	56	71	15	87	317	88	15	63.4	30.1	100.0
MALL	62	52	25	30	140	309	140	25	61.8	46.3	100.0
NOPI	30	0	11	9	20	70	30	9	17.5	9.6	80.0
GADW	0	6	0	0	0	6	6	6	6.0	0.0	20.0
AMWI	20	48	79	35	116	298	116	20	59.6	38.3	100.0
#DIV	30	3	3	2	0	38	30	2	9.5	13.7	80.0
COGO	0	0	1	0	0	1	1	1	1.0	0.0	20.0
BUFF	0	3	2	0	0	5	3	2	2.5	0.7	40.0
HOME	0	0	0	2	0	2	2	2	2.0	0.0	20.0
DUCK	30	0	0	0	0	30	30	30	30.0	0.0	20.0
#RAP	1	0	0	0	0	1	1	1	1.0	0.0	20.0
COHA	1	0	0	0	0	1	1	1	1.0	0.0	20.0
#SHO	31	0	0	0	0	31	31	31	31.0	0.0	20.0
DUNL	30	0	0	0	0	30	30	30	30.0	0.0	20.0
LBDO	1	0	0	0	0	1	1	1	1.0	0.0	20.0
#GUL	0	1	0	3	0	4	3	1	2.0	1.4	40.0
GWGU	0	1	0	3	0	4	3	1	2.0	1.4	40.0
#TOT	262	167	210	115	399	1153	399	115	230.6	108.6	100.0

Bird surveys of west estuarine channel habitat for Winter 88

Date	06Dec	13Dec	05Jan	10Jan	14Feb	23Feb	Total	Max	Min	Mean	SD	%Freq
#HER	0	0	1	0	0	1	2	1	1	1.0	0.0	33.3
GBHE	0	0	1	0	0	1	2	1	1	1.0	0.0	33.3
#GEE	0	4	0	0	0	0	4	4	4	4.0	0.0	16.7
CAGO	0	4	0	0	0	0	4	4	4	4.0	0.0	16.7
#DAB	20	47	32	72	38	6	215	72	6	35.8	22.8	100.0
DABL	0	5	0	13	0	0	18	13	5	9.0	5.7	33.3
GWTE	3	23	11	18	4	3	62	23	3	10.3	8.6	100.0
MALL	8	13	21	39	28	1	110	39	1	18.3	13.9	100.0
GADW	8	6	0	2	0	2	18	8	2	4.5	3.0	66.7
AMWI	1	0	0	0	6	0	7	6	1	3.5	3.5	33.3
#DIV	0	0	1	1	1	4	7	4	1	1.8	1.5	66.7
CANV	0	0	0	0	0	1	1	1	1	1.0	0.0	16.7
COGO	0	0	0	0	0	3	3	3	3	3.0	0.0	16.7
BUFF	0	0	1	1	1	0	3	1	1	1.0	0.0	50.0
#SHO	0	0	0	1	1	0	2	1	1	1.0	0.0	33.3
GRYE	0	0	0	0	1	0	1	1	1	1.0	0.0	16.7
DOWI	0	0	0	1	0	0	1	1	1	1.0	0.0	16.7
#GUL	9	0	0	0	0	1	10	9	1	5.0	5.7	33.3
GULL	9	0	0	0	0	0	9	9	9	9.0	0.0	16.7
GWGU	0	0	0	0	0	1	1	1	1	1.0	0.0	16.7
#PAS	2	0	0	0	1	0	3	2	1	1.5	0.7	33.3
NOCR	2	0	0	0	1	0	3	2	1	1.5	0.7	33.3
#TOT	31	51	34	74	41	12	243	74	12	40.5	20.9	100.0

Bird surveys of west estuarine channel habitat for Spring 89

Date	02Mar	10Mar	16Mar	22Mar	30Mar	07Apr	13Apr	20Apr	05May	11May	24May	Total	Max	Min	Mean	SD	%Freq
#HER	0	0	0	0	0	1	0	1	0	1	0	3	1	1	1.0	0.0	27.3
GBHE	0	0	0	0	0	1	0	1	0	1	0	3	1	1	1.0	0.0	27.3
#GEE	0	0	0	0	0	0	0	0	2	2	0	4	2	2	2.0	0.0	18.2
CAGO	0	0	0	0	0	0	0	0	2	2	0	4	2	2	2.0	0.0	18.2
#DAB	58	1	27	16	3	9	2	50	3	1	1	171	58	1	15.5	20.7	100.0
GWTE	8	1	19	15	3	9	2	50	0	0	0	107	50	1	13.4	16.1	72.7
MALL	40	0	2	1	0	0	0	0	3	1	1	48	40	1	8.0	15.7	54.5
GADW	2	0	6	0	0	0	0	0	0	0	0	8	6	2	4.0	2.8	18.2
AMWI	8	0	0	0	0	0	0	0	0	0	0	8	8	8	8.0	0.0	9.1
#DIV	0	1	3	2	2	0	2	4	0	0	0	14	4	1	2.3	1.0	54.5
BUFF	0	1	3	2	2	0	2	2	0	0	0	12	3	1	2.0	0.6	54.5
COME	0	0	0	0	0	0	0	2	0	0	0	2	2	2	2.0	0.0	9.1
#SHO	1	0	2	1	0	0	0	0	0	0	0	4	2	1	1.3	0.6	27.3
KILL	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	9.1
GRYE	0	0	2	1	0	0	0	0	0	0	0	3	2	1	1.5	0.7	18.2
#GUL	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1.0	0.0	9.1
GULL	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1.0	0.0	9.1
#PAS	1	0	0	0	2	3	1	0	3	1	0	11	3	1	1.8	1.0	54.5
NOCR	1	0	0	0	2	0	1	0	3	0	0	7	3	1	1.8	1.0	36.4
MOBL	0	0	0	0	0	3	0	0	0	0	0	3	3	3	3.0	0.0	9.1
EUST	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1.0	0.0	9.1
#TOT	60	2	32	19	7	13	5	55	8	6	1	208	60	1	18.9	21.0	100.0

