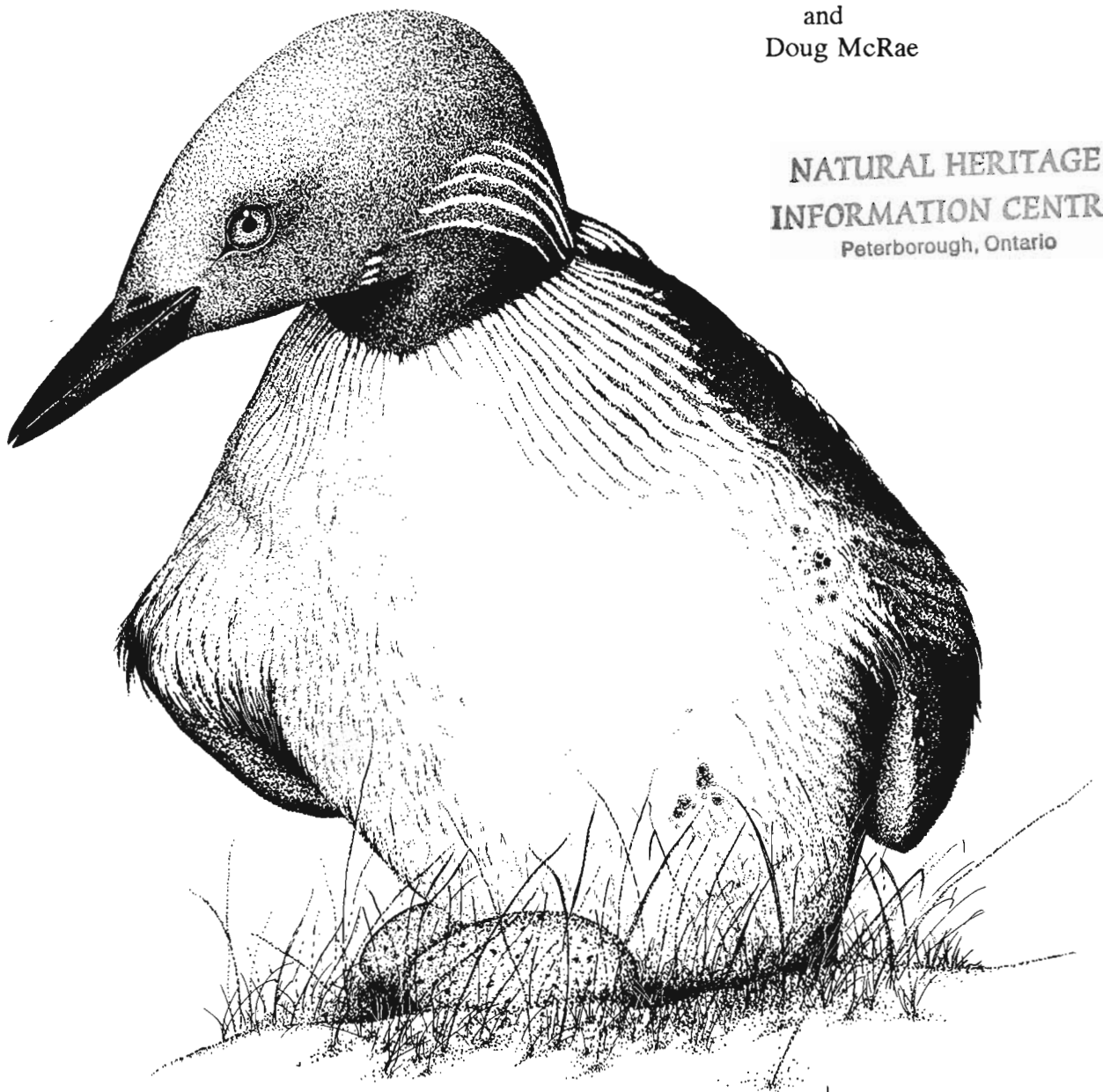


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Seasonal and Geographical Distribution of Birds for Selected Sites in Ontario's Hudson Bay Lowland

Nancy C. Wilson
and
Doug McRae

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Shayna LaBelle-Beadman '92

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Selected Sites in Ontario's Hudson Bay Lowland

KENORA



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Seasonal and Geographical Distribution of Birds for Selected Sites in Ontario's Hudson Bay Lowland

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Abstract: Seasonal bird surveys were conducted in 1990 and 1991 at five sites (3 coastal, 2 inland), which were geographically distributed in the coastal zone of the Hudson Bay Lowland, each with different physiognomic and habitat characteristics, to investigate the status of all bird species inhabiting these areas. All sites were found to have distinct assemblages of six major bird groups (waterbirds, shorebirds, seabirds, raptors, passerines and "others") over the studied seasons and between sites. A total of 197 bird species was recorded. The number of species using the study areas remained fairly constant throughout the study periods for all sites but Moosonee, with the more diverse coastal locations hosting more species than the less diverse, inland tundra habitat. The inland Moosonee site showed similar numbers of species to the coastal sites during breeding season, but reduced song activity and visibility difficulties led to a decline in species recorded for the remainder of the study sessions. Investigation of the numbers of birds which used the sites on a seasonal basis found similar trends in numbers for sites studied within the same year. The coastal locations supported a large number of migrant birds, while migrants at the inland sites were the lowest numbers recorded, and remained comparable between study periods. Species diversity was highest at the inland locations, presumably due to the lack of abundant migrant species passing through these areas. Site-specific differences in species diversity occurred for the coastal sites. A species account section is provided for a more detailed look at seasonal and geographical variation in abundance, and management considerations are discussed.

CONTENTS

INTRODUCTION	1	Species Accounts	23
<i>Acknowledgements</i>	2	Management Considerations	95
STUDY AREA	3	CONCLUSIONS	96
Shagamu	5	LITERATURE CITED	98
Brant	5	APPENDIX 1 (<i>Statistics</i>)	102
Ekwan	5	APPENDIX 2 (<i>Species Lists</i>)	106
Longridge	10	APPENDIX 3 (<i>Waterbirds</i>)	111
Moosonee	10	APPENDIX 4 (<i>Shorebirds</i>)	116
METHODS	10	APPENDIX 5 (<i>Raptors</i>)	121
RESULTS AND DISCUSSION	13	APPENDIX 6 (<i>Seabirds</i>)	126
Distribution of Birds	13	APPENDIX 7 (<i>Passerines</i>)	131
<i>Bird Group Assemblages</i>	13	APPENDIX 8 (<i>Others</i>)	141
<i>Number of Bird Species</i>	18		
<i>Number of Birds</i>	19		
<i>Species Diversity</i>	21		

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INTRODUCTION

The extreme northeastern portion of Ontario lies adjacent to both Hudson and James bays and is an internationally significant migration route for birds of the arctic and sub-arctic. Three Migratory Bird Sanctuaries have been established in James Bay (Moose River M.B.S., Hannah Bay B.S., and Akimiski Island B.S.) which emphasize the importance of this area to migrating and staging waterfowl and shorebirds. Over 2.5 million Lesser Snow Geese², 200,000 small Canada Geese and approximately 50% of the Atlantic Brant population utilize the salt marsh resources provided by the bays for extended periods in the spring and fall (Thomas and Prevett 1982). Extremely high concentrations of dabbling ducks (Black Duck, Northern Pintail, Green-winged Teal, Mallard, American Wigeon), comparable to some areas in the southern Great Lakes, are found taking advantage of the rich fall food resources of the James Bay coastal marshes (Ross 1982). Migrant shorebirds build up large fat reserves necessary for long-distance flights by using widely separated and seasonally abundant food resources. Some shorebirds have been reported to double their pre-migration weight (Morrison and Harrington 1979). Of the migrant shorebirds, the Red Knot, Hudsonian Godwit and Semipalmated Sandpiper are critically dependant on the vast resources of James Bay (Morrison and Harrington 1979, Rimmer 1992). The Bay constitutes one of a few key staging areas that enables these species to undertake long distance migrations to South America. Most bird species which use the Lowland area of Ontario represent migrant species; few species being able to survive the long, harsh winters.

Of the 290 bird species documented as confirmed, probable or possible breeders in Ontario (Cadman et al. 1987), 36 have breeding locations identified only within the Hudson Bay Lowland, representing the southern breeding limits of some species and disjunct populations of others. The narrow band of tundra habitat along Hudson Bay allows for the most southern breeding records of several species: the Tundra Swan, Rough-legged Hawk, Lesser Golden-Plover, Whimbrel, Hudsonian Godwit, Pectoral Sandpiper, Stilt Sandpiper, Parasitic Jaeger, Smith's Longspur, Snow Bunting and Harris' Sparrow (Godfrey 1986). The extensive coastal Lowland marshes are remarkably similar in appearance to the prairies, and several prairie species breed regularly in this area: the Sharp-tailed Sparrow, Le Conte's Sparrow, Wilson's Phalarope, Marbled Godwit (Cadman et al. 1987). It is quite possible that the Hudson Bay Lowland may be the primary breeding area for the small North American population of Little Gull (McRae 1989). The Lowland hosts the most southern of the large breeding colonies of Lesser Snow Goose, the Cape Henrietta Maria colony, consisting of over 55,000 pairs when last surveyed in 1979 (Anghern 1979). In addition, the Lowland provides suitable breeding habitat for about 875,000 Canada Geese (*B.c. interior*) from the Mississippi Valley and the Southern James Bay populations (Tacha and Leafloor 1992, Leafloor 1992).

Feather moulting is another important process supported by the Lowland and its offshore waters. Black Scoter flocks gather in several concentration areas off the Ontario coastline in the early

² The scientific names for all bird species mentioned in this report are provided in the Species Accounts section.

summer to moult, presumably in areas of preferred food availability, but perhaps indicative of a patchy breeding range (Ross 1983). Survey counts of Black Scoters along the Ontario coastline yielded 88,700 individuals in 1977 (Ross 1983) and 82,600 in 1991 (K. Ross, pers.comm.). Duck densities increase along the coast as summer progresses, when post-breeding ducks move to the coast to moult. Northern Pintails form large moulting flocks on the brackish coastal ponds, which are comparable in importance to the major prairie moulting sites (Ross 1982). Of the migrant shorebirds, the Dunlin is unique in that it undergoes a complete wing and body moult in James Bay before continuing south to the wintering grounds (Rimmer 1992). In addition to the local Lowland breeding geese which use the vast coastal resources during the moult, giant Canada Geese (sub-adults and failed breeders) from the Great Lakes region migrate to the Lowland to moult.

Clearly, the Hudson Bay Lowland habitats are essential for many bird species. Unfortunately, very little work has been completed to investigate the importance of this area to species other than waterfowl and shorebirds. Isolated inventories and annotated checklists make up the bulk of our knowledge of the other bird species in this remote part of the province (Cadman et al. 1987, Schueler et. al. 1974, Peck 1972, James et. al. 1983, Manning 1952). To date, there have been relatively few developmental impacts to the Ontario Hudson Bay Lowland. It is evident, in light of the current massive hydroelectric developments on the Quebec side of James Bay, that solid base-line information is essential prior to considering extensive future developments and for assessing cumulative impacts associated with present and future developments in the Hudson-James Bay watershed area. Environmental or developmental impacts which affect the vegetation, benthic invertebrates, critical breeding habitat or the vast undisturbed stretches of coastal marsh cannot be assessed without this information. Certainly, from our present knowledge, we know that damage to critical food resources (staging areas) could lead to the decline or elimination of entire populations of birds (Morrison and Gaston 1986).

This report is the first on a series of studies which were undertaken in the Hudson Bay Lowland in 1990 and 1991 to obtain further base-line information on the wildlife which use this area. This "base-line" study attempts to establish a quantitative record of present bird populations to enable managers to gauge impacts that may occur to the ecosystem in the future. Habitat assessments for avian use have been carried out and will be presented in a future report. The discussion of these data is restricted to broad themes and a species account section.

Acknowledgements.- We gratefully acknowledge the assistance of the many volunteer naturalists (listed inside front cover) who collected the data at the field sites, in conjunction with Ontario Ministry of Natural Resources, Moosonee District staff. This study would not have been possible without their seemingly unending enthusiasm for data collection. A special thank you to the Partners involved in this part of the *Habitat Based Wildlife Assessment of Ontario's Sub-Arctic Coast Project*, who provided additional funding, expertise and/or personnel (Federation of Ontario Naturalists, Ontario Field Ornithologists, Royal Ontario Museum, OMNR Wildlife Research Branch). For providing insightful comments to the draft reports, we would like to thank Ken Abraham, Chris Davies, Ross James, Jim Leafloor, Paul Prevett, and John Thompson. As well, thanks to Alan Wormington for providing comments on a first draft of the species accounts.

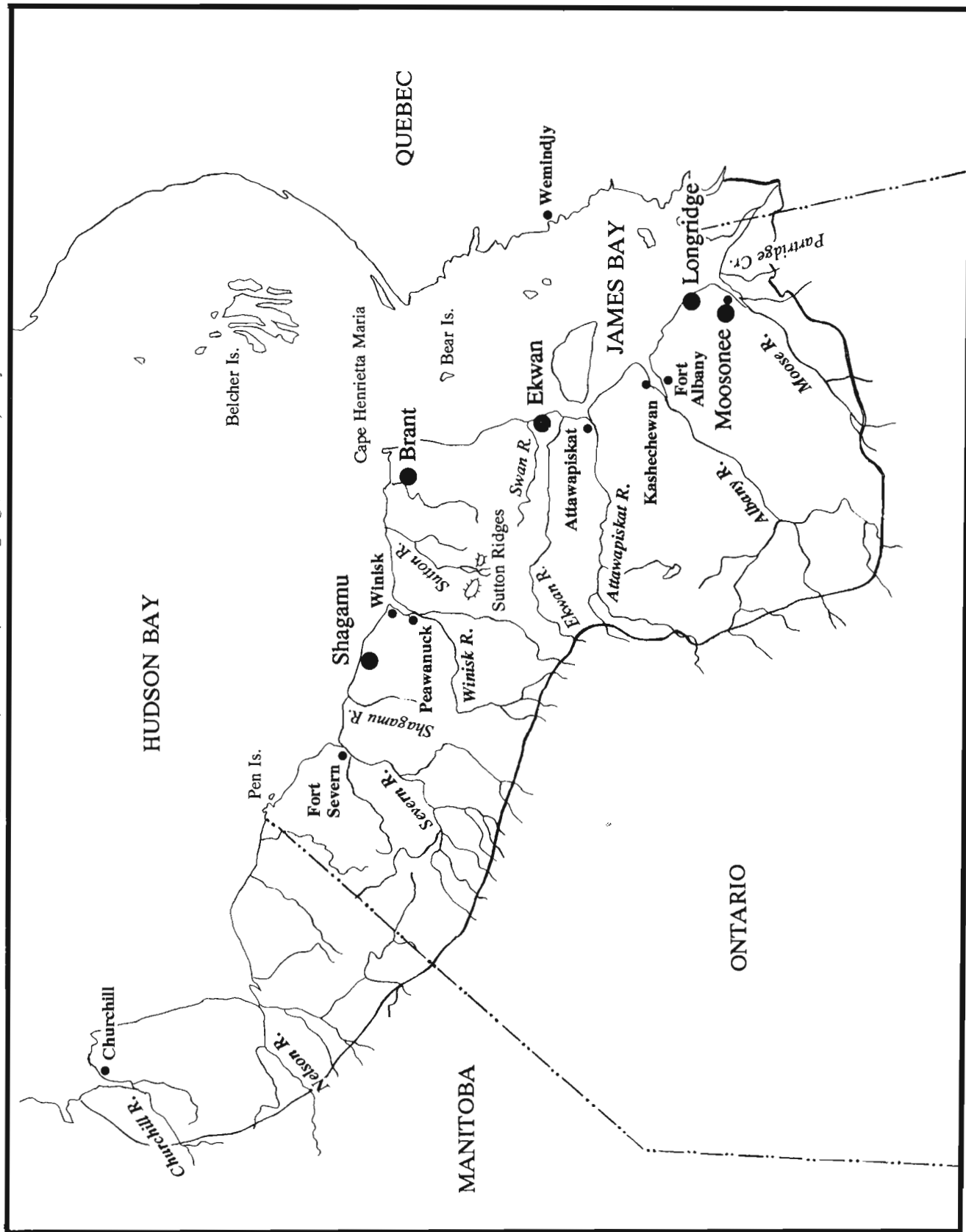
STUDY AREA

The Hudson Bay Lowland (HBL) is a flat, watery plain which lies to the south and west of Hudson and James bays, extending across Ontario, most of the north shore of Manitoba and into Quebec (Fig. 1). It comprises approximately 260,000 square kilometres of northern Ontario, representing a quarter of the provincial landscape. The slight incline of land from the coast, averaging only 1 meter per kilometre or less (Sims et al. 1979), has resulted in a waterlogged terrain and many water bodies. During the last continental glaciation, this area was depressed due to the massive weight of the glaciers. When these glaciers melted (7500-8000 years ago), the area now known as the HBL became part of the Tyrrell Sea. The land mass has been undergoing the slow process of uplift which still continues today at an estimated rate of 1.2 m per century at Cape Henrietta Maria (Webber et al. 1970). This history is evident in many areas of the HBL through the beach ridge features which mark the uplift process. The present coastal area hosts early successional stages while the interior of the Lowland is a mature peatland of bogs, fens and swamps.

The climate varies from arctic conditions along the Hudson Bay coast to temperate boreal conditions in the southwest. The arctic influence provides Ontario with the most southern tundra habitat found in the world. Along the tundra belt of the Hudson Bay coast, permafrost features abound, and proceeding south, areas of discontinuous permafrost are evident. Poor drainage and climatic conditions affect the decomposition of organic matter, which builds up in thick mats of peat, depths of which can reach several meters. Peat accumulations become greater as one moves inland from the coast and wetlands become less well drained and poorer in nutrient supply. Limestone bedrock overlain with clay sediments has resulted in wetlands which are much less acid and usually more calcium-rich than those in the surrounding Precambrian Shield (Sims et al. 1979). The beach ridges and the river banks or levees are the best drained areas in the Lowland, supporting good forest growth with time. The salt water coastline and tidal influences on the HBL are unique in Ontario. The HBL lies within the Boreal Forest Region of Canada, and has been subdivided into the Hudson Bay Lowlands and the Forest-Tundra sections (Rowe 1977). Two Land Regions have been identified for the coastal portion of the Hudson Bay Lowland, the Hudson Region and the James Region (Cowell et al. 1979). The Hudson Region is the zone of continuous permafrost and features tundra vegetation and landform features associated with permafrost conditions. The James Region features extensive mudflats and salt and freshwater marshes, which are characterized by a number of long promontories resulting from post-glacial deposits between the Moose and Albany Rivers.

Coastal Cree communities (7 in total) are situated near the mouths of the major riverways with an approximate total population of 6000. The Cree dependency on the resources of the Lowland goes well beyond the reserve boundaries and entails food and fuel gathering activities (Thompson and Hutchison 1987). Sixteen Mid-Canada Line Radar Sites were situated in the HBL; however, these were abandoned, for the most part, in 1965. Only localized community road systems are in place. A railway from the south to Moosonee is the only year-round ground transportation route into the Lowland in Ontario. Access beyond is restricted to air or boat travel and, in the winter months, via winter roads which join the James Bay communities. Air transportation

Fig. 1. The Hudson Bay Lowland, showing the 1990 (Shagamu, Ekwan) and 1991 (Brant, Longridge, Moosonee) study site locations.



within the HBL is limited by landing conditions which require firm beach ridge formations (wheeled plane) or deep lakes (float plane). Helicopter transport allows access to most of the HBL. Ontario Ministry of Natural Resources, Moosonee District, is presently responsible for ecosystem management of the HBL within Ontario. Such management responsibilities will change with the expected increased roles of the First Nations in the area.

The study areas for this project are focused in the coastal region of the HBL, from the Manitoba to Quebec borders. Along the coast, a greater diversity of vegetative types associated with early successional stages has provided suitable habitat for a diversity of wildlife species. Three "coastal" sites (camp located less than 2 km from coast) and two "inland" sites (camp located 10 km or more from coast) were selected for this study. Detailed descriptions of the habitats mentioned here can be obtained from Riley (1981, under revision).

Shagamu

This base camp was located 1.5 km inland from Hudson Bay, between the Severn River and the Winisk River. Approximately 70 km southeast of Fort Severn, the study site was 7 km to the east of Little Shagamu River. This area features a compression of habitat types where the tundra belt narrows along the coast making forest habitat types available for study. The surveyed area progressed from intertidal and supertidal marshes at the coast associated with barren, graminoid and shrub covered beach ridges (Fig. 2) to freshwater meadow marshes associated with tundra heath covered ridges (Fig. 3) and sparse spruce-lichen woodlands (Fig. 4) which succeeded into dense black spruce forest covered ridges. Several strand lakes and small ponds were scattered between the ridges. Study coverage consisted of an area of approximately 16 km² around the base camp location.

Brant

The Brant camp was situated 10 km south of the Hudson Bay coast and 1.5 km east of the Brant River, between the Sutton River and Cape Henrietta Maria. Broadening of the tundra in the Cape region yielded less diversity in habitat types in the immediate study area; the nearest treeline was 20 km south-west of camp. Vast stretches of tundra fen areas (Fig. 5) surrounding the camp showed permafrost features such as raised peat hummocks (Fig. 6). Most notable were the number of large shallow lakes and ponds which occurred in this area. The few beach ridge formations and river banks were covered with tundra heath vegetation, a few of these areas having dense shrub cover (alder, willow) (Fig. 7). Study coverage in this location was approximately 16 km² around the camp with additional coverage to the coast at least once during each study period.

Ekwan

The Ekwan base camp was established on the first beach ridge next to the waters of James Bay (Fig. 8), 23 km north of Ekwan Point. This area consisted of compressed beach ridge formations



Fig.2. SHAGAMU SITE. First sand/gravel beach ridge showing early successional vegetation establishment next to the intertidal zone and mudflats. (photo by J. Confer)



Fig.4. SHAGAMU SITE. White spruce woodland ridge showing extensive carpeting of mosses and lichens. (photo by K.L. Allaben-Confer)



Fig.3. SHAGAMU SITE. Tundra heath covered ridge near the treeline with a strand lake shown in the inter-ridge area. (photo by P.A. Woodliffe)



Fig.5. BRANT SITE. Tundra heath covered ridge showing the extensive tundra fen area in the distance. (photo by T. Knight)

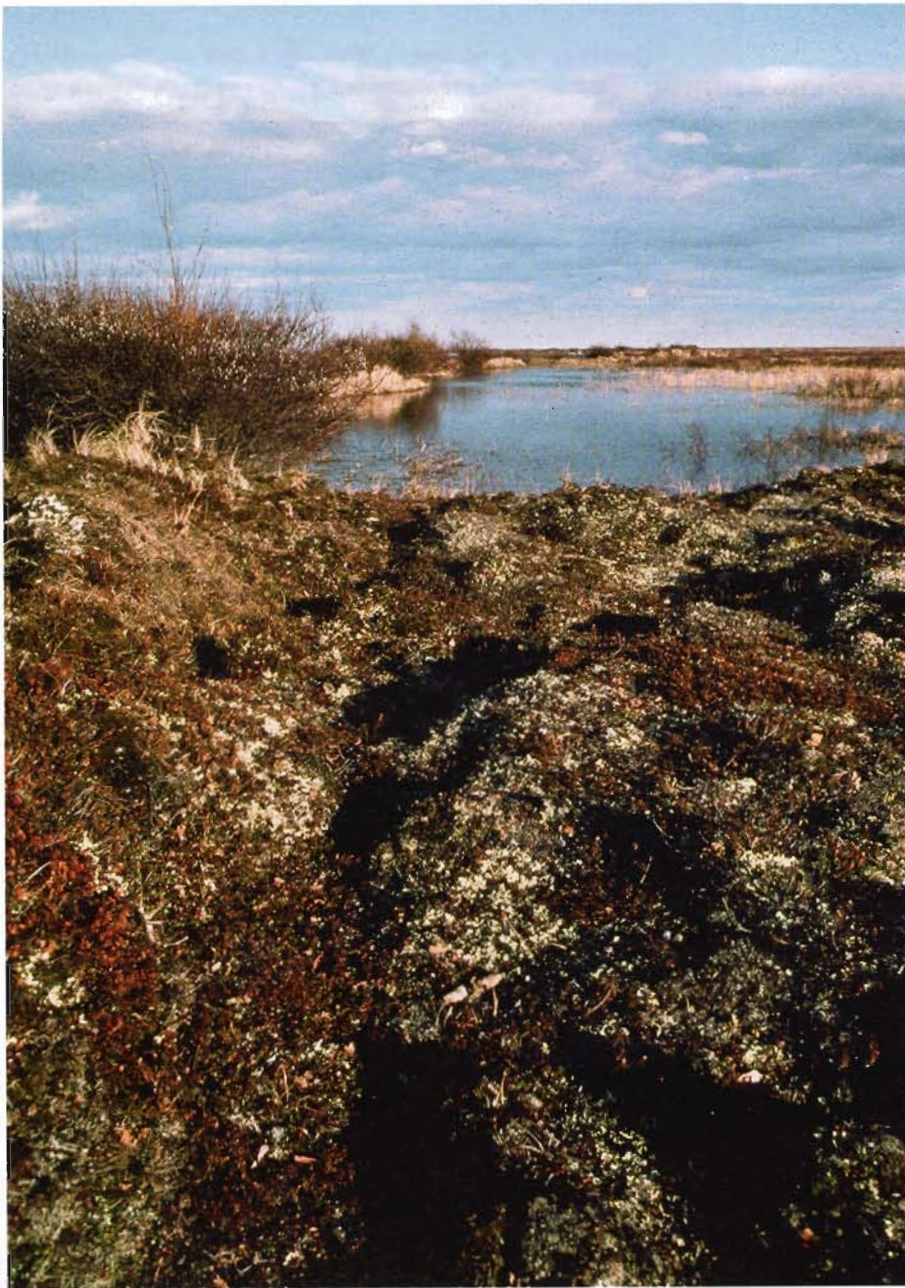


Fig.6. **BRANT SITE.** Permafrost heaves causing raised peat hummocks, usually established with tundra heath vegetation if of older age. Pond showing typical shrub fringing. (photo by T. Knight)



Fig.7. **BRANT SITE.** Shrub-lined pond with typical freshwater marsh vegetation in shallow areas. (photo by P.A. Woodliffe)



Fig.8. **EKWAN SITE.** First beach ridge next to James Bay, showing Ekwan camp setup. Intertidal marsh established to ridge on left of photo with supertidal marsh between camp and the shrubbed and forested ridges. (photo by Y.R. Tymstra)



Fig.9. **EKWAN SITE.** Freshwater marsh in interridge area between the spruce-lichen woodland ridges. (photo by C. Jane)



Fig. 10. **LONGRIDGE SITE.** Part of Longridge Point showing early stages of vegetation establishment. Background showing intertidal marsh near base of Point during high tide. (photo by T. Knight)



Fig.11. **LONGRIDGE SITE.** Foreground showing intertidal zone, grading back to supertidal marsh, shrubbed ridge at base of Longridge Point and forested ridges beyond. (photo by J. Leader)



Fig.12. **LONGRIDGE SITE.** Base of Longridge Point showing the mixed conifer/deciduous forest area. Supertidal marsh beyond pond at left of photo. (photo by D. McRae)



Fig.13. **MOOSONEE SITE.** The townsite of Moosonee situated on the banks of the Moose River. Further inland, lie extensive areas of medium to high density tamarack fens. (District file photo)

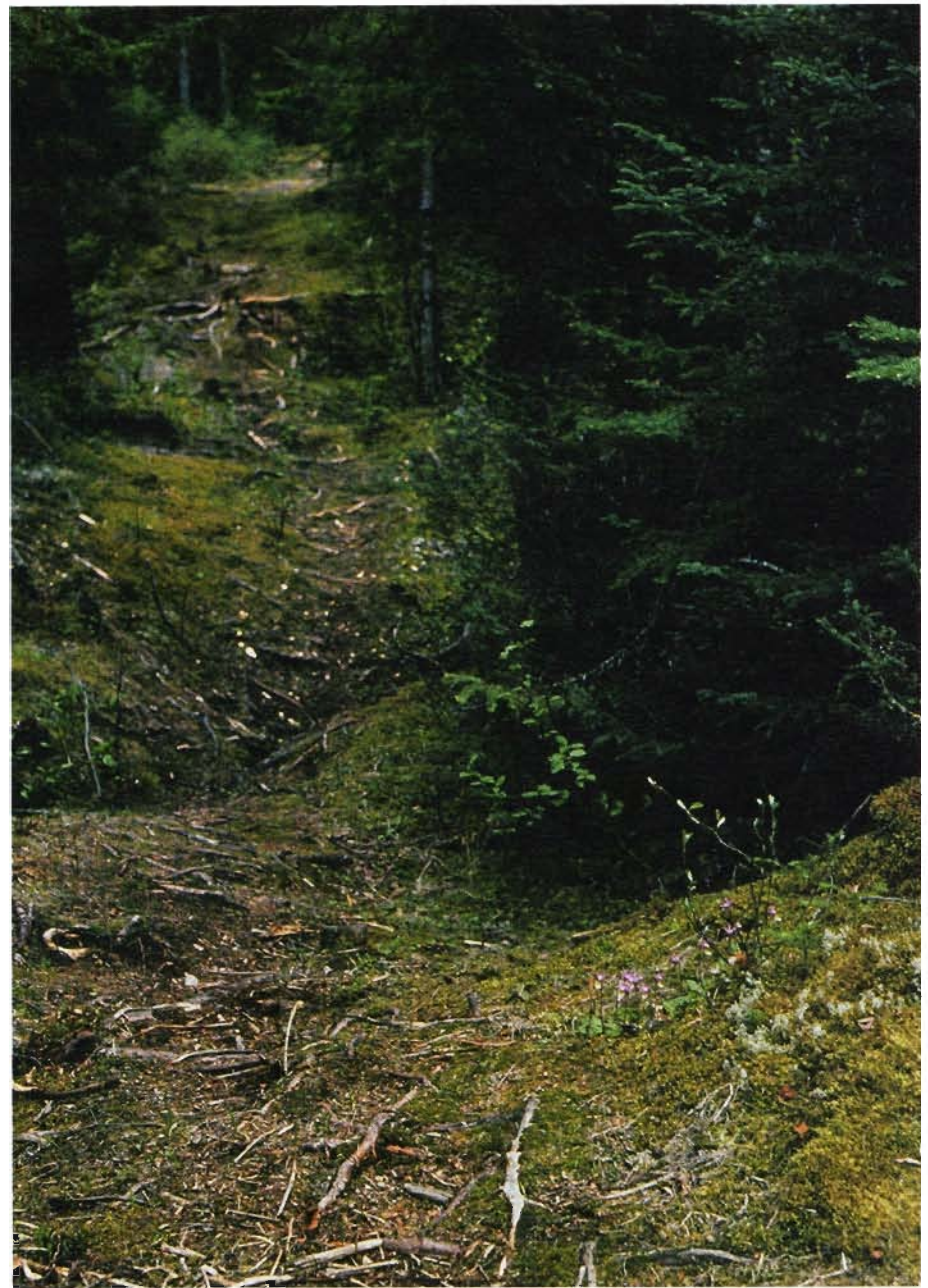


Fig.14. **MOOSONEE SITE.** Riparian forest along Store Creek showing substantial white spruce growth with extensive forest carpeting of mosses and some lichens. (photo by D. McRae)

would have migrants and breeding slightly earlier than the Hudson Bay locations in the spring and slightly later migrants in the fall. Thus, the study time periods for the James Bay sites correspond, as do the two Hudson Bay locations (Table 1). All study sites were surveyed on three occasions, with the exception of Shagamu which had four survey periods. Time periods have been assigned numbers (0-3) for ease of identification and comparison throughout this report. The additional study period which occurred at Shagamu is assigned '0' and has no comparable data from the other sites. The times selected represent different events which were ongoing in the Lowland. Time 0 monitored the end of the spring migration and return of the local breeders. Time 1 generally represented the breeding season, however, the coastal locations recorded some late spring migrants and moulting flocks. Time 2 observed the beginning of the fall migration for shorebirds at the coastal locations, while the inland sites documented the summer residents, most of which likely bred in the area. Time 3 monitored part of the fall migration for most bird groups. Study sites will be referred to throughout the report by the first initial of the site (S-Shagamu, B-Brant, E-Ekwan, L-Longridge, M-Moosonee).