Bird surveys of west spit (campground) habitat for Autumn 88

Date	03Nov	09Nov	16Nov	23Nov	30Nov	Total	Max	Min	Mean	SD	%Freq
#HER	0	0	0	0	2	2	2	2	2.0	0.0	20.0
GBHE	0	0	0	0	2	2	2	2	2.0	0.0	20.0
#GEE	8	0	49	39	0	96	49	8	32.0	21.4	60.0
CAGO	8	0	49	39	0	96	49	8	32.0	21.4	60.0
#GUL	0	7	0	0	0	7	7	7	7.0	0.0	20.0
GWGU	0	7	0	0	0	7	7	7	7.0	0.0	20.0
#PAS	43	2	33	2	11	91	43	2	18.2	18.8	100.0
NOCR	0	2	13	2	2	19	13	2	4.8	5.5	80.0
WAPI	13	0	0	0	0	13	13	13	13.0	0.0	20.0
NOSH	0	0	0	0	1	1	1	1	1.0	0.0	20.0
EUST	30	0	0	0	3	33	30	3	16.5	19.1	40.0
WEME	0	0	0	0	5	5	5	5	5.0	0.0	20.0
HOFI	0	0	20	0	0	20	20	20	20.0	0.0	20.0
#TOT	51	9	82	41	13	196	82	9	39.2	29.9	100.0

Bird surveys of west spit (campground) habitat for Winter 88

Date	06Dec	13Dec	05Jan	10Jan	14Feb	23Feb	Total	Max	Min	Mean	SD	%Freq
#HER	0	0	0	0	0	1	1	1	1	1.0	0.0	16.7
GBHE	0	0	0	0	0	1	1	1	1	1.0	0.0	16.7
#GEE	0	0	0	1	13	0	14	13	1	7.0	8.5	33.3
CAGO	0	0	0	1	13	0	14	13	1	7.0	8.5	33.3
#DAB	0	0	0	16	40	0	56	40	16	28.0	17.0	33.3
AMWI	0	0	0	16	40	0	56	40	16	28.0	17.0	33.3
RNPH	2	0	0	0	0	0	2	2	2	2.0	0.0	16.7
#GUL	0	1	40	7	0	1	49	40	1	12.3	18.7	66.7
GULL	0	0	40	0	0	0	40	40	40	40.0	0.0	16.7
GWGU	0	1	0	7	0	1	9	7	1	3.0	3.5	50.0
#WOO	0	0	0	0	1	0	1	1	1	1.0	0.0	16.7
NOFL	0	0	0	0	1	0	1	1	1	1.0	0.0	16.7
#PAS	5	19	17	12	75	24	152	75	5	25.3	25.2	100.0
NOCR	3	9	17	7	20	8	64	20	3	10.7	6.5	100.0
AMRO	0	0	0	1	2	1	4	2	1	1.3	0.6	50.0
EUST	2	10	0	0	52	14	78	52	2	19.5	22.2	66.7
SOSP	0	0	0	0	1	0	1	1	1	1.0	0.0	16.7
DEJU	0	0	0	0	0	1	1	1	1	1.0	0.0	16.7
HOFI	0	0	0	4	0	0	4	4	4	4.0	0.0	16.7
#TOT	7	20	57	36	129	26	275	129	7	45.8	44.1	100.0

Bird surveys of west spit (campground) habitat for Spring 89

Date	02Mar	10Mar	16Mar	22Mar	30Mar	07Apr	13Apr	20Apr	05May	11May	24May	Total	Max	Min	Mean	SD	%Freq
#GEE	0	0	0	0	0	0	0	0	2	0	0	2	2	2	2.0	0.0	9.1
CAGO	0	0	0	0	0	0	0	0	2	0	0	2	2	2	2.0	0.0	9.1
#RAP	0	1	2	0	0	0	0	3	0	0	4	10	4	1	2.5	1.3	36.4
BAEA	0	0	2	0	0	0	0	2	0	0	4	8	4	2	2.7	1.2	27.3
COHA	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	9.1
AMKE	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	0.0	9.1
RNPH	0	0	0	0	1	0	1	1	2	1	2	8	2	1	1.3	0.5	54.5
#PAS	10	112	8	37	4	48	121	29	74	10	13	466	121	4	42.4	42.3	100.0
VGSW	0	0	0	0	0	0	0	0	0	2	0	2	2	2	2.0	0.0	9.1
NOCR	5	12	8	1	4	8	10	16	18	5	6	93	18	1	8.5	5.2	100.0
GCKI	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	0.0	9.1
MOBL	0	0	0	4	0	0	0	0	0	0	0	4	4	4	4.0	0.0	9.1
AMRO	1	0	0	1	0	0	0	0	1	0	0	3	1	1	1.0	0.0	27.3
WAPI	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1.0	0.0	9.1
EUST	1	100	0	30	0	0	110	8	42	3	3	297	110	1	37.1	44.4	72.7
YRWA	0	0	0	1	0	0	0	0	0	0	1	2	1	1	1.0	0.0	18.2
SAVS	0	0	0	0	0	0	0	4	11	0	2	17	11	2	5.7	4.7	27.3
RWBL	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1.0	0.0	9.1
WEME	3	0	0	0	0	0	0	0	0	0	0	3	3	3	3.0	0.0	9.1
PISI	0	0	0	0	0	40	0	0	0	0	0	40	40	40	40.0	0.0	9.1
AMGO	0	0	0	0	0	0	0	0	1	0	1	2	1	1	1.0	0.0	18.2
#TOT	10	113	10	37	5	48	122	33	78	11	19	486	122	5	44.2	42.1	100.0

Bird surveys of west marsh habitat for Autumn 88

Date	03Nov	09Nov	16Nov	23Nov	30Nov	Total	Max	Min	Mean	SD	%Freq
#GEE	0	12	0	0	0	12	12	12	12.0	0.0	20.0
CAGO	0	12	0	0	0	12	12	12	12.0	0.0	20.0
#RAP	1	0	0	0	0	1	1	1	1.0	0.0	20.0
NOHA	1	0	0	0	0	1	1	1	1.0	0.0	20.0
#TOT	1	12	0	0	0	13	12	1	6.5	7.8	40.0

Bird surveys of west marsh habitat for Winter 88

Date	06Dec	13Dec	05Jan	10Jan	14Feb	23Feb	Total	Max	Min	Mean	SD	%Freq
#PAS	0	0	0	0	7	0	7	7	7	7.0	0.0	16.7
NOCR	0	0	0	0	7	0	7	7	7	7.0	0.0	16.7
#TOT	0	0	0	0	7	0	7	7	7	7.0	0.0	16.7

Bird surveys of west marsh habitat for Spring 89

Date	02Mar	10Mar	16Mar	22Mar	30Mar	07Apr	13Apr	20Apr	05May	11May	24May	Total	Max	Min	Mean	SD	%Freq
#RAP	1	0	0	0	0	0	0	1	0	0	0	2	1	1	1.0	0.0	18.2
BAEA	1	0	0	0	0	0	0	1	0	0	0	2	1	1	1.0	0.0	18.2
RNPH	0	0	0	1	0	1	0	1	1	1	0	5	1	1	1.0	0.0	45.5
CAQU	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1.0	0.0	9.1
#WOO	0	0	0	0	0	0	0	1	1	1	0	3	1	1	1.0	0.0	27.3
NOFL	0	0	0	0	0	0	0	1	1	1	0	3	1	1	1.0	0.0	27.3
#PAS	0	0	0	0	0	0	1	0	1	2	0	4	2	1	1.3	0.6	27.3
NOCR	0	0	0	0	0	0	0	0	0	2	0	2	2	2	2.0	0.0	9.1
OCWA	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1.0	0.0	9.1
SAVS	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1.0	0.0	9.1
#TOT	1	0	0	1	0	1	1	3	3	5	0	15	5	1	2.1	1.6	63.6

Bird surveys of north estuarine channel habitat for Autumn 88

Date	03Nov	09Nov	16Nov	23Nov	30Nov	Total	Max	Min	Mean	SD	%Freq
#GRE	0	0	0	0	1	1	1	1	1.0	0.0	20.0
PBGR	0	0	0	0	1	1	1	1	1.0	0.0	20.0
#HER	1	0	1	1	2	5	2	1	1.3	0.5	80.0
GBHE	1	0	1	1	2	5	2	1	1.3	0.5	80.0
#GEE	8	0	30	24	4	66	30	4	16.5	12.5	80.0
CAGO	8	0	30	24	4	66	30	4	16.5	12.5	80.0
#DAB	452	138	527	163	398	1678	527	138	335.6	175.3	100.0
GWTE	46	77	7	20	13	163	77	7	32.6	28.9	100.0
MALL	35	14	77	49	114	289	114	14	57.8	38.9	100.0
NOPI	43	0	3	6	0	52	43	3	17.3	22.3	60.0
EUWI	0	0	2	1	4	7	4	1	2.3	1.5	60.0
AMWI	328	47	438	87	267	1167	438	47	233.4	164.4	100.0
#DIV	0	0	9	2	1	12	9	1	4.0	4.4	60.0
COGO	0	0	0	0	1	1	1	1	1.0	0.0	20.0
BUFF	0	0	8	1	0	9	8	1	4.5	4.9	40.0
HOME	0	0	1	1	0	2	1	1	1.0	0.0	40.0
#GUL	0	0	10	2	0	12	10	2	6.0	5.7	40.0
GULL	0	0	10	0	0	10	10	10	10.0	0.0	20.0
GWGU	0	0	0	2	0	2	2	2	2.0	0.0	20.0
BEKI	0	0	0	1	0	1	1	1	1.0	0.0	20.0
#PAS	0	0	1	0	0	1	1	1	1.0	0.0	20.0
NOCR	0	0	1	0	0	1	1	1	1.0	0.0	20.0
#TOT	461	138	578	193	406	1776	578	138	355.2	185.0	100.0

Bird surveys of north estuarine channel habitat for Winter 88

Date	06Dec	13Dec	05Jan	10Jan	14Feb	23Feb	Total	Max	Min	Mean	SD	%Freq
#HER	0	3	0	2	0	0	5	3	2	2.5	0.7	33.3
GBHE	0	3	0	2	0	0	5	3	2	2.5	0.7	33.3
#GEE	0	43	0	0	0	0	43	43	43	43.0	0.0	16.7
CAGO	0	43	0	0	0	0	43	43	43	43.0	0.0	16.7
#DAB	141	30	52	44	85	9	361	141	9	60.2	46.9	100.0
GWTE	14	7	16	14	11	4	66	16	4	11.0	4.6	100.0
MALL	67	11	26	25	44	1	174	67	1	29.0	23.7	100.0
NOSL	0	0	2	2	0	0	4	2	2	2.0	0.0	33.3
GADW	0	0	4	1	2	4	11	4	1	2.8	1.5	66.7
EUWI	0	1	0	0	0	0	1	1	1	1.0	0.0	16.7
AMWI	60	11	4	2	28	0	105	60	2	21.0	24.1	83.3
#DIV	2	0	4	5	9	1	21	9	1	4.2	3.1	83.3
COGO	0	0	0	0	2	0	2	2	2	2.0	0.0	16.7
BUFF	2	0	4	2	7	1	16	7	1	3.2	2.4	83.3
HOME	0	0	0	3	0	0	3	3	3	3.0	0.0	16.7
#GUL	5	2	0	0	0	1	8	5	1	2.7	2.1	50.0
GWGU	5	2	0	0	0	1	8	5	1	2.7	2.1	50.0
#PAS	0	0	0	0	2	0	2	2	2	2.0	0.0	16.7
NOCR	0	0	0	0	2	0	2	2	2	2.0	0.0	16.7
#TOT	148	78	56	51	96	11	440	148	11	73.3	46.5	100.0