Table 1. Study dates for each site surveyed in the Hudson Bay Lowland during 1990 and 1991. Time periods have been assigned numbers (0-3) for site comparison purposes throughout this report.

	Shagamu 1990	Brant 1991	Ekwan 1990	Longridge 1991	Moosonee 1991
0	28 May-9 Jun	---	---	---	---
1	21-28 Jun	17-28 Jun	12-20 Jun	5-15 Jun	3-5 Jun
2	10-18 Jul	9-18 Jul	24 Jul-2 Aug	26 Jul-2 Aug	21-25 Jul
3	20-30 Aug	19-30 Aug	3-13 Sep	4-13 Sep	1-3 Sep

The total number of each bird species seen by the field crew (generally 4 persons) was recorded on a daily basis. Field crews were made up of at least two naturalists experienced in the identification of bird species. Strip transect bird surveys (findings and methods to be reported elsewhere) were undertaken in the mornings in different vegetation types within the study area. The transect surveys ensured comparable coverage of different habitats in the morning hours from day to day. The afternoons allowed for additional exploration of the study area to record species which may not have been found during the morning surveys, as well as monitoring daily movement patterns.

Daily totals for the number of species and the number of all birds observed were used for the statistical calculations. Species diversity index was calculated using the relative diversity index [J] (expressing the observed diversity, Shannon's Index [H], as a proportion of the maximum possible diversity) on a daily basis for comparison between sites and time periods (Zar 1984). We used analysis of variance (ANOVA) to test for differences in number of birds species, total number of birds observed and species diversity, both within and among sites over three time periods. The ANOVA was performed using SAS General Linear Model procedure (PROC

which progressed quickly from graminoid and shrub-established ridges to spruce lichen woodland and spruce forest beyond, fewer than six beach ridges from the coast. The inter-ridge wetland areas progressed from mudflats to intertidal marsh to supertidal marsh (Fig. 8) to freshwater marsh (Fig. 9) within the study area. Coverage at this site was somewhat limited by accessibility inland; however, approximately 14 km² were regularly surveyed.

Longridge

The Longridge camp was situated at the base of Longridge Point on James Bay, located 57 km due north of Moosonee. As this peninsula projects 6 km north into James Bay, extensive stretches of mudflats, intertidal (Fig. 10) and supertidal marshes (Fig. 11) occur. The ridge itself progressed from the tip to base in successive stages of vegetative establishment, barren sand and gravel to graminoid to shrub-rich to a mixed conifer/deciduous forest (Fig. 12). Fresh water marshes and meadow marshes were available for study, however, accessibility further inland was limited. The study coverage at this site included approximately 16 km² of habitat.

Moosonee

The Moosonee study sites were located directly north and west of the townsite, located 18 km inland from the mouth of the Moose River. Habitat types regularly covered at this site included the vast tamarack fens (Fig. 13), black spruce/tamarack swamp, spruce forest associated with drainage areas (Fig. 14), a mixed conifer/deciduous forest west of town and the urban townsite itself. The Moose River was the main waterway surveyed from the mainland. Regular coverage in this area consisted of approximately 7 km², due to the dense nature of the habitats studied.

METHODS

Data presented in this report were collected as part of a series of surveys undertaken at various sites in the HBL. The study site selection (Fig. 1) was somewhat dependent on finding suitable landing areas for the DHC6 Twin Otter aircraft. Funding and time constraints allowed the intensive exploration of four sites (Shagamu, Brant, Ekwan, Longridge) and a more superficial look at a fifth site (Moosonee). These study locations were geographically distributed along the coasts of Hudson and James bays so that two intensive sites were located in the tundra habitat near Hudson Bay (Shagamu, Brant) and the other two intensive sites were located on the upper and lower western shore of James Bay (Ekwan, Longridge). The area around Moosonee was surveyed to a lesser extent to provide us with some coverage of inland habitats.

Shagamu and Ekwan were surveyed in 1990, and Brant, Longridge and Moosonee were surveyed in 1991. The timing for the seasonal study of birds was limited to early June until mid September by the earliest possible accessibility to the sites and unpredictable weather conditions in the fall. As sites could not be surveyed simultaneously, survey times were chosen to correspond to the different geographic locations, with the assumption that sites on James Bay

GLM), as an unbalanced ANOVA was necessary due to the unequal number of observations in the data set (SAS Institute Inc. 1988). Type III SS (partial sum of squares) were investigated and these findings are presented in Appendix 1, with significant differences identified in bold face type for ease of data interpretation. A 95% confidence interval was used when testing for significant differences. Duncan's Multiple Range Test was used to identify specific variable differences ($\alpha = 0.05$).

We have made two assumptions for analysis of these data. The first assumption is that among survey periods for each site, the field crews covered generally the same area with the same amount of effort. The second assumption is that over a study period, the same general weather conditions affected the data collection. Thus, for simplicity, these daily location totals have been averaged for each species over the duration of each study period to provide us with a seasonal species structure at each site. These average daily totals have been used throughout this report in the graphs of the species accounts and in Appendices 3-8.

All bird species were grouped by families into one of six **functional GROUPS** for assemblage analysis: **WATERBIRDS** (Gaviidae, Podicipedidae, Anatidae), **SHOREBIRDS** (Ardeidae, Gruidae, Rallidae, Recurvirostridae, Charadriidae, Scolopacidae), **RAPTORS** (Accipitridae, Falconidae, Strigidae), **SEABIRDS** (Phalacrocoracidae, Laridae, Alcidae), **PASSERINES** (Tyrannidae, Alaudidae, Hirundinidae, Corvidae, Paridae, Certhiidae, Sittidae, Troglodytidae, Muscicapidae, Laniidae, Mimidae, Motacillidae, Bombycillidae, Sturnidae, Vireonidae, Emberizidae, Passeridae, Fringillidae) and "**OTHERS**" (Phasianidae, Columbidae, Caprimulgidae, Alcedinidae, Picidae) (Appendix 2). Statistical analysis of this categorical data involved the use of 2x6 chi-squared contingency tables to test for differences in avian community composition within sites at different times and between sites during the same seasonal time period (Sokal and Rohlf 1981). These analyses were performed using Saturn-Calc (Saturn Systems Inc. 1988) and the results are presented in Appendix 1. The average daily total of each bird species by group, site and time period are presented (Appendices 3-8).

The common and scientific names, and four-letter species codes for birds follow the guidelines set by James (1991). Common names of birds have been used throughout the text of this report for ease of interpretation. Scientific names have been provided only in the Species Accounts section of this report. The four-letter codes have been used in Appendices 3-8 and can be cross-referenced to Appendix 2 to determine the common names.

RESULTS AND DISCUSSION

Distribution Of Birds

Bird Group Assemblages:

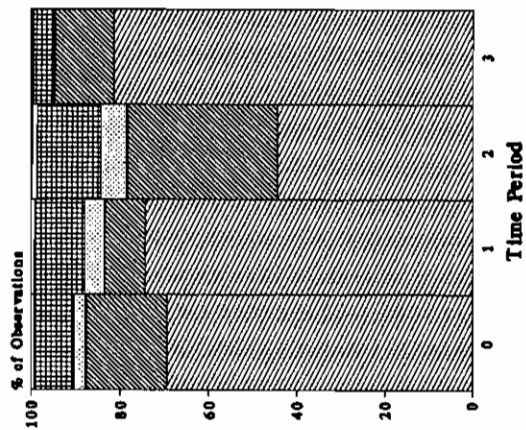
We examined the representation of different bird "groups" on a seasonal basis for each study site (Fig. 15) and have listed the five most abundant species in each category, when available, by site and time (Table 2). Further information on species composition of these bird groups can be extracted from Appendices 2-8. Chi-squared testing yielded a significant difference in the relative abundance of these groups for all time periods at each site (Appendix 1-Table A) and all corresponding time periods between sites (Appendix 1-Table B), indicating considerable seasonal and geographic variation in community composition. The most apparent trends are discussed here.

Two main trends for waterbird proportions are notable. The first trend is the high waterfowl use of the B and S sites, both tundra locations, throughout the study periods. This substantiates the fact that these areas are not only important for staging waterfowl, but they also support higher density nesting areas (Thomas and Prevett 1982, Tacha and Leafloor 1992). The second trend is shown at the James Bay sites, with time 1 and 3 proportions underscoring the importance of these locations to staging and moulting waterfowl (Thomas and Prevett 1982). The waterbird proportion in time 1 at E was influenced by the influx of non-breeding Canada Geese and a northward migration of Red-throated Loons (the two most abundant bird species during this time period). Waterbird proportions in time 1 at L were directly influenced by the large moulting flocks of Black Scoter and non-breeding Canada Geese. This concentration of Black Scoters had been previously documented at L by Ross (1983). Time 3 studies captured the fall migration for several waterfowl species, the most abundant of these being the Snow Goose, Canada Goose and Brant.

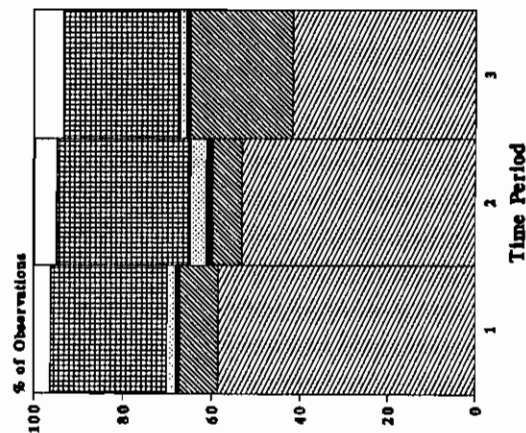
Shorebirds proportions of note were during time 2 at E, L and to a lesser extent S. The large proportion of shorebirds at E was influenced mainly by three species with average daily sightings of over 100 birds per day (Semipalmated Sandpiper, Hudsonian Godwit, Red Knot). L documented a greater number of abundant shorebird migrants than at E, with species that on average represented over 100 birds sighted per day including the Red Knot, Semipalmated Sandpiper, Lesser Yellowlegs, Ruddy Turnstone, White-rumped Sandpiper, Least Sandpiper and Hudsonian Godwit. This underscores the importance of the James Bay habitats for migrating shorebirds (Morrison and Harrington 1979). The beginning of the southward migration of shorebirds was documented at S in this time period, with Short-billed Dowitcher, Hudsonian Godwit, and Least Sandpiper most heavily affecting shorebird proportions at this site. Although the proportion of shorebirds at S was less than those found at the James Bay sites, it illustrates the importance of the coast for these migrating birds, as further inland at B and M, Shorebird numbers in time 2 did not increase.

Fig. 15: Seasonal bird assemblages by major bird group at five study sites in the Hudson Bay Lowland, during 1990 and 1991.

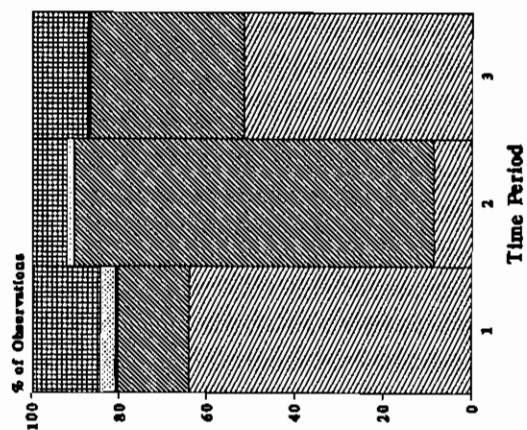
Shagamu - 1990



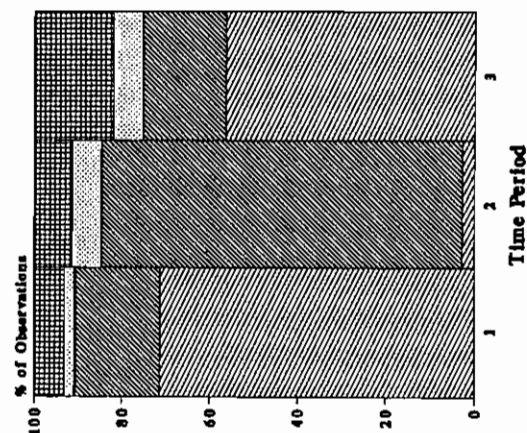
Brant - 1991



Ekwan - 1990



Longridge - 1991



Moosonee - 1991

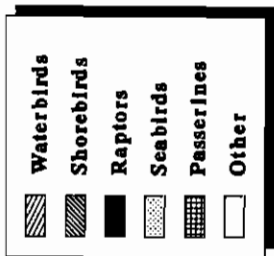
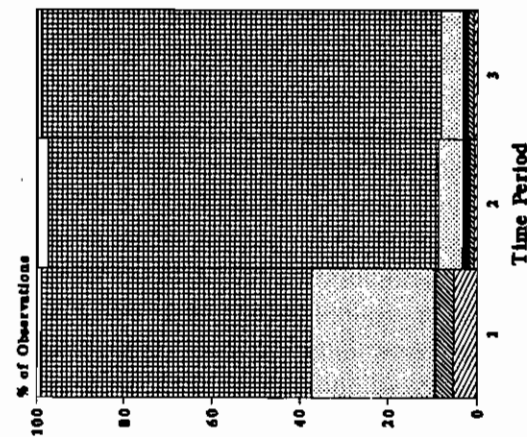


Table 2. The five most abundant bird species observed (if available) for each bird group by site and time period, during studies undertaken in 1990 (Shagamu, Ekwan) and 1991 (Brant, Longridge, Moosonee). Numbers in brackets indicate the average number sighted per day for that site and time period.

Site/ Time	WATERBIRDS	SHOREBIRDS	RAPTORS	SEABIRDS	PASSERINES	"OTHERS"
S0	SNGO (992.7) CAGO (372.7) NOPI (37.4) ABDU (25.4) MALL (18.2)	LEGP (196.6) DUNL (49.0) SAND (31.7) SESA (19.8) BBPL (17.7)	NOHA (3.2) MERL (1.7) PEFA (1.1) SEOW (0.9) RLHA (0.3)	HERG (19.2) BOGU (19.1) ARTE (16.2) SAGU (1.8) GLGU (1.2)	SAVS (46.6) LALO (18.5) SNBU (17.9) WCSP (17.1) CORE (15.7)	WIPT (11.8) NOFL (1.4) SPGR (0.1)
S1	CAGO (468.8) SNGO (105.0) GWTE (43.9) ABDU (32.5) NOPI (26.5)	HUGO (17.3) LESA (14.3) WHIM (12.0) DUNL (10.8) STSA (10.1)	NOHA (1.4) MERL (0.9) NHOW (0.5) OSPR (0.1) BAEA (0.1)	ARTE (18.5) BOGU (17.8) HERG (11.1) GLGU (0.3) LTJA (0.1)	SAVS (40.6) ATSP (14.9) WCSP (12.9) HOLA (10.4) AMRO (8.3)	WIPT (5.1) NOFL (1.0) ROPT (0.6)
S2	GWTE (129.4) CAGO (105.6) RBME (96.6) LESC (47.3) BLSC (33.3)	SBDO (114.1) HUGO (95.6) LESA (41.9) GRYE (34.9) LEYE (25.9)	NOHA (2.3) MERL (1.1) OSPR (0.5) BAEA (0.4) GOEA (0.1)	BOGU (36.3) ARTE (14.6) HERG (14.1) PAJA (1.5) LIGU (0.1)	SAVS (58.8) WCSP (21.9) ATSP (17.4) CORE (10.8) HOLA (10.3)	WIPT (12.0) NOFL (1.5) ROPT (1.4)
S3	SNGO(4600.0) CAGO (572.7) GWTE (72.2) ABDU (69.8) NOPI (54.2)	PESA (236.4) HUGO (230.6) SESA (136.5) LEGP (56.7) GRYE (41.5)	NOHA (12.1) MERL (2.8) NOGO (1.4) OSPR (0.8) SSHA (0.7)	HERG (18.4) BOGU (3.8) ARTE (1.4) RBGU (1.0) PAJA (0.2)	LALO (62.4) HOLA (48.4) SAVS (38.4) DEJU (17.8) WCSP (15.6)	WIPT (21.0) ROPT (1.1) MODO (0.1) NOFL (0.1)
B1	SNGO (127.2) CAGO (109.6) COGO (41.7) ABDU (22.5) GRSC (17.1)	HUGO (11.1) DUNL (9.3) SESA (8.7) LESA (7.3) COSN (5.6)	NOHA (4.0) MERL (0.6) OSPR (0.4) RLHA (0.3)	HERG (10.4) PAJA (2.4) LTJA (0.2) ARTE (0.2)	SAVS (47.5) LALO (20.8) HOLA (18.7) YWAR (14.5) CORE (14.3)	WIPT (23.4)
B2	SNGO (104.8) CAGO (65.0) NOPI (14.2) PALO (11.0) ABDU (10.7)	WHIM (8.4) LESA (5.9) GRYE (5.7) COSN (3.8) RNPH (2.0)	NOHA (5.8) OSPR (0.5) BAEA (0.1) MERL (0.1)	HERG (11.6) PAJA (5.1) ARTE (0.1)	SAVS (71.3) HOLA (17.0) LALO (14.1) SMLO (11.8) CORE (7.9)	WIPT (23.4)
B3	CAGO (133.0) SNGO (124.9) ABDU (8.5) GWTE (7.0) PALO (5.9)	LEGP (104.4) PESA (41.7) GRYE (9.7) BBPL (5.8) RUTU (2.8)	NOHA (5.5) MERL (0.3) NOGO (0.1)	HERG (9.3) PAJA (0.8) BOGU (0.8) BLTE (0.1)	SAVS (93.0) LALO (30.3) HOLA (19.9) CORE (9.9) CORA (5.3)	WIPT (47.5)

Site/ Time	WATERBIRDS	SHOREBIRDS	RAPTORS	SEABIRDS	PASSERINES	"OTHERS"
E1	CAGO (176.0) RTLO (127.4) NOPI (40.6) ABDU (36.8) MALL (36.4)	SBDO (30.4) LEYE (22.1) COSN (20.0) SACR (12.4) RUTU (12.4)	MERL (1.3) NOHA (1.2) RTHA (1.1) GHOW (0.7) OSPR (0.6)	HERG (24.7) CATE (3.0) ARTE (2.6) RBGU (1.3)	SAVS (20.6) RUBL (17.4) YWAR (10.4) RWBL (10.3) ALFL (9.1)	NOFL (1.4) SPGR (0.9) MODO (0.1) CONI (0.1) TTWO (0.1)
E2	BLSC (39.4) MALL (37.0) ABDU (25.7) CAGO (9.8) NOPI (9.4)	SESA (695.2) HUGO (124.3) REKN (114.0) WRSA (79.5) PESA (75.4)	NOHA (1.3) MERL (0.7) GHOW (0.6) OSPR (0.3) RTHA (0.1)	HERG (11.7) RBGU (5.9) BOGU (3.8) ARTE (2.6) CATE (1.8)	SAVS (27.6) CORE (10.5) YRWA (9.1) RWBL (7.2) WTSP (6.8)	SPGR (1.3) NOFL (0.1)
E3	SNGQ(1677.3) CAGO(1077.3) MALL (65.6) BRAN (53.6) ABDU (47.2)	PESA (783.2) SESA (535.5) HUGO (212.7) DUNL (145.5) LEGP (119.1)	NOHA (8.5) NOGO (3.6) PEFA (1.7) MERL (1.2) RTHA (0.9)	HERG (11.8) RBGU (7.5) CATE (1.8) PAJA (0.2) THGU (0.2)	HOLA (370.0) SAVS (80.1) LALO (42.5) WTSP (31.6) AMPI (24.5)	SPGR (0.9) BEKI (0.2) MODO (0.1) TTWO (0.1)
L1	BLSC (661.8) CAGO (482.5) COGO (77.4) ABDU (58.3) COME (34.9)	RUTU (155.1) BBPL (91.5) SESA (28.4) LEYE (14.1) KILL (8.4)	OSPR (1.6) NOHA (1.1) MERL (1.0) RLHA (0.8) NOGO (0.2)	HERG (16.5) RBGU (7.8) BOGU (7.0) COTE (2.7) CATE (2.1)	SAVS (43.6) WTSP (12.9) YWAR (11.8) ALFL (8.8) AMCR (7.8)	RUGR (0.3) NOFL (0.2) MODO (0.1)
L2	ABDU (29.3) MALL (14.3) COGO (12.3) CAGO (9.4) COME (4.6)	REKN (547.3) SESA (535.5) LEYE (265.6) RUTU (223.5) WRSA (156.6)	OSPR (0.8) NOHA (0.8) MERL (0.3) GHOW (0.1)	BOGU (158.8) RBGU (18.9) HERG (11.1) COTE (6.4) CATE (1.4)	SAVS (102.0) WWCR (33.8) WTSP (22.8) CORE (15.1) YRWA (9.3)	CONI (0.4)
L3	CAGO (711.1) SNGO (514.2) BRAN (153.9) COGO (56.3) ABDU (51.2)	DUNL (126.5) PESA (74.3) SESA (51.8) SAND (50.1) LEGP (46.8)	NOHA (2.0) MERL (1.8) OSPR (0.9) PEFA (0.8) SSHA (0.6)	BOGU (157.0) HERG (12.8) RBGU (9.7) COTE (4.0) LIGU (2.3)	HOLA (190.7) SAVS (82.3) AMPI (45.4) WWCR (40.5) WTSP (30.9)	NOFL (0.4) CONI (0.2)
M1	CAGO (34.0) RBME (2.3) COGO (1.0) MALL (0.7) AMWI (0.7)	SESA (13.3) COSN (5.7) KILL (3.7) SACR (2.0) SPSA (1.3)	OSPR (1.0) AMKE (0.7) MERL (0.3)	HERG (105.7) RBGU (53.3) ARTE (41.0) COTE (5.3) BOGU (2.3)	CORA (33.3) TRES (30.7) CONW (25.7) WTSP (25.0) RCKI (23.3)	MODO (3.3) SPGR (2.7) BEKI (1.0) NOFL (0.3)
M2	MALL (1.6) GWTE (0.2)	KILL (1.8) GRYE (0.6) GTBH (0.2) SPSA (0.2)	AMKE (2.8) MERL (0.6) OSPR (0.4) SSHA (0.2)	HERG (9.2) RBGU (4.8)	CORA (50.6) EUST (30.0) WTSP (15.2) WWCR (13.0) LISP (11.4)	CONI (3.2) NOFL (2.6) BEKI (0.4) DOWO (0.2)
M3	MALL (1.7) COGO (1.0) CAGO (0.7)	GRYE (2.0) SACR (1.3) GTBH (1.0) LEYE (1.0)	OSPR (2.0) MERL (0.1) SSHA (0.7) BAEA (0.3) NOHA (0.3)	RBGU (10.0) HERG (9.3)	EUST (58.3) PAWA (58.0) YRWA (43.7) CORA (30.0) WWCR (28.0)	BEKI (1.3) NOFL (0.7) SPGR (0.3) DOWO (0.3) HAWO (0.3)

Passerines were the most abundant bird group at the inland forested areas of M, demonstrating of the importance of the boreal forest habitat for nesting and migrating birds, and the relative lack of suitable habitat for many waterbirds and shorebirds. Those passerine species which were most abundant during the study times were the Common Raven, Tree Swallow, Connecticut Warbler, White-throated Sparrow, Ruby-crowned Kinglet, European Starling, White-winged Crossbill, Lincoln's Sparrow, Palm Warbler and Yellow-rumped Warbler. Passerine proportions, although substantially less than at M, were greater at B than for the remaining coastal locations, revealing that the tundra habitats found inland at B support waterbird and shorebird use to a lesser extent. The most abundant passerine species at B included the Savannah Sparrow, Lapland Longspur, Horned Lark, Smith's Longspur, Yellow Warbler, Common Redpoll and Common Raven.

The most notable Seabird representation was documented at M in time 1. Generally, these seabirds represented birds staging at the Moosonee townsite dump (Herring Gull, Ring-billed Gull) and a passage of northward migrants (Arctic Tern, Common Tern, Bonaparte's Gull). This demonstrates the concentrating nature of dump sites and major riverways during spring migration. Also of note, were the Seabird proportions at L, which were influenced by the Bonaparte's Gull, whose numbers increased substantially, with large flocks of presumably failed breeders or unmated individuals attracted to the extensive flats provided by Longridge Point in time 2 and included many more juveniles in time 3.

Raptors and "others" generally represented a very small portion of the birds observed at all study sites, as would be expected. Two low small mammal years (Knight in prep.) most likely affected the numbers and species makeup of raptors found at these sites. The greatest proportion of "others" was observed at B, and was represented by only one species, the Willow Ptarmigan.

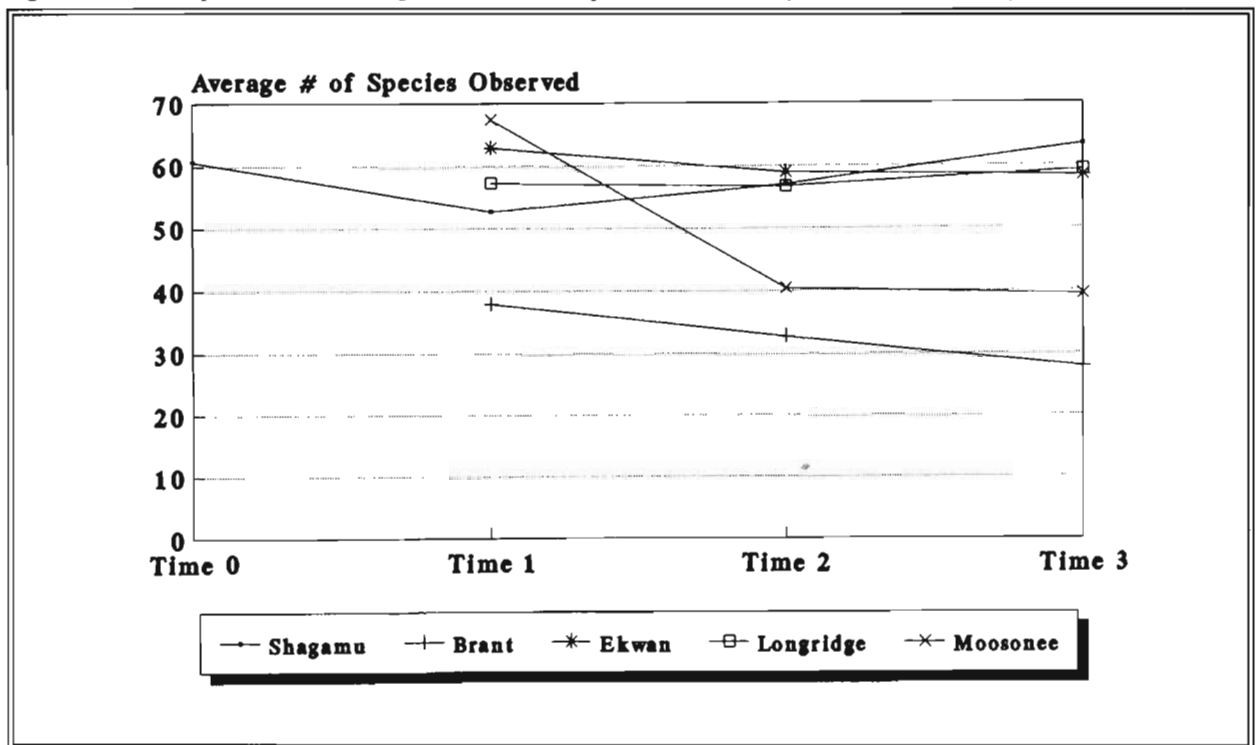
All sites were found to have distinct assemblages of bird groups over study times and between sites, confirming the physiognomic differences in the study sites selected and the seasonal differences in use. The coastal locations were more important than inland areas for migrant species (Morrison and Harrington 1979, Thomas and Prevett 1982). Passerine group proportions were better represented at sites further inland from the actual coast, where habitats restricted site use by the waterbird and shorebird groups to varying degrees.