Bird surveys of north estuarine channel habitat for Spring 89

Date	02Mar	10Mar	16Mar	22Mar	30Mar	07Apr	13Apr	20Apr	05May	11May	24May	Total	Max	Min	Mean	SD	%Freq
#HER	1	0	0	0	1	0	0	0	0	0	0	2	1	1	1.0	0.0	18.2
GBHE	1	0	0	0	1	0	0	0	0	0	0	2	1	1	1.0	0.0	18.2
#GEE	0	0	0	0	0	0	0	2	4	2	6	14	6	2	3.5	1.9	36.4
CAGO	0	0	0	0	0	0	0	2	4	2	6	14	6	2	3.5	1.9	36.4
#DAB	237	0	40	20	38	2	5	7	0	0	5	354	237	2	44.3	79.3	72.7
GWTE	30	0	13	7	32	2	0	7	0	0	0	91	32	2	15.2	12.8	54.5
MALL	138	0	0	4	6	0	5	0	0	0	2	155	138	2	31.0	59.8	45.5
BWTE	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3.0	0.0	9.1
EUWI	0	0	1	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	9.1
AMWI	69	0	26	9	0	0	0	0	0	0	0	104	69	9	34.7	30.9	27.3
#DIV	5	2	1	0	4	2	1	1	0	1	0	17	5	1	2.1	1.6	72.7
COGO	1	0	1	0	0	0	0	0	0	0	0	2	1	1	1.0	0.0	18.2
BUFF	4	2	0	0	2	2	0	0	0	0	0	10	4	2	2.5	1.0	36.4
COME	0	0	0	0	2	0	1	1	0	1	0	5	2	1	1.3	0.5	36.4
#SHO	10	0	0	0	0	0	0	15	20	6	0	51	20	6	12.8	6.1	36.4
KILL	10	0	0	0	0	0	0	1	0	0	0	11	10	1	5.5	6.4	18.2
PEEP	0	0	0	0	0	0	0	14	20	0	0	34	20	14	17.0	4.2	18.2
SAND	0	0	0	0	0	0	0	0	0	6	0	6	6	6	6.0	0.0	9.1
#GUL	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	9.1
THGU	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	9.1
BEKI	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1.0	0.0	9.1
#PAS	21	0	0	0	4	0	1	6	0	3	5	40	21	1	6.7	7.2	54.5
VGSW	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3.0	0.0	9.1
NRWS	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	0.0	9.1
NOCR	7	0	0	0	4	0	1	3	0	3	2	20	7	1	3.3	2.1	54.5
EUST	14	0	0	0	0	0	0	2	0	0	0	16	14	2	8.0	8.5	18.2
#TOT	275	2	41	20	47	4	7	31	24	13	16	480	275	2	43.6	78.1	100.0

Bird surveys of south central marsh and river habitat for Autumn 88

Date	03Nov	09Nov	16Nov	23Nov	30Nov	Total	Max	Min	Mean	SD	%Freq
#HER	0	0	0	1	0	1	1	1	1.0	0.0	20.0
GBHE	0	0	0	1	0	1	1	1	1.0	0.0	20.0
#DAB	47	297	14	2	31	391	297	2	78.2	123.5	100.0
GWTE	0	0	0	0	1	1	1	1	1.0	0.0	20.0
MALL	4	84	1	2	30	121	84	1	24.2	35.5	100.0
NOPI	0	4	0	0	0	4	4	4	4.0	0.0	20.0
EUWI	0	1	0	0	0	1	1	1	1.0	0.0	20.0
AMWI	43	208	13	0	0	264	208	13	88.0	105.0	60.0
#DIV	4	0	0	0	2	6	4	2	3.0	1.4	40.0
COGO	0	0	0	0	1	1	1	1	1.0	0.0	20.0
BUFF	4	0	0	0	1	5	4	1	2.5	2.1	40.0
#SHO	152	0	45	0	30	227	152	30	75.7	66.5	60.0
BBPL	17	0	4	0	30	51	30	4	17.0	13.0	60.0
BLTU	1	0	0	0	0	1	1	1	1.0	0.0	20.0
DUNL	134	0	41	0	0	175	134	41	87.5	65.8	40.0
#GUL	0	0	61	2	60	123	61	2	41.0	33.8	60.0
GULL	0	0	61	2	60	123	61	2	41.0	33.8	60.0
#PAS	0	0	0	0	26	26	26	26	26.0	0.0	20.0
NOCR	0	0	0	0	26	26	26	26	26.0	0.0	20.0
#TOT	203	297	120	5	149	774	297	5	154.8	107.5	100.0

Bird surveys of south central marsh and river habitat for Winter 88

Date	06Dec	13Dec	05Jan	10Jan	14Feb	23Feb	Total	Max	Min	Mean	SD	%Freq
#GRE	0	0	0	1	0	0	1	1	1	1.0	0.0	16.7
HOGR	0	0	0	1	0	0	1	1	1	1.0	0.0	16.7
#GEE	0	16	0	0	0	0	16	16	16	16.0	0.0	16.7
CAGO	0	16	0	0	0	0	16	16	16	16.0	0.0	16.7
#DAB	62	0	26	18	18	0	124	62	18	31.0	21.0	66.7
DABL	0	0	0	6	0	0	6	6	6	6.0	0.0	16.7
GWTE	2	0	0	0	1	0	3	2	1	1.5	0.7	33.3
MALL	25	0	26	0	7	0	58	26	7	19.3	10.7	50.0
NOPI	5	0	0	0	0	0	5	5	5	5.0	0.0	16.7
AMWI	30	0	0	12	10	0	52	30	10	17.3	11.0	50.0
#DIV	1	1	2	0	1	2	7	2	1	1.4	0.5	83.3
COGO	1	0	2	0	0	0	3	2	1	1.5	0.7	33.3
BUFF	0	1	0	0	0	2	3	2	1	1.5	0.7	33.3
HOME	0	0	0	0	1	0	1	1	1	1.0	0.0	16.7
#SHO	0	0	39	0	0	0	39	39	39	39.0	0.0	16.7
BBPL	0	0	5	0	0	0	5	5	5	5.0	0.0	16.7
DUNL	0	0	34	0	0	0	34	34	34	34.0	0.0	16.7
#GUL	153	4	0	0	0	0	157	153	4	78.5	105.4	33.3
GULL	153	4	0	0	0	0	157	153	4	78.5	105.4	33.3
BEKI	0	0	0	0	0	1	1	1	1	1.0	0.0	16.7
#PAS	0	0	7	0	0	0	7	7	7	7.0	0.0	16.7
NOCR	0	0	7	0	0	0	7	7	7	7.0	0.0	16.7
#TOT	216	21	74	19	19	3	352	216	3	58.7	80.8	100.0