Number of Bird Species:

The number of species observed between sites and time periods was investigated to determine if sites hosted different numbers of species during comparable time periods and during different time periods (Fig. 16). Seasonal investigation on a site by site basis uncovered significant differences in the number of species observed over the different time periods at both B and M (Appendix 1-Table C). The B site had significantly more species in time 1 than time 3, with time 2 not significantly different from either period. At M, significantly greater numbers of species were found in the first time period.

Analysis of sites by similar time periods yielded significant differences in the number of species observed at all sites within the same time frame (Appendix 1-Table D). During time 1, M had significantly more species than S or B while S, E, L and M had significantly more species than B. In the second time period, S, E and L had significantly more species than M or B. During the final time period (time 3), S, E and L had significantly more species than M which in turn had a significantly greater number of species than B.

Fig. 16. A site comparison of the average number of bird species observed daily for each study time period.



The sites with the greater diversity of habitats (S, E, L) showed no significant differences in the number of species over the different study periods. The forested areas at S, E and L were more isolated (ie. beach ridge formations) and thus the forest bird species were more concentrated and easier to observe daily; reduction in song activity had little impact on forest species recorded. In general, these coastal locations held the highest number of species on a seasonal basis, which

would be expected from sites showing greater habitat diversity.

The higher number of species found in time 1 over 2 and 3 at M is indicative of the dense forest habitat surveyed, as passerines represented the largest group of birds at this site. This coverage was during the breeding season, when bird identification by song was optimal. Decreased song activity during the rest of the M times made identification by sight more important. Some visibility difficulties were encountered in the extensive forest habitats of M once leaf-out had occurred. In addition, the end of the spring migration was documented during M's time 1 for some shorebird species (Ruddy Turnstone, Semipalmated Sandpiper, Dunlin, Short-billed Dowitcher).

The lowest number of species recorded for any site was at the B location, reflecting the less diverse habitat of inland, open tundra with many waterbodies. The B site had significantly higher species counts for time 1 than for time 3. Possible explanations for this include: 1) a fire which pushed several forest bird species (Eastern Kingbird, Tennessee Warbler, Chipping Sparrow, Red-winged Blackbird, Pine Grosbeak, White-winged Crossbill) onto the tundra habitat of B during time 1, 2) spring migrants (Tree Swallow, Barn Swallow) searching for possible nesting locations, and 3) reduced song activity of the more secretive species during the final time period (LeConte's Sparrow, Sharp-tailed Sparrow).

Interestingly, the highest number of species observed across the study sites during time 1 was at M, indicative of the value of the inland forested areas as bird habitat, the townsite attracted species, and the collective nature of the major river corridors during migration. In subsequent time periods, the number of bird species found at M were lower than S, E and L, which was expected due to the less diverse nature of the habitats surveyed. The diverse habitats at S, E and L showed the highest and fairly constant number of species which used the area during all studied seasons. In all time periods, B had the fewest bird species documented, reflecting less habitat diversity and the comparative absence of three dimensional structure (ie. trees) in this open tundra habitat.

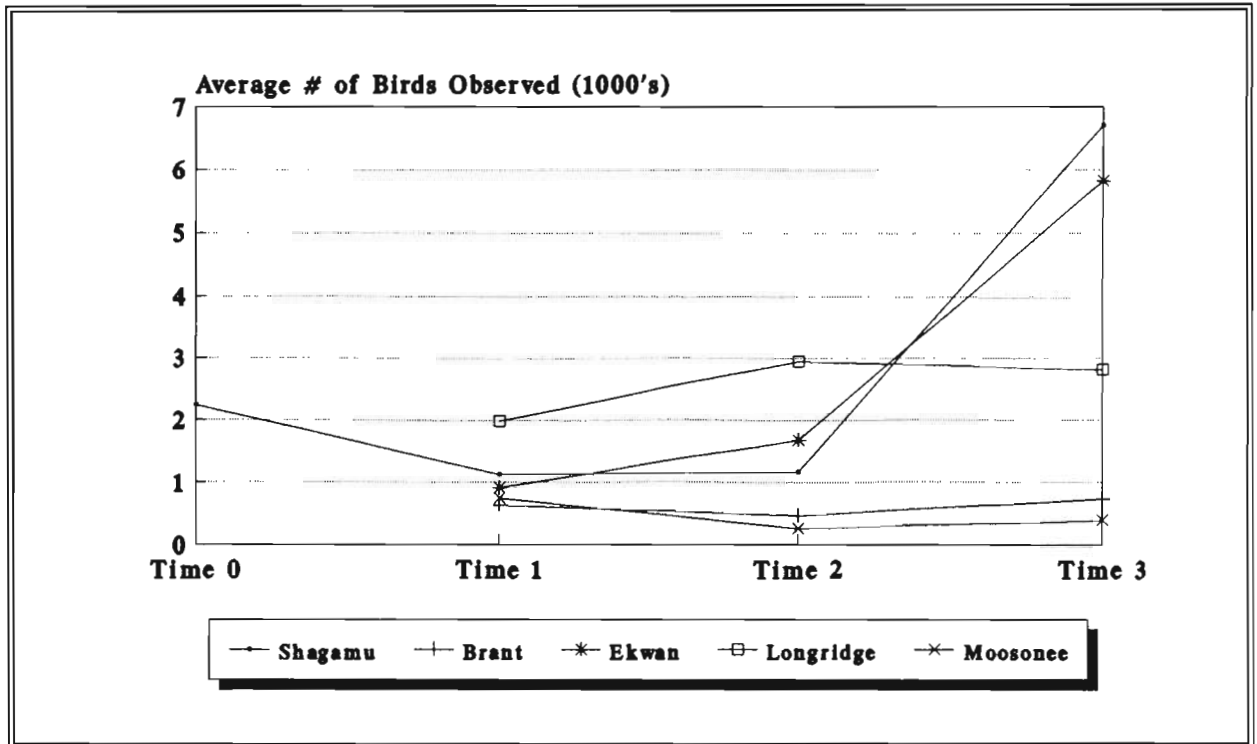
Number of Birds:

Statistical tests were performed to investigate differences in the overall number of birds observed at each site and time period (Fig. 17). Significant differences in the numbers of birds observed over different time periods were found at the S, E and M sites (Appendix 1-Table E). Time 3 at S held significantly greater numbers of birds than times 0, 1 or 2. At E, time 3 had significantly more birds than either time 1 or 2. At M, time 1 had significantly greater numbers of birds than time 2; however, neither differed significantly from time 3.

Analysis of between site differences in the numbers of birds observed during corresponding time periods found significant differences between sites for all study times (Appendix 1-Table F). During the first time period, L had significantly higher bird numbers than the rest of the study sites. In the second time period, L again had significantly higher numbers than the other sites,

and E had significantly higher numbers than either B or M. For the final time period, S had significantly higher numbers of birds than L, B and M, but was not significantly different from the numbers found at E. Numbers at E were significantly higher than those at B and M in time 3.

Fig. 17. A site comparison of the average number of birds observed daily for each study time period.



The sites studied within the same year have shown similar trends, confirming the seasonal variability of events from year to year. The greater number of birds at S in time 0 over times 1 and 2 is indicative of the spring migration. Similar trends were observed at S and E during times 1, 2 and 3, with significantly greater numbers in time 3, demonstrating that this time period recorded a great number of fall migrants. At the B, L and M sites, numbers of birds remained fairly constant between time periods, suggesting that a similar migration composition was not observed in the 1991 study sites. It is interesting that there was little difference in numbers observed between S, B, E and M in time 1, which corresponded generally to the breeding seasons for birds in these areas.

We would expect that numbers of migrating birds would be greater at the coastal locations and less at the two inland sites, given the proportion of waterbirds and shorebirds in the site totals (see *Bird Group Assemblages*) and the vast food resources for these groups being located primarily in the coastal mudflats, salt marshes and freshwater marshes. The inland site locations (B and M) showed the lowest numbers of birds, particularly in time 3, which corresponded to the fall migration of most bird groups. No significant increase in numbers was noted in times 2 or 3 at these inland sites, suggesting an insignificant passage of migrant waterbirds and

shorebirds at these locations.

The greatest number of birds in time 1 and 2 were found at L, perhaps due to the physical structure of the site and the extensive salt marshes and mudflats associated with Longridge Point. L time 1 numbers were directly influenced by the large flocks of Black Scoters, moult migrant Canada Geese and some northward shorebird migrants. In time 3, both S and E bird numbers increased significantly, showing that the fall migration was well in progress. We would expect that time 3 numbers at Longridge would correspond with the numbers found at the other coastal sites given the same conditions. The fall shorebird migration composition captured at L was somewhat different than the preceding year (1990), with a greater surge of migrant shorebirds showing up in time 2 than time 3. The S and E sites showed a more equal distribution of shorebird migrants for time 2 and 3, with an inclination towards higher numbers in time 3 (Appendix 4).

Similar trends within study years underscores the variability in the phenology of events for which the HBL is utilized. The coastal locations (S,E,L) were of great importance to large numbers of migrant bird species. The L site recorded the largest number of birds during the breeding season; all other sites had similar numbers of birds during time 1. The lowest numbers of birds were found at the inland study locations of B and M.

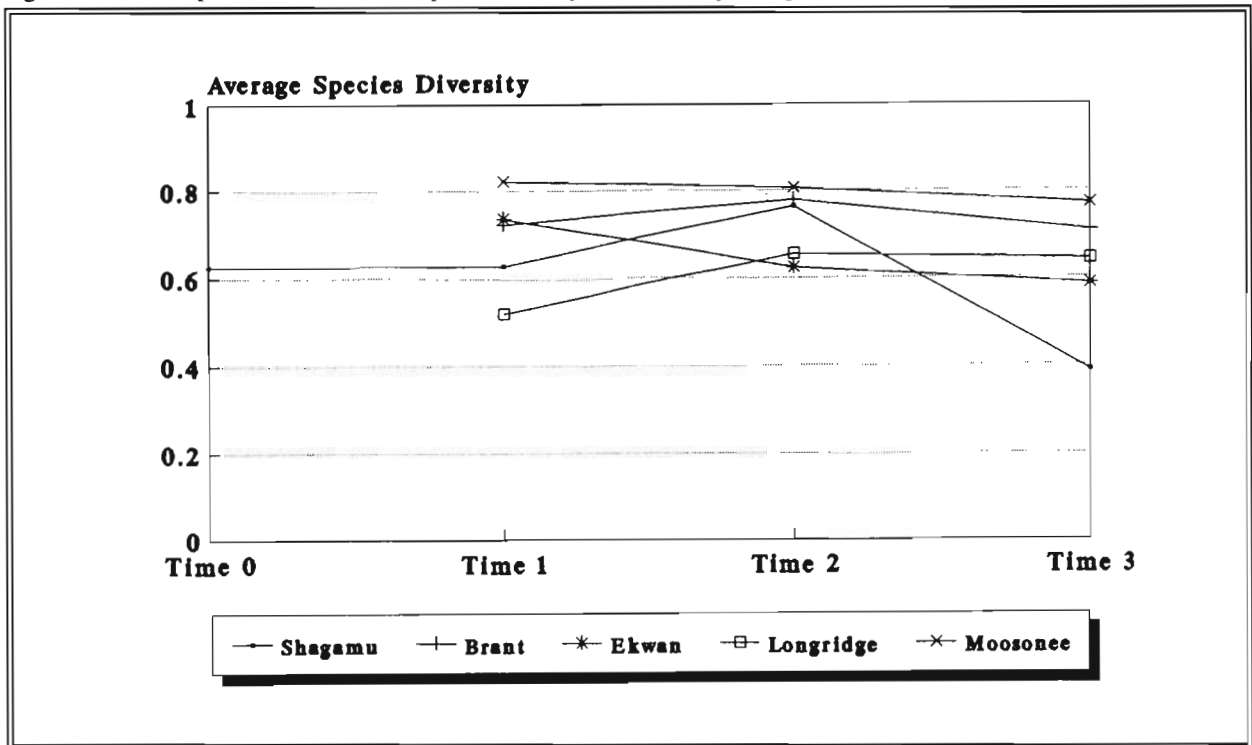
Species Diversity:

To explore the relationship between the number of species and the numbers of each species, the concept of diversity (the distribution of observations among categories) was investigated (Fig. 18). Observations which are distributed evenly among species would result in a high diversity index, while a low diversity index would result if observations were distributed mostly among a few species.

Significant differences in the species diversity index between time periods were noted for the S, E and L sites (Appendix 1-Table G). Diversity of species at S was significantly greater at time 2 than the rest of the time periods and the diversity indices for times 0 and 1 were significantly greater than time 3. At E, species diversity during time 1 was significantly greater than times 2 or 3, while at L, species diversity for time 1 was significantly less during times 2 and 3.

Analysis of between site differences in the species diversity index during corresponding time periods found significant differences between sites for all study times (Appendix 1-Table H). In time 1, M had significantly greater species diversity than both S and L, with E and B not varying significantly from either M or S but having greater diversity than L. During time 2, M, B and S had significantly greater species diversity than both L and E. Time 3 had a significantly greater species diversity at M when compared with L, E and S, with B not being significantly different from M or L but with greater diversity than E and S. All of the sites (M, B, L, E) had significantly higher species diversity than that found at S during time 3.

Fig. 18. A site comparison of the relative species diversity for each study time period.



The inland locations of B and M showed no differences in diversity for the time periods studied. Lower diversity indices could be expected if large numbers of a few migrant species were documented, which was not the case at these two inland sites. Interestingly, these two sites recorded the highest overall species diversities.

The two James Bay sites (E and L) had similar diversities for times 2 and 3. These diversities were lower than at B and M due to several abundant migrant species recorded during these times. The higher diversities in time 1 at E (similar to B and M) would indicate the absence of large numbers of migrant species and a fairly even representation of species which utilize this area, as could be expected during the breeding season. The lower species diversity at L in time 1 would indicate that a few species were represented to a greater extent than others (Black Scotermoulting flocks, giant Canada Geese-moult migrants, Ruddy Turnstone-late spring migrants, Black-Bellied Plover-late spring migrants).

At S, the highest diversity was found in time 2 with summer residents predominating and the lowest diversity was found in time 3 during fall migration for a few species (Snow Goose, Canada Goose, Pectoral Sandpiper, Hudsonian Godwit, Semipalmated Sandpiper); however, the passage of Snow Geese during this final session had the greatest effect in reducing the species diversity index. Time 3 at E did not notice the drop in species diversity which was documented at S, indicating a more even distribution in numbers of abundant migrant birds.

Species Accounts

During the two field seasons for this project, 197 species of birds were recorded. We have presented the results (graphic and tabular) and discussion by species following the order of the American Ornithologist's Union *Check-list of North American Birds* (1983) and its supplements (AOU 1985, AOU 1989). Graphs and tables have not been assigned numbers in this section, but have been placed beside each species account. Data are always presented from the Shagamu site to the Moosonee site, representing the transition from north to south along the coast. Several additional abbreviations are used throughout this section: HB - Hudson Bay, JB - James Bay, ED - Egg Dates and CD - Chick Dates. Months have been abbreviated to the first three letters for simplicity in these accounts. Locations and land form features documented in these accounts can be referenced to Fig. 1 and/or Fig. 19.

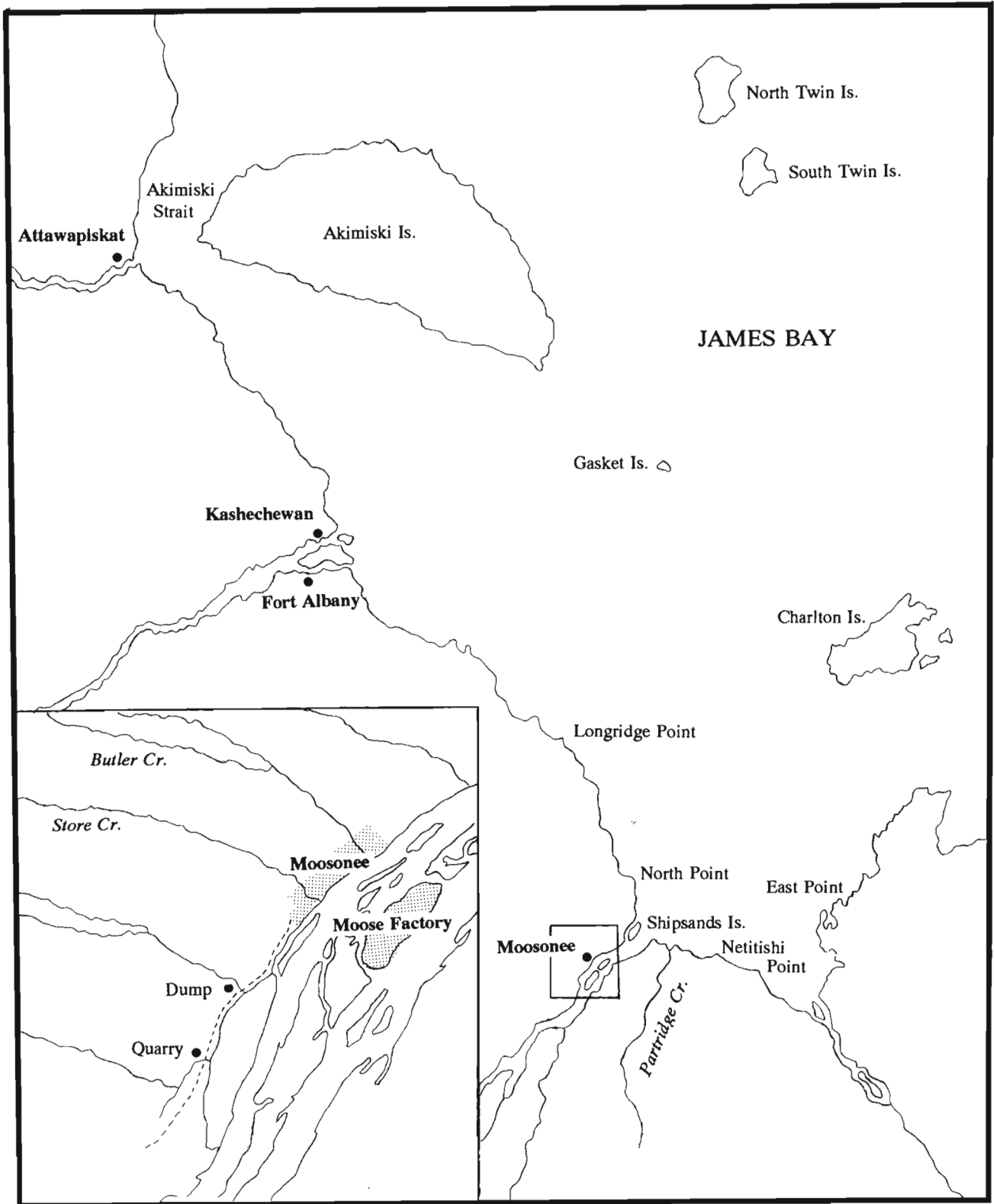
Graphs present the average number of each bird species observed per day for each time period, so that a site by site comparison could be made. The lowest graph scale shows up to a maximum number of five (5) birds per day. Changes in scale will be noted when grid lines appear within the graph. These grid lines represent units of five birds per day unless otherwise noted on the top right corner of the graph. Numbers in brackets here represent the size of the grid unit. For example, a graph with (2X) in the top corner would indicate that each grid unit would equal 10 birds per day [2 X 5]. Similarly, the following examples apply: a (10X) grid would equal 50 birds and a (20X) grid would equal 100 birds. This has been done so that comparison between species would be facilitated.

Tabular data have been presented to expand on the information provided by the graphs. Blank cells indicate zero sightings. The fractional numbers indicate the number of days the species was observed out of the total possible study days for that site and time period. The bracketed numbers indicate the highest daily count for that species. Egg dates (ED) and chick dates (CD) are provided from records documented during this study. The dates are not all encompassing and represent only the days that definitive observations were made. As the sites were not covered during the entire breeding season, data on nesting are lacking. Other project objectives did not permit time for extensive nest searching at any site.

Throughout the text, several terms have been used which need further clarification. For this study, the term "breeds" means that a nest was found or dependent young were observed. A "high count" is the highest count documented for that particular species. An "unusual high" is stated when a high count is well above the other numbers observed for that species. "Chick Dates" indicate dates when chicks which were under parental care were observed, including those in or near the nest.

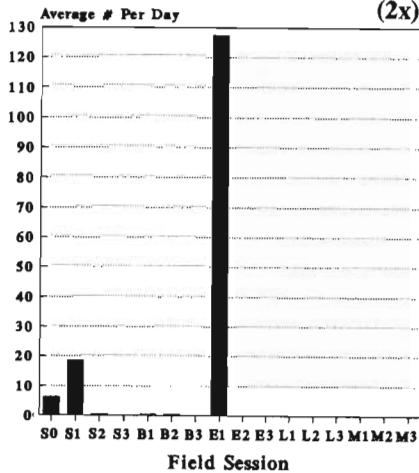
Data presented represent point-in-time study; thus, are influenced by such factors as area coverage, weather and cyclic prey abundance. Whenever possible, these influences have been noted.

Fig. 6. Southern James Bay area showing some of the locations and land form features identified within the Species Accounts.



Red-throated Loon

(2x)



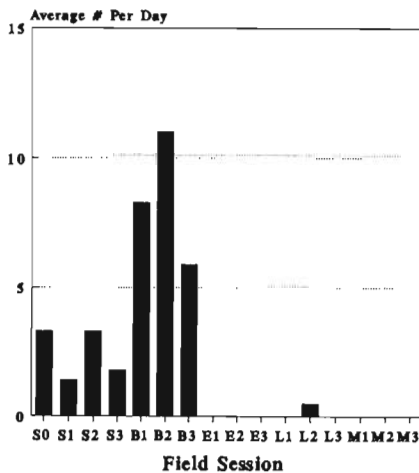
RTLO

Gavia stellata

This species was reported from the three northern sites. At S, westbound migrants were recorded along the coast from late May until late Jun. In addition, 90 small loons moving west at S on 1 Jun were believed to be this species. The few birds reported in mid Jul may be failed breeders or non-breeding individuals. Spring migrants were not observed at B, probably due to the inland location of the study area, but several individuals observed in small ponds near the coast in Jun and Jul suggest that breeding was a possibility. All known breeding records on the Ontario HB coast have been from similar habitat near Cape Henrietta Maria (Peck and James 1983, Peck in Cadman et al. 1987). Large numbers recorded at E in Jun represent spring migrants passing through the strait between Akimiski Island and the mainland. On the first three days of the Jun session alone, over 400 birds were seen moving north.

RTLO	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	4/13 (40)				
1	6/8 (75)	1/12 (3)	6/9 (400)		
2	2/8 (2)	2/10 (2)			
3					

Pacific Loon



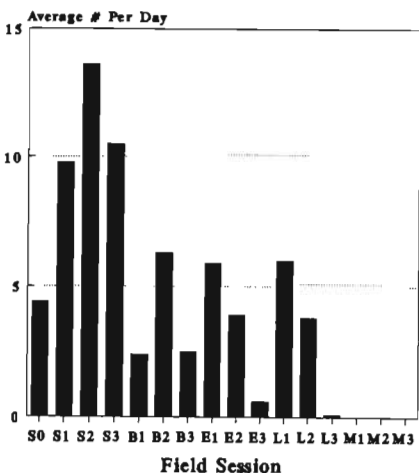
PALO

Gavia pacifica

Along the HB coast, Pacific Loons were found at both sites. While some migrants were noted on HB, most sightings pertained to nesting pairs, particularly at B, where coastal observations were minimal. Most surprising were observations of two birds flying inland at L on 27 and 29 Jul. While considerably further south than the nearest known nesting site, potential breeding here should not be discounted since Manning (1952) also recorded two just south of L on 13 Jun 1947. There are very few records for this species in southern JB.

PALO	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	8/13 (24)				
1	7/8 (2)	12/12 (22)			
2	8/8 (6)	10/10 (18)		2/8 (2)	
3	8/11 (5)	11/12 (12)			
ED	25 June	19-22 June			
CD		10 July			

Common Loon



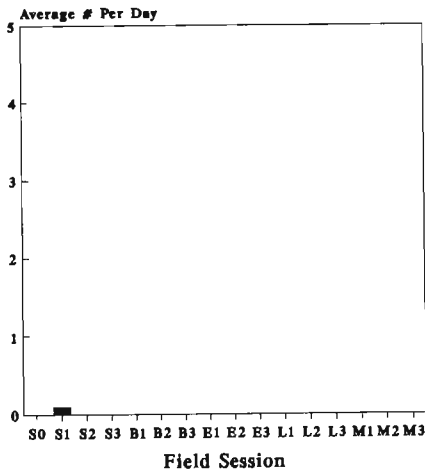
COLO

Gavia immer

This species was found at all coastal localities. Several pairs bred at S, one of the few areas on the immediate coast in Ontario where this species nests sympatrically with the Pacific Loon. The majority of birds were migrants; however, Jul and early Aug sightings refer to foraging breeders from inland nest sites or unmated and/or failed breeders. The general fall-off in numbers during the latter sessions may have been a result of birds leaving to concentrate on lakes or the bay, before actually leaving the Lowland.

COLO	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	13/13 (7)				
1	8/8 (25)	10/12 (7)	8/9 (20)	11/11 (11)	
2	8/8 (20)	9/10 (13)	9/10 (10)	8/8 (7)	
3	11/11 (25)	9/12 (6)	4/11 (3)	1/10 (1)	
ED	22-23 June				

Horned Grebe



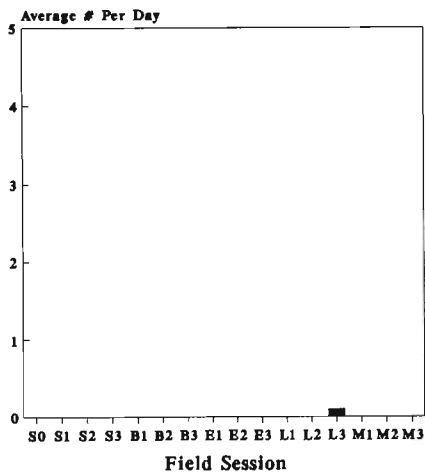
HOGR

Podiceps auritus

The only observation during the study was of a bird in breeding plumage on HB at S on 28 Jun 1990. One pair bred at Fort Severn during the Atlas study (Eagles in Cadman et al. 1987) and small numbers breed at Churchill, Manitoba (Chartier 1988) - so it is conceivable that breeding may occur near S. This sighting date would suggest either a failed breeder or an unmated individual, rather than a migrant. Horned Grebes are very scarce, but annual migrants along coastal regions of the HBL do occur.

HOGR	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1	1/8 (1)				
2					
3					

Red-necked Grebe



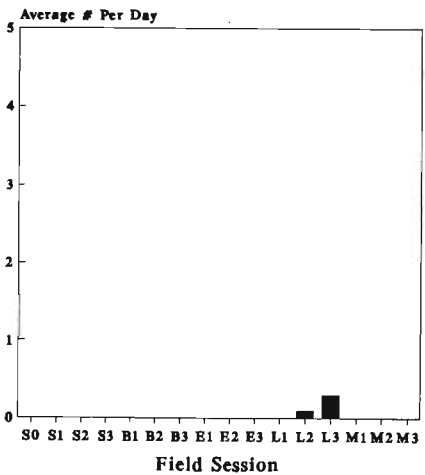
RNGR

Podiceps grisegena

A migrant observed at L on 11 Sep was the only report for the study. This species is a rare but annual migrant in southern JB. The origin of these birds is unknown and there is no evidence that they have ever bred in the HBL.

RNGR	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					
2					
3				L/10 (1)	

Double-crested Cormorant



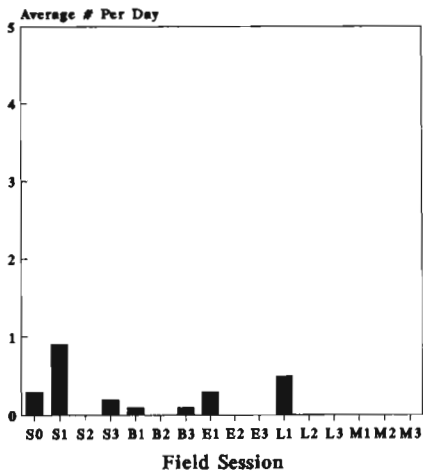
DCCO

Phalacrocorax auritus

One adult on 1 Aug and three birds on 5 Sep, all at L, were the only reports from our study. Additionally, observations unrelated to this study revealed that small numbers were seen on the Moose River during May and Jun 1991. This species has been known to breed in JB at an island colony off Wemindjy (formerly Eastmain), Quebec since 1912 (Lewis and Peters 1941). In 1937, the colony was carefully censused and 105 active nests were found (East 1938). Sometime afterwards, the colony was deserted and cormorants became quite rare in JB. Over the past two decades this species has not been reported on an annual basis but in the past two years, sightings have increased dramatically, suggesting that the birds may have once again started breeding in the region. This increase is presumably part of the greater expansion of cormorants over the past decade on the Great Lakes (Weseloh et al. 1988). While this species may become numerous, they remain vulnerable if breeding is restricted to only one or two nest sites.

DCCO	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					
2				1/8 (1)	
3				L/10 (3)	

American Bittern



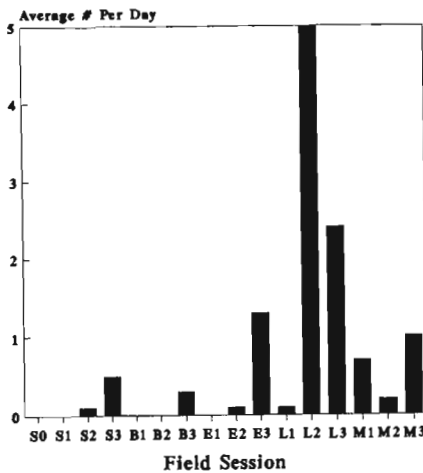
AMBI

Bitterns were found at all coastal sites. At S, a few were occasionally located in all but the Jul session. Singles at B on 26 Jun and 28 Aug were the only reports from this site. A few single birds were located at E, but only in the first session, and at L up to two were heard calling in the first session but, like E, were not recorded afterwards. It seems likely that one or two pairs were breeding at all sites but were difficult to locate once calling had stopped. The American Bittern was given probable or confirmed breeding status in most coastal squares during the Atlas project (Bucknell *in* Cadman et al. 1987).

AMBI	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	4/13 (1)				
1	5/8 (2)	1/12 (1)	3/9 (1)	5/11 (2)	
2					
3	2/11 (1)	1/12 (1)			

Botaurus lentiginosus

Great Blue Heron



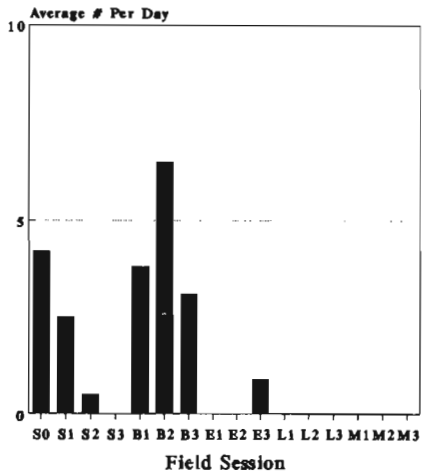
GTBH

This species, which reaches its northern limit in the HBL, was reported at all study sites. Singles were reported at S on 11 Jul and 20 Aug and two were seen there from 21-22 Aug. At B, one was observed on 23, 25 and 27 Aug. One on 29 Jul was the first E sighting and they were regular between 4-10 Sep, with up to three there on 9 Sep. These S, B and E birds likely represent post-breeding wanderers. One on 11 Jun at L was the only report from the first session. The second L session produced unexpected numbers. Two were recorded on 27 Jul, one on 28 Jul, five on 29 Jul, three on 31 Jul, 25 on 1 Aug and four on 2 Aug. From one to two birds were seen during each M period. The observation of 25 from L consisted of birds passing over in small groups, and is an unprecedented number for the HBL. This species apparently nested in 1990 at Partridge Creek (Dave Fletcher pers. com.) and, with numbers such as those from L, it seems likely that this species may be nesting more frequently in the HBL than was previously thought.

GTBH	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1				1/11 (1)	1/3 (2)
2	1/8 (1)		1/10 (1)	6/8 (25)	1/5 (1)
3	3/11 (2)	3/12 (1)	7/11 (3)	5/10 (6)	3/3 (1)

Ardea herodias

Tundra Swan



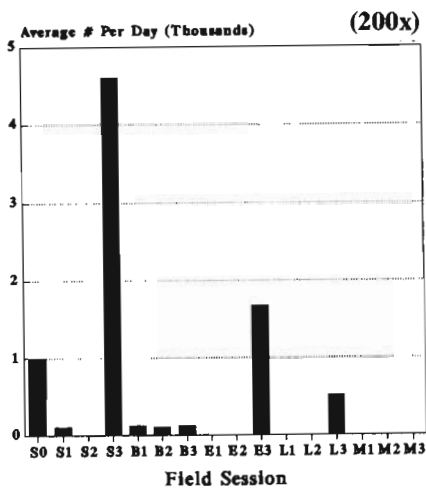
TUSW

Small numbers were recorded regularly at both HB sites, and most sightings likely refer to birds nesting nearby. A pair were observed at a nest at B but the contents of the nest could not be determined. This B nest site was revisited on 13 Jul and two adult swans with four cygnets were observed. Tundra Swan breeding has increased dramatically over the past 20 years along the tundra belt of Ontario (Lumsden *in* Cadman et al. 1987, OMNR files). Fall migrants were documented at E, with eight on 6 Sep and two on 7 Sep.

TUSW	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	12/13 (8)				
1	7/8 (4)	9/12 (9)			
2	2/8 (2)	10/10 (14)			
3		9/12 (9)	2/11 (8)		

Cygnus columbianus

Snow Goose



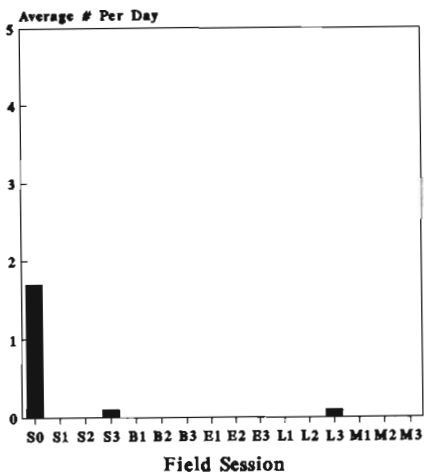
SNGO

This species is an abundant migrant and locally abundant breeding bird on the HB coast; thus, large numbers recorded during the early and late sessions at S and B were not surprising. Presumably, the main spring flight had already passed E, since only small numbers were recorded there. At S, breeding birds were present but not common, however at B, much larger numbers bred near the coast at the seldom visited north-east corner of the study area. By late Jun, some geese had brought their goslings to the large lakes south of camp, approximately 8 km inland. Small numbers, presumably failed breeders or unmated birds, began appearing at E by early Aug. The most interesting Snow Goose record involved a nesting pair discovered at L on 6 Jun 1991. Unfortunately, this nest was depredated the next day but eggshell fragments were saved and have been deposited in the ROM. The two adults, both blue phase birds, are likely the same pair that were banded with flightless young in 1990 at the same site (Robert Stitt, pers. com.). This is the southern most nesting ever reported for Snow Goose. Full details of this interesting find will be published elsewhere.

Chen caerulescens

SNGO	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	13/13 (4000)				
1	8/8 (380)	8/12 (1000)	2/9 (16)	2/11 (2)	
2	2/8 (5)	10/10 (462)	2/10 (12)		
3	11/11 (15000)	12/12 (225)	11/11 (6000)	10/10 (1500)	
ED	29 May-3 June			6 June	
CD	21 June				

Ross' Goose



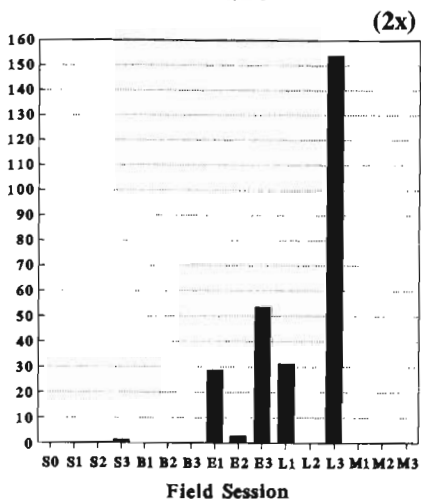
ROGO

The Ross' Goose has been steadily expanding its breeding range south-east along the HB coast since the early 1960s (Prevett in Cadman et al. 1987). The first Ontario nesting was recorded in the Snow goose colony near the Brant River mouth in 1975 (Prevett and Johnson 1977). In 1984, it was discovered nesting as far south as Akimiski Island (Prevett in Cadman et al. 1987). During the study sessions, small numbers of Ross' Geese were observed with the large flocks of migrant Snow Geese at S. In addition, this species was reported, again with migrant Snow Geese, at both S and B during camp set-up in mid May. On 7 Sep, an immature white phase bird was noted in passage at L. Ross' Geese are rare but annual migrants in southern JB.

Chen rossii

ROGO	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	11/13 (6)				
1					
2					
3	1/11 (1)			1/10 (1)	

Brant



BRAN

The Brant is primarily a coastal migrant, with most of the eastern population passing through JB in the spring and fall (Bellrose 1976). No spring migrants were noted at S, despite sessions coinciding with peak migration, suggesting that most of the population may move north across HB, rather than taking a westerly route along the coast. It is a rare spring migrant at Churchill, giving some support for this possibility. A single bird, observed on HB at S on 15 Jul, probably represented an unmated bird. Brant were not recorded during any session at B, probably due to the sites' inland location. Small numbers were moving north at E until 19 Jun. E observations of 18 on 29 Jul and 9 the following day were likely unmated or failed breeders. By the last session, migrants had begun to move south. At L, small numbers were observed

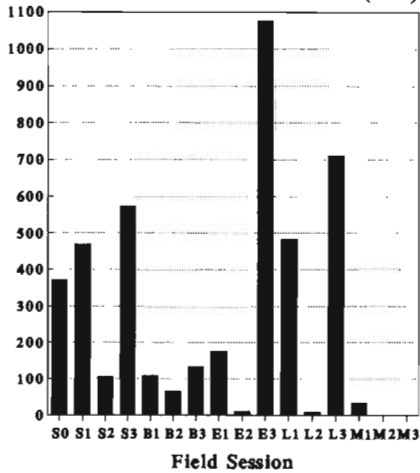
Branta bernicla

moving north in the first session, primarily on two days, and returning birds were seen in moderate numbers during the last session.

BRAN	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1			5/9 (120)	6/11 (238)	
2	1/8 (1)		2/10 (18)		
3	2/11 (10)		9/11 (300)	8/10 (500)	

Canada Goose

(20x)



CAGO

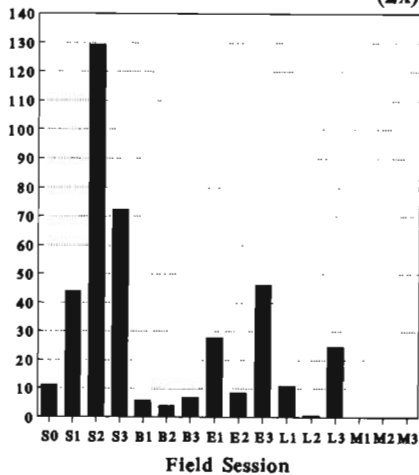
Branta canadensis

This species was reported from all sites. At S, it was a common breeder, with numerous migrants noted in all but the Jul session. It bred commonly at B as well, but migrants were less obvious, perhaps due to the site's inland location. At E, it was common in the first session but most were migrants and only one nest was found. By the final session numbers had increased dramatically. At L, none were found breeding and the vast majority of birds from the first session were moult-migrants that were feeding on the extensive flats. Birds were very scarce in Jul but fall migrants had arrived by the final session. At M, 102 birds noted on two dates in early Jun were believed to be moult-migrants. Two birds on 3 Sep, the only other M report, were fall migrants.

CAGO	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	13/13 (1200)				
1	8/8 (600)	12/12 (300)	9/9 (992)	11/11 (1775)	2/3 (100)
2	8/8 (300)	10/10 (165)	5/10 (33)	4/8 (60)	
3	11/11 (950)	12/12 (310)	11/11 (4000)	10/10 (1800)	1/3 (2)
ED		17-21 June	14 June		
CD		19 June			

Green-winged Teal

(2x)



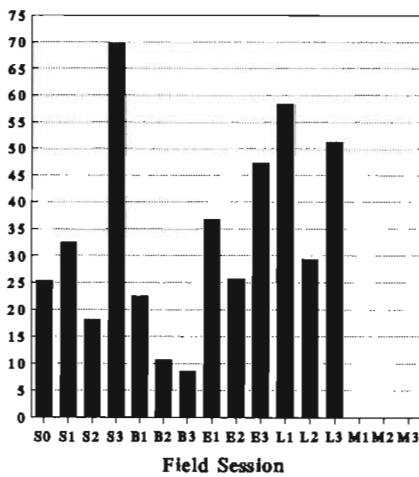
GWTE

Anas crecca

Green-winged Teals were most common at S, where they were documented regularly. Most birds appeared to be migrants or staging males, but small numbers bred there as well. Green-winged Teal were much scarcer at B and, again, sightings are believed to pertain to staging males found in the duck flocks on the large lakes south of camp. No evidence of breeding was found here but it is possible that a small number might nest in the general area. It was primarily a migrant at E but one instance of breeding was documented. Small numbers of birds were noted at L in the first and third sessions, but was only noted on two occasions during Jul, suggesting that breeding here is rare if it occurs at all. One bird on 23 Jul was the only report from M. The Green-winged Teal is one of the most common migrants in the HBL, particularly in the fall, but peak numbers do not occur until Oct, which was past the study period.

GWTE	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	13/13 (35)				
1	8/8 (80)	7/12 (32)	9/9 (110)	10/11 (46)	
2	7/8 (370)	4/10 (30)	10/10 (19)	3/8 (2)	1/5 (1)
3	10/11 (280)	6/12 (29)	11/11 (90)	9/10 (60)	
ED	6-8 June				
CD			2 August		

American Black Duck



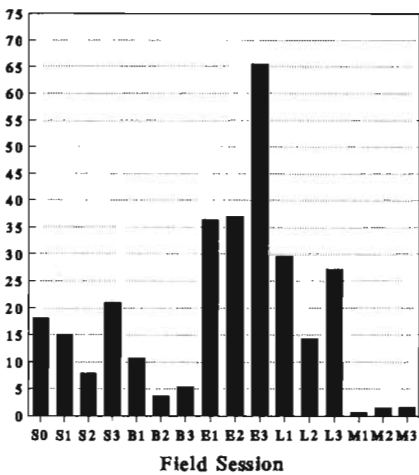
ABDU

At S, this species was common, particularly in the final period. No evidence of nesting was found and most birds were thought to be post-breeding or non-breeding individuals. At B, they were present, but not numerous, with the high count being 75 on 26 Jun and no evidence of breeding was found. At E and L, Blacks were a common migrant and summering bird but, again no breeding evidence was found. While nesting could be expected at virtually all sites, most summer reports seem to involve post-breeding birds or staging males.

ABDU	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	13/13 (105)				
1	8/8 (45)	12/12 (75)	9/9 (75)	11/11 (225)	
2	7/8 (50)	10/10 (27)	10/10 (70)	7/8 (90)	
3	11/11 (160)	12/12 (21)	11/11 (150)	10/10 (150)	

Anas rubripes

Mallard



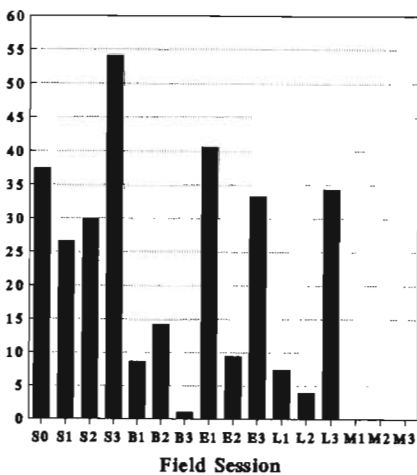
MALL

Mallards were scarce along the north coast, especially on the open tundra at B, with most sightings pertaining to small groups of males. Along the JB coast, it was more frequent, but again, most sightings were of groups of males or migrants. Small numbers were observed during all three sessions away from the coast at M. No evidence of nesting was found at any site, although breeding probably occurs, given the past records along most of the coast (Peck and James 1983, Sandilands *in* Cadman et al. 1987).

MALL	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	13/13 (80)				
1	8/8 (25)	11/12 (38)	9/9 (75)	11/11 (60)	2/3 (1)
2	8/8 (12)	8/10 (7)	10/10 (90)	8/8 (40)	2/5 (4)
3	10/11 (40)	9/12 (14)	11/11 (250)	10/10 (80)	2/3 (4)

Anas platyrhynchos

Northern Pintail



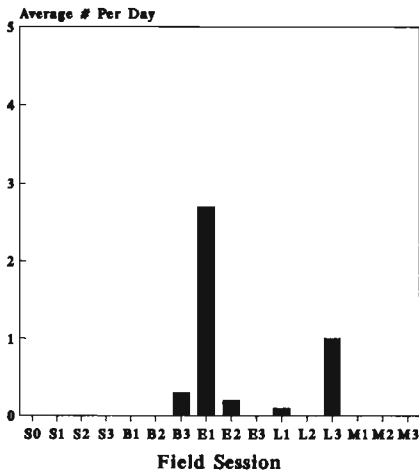
NOPI

Pintails were recorded commonly during migration at S, but few bred there. They were less common at B, again possibly a result of the tundra environment. While no solid evidence of nesting was found, several females exhibited distraction displays, suggesting that breeding may have occurred at B as well. The small number of fall migrants observed at B may be due to the site's inland location, as Pintails prefer the coast during fall migration. Both E and L recorded good numbers of migrants and smaller numbers during the nesting period. While no direct evidence of breeding was found, this seems likely, as the species has been confirmed or suspected of breeding along the entire HBL coast (Sandilands *in* Cadman et al. 1987). No Pintails were observed inland at M.

NOPI	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	13/13 (70)				
1	8/8 (45)	10/12 (36)	9/9 (110)	11/11 (30)	
2	7/8 (75)	9/10 (91)	9/10 (20)	4/8 (25)	
3	11/11 (130)	3/12 (7)	11/11 (100)	9/10 (125)	
ED	8-23 June				

Anas acuta

Blue-winged Teal



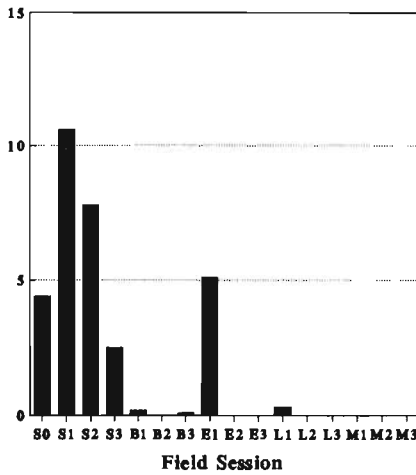
BWTE

Anas discors

Blue-winged Teals are scarce in the HBL and our data reflects this fact. None were reported at S or M. Three birds, probably migrants, on 24 Aug were the only reports from B. During the first E session, they were recorded regularly in small numbers but a moulting male on 27-28 Jul was the only other E sighting. One on 9 Jun was the only spring report from L, and 10 more were seen during the last session between 6-12 Sep. No evidence of breeding was found, although breeding has previously been established at several sites along the coast (Ross in Cadman et al. 1987).

BWTE	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1			8/9 (6)	1/11 (1)	
2			2/10 (1)		
3		1/12 (3)		3/10 (6)	

Northern Shoveler



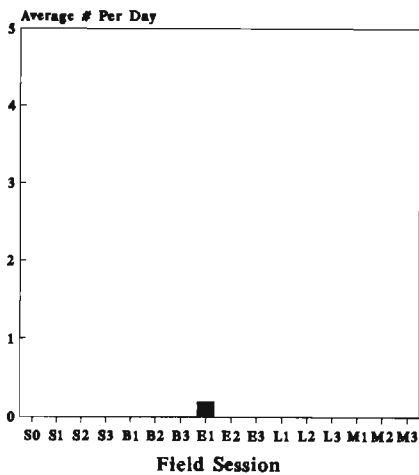
NSHO

Anas clypeata

Breeding shovelers were regular at S and one nest was found. On the inland tundra at B only 3 birds were found, two males on 27 Jun and one on 23 Aug and there was no suggestion of breeding. Small numbers, presumably migrants and staging males, were recorded at E during the first session but not afterwards. At L, the only reports were of migrants; a single on 5 Jun and two on 11 Jun. Ross and North (1983) described the first proven breeding of this species in the HBL, when females with flightless young were found near the mouth of the Shagamu River - approximately 5 km west of our site.

NSHO	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	9/13 (12)				
1	7/8 (25)	1/12 (2)	9/9 (12)	2/11 (2)	
2	2/8 (55)				
3	2/11 (25)	1/12 (1)			
ED	28 June				

Eurasian Wigeon



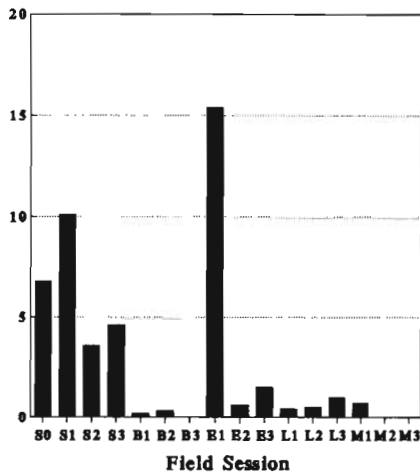
EUWI

Anas penelope

A male seen on 12 and 14 Jun at E was the first record for the Ontario portion of the HBL (Curry 1991), and one of only a handful for the entire HBL. Interestingly, another male was observed on 5 May 1991 at M (Bain 1992). It has occurred several times at Churchill, Manitoba and is an annual but rare migrant along the Great Lakes. Considering that American Wigeons, with which this species usually associates, are common in the region and given the relative lack of coverage the area receives, this species can probably be expected to occur within the HBL from time to time.

EUWI	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1			2/9 (1)		
2					
3					

American Wigeon



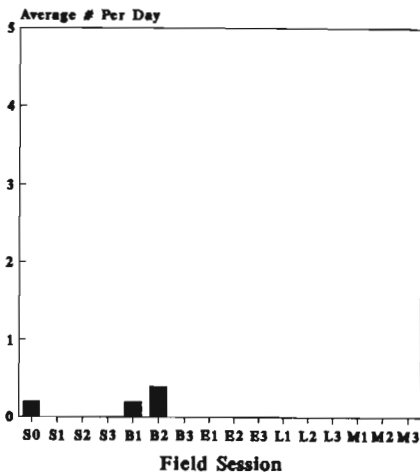
AMWI

Anas americana

The American Wigeon was found in moderate numbers during all sessions at S but was decidedly scarce on the inland tundra at B, with only two on 21 Jun and three on 17 Jul. Spring migrants were recorded at E during the first session. Six on 25 Jul was the only E report for summer. Small numbers of migrants began to appear during the final E session. A few were observed in each session at L, while two on 4 Jun, likely migrants, were the only birds seen away from the coast at M. While breeding records are known from both coasts (Sandilands in Cadman et al. 1987, Peck and James 1983), our study found no evidence of breeding at any site. If they breed regularly in the study areas, it is in low numbers.

AMWI	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	12/13 (12)				
1	7/8 (19)	1/12 (2)	9/9 (35)	2/11 (2)	1/3 (2)
2	3/8 (18)	1/10 (3)	1/10 (6)	1/8 (4)	
3	8/11 (20)		3/11 (9)	5/10 (3)	

Ring-necked Duck



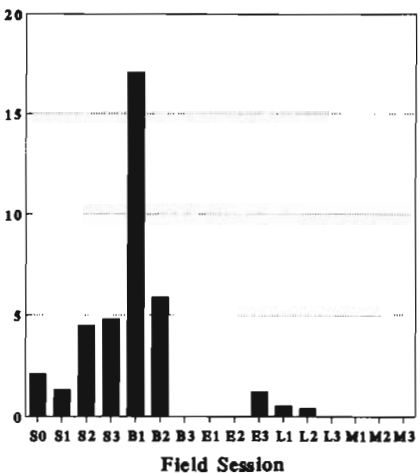
RNDU

Aythya collaris

This species is principally a duck of inland lakes and beaver ponds, so it is not surprising that it was very scarce on the coast. Our only records were two on 1 Jun at S, and 2 on 26 Jun and four on 17 Jul at B. These records likely pertained to failed breeders or staging males.

RNDU	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	1/13 (2)				
1		1/12 (2)			
2		1/10 (4)			
3					

Greater Scaup



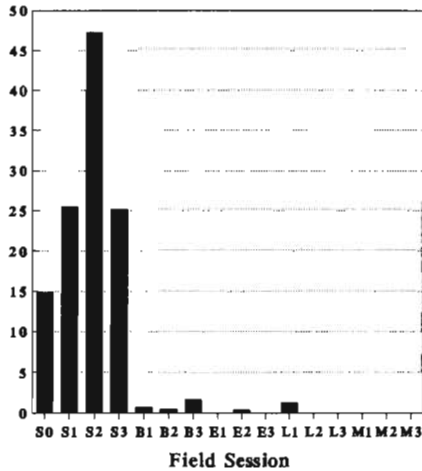
GRSC

Aythya marila

On the HB coast, this species was recorded in small numbers and breeding was confirmed at both sites. Although somewhat more common at B, the larger numbers reported during the first session were a result of staging males in the duck pond, rather than breeding individuals. A small number of migrants were found during the first session at E and L. Three birds on 1 Aug at L were likely early fall migrants.

GRSC	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	9/13 (5)				
1	4/8 (4)	10/12 (125)		2/11 (5)	
2	7/8 (11)	9/10 (15)		1/8 (3)	
3	6/11 (16)		2/11 (12)		
ED		11-12 July			
CD	21-29 August				

Lesser Scaup



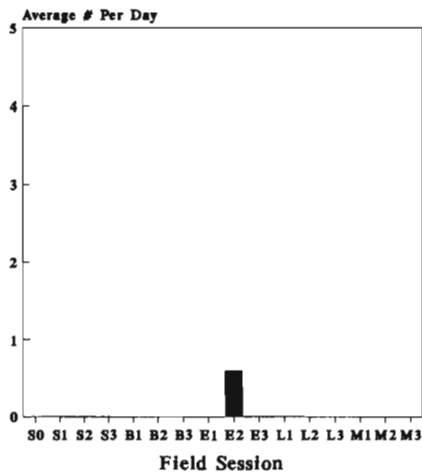
LESC

The Lesser Scaup was commonly found only at S. While some birds were staging males and non-breeding birds, two nests were located at S and others were likely present. The small number of birds reported during all sessions in the ponds at B were believed to be non-breeding individuals and staging males. Four on 29 Jul at E may have been non-breeders or early migrants while three on 7 Jun and 11 on 8 Jun at L were considered spring migrants.

Aythya affinis

LESC	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	13/13 (30)				
1	8/8 (55)	1/12 (8)		2/11 (11)	
2	7/8 (115)	3/10 (3)	1/10 (4)		
3	9/11 (90)	1/12 (20)			
ED	28 June				

Common Eider



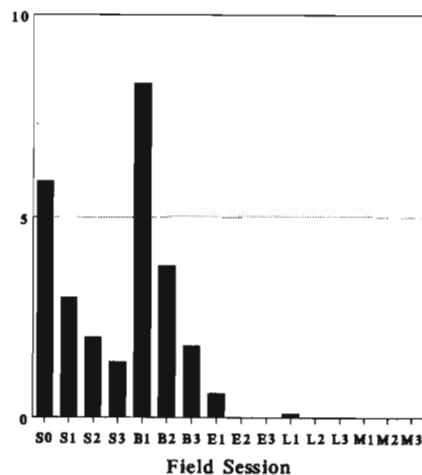
COEI

Six female eiders, believed to be of this species, were observed flying offshore at E on 29 Jul. While their identity cannot be established with certainty, large numbers of Common Eiders are known to nest both to the north and south of E on Bear Island and Gasket Shoal (Island), respectively (Manning and Coates 1952), whereas King Eiders are quite rare in this region during the breeding season.

Somateria mollissima

COEI	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					
2			1/10 (6)		
3					

Oldsquaw



OLDS

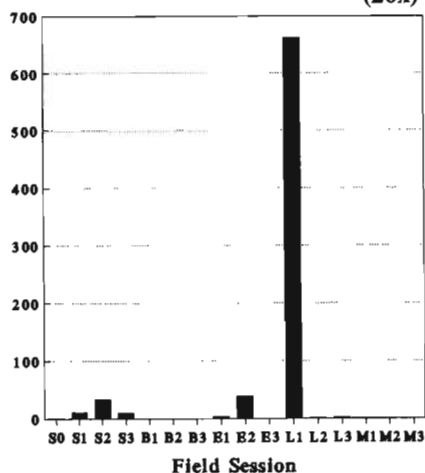
At S, Oldsquaws were documented throughout the study periods in small numbers. The higher number during the first S session was a result of spring migrants. Several pairs summered in ponds and were presumed to be nesting, although no proof was obtained. Oldsquaws were slightly more common at B, particularly during the first session, and were suspected of nesting but, again, no proof was obtained. The larger number in the first session at B were thought to be a result of high courtship activity, when birds are vocal and therefore more visible, rather than from migrants. The inability to confirm nesting at B may have been a result of early nest predation, eliminating the possibility of locating broods. Small mammal populations were almost non-existent (Knight in prep.) and many instances of nest predation by Arctic Fox were noted, particularly with Canada Geese and Willow Ptarmigan. Historically in Ontario, this species has been found breeding only in the Cape Henrietta Maria region and along the coast near the Manitoba boarder (Peck and James 1983, Hussell in Cadman et al. 1987). The few birds reported in time 1 at E and L were presumed to be spring migrants.