Bird surveys of south central marsh and river habitat for Spring 89

Date	02Mar	10Mar	16Mar	22Mar	30Mar	07Apr	13Apr	20Apr	05May	11May	24May	Total	Max	Min	Mean	SD	%Freq
#HER	0	0	1	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	9.1
GBHE	0	0	1	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	9.1
#GEE	0	0	0	0	2	1	1	2	2	12	11	31	12	1	4.4	4.9	63.6
CAGO	0	0	0	0	2	1	1	2	2	12	11	31	12	1	4.4	4.9	63.6
#DAB	131	0	0	40	4	2	132	3	0	2	2	316	132	2	39.5	58.2	72.7
GWTE	2	0	0	0	2	0	0	1	0	0	0	5	2	1	1.7	0.6	27.3
MALL	43	0	0	0	2	2	14	2	0	2	2	67	43	2	9.6	15.4	63.6
EUWI	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	9.1
AMWI	85	0	0	40	0	0	118	0	0	0	0	243	118	40	81.0	39.2	27.3
#DIV	5	0	7	0	0	2	0	0	0	0	0	14	7	2	4.7	2.5	27.3
COGO	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	9.1
BAGO	4	0	0	0	0	0	0	0	0	0	0	4	4	4	4.0	0.0	9.1
COME	0	0	7	0	0	2	0	0	0	0	0	9	7	2	4.5	3.5	18.2
#SHO	3	0	0	1	0	0	0	1	2	0	0	7	3	1	1.8	1.0	36.4
KILL	3	0	0	1	0	0	0	1	2	0	0	7	3	1	1.8	1.0	36.4
#GUL	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1.0	0.0	9.1
GULL	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1.0	0.0	9.1
#PAS	5	0	0	0	0	0	2	5	0	4	5	21	5	2	4.2	1.3	45.5
NOCR	5	0	0	0	0	0	2	5	0	4	4	20	5	2	4.0	1.2	45.5
EUST	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1.0	0.0	9.1
#TOT	144	0	8	41	6	5	135	11	4	19	18	391	144	4	39.1	54.1	90.9

Bird surveys of north central marsh and river habitat for Autumn 88

Date	03Nov	09Nov	16Nov	23Nov	30Nov	Total	Max	Min	Mean	SD	%Freq
#GRE	0	1	0	0	0	1	1	1	1.0	0.0	20.0
WEGR	0	1	0	0	0	1	1	1	1.0	0.0	20.0
#GEE	4	0	8	2	0	14	8	2	4.7	3.1	60.0
SNGO	4	0	0	0	0	4	4	4	4.0	0.0	20.0
CAGO	0	0	8	2	0	10	8	2	5.0	4.2	40.0
#DAB	363	84	2	92	4	545	363	2	109.0	148.2	100.0
MALL	8	0	1	10	0	19	10	1	6.3	4.7	60.0
NOPI	25	6	0	45	0	76	45	6	25.3	19.5	60.0
AMWI	330	78	1	37	4	450	330	1	90.0	137.7	100.0
#DIV	3	1	0	30	0	34	30	1	11.3	16.2	60.0
COGO	0	0	0	30	0	30	30	30	30.0	0.0	20.0
BUFF	2	1	0	0	0	3	2	1	1.5	0.7	40.0
COME	1	0	0	0	0	1	1	1	1.0	0.0	20.0
#SHO	28	0	0	0	0	28	28	28	28.0	0.0	20.0
BBPL	8	0	0	0	0	8	8	8	8.0	0.0	20.0
DUNL	20	0	0	0	0	20	20	20	20.0	0.0	20.0
#GUL	258	312	117	172	188	1047	312	117	209.4	76.3	100.0
GULL	258	114	117	172	188	849	258	114	169.8	59.2	100.0
BOGU	0	127	0	0	0	127	127	127	127.0	0.0	20.0
MEGU	0	13	0	0	0	13	13	13	13.0	0.0	20.0
CAGU	0	12	0	0	0	12	12	12	12.0	0.0	20.0
GWGU	0	46	0	0	0	46	46	46	46.0	0.0	20.0
#PAS	0	20	0	0	2	22	20	2	11.0	12.7	40.0
NOCR	0	20	0	0	2	22	20	2	11.0	12.7	40.0
#TOT	656	418	127	296	194	1691	656	127	338.2	208.9	100.0

Bird surveys of north central marsh and river habitat for Winter 88

Date	06Dec	13Dec	05Jan	10Jan	14Feb	23Feb	Total	Max	Min	Mean	SD	%Freq
#GRE	0	0	0	1	0	0	1	1	1	1.0	0.0	16.7
HOGR	0	0	0	1	0	0	1	1	1	1.0	0.0	16.7
#SWA	0	0	0	0	2	0	2	2	2	2.0	0.0	16.7
TRUS	0	0	0	0	2	0	2	2	2	2.0	0.0	16.7
#GEE	1	11	0	0	0	0	12	11	1	6.0	7.1	33.3
CAGO	1	11	0	0	0	0	12	11	1	6.0	7.1	33.3
#DAB	137	21	5	4	121	2	290	137	2	48.3	63.1	100.0
GWTE	0	0	0	0	2	0	2	2	2	2.0	0.0	16.7
MALL	22	0	2	4	91	2	121	91	2	24.2	38.3	83.3
NOPI	0	2	0	0	0	0	2	2	2	2.0	0.0	16.7
EUWI	2	0	0	0	0	0	2	2	2	2.0	0.0	16.7
AMWI	113	19	3	0	28	0	163	113	3	40.8	49.3	66.7
#DIV	0	8	0	0	3	6	17	8	3	5.7	2.5	50.0
COGO	0	5	0	0	1	1	7	5	1	2.3	2.3	50.0
BUFF	0	3	0	0	2	2	7	3	2	2.3	0.6	50.0
COME	0	0	0	0	0	3	3	3	3	3.0	0.0	16.7
#RAP	1	0	1	0	0	0	2	1	1	1.0	0.0	33.3
BAEA	1	0	1	0	0	0	2	1	1	1.0	0.0	33.3
#SHO	0	0	0	0	1	0	1	1	1	1.0	0.0	16.7
KILL	0	0	0	0	1	0	1	1	1	1.0	0.0	16.7
#GUL	61	335	82	0	45	31	554	335	31	110.8	126.8	83.3
GULL	61	335	82	0	45	31	554	335	31	110.8	126.8	83.3
#PAS	0	15	0	0	3	13	31	15	3	10.3	6.4	50.0
NOCR	0	15	0	0	3	13	31	15	3	10.3	6.4	50.0
#TOT	200	390	88	5	175	52	910	390	5	151.7	138.0	100.0