Clangula hyemalis

OLDS	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	11/13 (40)				
1	7/8 (8)	12/12 (18)	1/9 (5)	1/11 (1)	
2	7/8 (4)	9/10 (12)			
3	5/11 (3)	4/12 (11)			

Black Scoter

(20x)



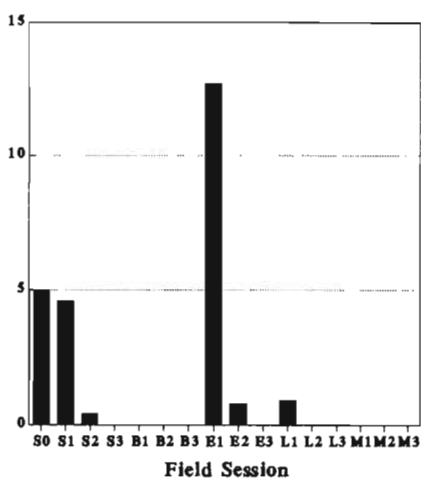
BLSC

Large concentrations of summering males and sub-adults occur regularly along the coast of James and HB although this species is not known to breed in Ontario (Ross 1983). Small groups were observed at S, with a high count of 90 birds on 28 Jun. None were recorded at B, probably due to the sites' inland location. A flock of 22 on 19 Jun and 10 the following day were the only records from the first session at E, but it was regular in moderate numbers during the last two sessions. Far and away the largest concentrations were found at L, but only in the first session. A careful estimate of the entire flock of staging birds revealed 2600 individuals, mostly males, on 8 Jun. This flock was present throughout the first session but, as it was several kilometres south of camp, was only surveyed in full once, so the actual graph index is artificially low. Interestingly, this group had dissipated to only a few birds by late Jul when the second session began and they remained scarce during the final session.

Melanitta nigra

BLSC	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	1/13 (15)				
1	1/8 (90)		2/9 (22)	11/11 (2600)	
2	6/8 (70)		5/10 (180)	2/8 (7)	
3	5/11 (40)		3/11 (4)	6/10 (10)	

Surf Scoter



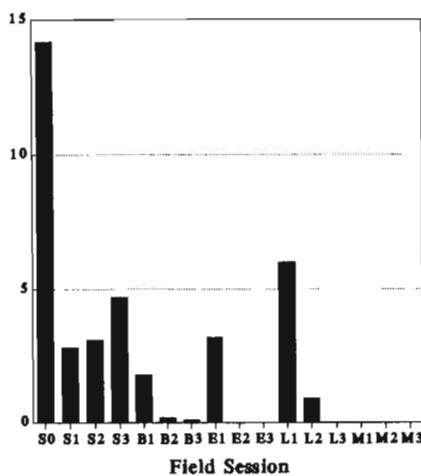
SUSC

Small numbers were present on the HB coast during the first two S sessions, but a pair observed on an inland pond on 30 May suggests that breeding is a possibility. Breeding was confirmed nearby at Shagamu Lake in 1960 (Peck and James 1983) and, during the Atlas project, the species was given probable and possible breeding status in two squares inland just east of the Winisk River and near the Manitoba border, respectively (Ross in Cadman et al. 1987). Surf Scoters were not recorded inland at the B site. At E, small numbers were noted during the first session, with an unusual high of 81 on 21 Jun. Eight birds on 30 Jul were the only other E observations. Small numbers were present in the large Black Scoter flock at L during the first session.

Melanitta perspicillata

SUSC	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	9/13 (16)				
1	6/8 (12)		4/9 (50)	2/11 (5)	
2	2/8 (2)		1/10 (8)		
3					

White-winged Scoter



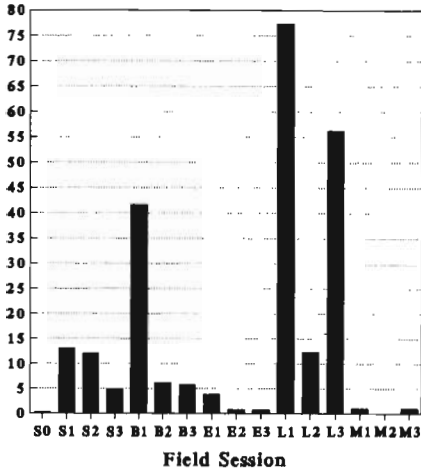
WWSC

Migrants were observed at S during the first session, with a high count of 60 on 4 Jun. Small numbers were seen throughout the remaining S sessions and a female with flightless young was observed from 25-30 Aug. At B, the small numbers recorded were presumably migrants or birds moving inland to search for potential nesting ponds. Two on 14 Jul and one on 21 Aug were the only other B reports. Small numbers were observed migrating past E during the first session. Up to 35 birds were seen in the large Black Scoter flock at L, during the first session, and seven birds on 1 Aug were the only others reported from L.

Melanitta fusca

WWSC	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	9/13 (60)				
1	5/8 (8)	6/12 (7)	3/9 (16)	6/11 (35)	
2	5/8 (6)	1/10 (2)		1/8 (7)	
3	6/11 (16)	1/12 (1)			
CD	25-30 August				

Common Goldeneye



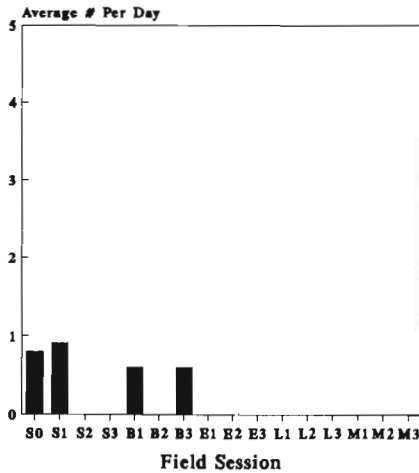
COGO

Goldeneyes were scarce at S during the first two sessions, but a sighting of 95 on 28 Jun inflated the total for the second period. In the final two S sessions, it was regular in small numbers. At B, it was common during the first session, with up to 285 birds seen on the ponds on 26 Jun. During the last two B sessions, numbers had declined considerably. Small numbers were also found at E during the first session but they became very scarce afterwards, with only a few isolated sightings. Interestingly, it was much more common at L, where up to 300 birds, mostly males, were seen along the coast on 8 Jun. Small numbers were present during the final two L periods but the totals appear inflated due to sightings of 65 on 1 Aug and 500 on 11 Sep. These latter birds were seen on one day only and presumably represent fall migrants. Three females on 4 Jun and three on 1 Sep were the only M reports. The females from the first M session were suspected of being local breeders but no proof was found.

Bucephala clangula

COGO	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	1/13 (3)				
1	3/8 (95)	7/12 (285)	4/9 (18)	11/11 (300)	1/3 (3)
2	7/8 (30)	6/10 (20)	1/10 (8)	5/8 (65)	
3	11/11 (12)	10/12 (19)	5/11 (3)	9/10 (500)	1/3 (3)

Bufflehead



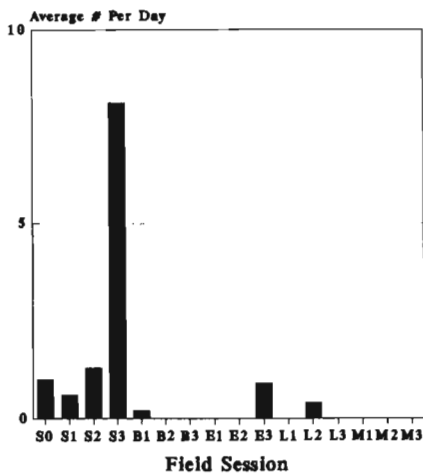
BUFF

Small numbers were recorded at S during the first two sessions but not afterwards. During the first B session, four were seen on 27 Jun and three the next day. Seven birds at B on 29 Aug were the only others observed and were likely migrants. Like the Goldeneye, this species is a cavity nester, so it is feasible that these records pertain to migrants and unmated/failed breeders, although nesting could occur not far inland, particularly at S. This species is a regular migrant on JB and the Moose River but for some reason, none were recorded. In addition, the species bred in 1973 at Moosonee (Peck and James 1983) and was assigned a probable status for the Atlas square along the coast between the Severn and Winisk Rivers (Abraham in Cadman et al. 1987).

Bucephala albeola

BUFF	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	4/13 (4)				
1	3/8 (4)	2/12 (4)			
2					
3		1/12 (7)			

Hooded Merganser



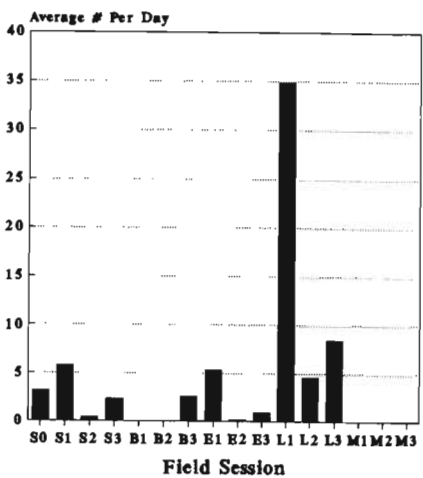
HOME

Hooded Mergansers were regular in small numbers during the first three S sessions. In the last S session, they were more common, with a surprising high of 20 on 27 Aug. Two on 27 Jun in a pond was the only observation from B. Five seen on 9-10 Sep was the only report at E and three on 2 Aug was the only L report. None were found at M, although the species is regular there and may breed as well. Atlas field work demonstrated an almost complete absence of this species from the HBL, with the exception of the extreme south-eastern section (Bouvier *in* Cadman et al. 1987). The frequency of the bird at S is all the more surprising given the known distribution.

Lophodytes cucullatus

HOME	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	5/13 (4)				
1	3/8 (3)	1/12 (2)			
2	5/8 (4)			1/8 (3)	
3	9/11 (20)		2/11 (5)		

Common Merganser



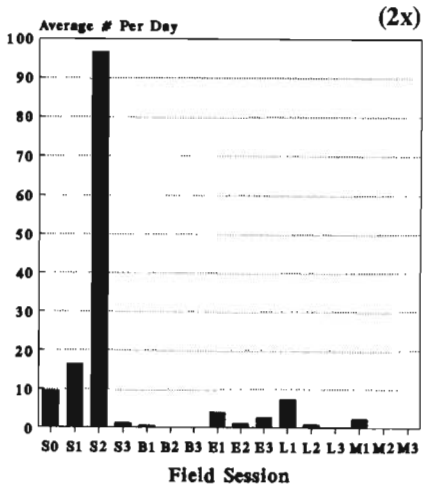
COME

Small numbers were found during all S sessions, with most birds observed along the coast. None were observed in the first two B sessions, but the last period recorded small numbers regularly and a larger group of 18 on 27 Aug. These birds, which were seen mostly on the river, were likely migrants. Small numbers were observed at E during the first period but were very scarce thereafter. By contrast, Common Mergansers were common during the first L session, with a high count of 125 on 5 Jun. Numbers were reduced during the final two L periods. Most of the L birds were observed feeding on JB but some individuals would enter tidal pools and creeks - especially at high tide. No evidence of breeding was found at any site, which contrasts with previous information. Atlas field work revealed the presence of breeding birds along the entire HB coast, and at various sites along JB (McNicol *in* Cadman et al. 1987) and Peck and James (1983) give two nest locations near the Shagamu River.

Mergus merganser

COME	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	7/13 (12)				
1	7/8 (10)		9/9 (11)	11/11 (125)	
2	2/8 (2)		1/10 (1)	5/8 (20)	
3	6/11 (8)	6/12 (18)	5/11 (2)	8/10 (25)	

Red-breasted Merganser



RBME

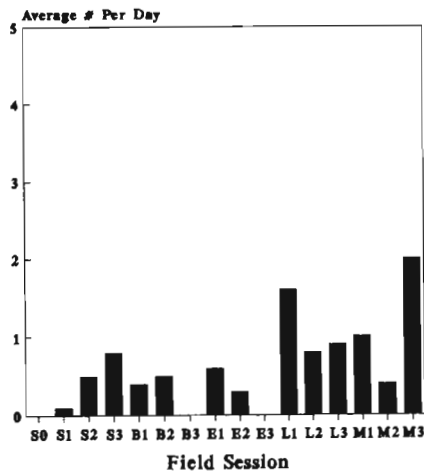
All S sessions recorded this species but it was common only during the Jul period, with a high count of 280 on 14 Jul. These birds were seen primarily on HB. Up to three birds were observed at the ponds during the first B session, but none afterwards. Small numbers were observed throughout the sessions at E and L, with a trend to reduced numbers as the summer progressed. Two on 4 Jun and five the next day were the only M records and likely represent spring migrants. The main fall flight typically occurs in Oct and Nov, which accounted for the low showing in early Sep. This project found no evidence of nesting at any site and the breeding status of the species along the coast remains unclear. Manning (1952) stated that "there appear to be no actual breeding records" for the HB and JB coasts and Peck and James (1983) also showed no breeding records near the coast. Fraser *in* Cadman et al. (1987) give

Mergus serrator

breeding evidence along virtually all coastal squares, but few represent confirmed breeding records.

RBME	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	13/13 (25)				
1	6/8 (60)	3/12 (3)	6/9 (10)	9/11 (30)	2/3 (5)
2	7/8 (280)	1/10 (1)	4/10 (6)	1/8 (6)	
3	6/11 (3)		8/11 (8)	1/10 (1)	

Osprey



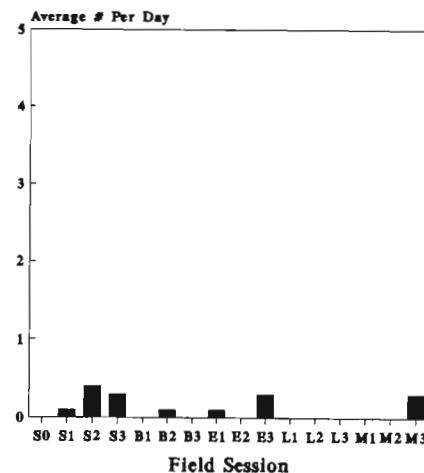
OSPR

This raptor, though scarce, was seen at all sites. The first S bird was not observed until 28 Jun but they became increasingly frequent through the season and, by the last session, were seen almost daily. Most sightings pertain to single birds but two were seen on two dates in the final session. At B, the reverse pattern was noted, with the greatest frequency of sightings being at the beginning of the season and none observed by the third session. Like S, B sightings involved single birds, with the exception of two seen on 10 Jul. E reported a similar situation, with sightings during the first two sessions and none on the third, and also like B, all reports were of single birds except two seen on 2 Aug. The greatest numbers and frequency of sightings came from the two southern-most sites. At L, from one to three birds were seen almost daily during all sessions, with a high count of five on 8 Jun. In several instances birds were seen flying inland with fish in their talons, suggesting that a nest was nearby. At M, from one to two birds were observed almost daily. Most of the M sightings likely involved birds from two local nests. Ospreys are known to breed throughout the HBL, primarily inland from the coast, especially along rivers (Weir *in* Cadman et al. 1987).

Pandion haliaetus

OSPR	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1	1/8 (1)	4/12 (1)	4/9 (2)	10/11 (5)	3/3 (1)
2	4/8 (1)	4/10 (2)	2/10 (2)	5/8 (2)	2/5 (1)
3	7/11 (2)			7/10 (2)	3/3 (2)

Bald Eagle



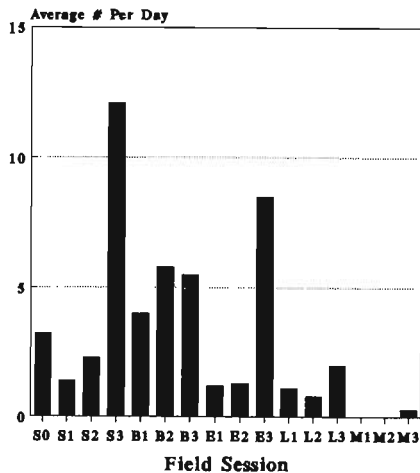
BAEA

There were seven sightings over four sessions at S, all involving single birds as follows: 1st year birds on 26 Jun, 10 Jul, 14 Jul and 16 Jul, adults were recorded on 20 and 28 Aug, and a bird of unknown age was seen on 25 Aug. It seems likely that duplication is involved, particularly with the sightings of immatures, since non-breeding individuals appear regularly on the coast, where large numbers of young birds can provide an easy food source. One sub-adult at B on 11 Jul was the only report from that site, though more may have been present near the coast. At E, a 1st year bird was seen on 16 Jun. A 1st year and one 2nd year bird were seen moving south past E on 8 Sep and possibly the same 2nd year bird was seen on 10 Sep. None were reported from L although a first year bird was observed several times along the coast, about 10 km south of the site. A bird of unknown age was seen at Moose Factory on 2 Sep. Several Bald Eagle nest sites are known in the HBL, but the species is scarce and the vast majority of sightings pertain to sub-adult birds, particularly along the coast.

Haliaeetus leucocephalus

BAEA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1	1/8 (1)		1/9 (1)		
2	3/8 (1)	1/10 (1)			
3	3/11 (1)		2/11 (2)		1/3 (1)

Northern Harrier



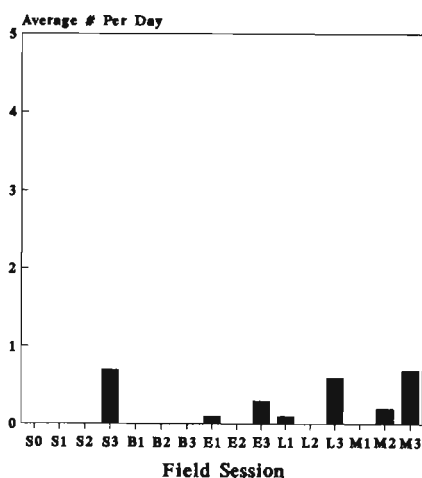
NOHA

Circus cyaneus

Harriers were seen throughout the four S sessions. One nesting pair was found and most sightings from the first three sessions pertain to these birds. In the final S period, migrants were evident, with daily totals of ten or more birds being frequent and a high count of 20 on 25 Aug. Several pairs were present at B and although no nest was located, breeding undoubtedly occurred here. The slightly higher totals from the second B session probably represent increased feeding trips and, therefore, visibility of these individuals, rather than an actual increase in numbers. Migrants were not conspicuous here, with a high count of only 11 on 24 Aug. Totals would probably have been higher on the coast, but trips to this area were difficult and infrequent. A few were seen at E during the first two sessions, likely representing a local pair. During the final E session, migrants were obvious, with a high count of 20 on 9 Sep. At least one pair was seen fairly often at L and were likely nesting at or beyond the periphery of the study site but, unlike E, no significant migration was recorded in the last session. Late Aug-early Sep is within the normal period of fall migration so this absence is curious. One bird on 3 Sep was the only M sighting, though at least one pair was known to be present at the old airfield.

NOHA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	13/13 (6)				
1	6/8 (3)	12/12 (6)	5/9 (4)	8/11 (3)	
2	8/8 (3)	10/10 (11)	10/10 (2)	5/8 (2)	
3	11/11 (20)	12/12 (11)	10/11 (20)	8/10 (4)	1/3 (1)
CD	14 July				

Sharp-shinned Hawk



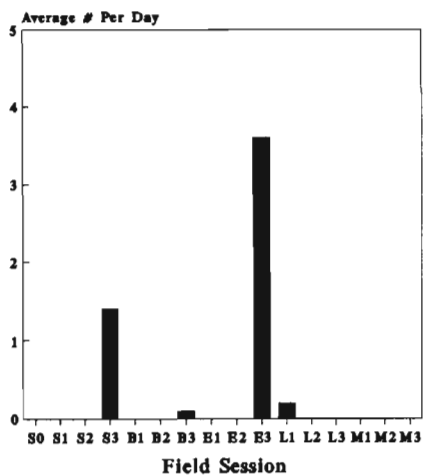
SSHA

Accipiter striatus

Four birds on 22 Aug and four others moving west on 25 Aug at S were migrants. This species is quite scarce in the northern HBL, so these totals are surprising. None were seen on the open tundra at B. A female, observed in the forest at E on 9 Jun, was the only spring report and single fall migrants were seen on 5, 7 and 12 Sep. The situation was similar at L, with a single female on 5 Jun. Fall migrants at L were slightly more numerous, with three on 5 Sep, two on 8 Sep and one on 11 Sep. Sightings at M were all of single birds on 21 Jul, and on 2 and 3 Sep.

SSHA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1			1/9 (1)	1/11 (1)	
2					1/5 (1)
3	2/11 (4)		3/11 (1)	3/10 (3)	2/3 (1)

Northern Goshawk



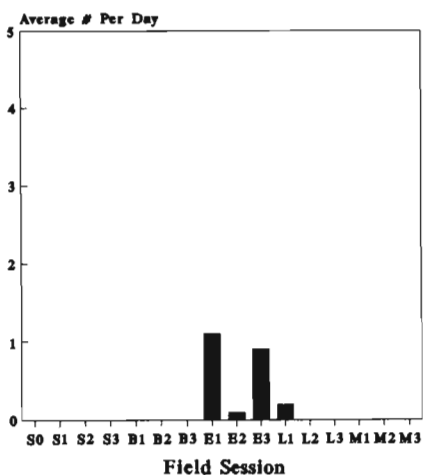
NOGO

This species is primarily a forest bird and populations tend to fluctuate in response to cyclic prey species such as Snowshoe Hare. Both study years were low years for hares, particularly 1991, so numbers reported may under-represent the true status of this bird. At S, Goshawks were seen during the last session only. Several were seen on seven dates, with a high of 5 on 28 Aug. An immature bird at B on 20 Aug was somewhat out of habitat, but may have been taking advantage of avian prey concentrated near the coast. E reported the largest numbers, all during fall migration, and demonstrated the exodus this species undertook in 1990. A few birds were seen on a daily basis at E, with a high count of 13 on 5 Sep. The only L sighting was of an adult male that spent 10-11 Jun near camp. No birds were seen at M and there was no suggestion of local nesting at any site, although this would certainly be possible at all sites except B, in high food years.

Accipiter gentilis

NOGO	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1				2/11 (1)	
2					
3	7/11 (5)	1/12 (1)	9/11 (13)		

Red-tailed Hawk



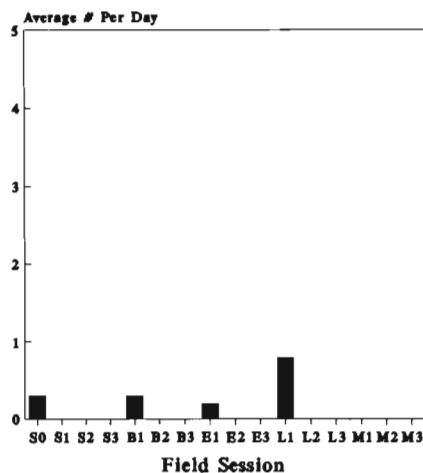
RTHA

No reports came from the HB coast, where it would only be expected occasionally as a migrant. At E, a nest, believed to be of this species, was found and one or two birds were seen daily during the first session but their breeding status was unclear. Only one sighting was made during the second E session, a single on 25 Jul. During the third E session, at least one bird was seen on a near daily basis and, in one case, an adult was seen sitting beside the nest. It seems likely that a pair did nest in the area but that the nest found was from a previous year. The only other reports were from L, where two adults were observed moving south, in company with nine Rough-legged Hawks, on 9 Jun during very strong west winds and high temperatures. Several pairs had been seen south of the quarry at M and probably were breeding, but this was outside the area regularly covered by this study.

Buteo jamaicensis

RTHA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1			6/9 (2)	1/11 (2)	
2			1/10 (1)		
3			7/11 (3)		

Rough-legged Hawk



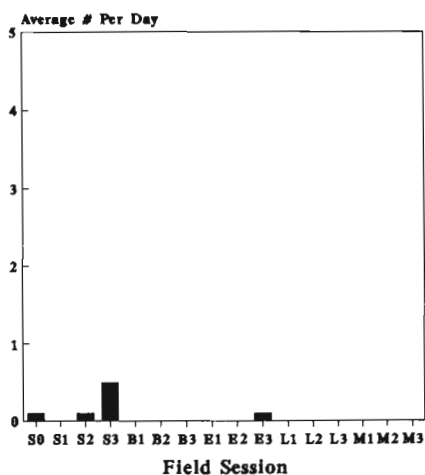
RLHA

One bird, moving east on 31 May, and three birds, going west on 5 Jun, were the only reports from S. At B, two seen on 24 Jun and one on 27 Jun were the only records. At E, single birds were seen moving south along the coast on 16 and 18 Jun. A southbound flight was documented at L on 9 Jun when nine birds were observed during very strong west winds. Where these southbound birds were coming from or going to is an interesting question but they may have been sub-adults that were not yet breeding. The fall movement of Rough-legs, which is substantial in southern JB (Sinclair 1986) usually begins in late Sep, after the study period was over, accounting for the lack of fall observations.

Buteo lagopus

RLHA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	2/13 (3)				
1		2/12 (2)	2/9 (1)	1/11 (9)	
2					
3					

Golden Eagle



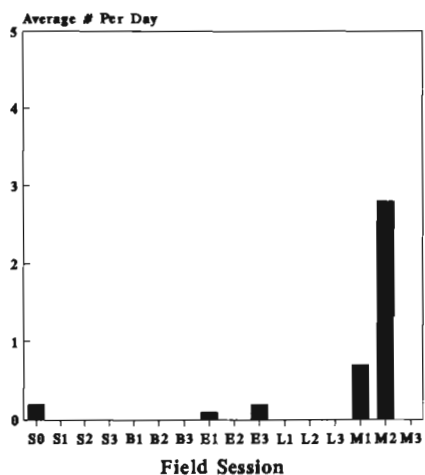
GOEA

Aquila chrysaetos

The few confirmed breeding sites for this raptor in Ontario are all located in the northern HBL, so it is not surprising that Golden Eagles were seen. One adult, moving west at S on 5 Jun, may have been a migrant or possibly an Ontario breeder. Other reports from S were of an immature heading east on 10 Jul, four birds of unknown age flying west on 25 Aug (part of a large movement of raptors that day) and an immature flying west on 28 Aug. The only other project report was of a sub-adult bird moving south at E on 9 Sep. This species can be expected in small numbers along the coast, particularly during fall migration.

GOEA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	1/13 (1)				
1					
2	1/8 (1)				
3	2/11 (4)		1/11 (1)		

American Kestrel



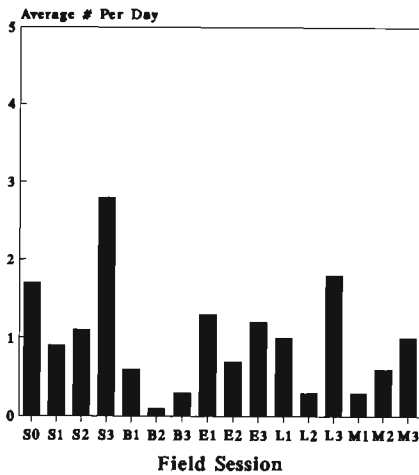
AMKE

Falco sparverius

Single birds were seen at S on 29 May, 31 May and 5 Jun. Most were migrants but one pair was believed to have had a territory nearby. Until recently, this species was not considered to breed on the north coast, but, during the Atlas project, a pair was discovered nesting at Winisk and birds were also observed at Fort Severn (Weir *in* Cadman et al. 1987). This species has bred as far north as Churchill, Manitoba (Chartier 1988), so it seems that if nesting sites can be found, kestrels may establish themselves. Elsewhere, migrant kestrels were seen at E, with one on 13 Jun and singles on 4 and 5 Sep. At M, a pair raised young in a natural tree cavity just south of town, and several other pairs were in the area. Although it was missed in the last M session, birds were still believed to be in the area.

AMKE	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	3/13 (1)				
1			1/9 (1)		2/3 (1)
2					4/5 (5)
3			2/11 (1)		
CD					4-18 July

Merlin



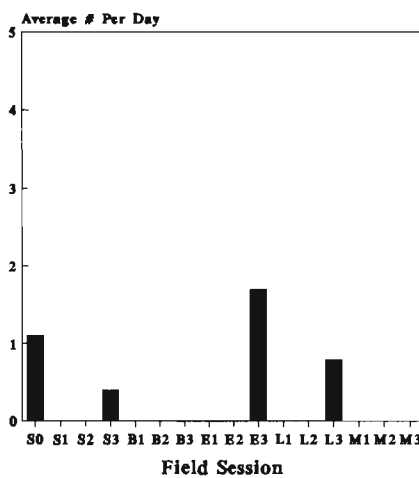
MERL

Merlins were seen regularly at all sites. The sightings from B were of birds hunting around the heath-covered ridges. Their reproductive status was unknown but they were likely birds coming north, out of the forest, to hunt on the tundra. Elsewhere, Merlins displayed similar trends, with the highest numbers occurring in the final sessions when young of the year and migrants added to the totals. The only nest found was at E, but birds were believed to be breeding at all sites except B.