Bird surveys of north central marsh and river habitat for Spring 89

Date	02Mar	10Mar	16Mar	22Mar	30Mar	07Apr	13Apr	20Apr	05May	11May	24May	Total	Max	Min	Mean	SD	%Freq
#HER	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	9.1
GBHE	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	9.1
#SWA	2	0	0	0	0	0	0	0	0	0	0	2	2	2	2.0	0.0	9.1
TRUS	2	0	0	0	0	0	0	0	0	0	0	2	2	2	2.0	0.0	9.1
#GEE	2	0	3	5	120	0	2	4	3	2	0	141	120	2	17.6	41.4	72.7
BRAN	0	0	0	0	120	0	0	0	0	0	0	120	120	120	120.0	0.0	9.1
CAGO	2	0	3	5	0	0	2	4	3	2	0	21	5	2	3.0	1.2	63.6
#DAB	24	0	15	65	483	2	131	21	2	8	0	751	483	2	83.4	155.5	81.8
GWTE	0	0	0	0	12	0	3	0	0	0	0	15	12	3	7.5	6.4	18.2
MALL	9	0	0	0	10	2	48	4	2	6	0	81	48	2	11.6	16.4	63.6
GADW	0	0	2	0	0	0	0	0	0	0	0	2	2	2	2.0	0.0	9.1
EUWI	0	0	0	0	4	0	0	0	0	0	0	4	4	4	4.0	0.0	9.1
AMWI	15	0	13	65	457	0	80	17	0	2	0	649	457	2	92.7	163.3	63.6
#DIV	1	0	0	16	2	0	2	3	0	0	0	24	16	1	4.8	6.3	45.5
BUFF	1	0	0	1	0	0	0	0	0	0	0	2	1	1	1.0	0.0	18.2
HOME	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0	0.0	9.1
COME	0	0	0	15	2	0	2	2	0	0	0	21	15	2	5.3	6.5	36.4
#RAP	0	0	0	0	2	0	1	0	0	0	0	3	2	1	1.5	0.7	18.2
BAEA	0	0	0	0	2	0	1	0	0	0	0	3	2	1	1.5	0.7	18.2
#SHO	0	0	0	2	80	0	0	38	0	0	0	120	80	2	40.0	39.0	27.3
BLTU	0	0	0	0	30	0	0	0	0	0	0	30	30	30	30.0	0.0	9.1
PEEP	0	0	0	0	0	0	0	38	0	0	0	38	38	38	38.0	0.0	9.1
DUNL	0	0	0	2	50	0	0	0	0	0	0	52	50	2	26.0	33.9	18.2
#GUL	3	0	880	254	580	0	381	0	2	0	17	2117	880	2	302.4	336.8	63.6
GULL	0	0	880	254	580	0	0	0	0	0	17	1731	880	17	432.8	377.1	36.4
BOGU	0	0	0	0	0	0	380	0	0	0	0	380	380	380	380.0	0.0	9.1
MEGU	3	0	0	0	0	0	0	0	0	0	0	3	3	3	3.0	0.0	9.1
GWGU	0	0	0	0	0	0	1	0	2	0	0	3	2	1	1.5	0.7	18.2
#PAS	2	0	1	10	232	0	1	0	7	0	0	253	232	1	42.2	93.1	54.5
NOCR	2	0	1	10	132	0	1	0	0	0	0	146	132	1	29.2	57.6	45.5
EUST	0	0	0	0	100	0	0	0	0	0	0	100	100	100	100.0	0.0	9.1
SAVS	0	0	0	0	0	0	0	0	7	0	0	7	7	7	7.0	0.0	9.1
#TOT	34	1	899	352	1499	2	518	66	14	10	17	3412	1499	1	310.2	489.4	100.0

Bird surveys of east marsh habitat for Autumn 88

Date	03Nov	09Nov	16Nov	23Nov	30Nov	Total	Max	Min	Mean	SD	%Freq
#HER	0	1	0	0	0	1	1	1	1.0	0.0	20.0
GBHE	0	1	0	0	0	1	1	1	1.0	0.0	20.0
#GEE	22	4	120	11	0	157	120	4	39.3	54.3	80.0
CAGO	22	4	120	11	0	157	120	4	39.3	54.3	80.0
#DAB	180	171	369	94	161	975	369	94	195.0	103.0	100.0
GWTE	3	0	0	0	0	3	3	3	3.0	0.0	20.0
MALL	22	44	52	6	42	166	52	6	33.2	18.8	100.0
EUWI	1	1	1	0	0	3	1	1	1.0	0.0	60.0
AMWI	154	126	316	88	119	803	316	88	160.6	90.0	100.0
#DIV	1	40	7	7	7	62	40	1	12.4	15.6	100.0
COGO	0	0	0	0	3	3	3	3	3.0	0.0	20.0
BUFF	0	40	7	7	4	58	40	4	14.5	17.1	80.0
HOME	1	0	0	0	0	1	1	1	1.0	0.0	20.0
#GUL	32	1	5	7	63	108	63	1	21.6	26.1	100.0
GULL	0	0	4	0	63	67	63	4	33.5	41.7	40.0
MEGU	14	0	0	0	0	14	14	14	14.0	0.0	20.0
GWGU	18	1	1	7	0	27	18	1	6.8	8.0	80.0
#PAS	0	9	1	1	1	12	9	1	3.0	4.0	80.0
NOCR	0	9	1	1	1	12	9	1	3.0	4.0	80.0
#TOT	235	226	502	120	232	1315	502	120	263.0	142.0	100.0