MERL	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	10/13 (5)				
1	5/8 (2)	6/12 (2)	7/9 (2)	9/11 (2)	1/3 (1)
2	5/8 (4)	1/10 (1)	6/10 (2)	2/8 (1)	2/5 (2)
3	10/11 (6)	3/12 (1)	8/11 (4)	9/10 (3)	2/3 (2)
ED			14 June		

Falco columbarius

Peregrine Falcon



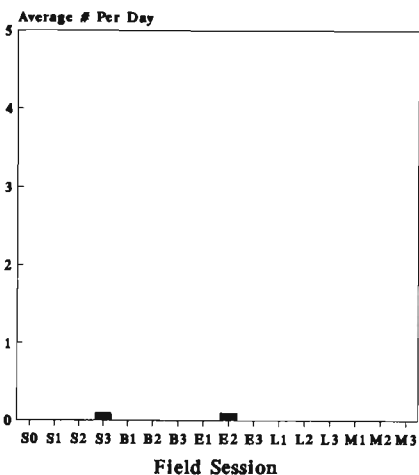
PEFA

The Ontario coast is an important migration corridor and feeding area for Peregrine Falcons. This region probably has more individuals during migration than any other part of Ontario. At S, birds were seen almost daily during the first session, with a high of three seen on 5 and 7 Jun. Some of these sightings probably represent the same birds roaming the general area, and most are likely non-breeding sub-adults of the *F.p. tundrius* race, slowly moving north. The only other reports from S were of fall migrants. Singles were observed on 21 and 30 Aug and two were seen on 27 Aug. None were reported at B during the three sessions but several adult birds, also of the *F.p. tundrius* race, were recorded during camp set-up in mid May. Fall migrants were seen at E on a near daily basis, with high counts of five birds on 10 and 12 Sep. L also recorded fall migrants, with two birds on 8 and 10 Sep and four on 11 Sep. There are no documented breeding records for the HBL, either modern or historical, although such an event would not be out of the question, as there are a number of apparently suitable sites.

Falco peregrinus

PEFA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	7/13 (3)				
1					
2					
3	3/11 (2)		7/11 (5)	3/10 (4)	

Gyrfalcon



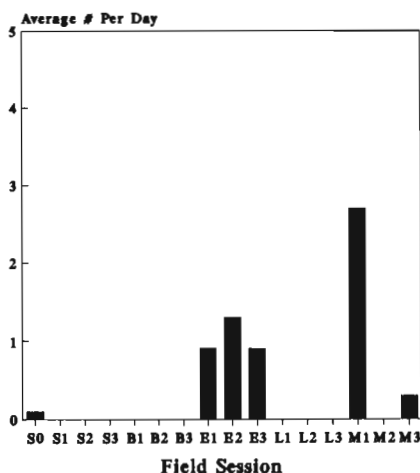
GYRF

There were two reports during the project. A sub-adult white-phase bird was seen at S on 28 Aug and a grey-phase bird was recorded at E on 31 Jul. The Gyrfalcon is an annual migrant along both coasts in Ontario, but is not regular before Oct. Both of these birds were in atypical periods, and the E bird may have been a non-breeding, summering individual that was wandering the coast. There have been previous late summer records as far south as Shipsands Island and there are also several records from late Jun and Jul at Churchill, Manitoba (Chartier 1988).

Falco rusticolus

GYRF	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					
2			1/10 (1)		
3	1/11 (1)				

Spruce Grouse



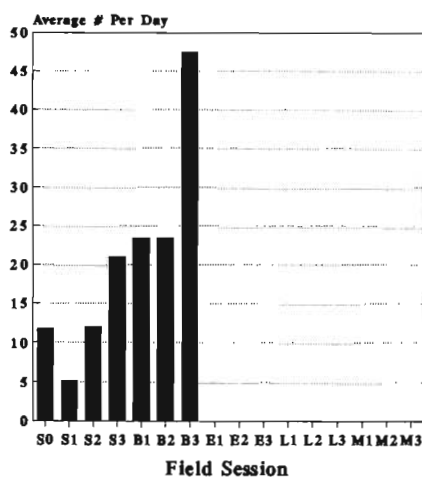
SPGR

Dendragapus canadensis

The only S report was of one on 1 Jun. At E, birds were seen in all sessions and a family group, consisting of a male with six fledged young, was seen on 31 Jul. The only other observations came from M during the first session, where up to four were observed in one day in the lichen-rich spruce forest along Store Creek. One on 1 Sep was the only other M observation. The Spruce Grouse likely breeds wherever it is found, and probably occurs at all study sites, with the exception of the open tundra at B.

SPGR	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	1/13 (1)				
1			5/9 (2)		3/3 (4)
2			2/10 (7)		
3			5/11 (4)		1/3 (1)

Willow Ptarmigan



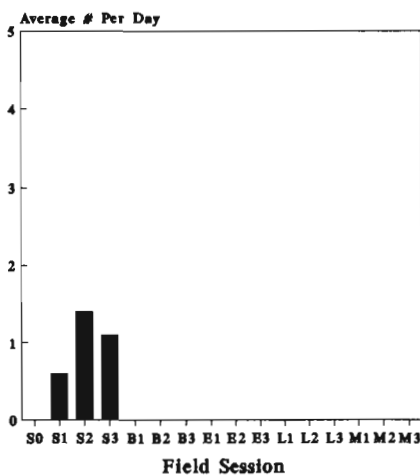
WIPT

Lagopus lagopus

This tundra species was fairly common at S and common at B, the only study sites where they could be expected during the breeding season. Nests were found at both sites, although nest depredation was high at B. Many late season observations pertained to family groups. The highest daily counts for each site were 58 on 22 Aug at S and 118 on 27 Aug at B.

WIPT	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	13/13 (21)				
1	6/8 (11)	12/12 (51)			
2	8/8 (32)	10/10 (39)			
3	11/11 (58)	12/12 (118)			
ED	8-24 June	20 June - 9 July			

Rock Ptarmigan



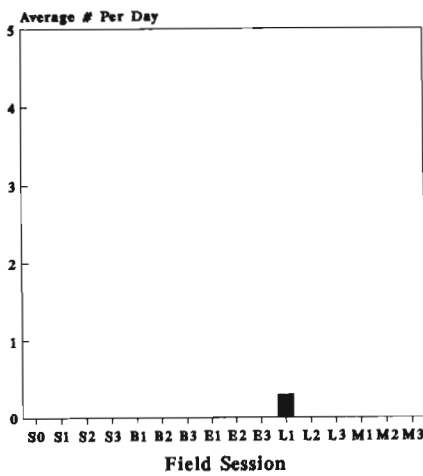
ROPT

Lagopus mutus

Prior to this study, the Rock Ptarmigan was believed to be only a scarce and erratic winter visitor to Ontario's north coast. Therefore, the discovery of several birds at S during the summer was very surprising. No evidence was found to suggest these birds bred here but both males and females were present, some apparently paired. Rock Ptarmigans breed as close as the Belcher Islands to the east, and Alder Lake, Keewatin to the north-west (Godfrey 1986). Birds have been seen at Churchill, Manitoba during the summer in recent years (McRae, pers. com.), so the possibility of nesting should not be discounted, especially following big "invasion" winters. As these are the first summer birds for the province, a full listing of records is given. The first birds were two males and three females found on 28 Jun. During the next session, birds were seen on two days, two females and a pair on 14 Jul and a male, two females and two pairs on 15 Jul. In the final session one pair and five singles were seen on 21 Aug, one female on 22 Aug, two females on 23 Aug and one male and one female on 26 Aug.

ROPT	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1	1/8 (5)				
2	2/8 (7)				
3	4/11 (7)				

Ruffed Grouse



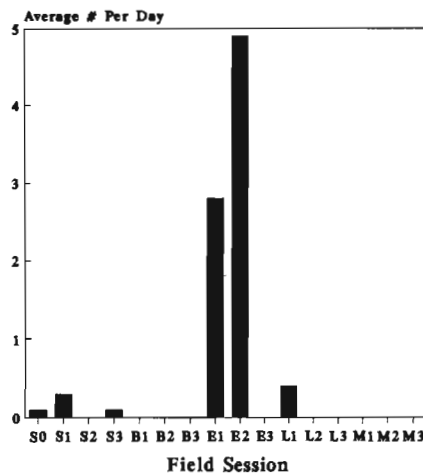
RUGR

Several birds heard drumming in the distance on the first L session were the only reports. This bird was clearly missed during field work, as it is a fairly common breeding bird in mixed forests from Moosonee north to at least Fort Albany (Peck and James 1983). The three transects in M and most of the L transects were not in dry poplar ridges, partially accounting for the lack of records.

Bonasa umbellus

RUGR	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1				3/11 (1)	
2					
3					

Yellow Rail



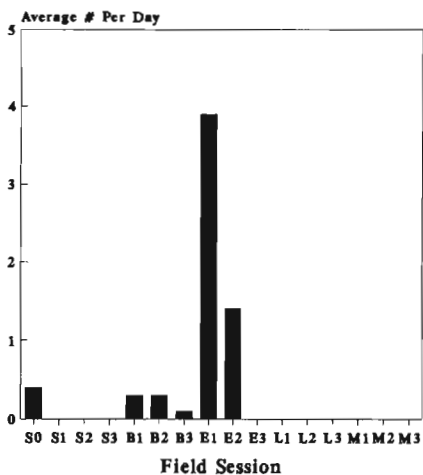
YERA

The Ontario HBL coast is the only area in the province where this species occurs commonly. Yellow Rails were found at three sites during this study. Singles were found at S on 5, 27 and 28 Jun and 21 Aug. The only site that recorded them in any frequency and numbers was E. They were regular throughout the first two sessions, with high counts of six on 12 Jun and 15 on 25 Jul, respectively. None were recorded in the final session, probably because singing had stopped. At L, two were heard on 6 Jun and a single bird on 12 and 15 Jun. While no evidence of breeding was found, it is likely that they bred wherever they were recorded. This species is notoriously difficult to confirm as a breeder and if only one or two pairs are in an area, singing is greatly reduced. Yellow Rails seemed under-represented on this project, particularly at L, which appeared to have perfect habitat for the species. During the Atlas project, birds were recorded in all coastal blocks (Prescott in Cadman et al. 1987). In addition, Yellow Rails are found along the HB coast as far north as Churchill (Chartier 1988), so birds could be expected at B. What factors determine where rails are found remain unclear but, for some reason, we found fewer than expected.

Coturnicops noveboracensis

YERA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	1/13 (1)				
1	2/8 (1)		8/9 (6)	3/11 (2)	
2			10/10 (15)		
3	1/11 (1)				

Sora



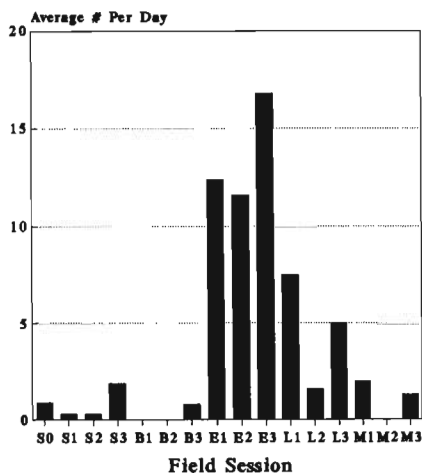
SORA

At S, the Sora was recorded during the first session only, with single birds observed on 2, 6 and 8 Jun and two on 5 Jun. Like the Yellow Rail, this species can be difficult to locate when not singing. Small numbers were recorded on all B sessions, with the high of two territorial birds on 22 Jun. The last B report was of one on 27 Aug. Soras were regular during the first two E sessions, with high counts of six on 12 and 14 Jun and 25 Jul. Breeding likely occurred at all of these sites, although no solid evidence was found. Again, like the Yellow Rail, this species appears to have been under-represented during this study and it is most surprising that none were recorded at L, which appears to have plenty of suitable habitat. During the Atlas project, it was recorded in all JB blocks and near Winisk (McCracken in Cadman et al. 1987). Peck and James (1983) give a further nest record from Ft. Severn and it is common at Churchill, Manitoba (Chartier 1988).

Porzana carolina

SORA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	4/13 (2)				
1		3/12 (2)	9/9 (6)		
2		3/10 (1)	5/10 (6)		
3		1/12 (1)			

Sandhill Crane

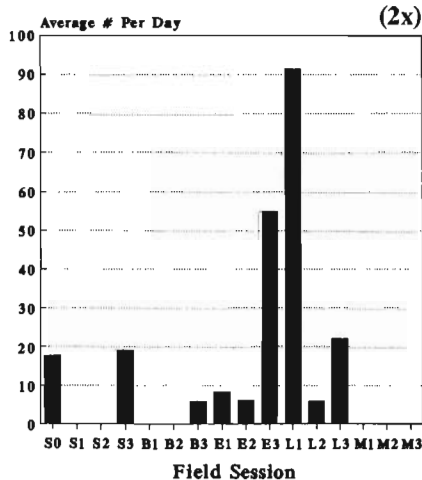


SACR

A few were recorded at S throughout the studied times, but were most frequent during the first and final sessions. At B, birds were seen almost daily during the final session and were presumably migrants. The largest number of cranes reported was from E and L. From 10-15 birds per day were typically recorded in all E sessions, with a high count of 60 on 4 Sep. Similar numbers were seen almost daily at L in the first session. About 25 birds were present at L, but spread over a large area. They were less frequent and numerous during the final two L sessions. At M, two birds were regularly heard in the tamarack fen during the first session. The only other sightings, presumably migrants, were one on 2 Sep and three on 3 Sep. Although breeding was never established, it was suspected at M, L, E, and S.

SACR	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	6/13 (3)				
1	2/8 (1)		9/9 (24)	11/11 (25)	3/3 (2)
2	2/8 (1)		10/10 (30)	4/8 (5)	
3	9/11 (4)	5/12 (3)	11/11 (60)	9/10 (9)	2/3 (3)

Black-bellied Plover



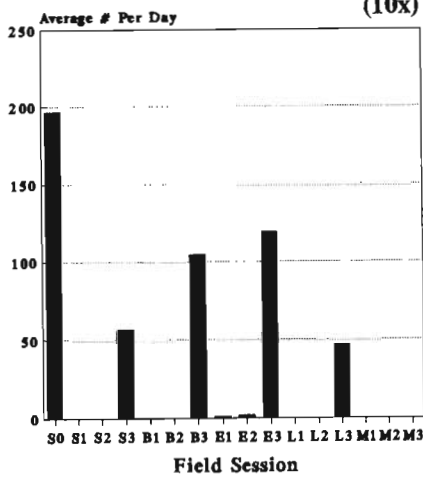
BBPL

Spring migrants were seen regularly during the first session at S, with high counts of 45 on 6 and 8 Jun. One on 21 Jun was likely a late spring migrant and the only observation of that period. Fall migrants had returned by the final period and were seen regularly in small numbers. At B, they were recorded on three dates during the final session, with the highest number being 42 on 26 Aug. The low numbers here are likely an influence of the site's inland location, as this species prefers coastal areas to feed. Small numbers of spring migrants were reported at E, with a high count of 25 on 13 Jun. By the second E session, the first fall migrants had appeared. In the final E session, numbers had increased, with between 20 and 40 seen daily, and an unusually large group of 400 on 6 Sep. The peak of spring migration was recorded at L, where large numbers were found at the start of the session but had tapered off by the end. The highest count was of 600 on 6 Jun. A few birds, presumably fall migrants, were present throughout the second L session. Numbers increased slightly by the final L period, with a high of 37 on 5 Sep. The largest numbers of fall migrants generally occur in Oct.

Pluvialis squatarola

BBPL	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	12/13 (45)				
1	1/8 (1)		9/9 (25)	9/11 (600)	
2			9/10 (25)	8/8 (10)	
3	11/11 (50)	3/12 (42)	11/11 (400)	10/10 (37)	

Lesser Golden-Plover

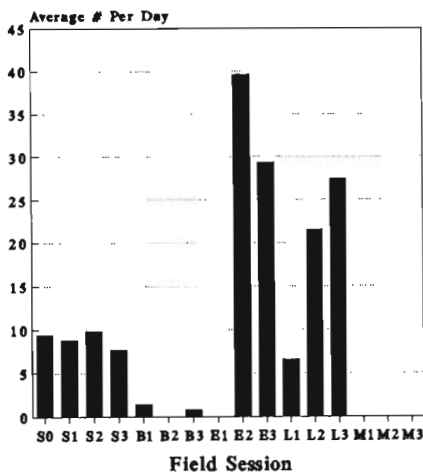


LEGP

An interesting pattern of occurrence can be seen with this species. Golden-Plovers have an elliptical migration route, passing through the mid-west in spring and swinging east in the fall. While all coastal stations reported them commonly in fall, only S reported significant numbers in spring, presumably being far enough west to catch the eastern edge of the northbound flight. At S, spring migrants were seen in good numbers, with a high of 600 on 29 May and 4 Jun, but numbers fell off by the end of the period. Three adults on 26 Jun were the only birds of that S session and were most likely early fall migrants. Fall migration picked up during the third S session, with singles on 11 and 14 Jul. By the final S session they were fairly common, with 15-50 typically seen in a day and an unusual high of 200 on 24 Aug. At B, they were seen commonly, but only during the final session. When compared to the previous species, the B high count of 287 on 28 Aug demonstrates the Golden-Plovers preference of inland tundra sites over strictly coastal sites. Twelve seen on 13 Jun were the only spring observations from E. In the second E period, the first fall migrants had begun to appear, with several singles and 13 on 26 Jul. Typically between 30-60 were seen daily in the final E session, with one large flight of 1000 birds noted on 6 Sep. Spring migrants at L were limited to two birds on 5 and 8 Jun. Fall migrants were just beginning to appear in the second L session, with singles on 26 and 28 Jul and two on 29 Jul. By the final L session, they were seen daily, generally in small numbers, with an unusual high count of 125 on 11 Sep.

LEGP	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	12/13 (600)				
1	1/8 (3)		1/9 (12)	2/11 (2)	
2	2/8 (1)		6/10 (13)	3/8 (2)	
3	10/11 (200)	12/12 (287)	11/11 (1000)	10/10 (125)	

Semipalmated Plover



SEPL

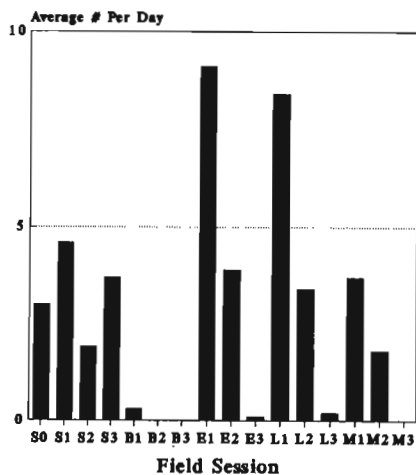
At S, small numbers were seen in all sessions and three nests were located. During the first S session, migrants were also present, with a high of 45 on 5 Jun. No substantial build-up of numbers was seen in fall at S, with the highest count being 18 on 30 Aug. The nest of the only resident pair at B was found during the first session and two additional birds seen on 18 Jun were the only migrants noted. None were seen during the second B period, suggesting nest failure, and migrants were observed on only two dates in the final session, two on 21 Aug and seven on 24 Aug. This species prefers coastal flats during migration, accounting for the scarcity of fall migrants at B. At E, the species appeared to be absent as a breeder and no observations were made during the first session. This absence is particularly interesting as Manning (1952) noted the complete lack of Semipalmated Plovers from the Swan (Raft) River, just north of E, in 1947, despite what appeared to be ample suitable habitat. In addition, Peck and James (1983) showed no nest records from this area and the only Atlas block where breeding was not confirmed on the entire Ontario coast was the one containing Ekwana and the Swan River (Hussell in Cadman et al. 1987). It would appear that this species may truly be absent as a breeder from this stretch of coast. Fall migrants were common at E by the second session, with a high count of 110 on 25 Jul. Numbers had dropped slightly by the final E period. Small numbers were seen at L during the first session, which included several local nesting pairs and the last spring migrants. Numbers picked up with the arrival of fall migrants in the final two L sessions, with respective high counts of 60 on 26 Jul and 45 on 6 Sep.

SEPL	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	9/13 (45)				
1	7/8 (25)	11/12 (4)		11/11 (25)	
2	7/8 (16)		9/10 (110)	8/8 (60)	
3	10/11 (18)	2/12 (7)	11/11 (80)	10/10 (45)	
ED	4-21 June	19-22 June		6-15 June	

Pluvialis dominica

Charadrius semipalmatus

Killdeer



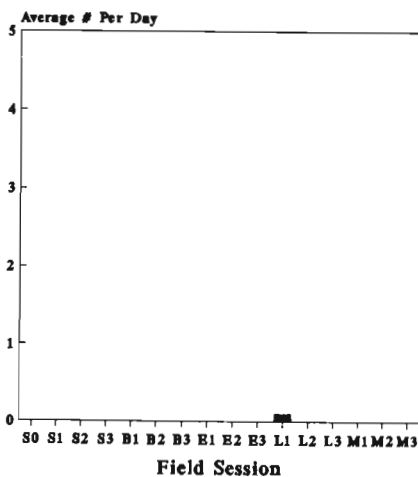
KILL

Charadrius vociferus

A few birds were present at S throughout and one nest was located; however, no obvious migration was noted. At B, up to two birds were seen on trips to the coast during the first session, suggesting that a pair may have nested there; but, it was absent from the study site proper and none were seen in subsequent sessions. Killdeers were regular in the first E session and six nests were located. Numbers were down somewhat by the next E period and one bird on 5 Sep was the only observation during the final session. The seemingly large number of nesting pairs at E is interesting, considering the lack of Semipalmated Plovers mentioned earlier. Whether Killdeers are somehow excluding Semipalmated Plovers in this particular region is unknown. Killdeers were obvious at L and two nests were located. Like E, numbers dropped somewhat by the second L session, and singles on 8 and 12 Sep were the only birds of the final L session. At M, this species was noted during the first two sessions and, although no nests were found, they are known to breed in the townsite and along several roadsides.

KILL	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	13/13 (7)				
1	8/8 (8)	3/12 (2)	9/9 (12)	11/11 (20)	3/3 (6)
2	7/8 (4)		10/10 (7)	7/8 (7)	2/5 (5)
3	11/11 (11)		1/11 (1)	2/10 (1)	
ED	3-27 June		12-24 June	6-15 June	
CD	27 June				

American Avocet



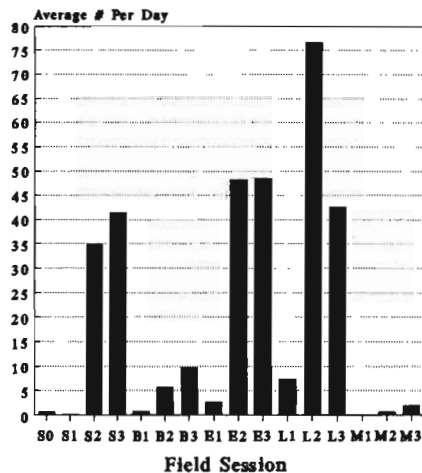
AMAV

Recurvirostra americana

A bird in breeding plumage was photographed on 6 Jun at L. It remained in the area for only a few minutes, then flew north along the coast. This represented the first record of this prairie breeder for the HBL (Bain 1992). Full details will be published elsewhere. The Avocet is an annual but rare migrant in Ontario, primarily along the lower Great Lakes. There is one isolated breeding record for the province from Sable Island, Lake-of-the-Woods in 1980 (Lamey 1981).

AMAV	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1				1/11 (1)	
2					
3					

Greater Yellowlegs



GRYE

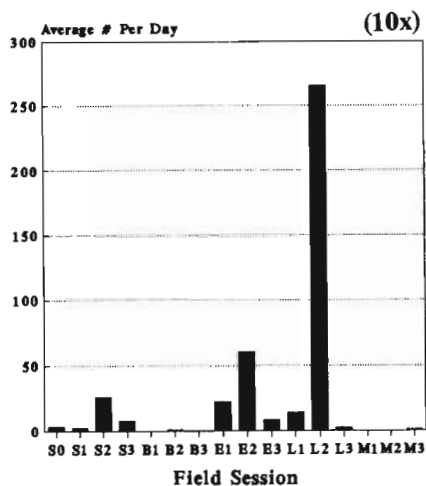
Tringa melanoleuca

A few birds were seen occasionally during the first S session, and one on 22 Jun, probably a fall migrant, was the only observation of the next session. Numbers increased considerably during the final two S sessions, with respective high counts of 45 on 15 Jul and 100 on 21 Aug. During the first B session, a bird was seen several times that acted as if it might have been nesting, but would vanish for a day or two and then reappear. Five seen on 26 Jun were likely fall migrants and were the only other birds reported in the first B session. Small numbers were seen during the final two B sessions. A few were observed daily at E during the first session. They became common by the second E session, with a high count of 80 on 1 Aug, and remained common during the third period, when a high count of 100 was noted on 5 Sep. Small numbers were seen daily during the first L session and numbers increased substantially in the second period, with the high count being 150 on 1 Aug. They were still common in the final L session, although numbers had dropped somewhat.

A few fall migrants were noted in M during the final two sessions. This species is very hard to confirm as a breeder as nests are exceptionally well hidden, parents begin distraction behaviour far from the actual nest and some birds will exhibit breeding behaviour after nesting; therefore, an actual nest or observation of flightless young is the only certain way to demonstrate nesting in a region. Breeding would be possible at any of the study sites, with the probable exception of B.

GRYE	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	6/13 (2)				
1	1/8 (1)	6/12 (5)	9/9 (4)	11/11 (17)	
2	8/8 (55)	9/10 (20)	10/10 (80)	8/8 (150)	3/5 (1)
3	11/11 (100)	12/12 (28)	11/11 (100)	10/10 (77)	3/3 (3)

Lesser Yellowlegs



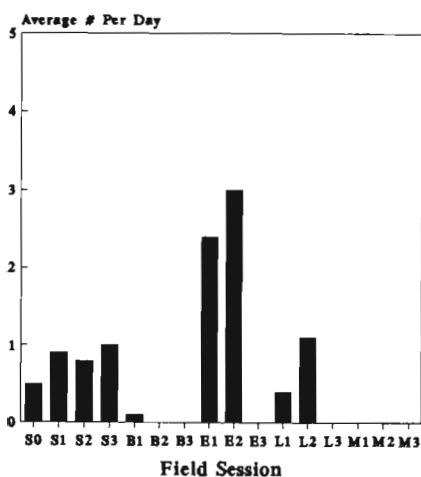
LEYE

Tringa flavipes

At S, a few birds were seen during the first two sessions and a nest was located. Although the species is believed to be a common breeding bird in the HBL, this is the first nest found in Ontario (James 1992). Numbers picked up slightly as fall migrants were noted in the final two S sessions. A few seen in the second B session, also fall migrants, were the only birds reported at that site. Small numbers were seen throughout the first E session, some of which were fall migrants while others may have been breeding birds. Numbers peaked in the second E period, with a high of 90 on 29 Jul and 1 Aug, then fell during the final session. The pattern at L was similar to E, except that the numbers during the second session were substantially greater than all others, with the high count being 420 on 26 Jul. Fall migrants were seen in low numbers during the final M session. What has been said about the potential breeding status of Greater Yellowlegs also applies to this species.

LEYE	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	11/13 (8)				
1	7/8 (6)		9/9 (45)	11/11 (28)	
2	8/8 (45)	5/10 (3)	10/10 (90)	8/8 (420)	
3	11/11 (25)		10/11 (30)	10/10 (5)	3/3 (1)
ED	23 June				

Solitary Sandpiper



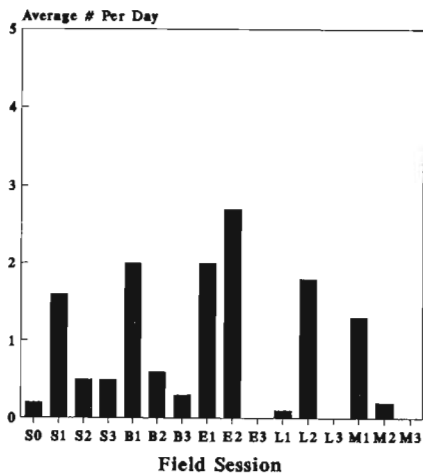
SOSA

Tringa solitaria

A few birds were seen during the first two S periods and may possibly have bred but no strong evidence was found. Five on 25 Jun were presumably fall migrants. Small numbers, mostly single birds, were seen on the last two S sessions, with a high of eight on 24 Aug. One on 22 Jun, likely a fall migrant, was the only B report. Small numbers were seen during the first two E sessions and like S, may have included local nesting birds in the first session but no direct nesting evidence was found. Seven on 2 Aug was the highest E count. No birds were reported in the final E period. One on 7 Jun and two on 9 Jun at L may have been breeding birds and were the only reports from the first session. The only other reports were from the second L session, with singles on 30 Jul and 1 Aug and seven on 31 Jul. There were no reports from M. This species likely breeds at all forested sites but is less frequent on the immediate coast where our studies were focused.

SOSA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	5/13 (2)				
1	3/8 (5)	1/12 (1)	8/9 (4)	3/11 (2)	
2	3/8 (4)		7/10 (7)	3/8 (7)	
3	4/11 (8)				

Spotted Sandpiper



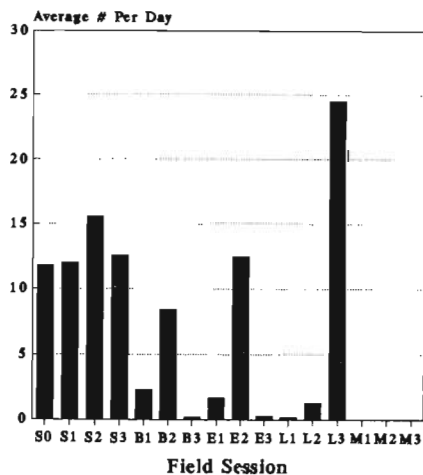
SPSA

Spotted Sandpipers were found at all sites and likely nested everywhere but L, although breeding evidence was found only at S and M. These birds were scarce at S, with three birds arriving on 5 Jun. Seven on 23 Jun was the S season maximum and the last birds were two on 22 Aug. At B, birds were observed along the Brant River only and numbers found depended on how much river coverage was done, with the maximum count being nine on 24 Jun. At E, small numbers were seen during the first session, increasing somewhat during the second, with up to six on 26 and 28 Jul. None were documented in the final E session. One on 7 Jun was the only report from the first L session. In the second L period, migrants were seen on four dates, with a maximum of five on 1-2 Aug. Like E, no birds were reported in the final L period. Small numbers were reported during the first two M sessions, and fieldwork from outside our study indicates that there is a small nesting population along most streams and rivers in the area.

Actitis macularia

SPSA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	1/13 (3)				
1	5/8 (7)	5/12 (9)	8/9 (4)	1/11 (1)	2/3 (3)
2	3/8 (2)	1/10 (6)	10/10 (6)	4/8 (5)	1/5 (1)
3	4/11 (2)	2/12 (2)			
ED	13 July				
CD	13 July				

Whimbrel



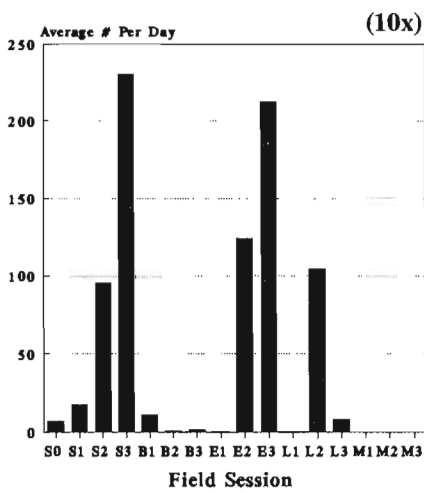
WHIM

Whimbrels were reported from all coastal sites, primarily as a fall migrant in Jul and Aug but nesting was established at S and suspected at B. No large concentrations were noted, possibly due to random timing, as large numbers have been reported previously, particularly in southern JB. At S, numbers were curiously consistent through all four periods and three nests were located. Small numbers were seen during the first B session and were believed to pertain to two or three pairs that appeared to be breeding in the wet tundra fen, half way between camp and the coast. The increase in the second B period was due to migrants and none of the "nesting" birds could be located, suggesting a breeding failure had occurred. Two on 23 Aug were the only birds of the final B period. At E, a few individuals were seen in the first period and were probably failed or non-breeding birds. Numbers picked up by the second E session, with a high count of 50 on 25 Jul. Two on 5 Sep and one the next day were the only Whimbrels of the last E period. A rather different pattern was documented at L. Two birds on 11 Jun were likely late spring migrants. Only a few individuals were noted during the second L period, perhaps reflecting inappropriate habitat at this site for Whimbrels. Very surprising was a large flock of 225 on the relatively late date of 7 Sep at L and another group of 20 on 11 Sep.

Numenius phaeopus

WHIM	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	12/13 (20)				
1	8/8 (20)	7/12 (10)	3/9 (10)	1/11 (2)	
2	8/8 (20)	7/10 (26)	10/10 (50)	6/8 (3)	
3	11/11 (20)	1/12 (2)	2/11 (2)	2/10 (225)	
ED	8-27 June				

Hudsonian Godwit



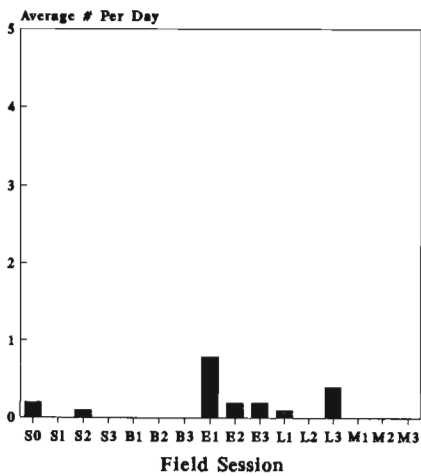
HUGO

Small numbers were seen during the first two S sessions, with the exception of 40 on 24 Jun and 60 on 28 Jun, both groups likely involved fall migrants. Several territorial pairs were also present at S. Numbers increased considerably in the final two S sessions, with high counts being 250 on 12 Jul and 920 on 24 Aug. At B, small numbers were seen daily during the first period, with a high of 22 on 26 Jun, some of which were fall migrants. While no nests were found, several birds exhibited the highly agitated behaviour indicative of nesting. Most birds suspected of breeding at B were found in the wet, hummocky tundra fen, half-way between the camp and the coast. They were very scarce in the second B session, perhaps suggesting breeding failure, and migrants were scarce in the final session as well. Two birds on 12 Jun and one bird the next day were the only spring sightings at E. By the second E session, fall migrants were common, with between 50-150 seen daily and a high count of 400 on 29 Jul. Numbers were even greater in Sep at E, when the high count of 800 was noted on 6 Sep. At L, the only observation in the first period was of two spring migrants on 13 Jun. Numbers picked up considerably in the second L session, with a high of 216 on 27 Jul. Fewer numbers were seen in the final L period, with the high being only 24 on 8 Sep.

Limosa haemastica

HUGO	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	12/13 (45)				
1	8/8 (60)	11/12 (22)	2/9 (2)	1/11 (2)	
2	8/8 (250)	6/10 (3)	10/10 (400)	8/8 (216)	
3	11/11 (920)	3/12 (14)	11/11 (800)	8/10 (24)	

Marbled Godwit



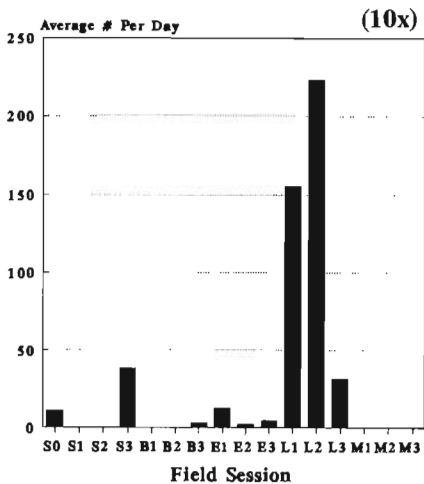
MAGO

The breeding population of Marbled Godwits in JB represents a disjunct population from the main body in the prairies (Morrison et al. 1976). Two birds on 30 May and one on 10 Jul at S were the only reports from the HB coast, where the species is scarce. While the status of this species along the HB coast remains unclear, it would appear to occur in small numbers and may breed in several areas. At both E and L, they were surprisingly rare. The only E reports were singles on 12 Jun, 25 Jul and 28 Jul and two on 13, 17 and 20 Jun and 7 Sep. At L, which appears to have ample suitable breeding habitat, the only reports were singles on 7 Jun, and 7, 9, 10 and 11 Sep. There is no good estimate of the total JB population, but it is small and potentially vulnerable. This species deserves special attention to determine its current status and ensure that a decline is not occurring and going unnoticed.

Limosa fedoa

MAGO	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	1/13 (2)				
1			4/9 (2)	1/11 (1)	
2	1/8 (1)		2/10 (1)		
3			1/11 (2)	4/10 (1)	

Ruddy Turnstone



RUTU

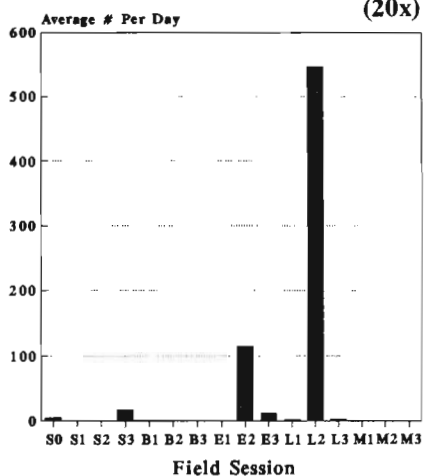
Turnstones were only seen in substantial numbers at L, although they were reported from all sites. Small numbers of spring migrants were seen at S, with highs of 40 on 3 and 5 Jun. One bird on 28 Jun was the only report from that period and may have been a very late spring migrant. None were seen during the third S session, but good numbers were present in the last period, with an unusual high count of 150 on 30 Aug. Turnstones were seen at B in the last session only, with 20 on 22 Aug and 14 on 24 Aug. Spring migrants were noted at E throughout the first session in small numbers, with the exception of 75 on 13 Jun. Fall migrants were present in small

Arenaria interpres

numbers during the remaining E sessions. Spring migrants were seen in impressive numbers at L during the first session with the highest count being 450 on 6 Jun. By the next L period, fall migrants were recorded, with several hundred seen daily and a high count of 600 on 26 Jul. Numbers were much lower in the final L session, with the high count being 75 on 11 Sep. One bird seen at M on 4 Jun was a spring migrant and the only report at that site.

RUTU	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	10/13 (40)				
1	1/8 (1)		8/9 (75)	9/11 (450)	1/3 (1)
2			7/10 (4)	8/8 (600)	
3	10/11 (150)	2/12 (20)	8/11 (15)	10/10 (75)	

Red Knot



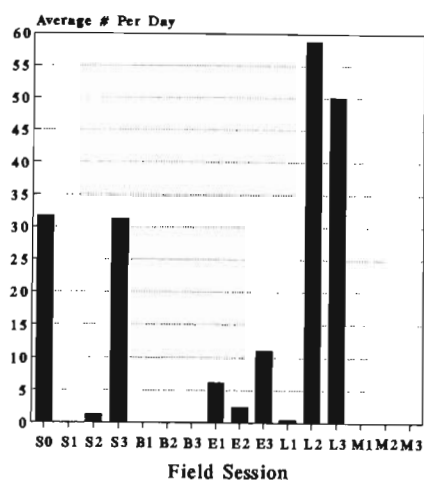
REKN

Calidris canutus

Knots were found at all coastal sites and large fall concentrations were noted in southern JB; however, no substantial spring flights were recorded. At S, small groups of migrants were seen on three dates, with the high count being 35 on 25 May. Eight on 25 Jun were the only birds recorded in the second S session and were likely late spring migrants. Fall migrants were scarce in the third S session, with three on 15 Jul, but small numbers were seen regularly in the final S period, with an unusual high of 95 on 24 Aug. At B, the only records were three spring migrants on 21 Jun and two birds, presumed fall migrants, on 15 Jul. The only spring migrants at E were three on 19 Jun. Numbers of fall migrants built up during the second E period with an eventual high of 320 on 1 Aug. By the final E session, small numbers were still present, except for a large group of 90 on 5 Sep. Spring migrants were seen on four dates at L, with the last report being four on 13 Jun. Very large numbers were seen during the second L period, with the two highest counts being 1600 and 926 on 26 Jul and 1 Aug, respectively. Only two observations were made during the final L session, 24 on 6 Sep and one on 10-11 Sep.

REKN	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	3/13 (35)				
1	1/8 (8)	1/12 (3)	1/9 (3)	4/11 (5)	
2	1/8 (3)	1/10 (2)	9/10 (320)	8/8 (1600)	
3	8/11 (95)		7/11 (90)	3/10 (24)	

Sanderling



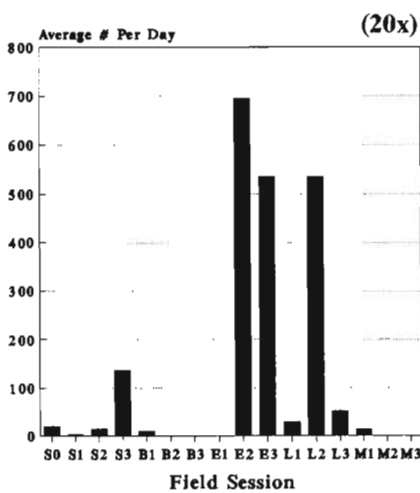
SAND

Calidris alba

Spring migrants at S were seen in small numbers, with an unusual high of 300 on 3 Jun. None were recorded in the next S period, but three birds on 14-15 Jul and four the next day were fall migrants and the only observations in the third S period. Moderate numbers were observed throughout the final S period, with the high being 60 on 24, 26 and 30 Aug. This species is very much a coastal migrant, probably accounting for the lack of sightings at B. Spring migrants were seen at E on 12, 13 and 15 Jun with four, 40 and 12 birds, respectively. A few birds were noted on four dates during the middle session and, by the final period, they were seen regularly in small numbers, with an unusual high of 60 on 6 Sep. At L, only five birds were observed on three dates during the first period. By the second session, fall migrants were present in moderate numbers, with an unusual high of 250 on 26 Jul. The final period recorded similar numbers, again with unusual highs of 106 and 125 on 5 and 6 Sep, respectively.

SAND	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	7/13 (300)				
1			3/9 (40)	3/11 (3)	
2	3/8 (4)		4/10 (9)	8/8 (250)	
3	10/11 (60)		8/11 (60)	10/10 (125)	

Semipalmated Sandpiper

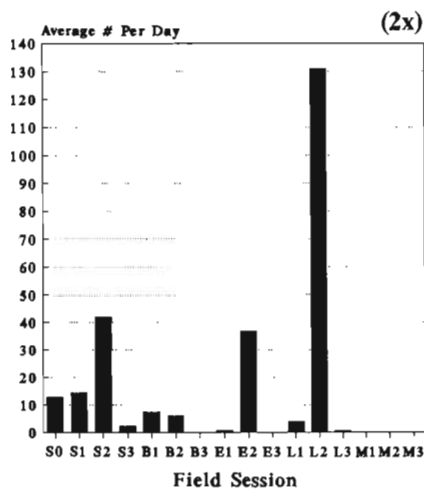


SESA

Generally, small numbers of migrants were seen during the first S session, but one group of 120 was observed on 5 Jun. Fifteen birds recorded on three dates during the second S session were probably the vanguard of fall migrants, and no evidence was found to suggest local breeding. Neither Peck and James (1983) nor the Atlas (Cooke in Cadman et al. 1987) recorded breeding in the area between the Severn and Winisk rivers. Small numbers were seen on four dates in the third S session and numbers picked up during the final S period, with a high count of 240 on 26 Aug. At B, the species was present in low numbers and nests were found. During the last two B sessions, birds were decidedly scarce and infrequently seen. Six birds on 19 Jun was the only report from the first E session and were likely late spring migrants. They were very common during the next two E sessions, averaging about 600 birds daily. Some high counts for the last two E periods were 1700 on 31 Jul, 1200 on 26 Jul and 1200 on 6 Sep. In contrast, L recorded small numbers throughout the first period, with a high of 80 on 11 Jun. The second L session reported fall migrants in similar numbers to E, with high counts of 1570 on 27 Jul and 1200 on 26 Jul, but numbers in the final L period were considerably lower, with the high being only 131 on 5 Sep. Forty spring migrants at M on 4 Jun was the only observation at that site.

SESA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	11/13 (120)				
1	3/8 (9)	10/12 (22)	1/9 (6)	8/11 (80)	1/3 (40)
2	4/8 (73)	6/10 (2)	10/10 (1700)	8/8 (1570)	
3	11/11 (240)	1/12 (10)	11/11 (1200)	10/10 (131)	
ED		20-27 June			

Least Sandpiper



LESA

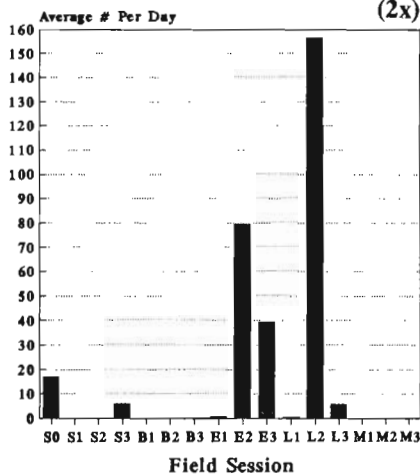
Small numbers were seen throughout the S sessions with several exceptions. Forty birds on 31 May was the last main thrust of spring migrants, while 40 on 28 Jun were considered fall migrants. The only other notable S count was 200 on 15 Jul. Breeding was demonstrated with the capture of a flightless chick. At B, small numbers were seen during the first two sessions, comprised mostly of local breeding birds. Ten on 22 Aug was the only report of the final B session. Single birds were seen on most days of the first E session, suggestive of local breeding, but no strong evidence was found. Numbers increased during the second E period, with a high count of 85 on 1 Aug. None were found in the final E period. The largest numbers of Least Sandpiper came from L. Small numbers were present in the first L session, with an unusual high count of 20 on 8 Jun, probably late spring migrants. Numbers had increased dramatically by the second L period, with an unusual high of 490 on 26 Jul and the next highest count was 190 on 30 Jul. Six birds on 5 Sep were the only reports of the final L period.

LESA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	13/13 (40)				
1	8/8 (40)	10/12 (17)	6/9 (1)	7/11 (20)	
2	8/8 (200)	10/10 (13)	10/10 (85)	8/8 (490)	
3	8/11 (8)			1/10 (6)	
ED		19 June - 10 July			
CD		10-11 July			

Calidris pusilla

Calidris minutilla

White-rumped Sandpiper



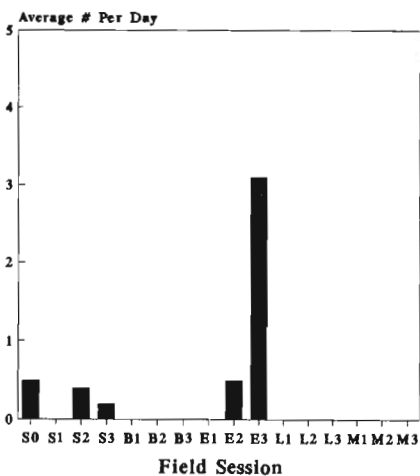
WRSA

Spring migrants were seen at S throughout the first session in small numbers, with high counts of 40 on 1 and 5 Jun. Small numbers, during the final session, were the only other observations from S. None were observed at B, presumably due to the sites inland location. Two on 13 Jun, one on 15 Jun and four on 19 Jun were spring migrants and the only reports for the first E session. Good numbers were present during the following E session, with an unusual high of 250 on 31 Jul. Numbers were down by the final E period, but appear inflated on the graph by a very high count of 300 on 6 Sep. Singles on 6 and 8 Jun and five on 11 Jun were the only spring migrants observed at L. Large numbers of southbound birds were seen during the next L period, with an unusual high count of 460 on 26 Jul and the next highest count being 163 on 29 Jul. Small numbers were recorded during the final L period.

WRSA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	10/13 (40)				
1			3/9 (4)	3/11 (5)	
2			9/10 (250)	8/8 (460)	
3	6/11 (25)		11/11 (300)	9/10 (19)	

Calidris fuscicollis

Baird's Sandpiper



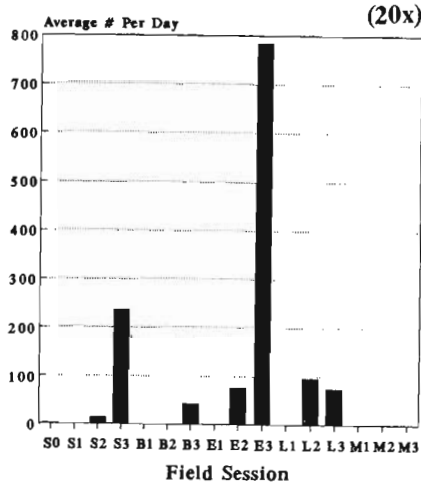
BASA

Baird's Sandpipers are scarce migrants in the HBL. Spring migrants were recorded at S, with one on 28 May, two on 29 May, one on 30 May, two on 4 Jun and one on 7 Jun. Three birds on 15 Jul and two on 30 Aug were the only fall reports from S. E was the only other site to report this species, all involving fall migrants. In the second E period, one was observed on 26 Jul and two on 29 Jul and 1 Aug. In the final E session, from one to three were reported almost daily, with a high of six on 7 and 12 Sep and 10 on 6 Sep.

BASA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	5/13 (2)				
1					
2	1/8 (3)		3/10 (2)		
3	1/11 (2)		10/11 (10)		

Calidris bairdii

Pectoral Sandpiper



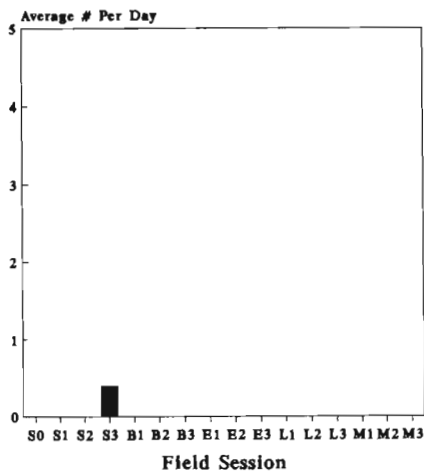
PESA

Spring migrants were scarce at S, with five on 29 May, two on 31 May and two on 2 Jun. Single birds on 23 and 28 Jun were likely fall migrants. Small numbers were present during the third S period and increased steadily through the last S session, reaching a high count of 900 on 28 Aug. At B, they were seen in small numbers only during the third session. One on 15 Jun at E is difficult to interpret, but may be a non-breeding bird or an early fall migrant. By the second E session, moderate numbers were present, with an unusual high of 300 on 29 Jul and the next highest count of 90 on 26 Jul. Very large numbers had arrived by the final E session, with a spectacular count of 5000 on 6 Sep, and 1200 on 10 Sep, though most days reported from 200 to 400. Pectorals were missed in the first L session, but were present in moderate numbers during the final two periods. The high L counts were 375 on 26 Jul and 200 on 11 Sep.

PESA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	3/13 (5)				
1	2/8 (1)		1/9 (1)		
2	6/8 (38)		10/10 (300)	8/8 (375)	
3	11/11 (900)	12/12 (87)	11/11 (5000)	10/10 (200)	

Calidris melanotos

Purple Sandpiper

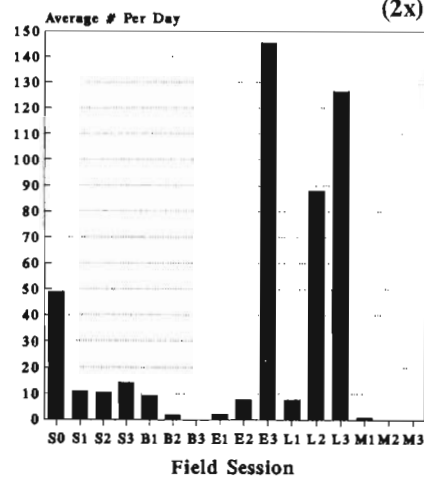


PUSA

Four birds observed on 30 Aug at S were the only reports of the study. This species breeds throughout the eastern Arctic, with outlying southern extensions to the Belcher Islands and North Twin Island (Godfrey 1986). A sighting of a single adult at Cape Henrietta Maria on 6 Jul 1985 was classified as a possible breeder by the Atlas, based primarily on the observation occurring in apparently suitable habitat (Hussell *in* Cadman et al. 1987). There are no other reports to suggest breeding in Ontario, although it shouldn't be ruled out. This species is a scarce fall migrant in southern JB and is normally not observed before mid Oct, so the birds observed at S were unusually early.

PUSA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					
2					
3	1/11 (4)				

Dunlin



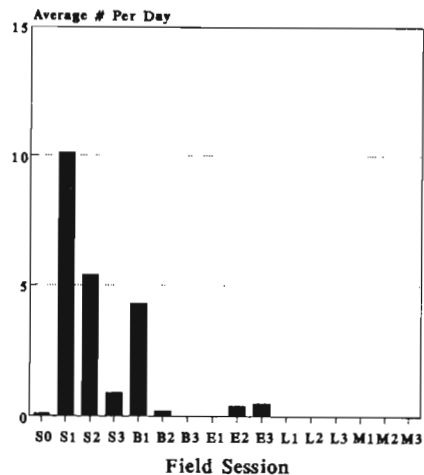
(2x)

DUNL

At S, typically 20 Dunlins would be seen daily during the first period but several big migration flights inflated the averages, the highest count being 200 on 1 Jun. For the remaining three S sessions, small numbers were seen, but not on a daily basis. Although within the known breeding range of Dunlin, no evidence of nesting was found. At B, it was regular in small numbers throughout the first period and several nests were found. It was suspected that most birds observed were either breeding or attempting to, as display flights were common. It was infrequently seen in small numbers during the second B session and missed altogether in the final B period. Spring migrants at E were 18 on 13 Jun and three on 15 Jun. Small numbers were reported throughout the second E session and numbers increased in the final E period, with 150-200 observed most days and the highest count being 400 on 6 Sep. Small numbers were recorded moving north at L in the first period, with a high of 25 on 7 and 8 Jun. Fall migrants arrived part way through the second L period, with the first large group of 320 on 29 Jul. It was common in the final L session, with typical daily counts in the 50-100 range and an unusual high of 750 on 8 Sep. Three spring migrants on 4 Jun was the only M sighting.

DUNL	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	12/13 (200)				
1	7/8 (35)	10/12 (27)	2/9 (18)	6/11 (25)	1/3 (3)
2	7/8 (43)	8/10 (5)	9/10 (20)	5/8 (320)	
3	8/11 (60)		11/11 (400)	9/10 (750)	
CD		27 June			

Stilt Sandpiper



STSA

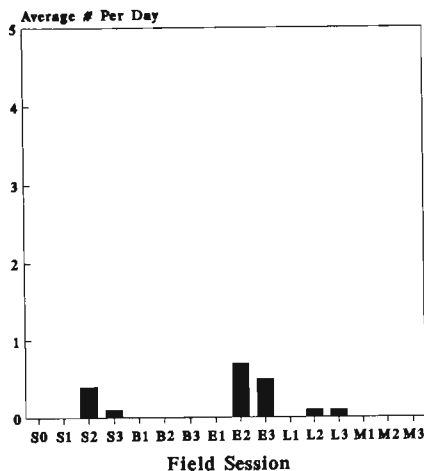
One bird on 2 Jun was the only report for the first S session. Birds reported on six dates during the last part of the second S session were presumed to be fall migrants. Thirty-two on 24 Jun and 10 on 25 Jun were the largest daily totals for that period. Migrants were seen on six dates during the third S session but in smaller numbers, with 19 on 15 Jul and 13 on 16 Jul being the highest counts. Four on 27 Aug and six on 30 Aug were the only reports of the final S period. At B, small numbers were present throughout the first session and were suspected of breeding, though no nests or young were found. On most days, at least three or four birds could be heard displaying, primarily from the wet, hummocky tundra fen about half-way between camp and the coast. Two birds on 17 Jul were the only sightings from the second B session and none were recorded in the final B period. This species is a scarce breeding bird along Ontario's HB coast, with confirmed breedings being found from

Calidris himantopus

just south of Cape Henrietta Maria west to the Sutton River mouth (Peck and James 1983). Migrants were seen at E in the last two periods, with two on 24 Jul, two on 30 Jul, three on 6 Sep and one on 9-10 Sep. None were seen at L or M and, in general, it is a very uncommon fall migrant in southern JB.

STSA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	1/13 (1)				
1	5/8 (32)	9/12 (12)			
2	6/8 (19)	1/10 (2)	2/10 (2)		
3	2/11 (6)		3/11 (3)		

Buff-breasted Sandpiper



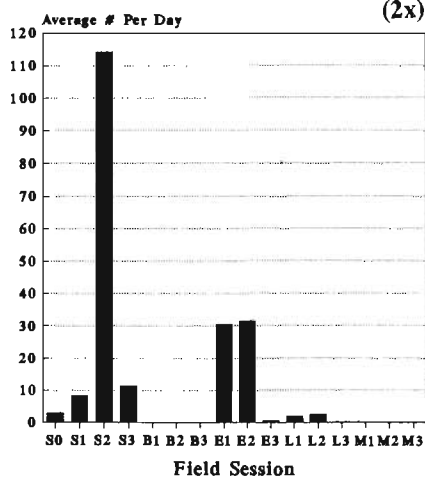
BBSA

This species is a scarce, but regular, fall migrant along the coast. Three on 17 Jul and one on 22 Aug were the only S records. At E, seven were seen on 1 Aug, one on 5 Sep, two on 8-9 Sep and one on 10 Sep. Singles on 26 Jul and 4 Sep were the only L reports.