Bird surveys of east marsh habitat for Winter 88

Date	06Dec	13Dec	05Jan	10Jan	14Feb	23Feb	Total	Max	Min	Mean	SD	%Freq
#HER	0	0	2	0	1	0	3	2	1	1.5	0.7	33.3
GBHE	0	0	2	0	1	0	3	2	1	1.5	0.7	33.3
#GEE	0	24	1	26	0	0	51	26	1	17.0	13.9	50.0
CAGO	0	24	1	26	0	0	51	26	1	17.0	13.9	50.0
#DAB	65	11	5	38	97	0	216	97	5	43.2	38.4	83.3
GWTE	0	1	0	0	0	0	1	1	1	1.0	0.0	16.7
MALL	18	0	5	3	53	0	79	53	3	19.8	23.1	66.7
NOPI	0	0	0	10	3	0	13	10	3	6.5	4.9	33.3
GADW	0	0	0	0	2	0	2	2	2	2.0	0.0	16.7
EUWI	1	0	0	0	0	0	1	1	1	1.0	0.0	16.7
AMWI	46	10	0	25	39	0	120	46	10	30.0	15.9	66.7
#DIV	1	1	9	5	9	6	31	9	1	5.2	3.6	100.0
SCAU	0	0	0	0	0	2	2	2	2	2.0	0.0	16.7
GRSC	0	0	8	0	0	0	8	8	8	8.0	0.0	16.7
BUFF	0	1	0	3	2	4	10	4	1	2.5	1.3	66.7
HOME	1	0	0	2	0	0	3	2	1	1.5	0.7	33.3
COME	0	0	0	0	7	0	7	7	7	7.0	0.0	16.7
RBME	0	0	1	0	0	0	1	1	1	1.0	0.0	16.7
#SHO	0	0	0	0	30	0	30	30	30	30.0	0.0	16.7
DUNL	0	0	0	0	30	0	30	30	30	30.0	0.0	16.7
#GUL	289	3	0	0	0	0	292	289	3	146.0	202.2	33.3
GULL	289	3	0	0	0	0	292	289	3	146.0	202.2	33.3
#TOT	355	39	17	69	137	6	623	355	6	103.8	131.7	100.0

Bird surveys of east marsh habitat for Spring 89

Date	02Mar	10Mar	16Mar	22Mar	30Mar	07Apr	13Apr	20Apr	05May	11May	24May	Total	Max	Min	Mean	SD	%Freq
#HER	0	0	1	0	0	0	1	0	0	0	0	2	1	1	1.0	0.0	18.2
GBHE	0	0	1	0	0	0	1	0	0	0	0	2	1	1	1.0	0.0	18.2
#GEE	0	0	7	2	2	5	3	4	7	6	6	42	7	2	4.7	2.0	81.8
CAGO	0	0	7	2	2	5	3	4	7	6	6	42	7	2	4.7	2.0	81.8
#DAB	41	0	45	60	7	4	206	62	12	0	33	470	206	4	52.2	61.6	81.8
GWTE	0	0	1	7	3	2	28	34	0	0	0	75	34	1	12.5	14.6	54.5
MALL	2	0	0	0	0	0	2	0	12	0	30	46	30	2	11.5	13.2	36.4
BWTE	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2.0	0.0	9.1
NOSL	0	0	0	0	0	0	0	2	0	0	1	3	2	1	1.5	0.7	18.2
GADW	2	0	0	2	4	0	2	2	0	0	0	12	4	2	2.4	0.9	45.5
EUWI	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1.0	0.0	9.1
AMWI	37	0	44	51	0	2	173	24	0	0	0	331	173	2	55.2	60.3	54.5
#DIV	1	6	3	9	3	8	3	0	1	0	0	34	9	1	4.3	3.1	72.7
COGO	1	0	1	0	0	0	0	0	0	0	0	2	1	1	1.0	0.0	18.2
BUFF	0	6	2	2	2	6	2	0	0	0	0	20	6	2	3.3	2.1	54.5
COME	0	0	0	7	1	2	1	0	1	0	0	12	7	1	2.4	2.6	45.5
#RAP	0	0	0	0	2	0	0	0	0	0	0	2	2	2	2.0	0.0	9.1
BAEA	0	0	0	0	2	0	0	0	0	0	0	2	2	2	2.0	0.0	9.1
#SHO	0	0	0	0	0	1	0	0	20	0	2	23	20	1	7.7	10.7	27.3
BBPL	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2.0	0.0	9.1
KILL	0	0	0	0	0	1	0	0	0	0	0	1	1	1	1.0	0.0	9.1
PEEP	0	0	0	0	0	0	0	0	20	0	0	20	20	20	20.0	0.0	9.1
#GUL	0	0	0	0	1	0	100	0	0	0	0	101	100	1	50.5	70.0	18.2
GULL	0	0	0	0	0	0	20	0	0	0	0	20	20	20	20.0	0.0	9.1
BOGU	0	0	0	0	0	0	80	0	0	0	0	80	80	80	80.0	0.0	9.1
GWGU	0	0	0	0	1	0	0	0	0	0	0	1	1	1	1.0	0.0	9.1
#PAS	2	0	2	0	2	0	0	0	0	0	1	7	2	1	1.8	0.5	36.4
NOCR	2	0	2	0	2	0	0	0	0	0	0	6	2	2	2.0	0.0	27.3
RWBL	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1.0	0.0	9.1
#TOT	44	6	58	71	17	18	313	66	40	6	42	681	313	6	61.9	86.3	100.0

Bird surveys of east marsh and mudflat habitat for Autumn 88

Date	03Nov	09Nov	16Nov	23Nov	30Nov	Total	Max	Min	Mean	SD	%Freq
#GEE	6	0	6	0	1	13	6	1	4.3	2.9	60.0
CAGO	6	0	6	0	1	13	6	1	4.3	2.9	60.0
#DAB	56	277	249	41	345	968	345	41	193.6	137.1	100.0
DABL	0	0	0	0	4	4	4	4	4.0	0.0	20.0
GWTE	8	49	17	0	4	78	49	4	19.5	20.4	80.0
MALL	7	49	13	3	34	106	49	3	21.2	19.6	100.0
NOSL	0	1	0	0	0	1	1	1	1.0	0.0	20.0
EUWI	0	0	0	0	1	1	1	1	1.0	0.0	20.0
AMWI	41	178	219	38	302	778	302	38	155.6	115.0	100.0
#DIV	0	2	3	0	2	7	3	2	2.3	0.6	60.0
COGO	0	0	0	0	1	1	1	1	1.0	0.0	20.0
BUFF	0	0	3	0	1	4	3	1	2.0	1.4	40.0
HOME	0	1	0	0	0	1	1	1	1.0	0.0	20.0
RBME	0	1	0	0	0	1	1	1	1.0	0.0	20.0
#SHO	0	730	0	0	0	730	730	730	730.0	0.0	20.0
DUNL	0	730	0	0	0	730	730	730	730.0	0.0	20.0
#GUL	0	1	1	0	5	7	5	1	2.3	2.3	60.0
GWGU	0	1	1	0	5	7	5	1	2.3	2.3	60.0
#PAS	3	6	2	4	6	21	6	2	4.2	1.8	100.0
NOCR	3	6	2	4	6	21	6	2	4.2	1.8	100.0
#TOT	65	1016	261	45	359	1746	1016	45	349.2	395.5	100.0

Bird surveys of east marsh and mudflat habitat for Winter 88

Date	06Dec	13Dec	05Jan	10Jan	14Feb	23Feb	Total	Max	Min	Mean	SD	%Freq
#COR	1	0	0	0	0	0	1	1	1	1.0	0.0	16.7
DCCO	1	0	0	0	0	0	1	1	1	1.0	0.0	16.7
#HER	0	1	0	0	0	0	1	1	1	1.0	0.0	16.7
GBHE	0	1	0	0	0	0	1	1	1	1.0	0.0	16.7
#GEE	8	6	0	0	0	1	15	8	1	5.0	3.6	50.0
CAGO	8	6	0	0	0	1	15	8	1	5.0	3.6	50.0
#DAB	146	74	31	47	76	11	385	146	11	64.2	47.2	100.0
DABL	0	8	0	0	0	0	8	8	8	8.0	0.0	16.7
GWTE	68	35	5	0	3	11	122	68	3	24.4	27.5	83.3
MALL	15	0	14	16	10	0	55	16	10	13.8	2.6	66.7
NOSL	1	1	0	1	2	0	5	2	1	1.3	0.5	66.7
AMWI	62	30	12	30	61	0	195	62	12	39.0	21.8	83.3
#DIV	2	2	7	7	2	0	20	7	2	4.0	2.7	83.3
GRSC	0	0	1	4	0	0	5	4	1	2.5	2.1	33.3
COGO	1	0	0	0	0	0	1	1	1	1.0	0.0	16.7
BUFF	1	2	2	1	1	0	7	2	1	1.4	0.5	83.3
HOME	0	0	4	2	1	0	7	4	1	2.3	1.5	50.0
#SHO	0	0	0	0	1	0	1	1	1	1.0	0.0	16.7
KILL	0	0	0	0	1	0	1	1	1	1.0	0.0	16.7
#GUL	1	1	0	1	0	0	3	1	1	1.0	0.0	50.0
GWGU	1	1	0	1	0	0	3	1	1	1.0	0.0	50.0
#PAS	1	0	1	0	8	0	10	8	1	3.3	4.0	50.0
NOCR	1	0	1	0	8	0	10	8	1	3.3	4.0	50.0
#TOT	159	84	39	55	87	12	436	159	12	72.7	50.8	100.0

Bird surveys of east marsh and mudflat habitat for Spring 89

Date	02Mar	10Mar	16Mar	22Mar	30Mar	07Apr	13Apr	20Apr	05May	11May	24May	Total	Max	Min	Mean	SD	%Freq
#HER	0	0	0	0	0	0	0	0	0	1	3	4	3	1	2.0	1.4	18.2
GBHE	0	0	0	0	0	0	0	0	0	1	3	4	3	1	2.0	1.4	18.2
#GEE	0	6	0	0	0	0	2	0	12	0	9	29	12	2	7.3	4.3	36.4
CAGO	0	6	0	0	0	0	2	0	12	0	9	29	12	2	7.3	4.3	36.4
#DAB	175	0	6	5	0	0	39	5	0	0	0	230	175	5	46.0	73.6	45.5
GWTE	10	0	2	5	0	0	3	5	0	0	0	25	10	2	5.0	3.1	45.5
MALL	19	0	2	0	0	0	0	0	0	0	0	21	19	2	10.5	12.0	18.2
NOSL	3	0	0	0	0	0	0	0	0	0	0	3	3	3	3.0	0.0	9.1
EUWI	2	0	0	0	0	0	2	0	0	0	0	4	2	2	2.0	0.0	18.2
AMWI	141	0	2	0	0	0	34	0	0	0	0	177	141	2	59.0	72.8	27.3
#DIV	2	2	0	0	0	0	0	0	0	2	0	6	2	2	2.0	0.0	27.3
HOME	2	2	0	0	0	0	0	0	0	0	0	4	2	2	2.0	0.0	18.2
COME	0	0	0	0	0	0	0	0	0	2	0	2	2	2	2.0	0.0	9.1
#SHO	13	0	0	0	2	0	2	2	107	2	1	129	107	1	18.4	39.3	63.6
SEPL	0	0	0	0	0	0	0	0	2	0	0	2	2	2	2.0	0.0	9.1
KILL	3	0	0	0	0	0	0	2	1	2	1	9	3	1	1.8	0.8	45.5
GRYE	0	0	0	0	2	0	2	0	0	0	0	4	2	2	2.0	0.0	18.2
WESA	0	0	0	0	0	0	0	0	100	0	0	100	100	100	100.0	0.0	9.1
LESA	0	0	0	0	0	0	0	0	4	0	0	4	4	4	4.0	0.0	9.1
DUNL	10	0	0	0	0	0	0	0	0	0	0	10	10	10	10.0	0.0	9.1
#GUL	0	0	0	0	0	1	6	0	0	2	2	11	6	1	2.8	2.2	36.4
GULL	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2.0	0.0	9.1
BOGU	0	0	0	0	0	0	4	0	0	0	0	4	4	4	4.0	0.0	9.1
GWGU	0	0	0	0	0	1	2	0	0	2	0	5	2	1	1.7	0.6	27.3
RODO	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1.0	0.0	9.1
#WOO	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1.0	0.0	9.1
NOFL	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1.0	0.0	9.1
#PAS	41	0	2	0	4	2	6	4	0	9	10	78	41	2	9.8	13.0	72.7
VGSW	0	0	0	0	0	0	3	0	0	2	8	13	8	2	4.3	3.2	27.3
NRWS	0	0	0	0	0	0	0	0	0	4	0	4	4	4	4.0	0.0	9.1
BASW	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2.0	0.0	9.1
NOCR	8	0	2	0	4	2	3	0	0	2	0	21	8	2	3.5	2.3	54.5
AMRO	3	0	0	0	0	0	0	0	0	0	0	3	3	3	3.0	0.0	9.1
EUST	29	0	0	0	0	0	0	0	0	1	0	30	29	1	15.0	19.8	18.2
SAVS	0	0	0	0	0	0	0	4	0	0	0	4	4	4	4.0	0.0	9.1
SOSP	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1.0	0.0	9.1
#TOT	231	8	8	5	6	3	56	11	119	16	26	489	231	3	44.5	70.8	100.0