Tryngites subruficollis

BBSA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					
2	1/8 (3)		1/10 (7)	1/8 (1)	
3	1/11 (1)		4/11 (2)	1/10 (1)	

Short-billed Dowitcher



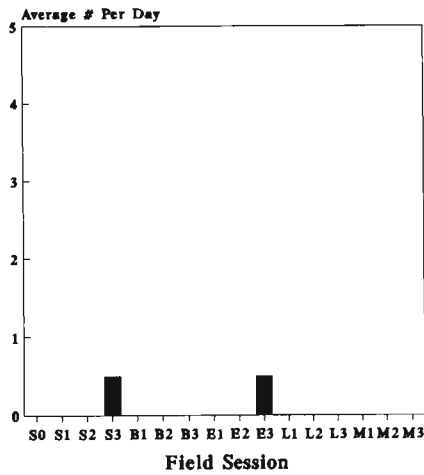
SBDO

At S, small numbers were present throughout the first session and the beginning of the second. These likely involved both local breeders, although no eggs or chicks were found, and non-breeding individuals. Mid way through the second S period, fall migrants began to appear, including groups of 20 and 30 on 24 and 28 Jun, respectively. They were common during the third S period, with an unusual high of 240 on 12 Jul. Numbers dropped considerably by the final S session, though they were still seen regularly. In the tundra of B, the species was missed entirely. At E, dowitchers were present in moderate numbers throughout the first two sessions and some were suspected of breeding, but most were considered to be fall migrants. In the final E session, only five birds were reported on four dates. At L, a few birds were seen daily, with a high count of seven on 6 Jun. While this latter group were suspected of being migrants, several birds were regularly heard doing low intensity display flights at the transition from swampy forest to super-tidal meadow, and may have been breeding. Surprisingly, there was no significant change in numbers or migration noticed during the second L session, and one seen on 6 Sep was the only report from the last L period. Displaying birds were reported from S and L; however, it was difficult to determine whether they actually bred here or not. This species is notoriously difficult to confirm as a breeder and it is necessary to locate a nest or flightless young before confidence in breeding can be established.

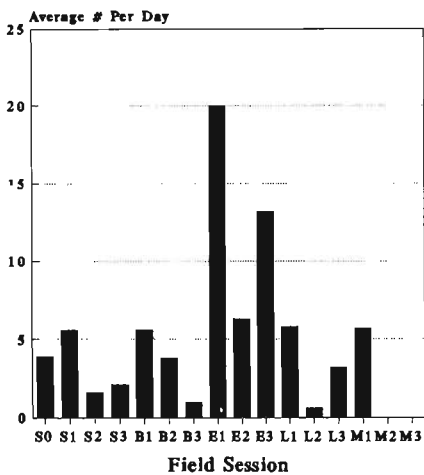
Limnodromus griseus

SBDO	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	10/13 (8)				
1	6/8 (30)		9/9 (60)	9/11 (7)	3/3 (6)
2	8/8 (240)		10/10 (75)	7/8 (7)	
3	11/11 (25)		4/11 (2)	1/10 (1)	

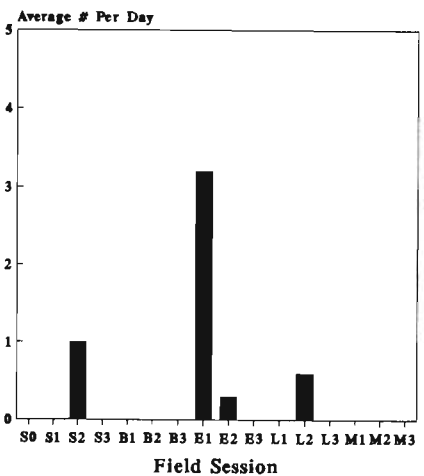
Long-billed Dowitcher



Common Snipe



Wilson's Phalarope



LBDO

Migrant Long-billed Dowitchers were reported during the final sessions at both S and E, suggesting that this species is a regular migrant in the HBL in small numbers. Based on these reports, the species was dropped from the Ontario Bird Records Committee review list for northern Ontario (Curry 1991). At S, one was observed on 23 Aug, three on 26 Aug and one on 30 Aug. E records were one on 9 Sep, three on 10 Sep and one on 12 Sep.

LBDO	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					
2					
3	3/11 (3)		3/11 (3)		

COSN

Common Snipes were recorded at all sites and, in general, were found in low numbers. Most early records pertain to displaying males and those numbers probably closely reflect the number of territorial birds in the study site. Most locations recorded a decrease in observations during Jul, when singing stops or is curtailed substantially. E reported the greatest numbers, with a high count of 30 birds on 15 Jun, and was the only site where an actual nest was located. E also had a noticeable increase in numbers during the final session, perhaps reflecting the "observability" of migrant snipes in that habitat. At M, birds were heard displaying in many areas but were not noted after the first session when singing had stopped. Direct evidence of nesting is difficult to find, but they likely bred at all locations.

COSN	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	10/13 (9)				
1	7/8 (12)	11/12 (14)	9/9 (30)	11/11 (10)	3/3 (6)
2	7/8 (3)	10/10 (8)	9/10 (12)	4/8 (2)	
3	9/11 (5)	7/12 (3)	11/11 (20)	10/10 (9)	
ED			17-23 June		

WIPH

This species shares a similar status to the Marbled Godwit in that it is essentially a prairie nesting species but has a disjunct breeding population in southern JB. It may breed further north, for it has nested at Churchill, Manitoba (Bousfield et al. 1986). The first proof of breeding in the HBL was obtained at North Point in 1975 (Morrison and Manning 1976), and JB remains the only confirmed breeding area in the Ontario HBL, according to the Atlas (Cadman in Cadman et al. 1987). However, data from this project suggests that birds may be breeding elsewhere. At S, one was seen on 15 Jul, three on 16 Jul and four the next day. Surprising numbers were found at E during the first session. There was a pair on 12 Jun, three on the 13th, three on the 14th, five on the 15th, two on the 16th, four on the 17th, three on the 18th, four on the 19th and three on the 20th. During the second E period, two juveniles were seen on 30 Jul and one bird on 1 Aug. While not proven, it seemed likely that there was a breeding population nearby. The only other reports came from L, where a juvenile was seen on five dates between 26 Jul and 1 Aug. Data from this study suggest that the Wilson's Phalarope is breeding north on the west JB coast to at least E and that small numbers are present on the HB coast, with possible nesting there as well.

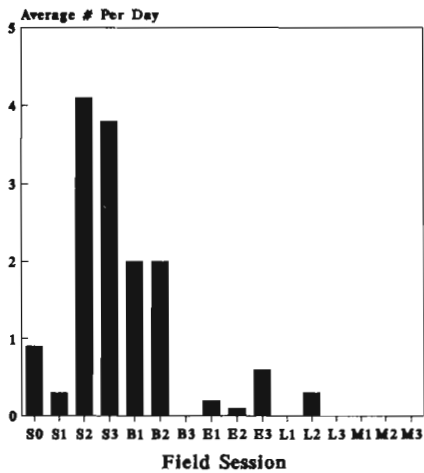
WIPH	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1			9/9 (5)		
2	3/8 (4)		2/10 (2)	5/8 (1)	
3					

Limnodromus scolopaceus

Gallinago gallinago

Phalaropus tricolor

Red-necked Phalarope

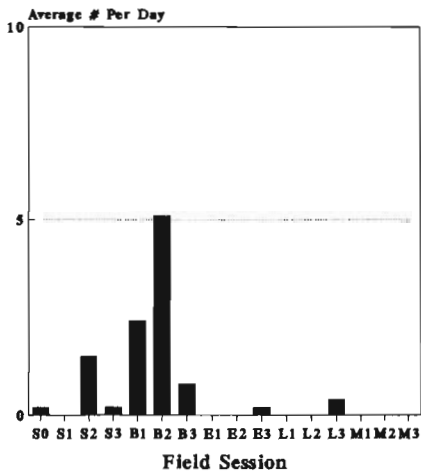


RNPH

Red-necked Phalaropes were most common at S, but even there, numbers were lower than we expected. During the first S session, they were seen irregularly and in small numbers. In the second S session, the peak of the breeding period, only two birds were documented, suggesting that local nesting was rare if at all. Fall migrants were more frequent on the final two S sessions, with respective high counts of 18 on 15 Jul and 27 on 22 Aug. Most of these migrants were seen in coastal ponds and not inland. At B, small numbers were present throughout the first session. It was suspected that only one or two pairs held territories in the B study area, a surprisingly low number considering the extent of what appeared to be suitable habitat. They were very scarce during the second B period, except for a migrant flock of 15 on 13 Jul, and were absent by the final B session. Single spring migrants were seen at E on 15 and 18 Jun, while fall migrants were one on 1 Aug, two on 6 Sep, four on 10 Sep and one on 12 Sep. The only L report was of a male and a juvenile observed on 27 Jul.

RNPH	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	5/13 (4)				
1	1/8 (2)	9/12 (6)	2/9 (1)		
2	5/8 (18)	3/10 (15)	1/10 (1)	1/8 (2)	
3	8/11 (27)		3/11 (4)		

Parasitic Jaeger

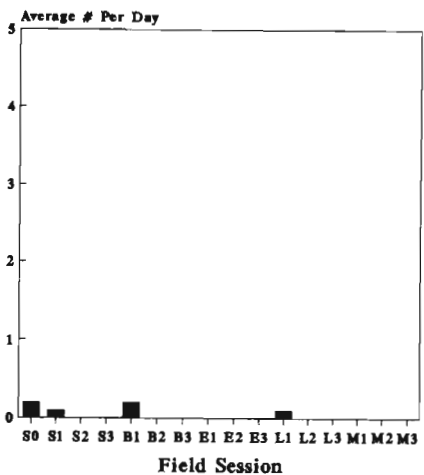


PAJA

This bird was reported from all coastal sites and the inland tundra site. At S, two on 4 Jun was the only sighting of spring. By early Jul, small numbers were recorded moving along the coast, with a high of seven on 11 Jul. Most of these likely refer to sub-adults and failed breeders, and no evidence to suggest breeding was found. Two on 27 Aug were the only birds noted during the last S session. At B, small numbers of Parasitic Jaegers were observed daily during the first two sessions, with a high count of 11 on 16 Jul. A nest, located about half way between camp and the coast, is only the second active nest ever found in Ontario (Peck in Cadman et al. 1983). Some of the other birds observed at B may have been nesting nearby or were sub-adults and failed breeders. Small numbers were reported during the third B session, but not on a daily basis. Two on 4 Sep at E were fall migrants and the only reports from that site. The only L reports were fall migrants, with three on 7 Sep and one on 11 Sep.

PAJA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	1/13 (2)				
1		11/12 (6)	0		
2	4/8 (7)	10/10 (11)			
3	1/11 (2)	5/12 (3)	1/11 (2)	2/10 (3)	
ED		23 June			

Long-tailed Jaeger

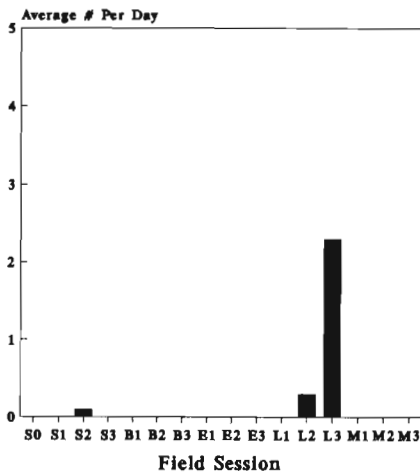


LTJA

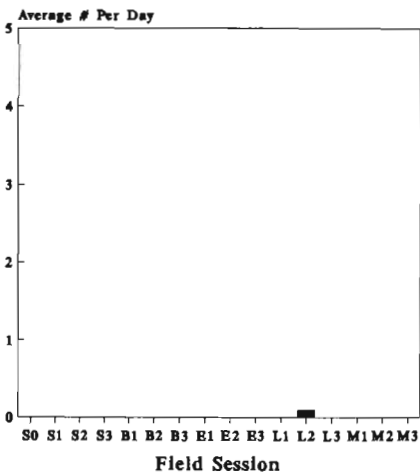
This species presence was documented at the three coastal sites and all were presumed to be spring migrants. Singles were at S on 4, 5 and 27 Jun, at B on 18 and 23 Jun and at L on 11 Jun. This species is a scarce but regular migrant on the HB coast, becoming rarer in southern JB.

LTJA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	2/13 (1)				
1	1/8 (1)	2/12 (1)		1/11 (1)	
2					
3					

Little Gull

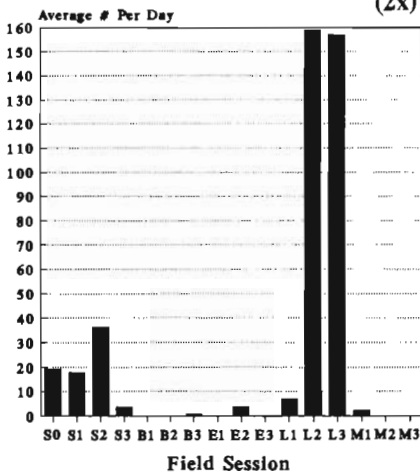


Common Black-headed Gull



Bonaparte's Gull

(2x)



LIGU

An adult, observed with Bonaparte's Gulls at S on 10 Jul, may have been a failed breeder. All other observations from the study were at L, where one adult was present from 31 Jul-1 Aug and up to five adults and one young-of-the-year were seen between 4 - 10 Sep. In addition to these reports, Little Gulls were seen regularly during May on the Moose River, with up to 15 reported daily. It has been suggested that the HBL may be the core breeding area in North American for this scarce species (McRae 1989), with confirmed breeding records from Churchill, Manitoba (McRae 1984), near Winisk and between Attawapiskat and Fort Albany (Weseloh in Cadman et al. 1987). Repeated observations from the HBL, particularly from the southern half of JB, suggest that most birds may be breeding on ponds and freshwater marshes along the western shore of JB. Little Gulls usually nest in association with terns - so special effort should be made to search for it whenever tern colonies are encountered.

LIGU	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					
2	1/8 (1)			2/8 (1)	
3				6/10 (6)	

Larus minutus

CBHG

An adult, found with one Little Gull and many Bonaparte's Gulls at L on 31 Jul, is only the second record for this species in JB (Bain 1992), but with increased coverage it might be found more often, perhaps even annually.

CBHG	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					
2				1/8 (1)	
3					

Larus ridibundus

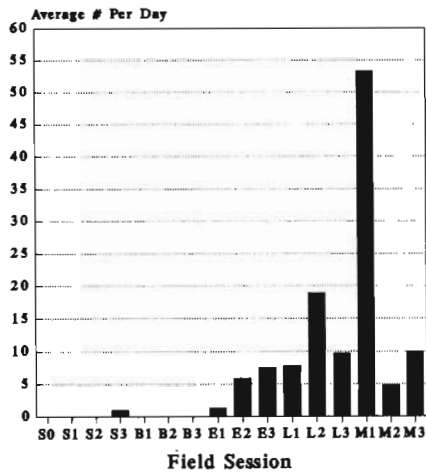
BOGU

Small numbers were seen throughout the S sessions, though numbers had dropped by the final period. Three nests were found and others were probably nesting nearby. At B, the species was recorded only twice, with eight on 23 Aug and two the next day. Given the fact that Bonaparte's are tree-nesters, it's not surprising that they went unrecorded on the inland open tundra of B until after breeding had finished. At E, small numbers, presumably failed breeders and/or unmated birds, were seen during the middle session only, with a high count of 15 on 28 Jul. L recorded the largest numbers of this species. During the first L session, small numbers of spring migrants were present throughout, with a high of 30 on 10 Jun. By Jul, large numbers began to gather on the tidal flats, with a high count of 240 on 30 Jul. Most of these birds were adults and were presumably failed breeders and unmated individuals. During the last L session, numbers peaked at 500 on 10 Sep but fell off dramatically within a few days. Previous work in southern JB also suggests that they become very scarce after the first week of Sep (McRae pers. obs.). Seven birds on 4 Jun at M were the only reports and likely involved spring migrants. Bonaparte's Gulls can be expected to nest anywhere in the HBL where suitable nest trees can be found - especially along rivers, lakeshores and in the taiga zone.

Larus philadelphia

BOGU	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	13/13 (45)				
1	8/8 (40)			5/11 (30)	1/3 (7)
2	8/8 (60)		6/10 (15)	7/8 (240)	
3	6/11 (13)	2/12 (8)		9/10 (500)	
ED	21 June - 11 July				
CD	11-15 July				

Ring-billed Gull



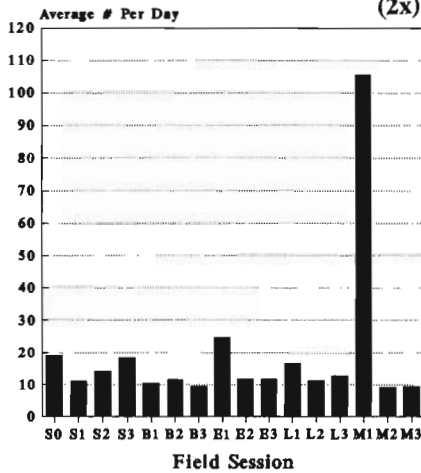
RBGU

The observations from S included two single adults in the first and third sessions, and a small number, primarily young of the year, recorded on three dates in the last session. None were reported from B. At E, birds were seen in small numbers during all sessions, but were irregular during Jun. Ring-billed Gulls were seen regularly in small numbers at L and six nests were located on the tip of Longridge Point. Previously, breeding in JB has been reported only from Akimiski Strait and an island in southern JB (Peck and James 1983). It seems likely that more colonies will be discovered over time but the prospects for expansion and long-term occupation of the Longridge Point colony seems limited, since, unlike islands, it is not protected from land-based predators. At M, this species was common during the first session but seen in fewer numbers during subsequent sessions.

Larus delawarensis

RBGU	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	1/13 (1)				
1			5/9 (5)	10/11 (24)	3/3 (60)
2	1/8 (1)		10/10 (10)	8/8 (40)	5/5 (12)
3	4/11 (4)		11/11 (14)	9/10 (28)	3/3 (10)
ED				7-13 June	

Herring Gull



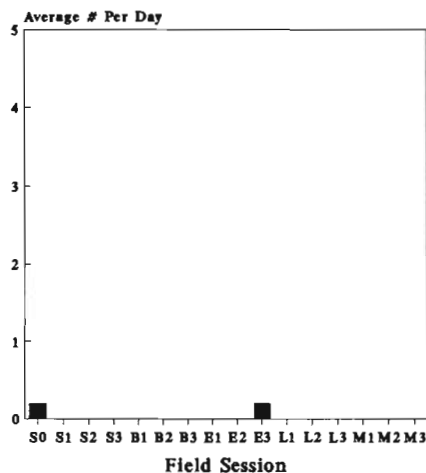
HERG

This widespread gull was seen in small numbers at all sites throughout the study. The only nest found was at S, but breeding was also suspected at B. Typical nest sites in the HBL are small rock or vegetated islands in ponds, but unlike Ring-billed Gulls, this species is not generally found nesting in large colonies. The increased numbers reported during the first session at M are primarily of non-breeding sub-adults, that congregate at the dump.

Larus argentatus

HERG	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	13/13 (40)				
1	8/8 (20)	12/12 (20)	9/9 (63)	11/11 (28)	3/3 (225)
2	8/8 (25)	10/10 (24)	10/10 (30)	8/8 (30)	5/5 (15)
3	11/11 (30)	12/12 (17)	11/11 (32)	10/10 (34)	2/3 (25)

Thayer's Gull



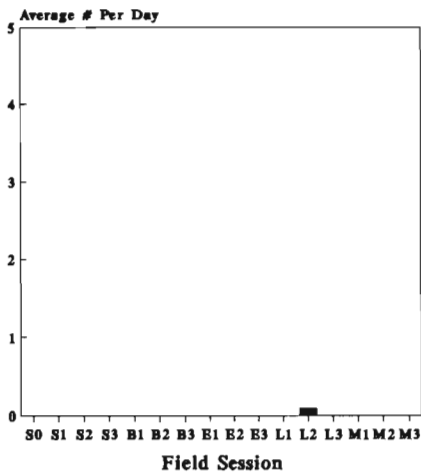
THGU

A first-winter immature on 28 May and an adult and first summer immature on 4 Jun were the only reports from S. The only other reports from the study were at E, where a third winter immature was seen on 4 Sep and an adult on 6 Sep. Recent fieldwork by birders on the coast and at townsite dumps suggests this species is a scarce but regular migrant. The taxonomy of this species has been debated and revised many times and most authorities (Godfrey 1986, James 1991) now consider it to be a subspecies of Iceland Gull, rather than a separate species. The AOU have yet to decide on its status, but, as the form is visually distinctive and has yet to be officially merged, it is accorded full species status here.

Larus thayeri

THGU	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	2/13 (2)				
1					
2					
3			2/11 (1)		

Iceland Gull



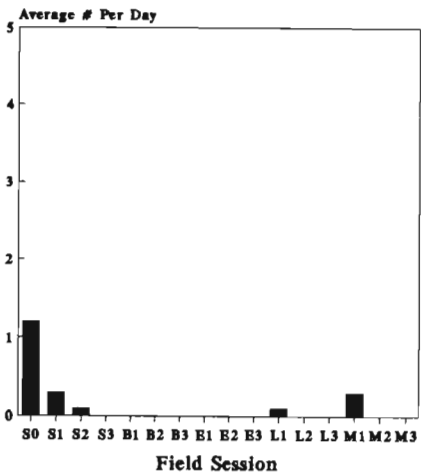
ICGU

Larus glaucooides

A first summer immature at L on 1 Aug was the only report for the project. This species is a scarce but regular migrant along the coast, particularly in the fall, but most birds occur in Oct and Nov, well after the study periods ended. There are relatively few records for Ontario at this time of year.

ICGU	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					
2				1/8 (1)	
3					

Glaucous Gull



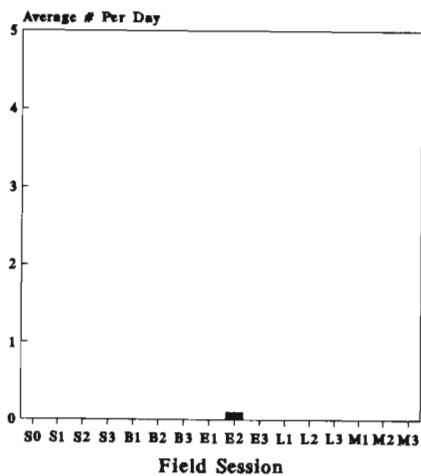
GLGU

Larus hyperboreus

Five birds on 28 May and 11 on 29 May were the only sightings from the first session at S and likely involve migrants. Single, non-breeding sub-adults on 25 and 26 Jun and 14 Jul were the only other S reports. A first summer bird at L on 12 Jun and a first summer bird at the dump in M on 3 Jun were the only other reports for the study. Glaucous Gulls are regular migrants, although not seen in large numbers, and are scarce in summer.

GLGU	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	2/13 (11)				
1	2/8 (1)			1/11 (1)	1/3 (1)
2	1/8 (1)				
3					

Great Black-backed Gull



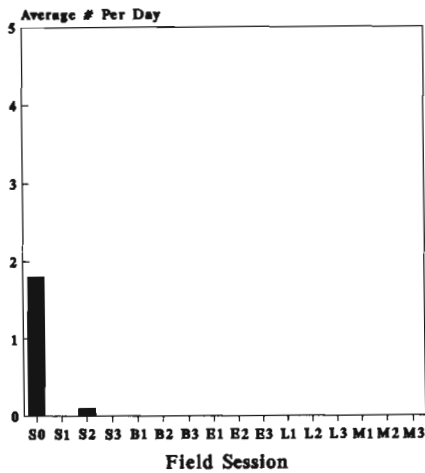
GBBG

Larus marinus

The only report for the study period was one bird, identified as a juvenile, at E on 28 Jul. In addition, several birds were seen in Moosonee during late Apr and May. Although most references still consider the bird to be rare in this region, recent fieldwork by birders on the coast and at town garbage dumps have shown a regular passage in both spring and fall (McRae pers. obs.). These sightings may refer to birds which have bred in northern Labrador or, possibly, small numbers which have established themselves somewhere in HB or JB. The fact that the E bird was a young of the year may support this possibility.

GBBG	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					
2				1/10 (1)	
3					

Sabine's Gull



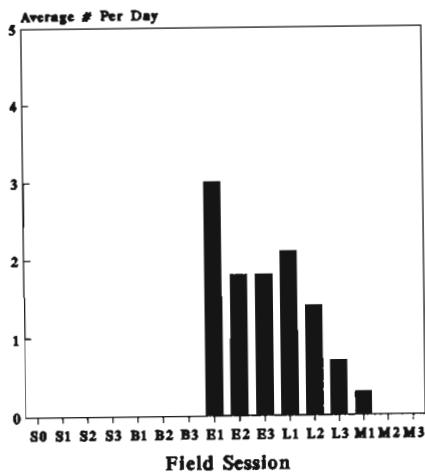
SAGU

Xema sabini

Twenty-three adults migrating past S on 7 Jun are at the eastern fringe of their spring route. This species is likely regular on the HB coast in spring - especially near the Manitoba border. More unusual was an adult observed with Bonaparte's Gulls on 12 Jul, also at S. There are only a few mid-summer records for the province, presumably involving sub-adults, failed breeders or unmated birds that never completed their northward flight (James et al. 1976).

SAGU	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	1/13 (23)				
1					
2	1/8 (1)				
3					

Caspian Tern



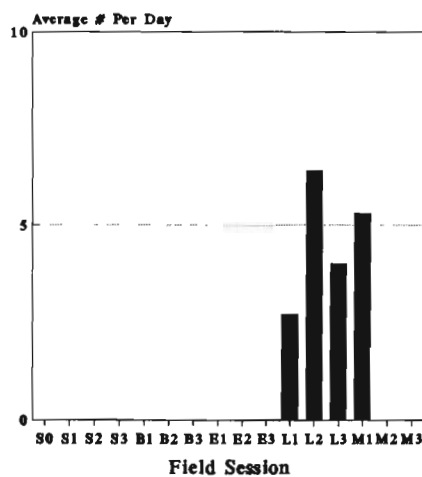
CATE

Sterna caspia

At E, small numbers were reported daily throughout the sessions, with a maximum of eight on 15 Jun. One on 11 Sep was the last E sighting. Most of these birds likely originated from the nesting colony in Akimiski Strait. Small numbers were also observed at L throughout the sessions, with the last sighting there on 10 Sep. The only M report was of one on 3 Jun, and likely involved a migrant. The nesting colony in Akimiski Strait, believed to contain several hundred pairs, is the only known breeding colony in the HBL (Peck and James 1983).

CATE	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1			5/9 (8)	8/11 (6)	1/3 (1)
2			9/10 (6)	5/8 (4)	
3			8/11 (6)	5/10 (3)	

Common Tern



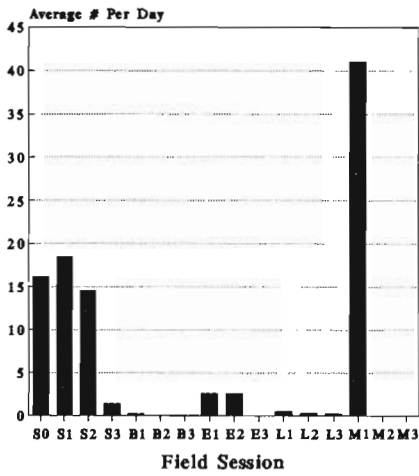
COTE

Sterna hirundo

Common Terns were found only in the southern portion of JB. At L, small numbers were seen in all periods and one nest was found in a small Ring-billed Gull colony at the extreme tip of Longridge Point. This is apparently a new breeding site, and one of very few in JB (Godfrey 1986). The only other observations were from M, where a small number were seen during the first session. The Atlas revealed several inland breeding sites for this species on the HBL, but notes that no breeding birds were found along the HB coast and most of the JB coast (Blokoel in Cadman et al. 1987).

COTE	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1				9/11 (10)	2/3 (10)
2				8/8 (9)	
3				5/10 (19)	

Arctic Tern



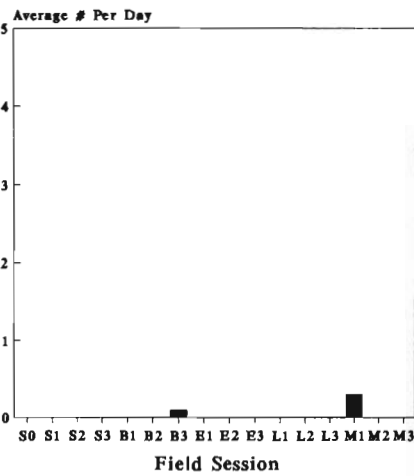
ARTE

Sterna paradisaea

At S, these terns were seen in all sessions and four nests were located. Most sightings presumably pertained to birds breeding locally but, during the first period, some migrants were also noted, with the high count being 70 on 5 Jun. By the final S period, birds were scarce and the last report was of four on 23 Aug. Two on 17 Jun and one on 16 Jul were the only definite reports from B. Several individuals that were either this species or Common Tern were also seen but could not be positively identified. All sightings were of birds foraging along the river and it may be that increased coverage on the coast would have produced more reports. Small numbers were recorded at E during the first two sessions, but no evidence of breeding was found. These birds may originate from the large colony in Akimiski Strait. A few birds were seen during each L session. Two seen on 6 Sep are late. Spring migrants were noted at M when three were seen on 3 Jun and several flocks, totalling 120 birds, were observed the next day. It is interesting to note that these birds appeared to be arriving from inland and were moving rapidly down-river. This offers additional support for the idea of a significant overland flight as proposed by Godfrey (1973).

ARTE	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	12/13 (70)				
1	8/8 (40)	1/12 (2)	5/9 (12)	3/11 (3)	2/3 (120)
2	8/8 (18)	1/10 (1)	4/10 (15)	2/8 (1)	
3	4/11 (9)			1/10 (2)	
ED	21 June - 17 July				

Black Tern



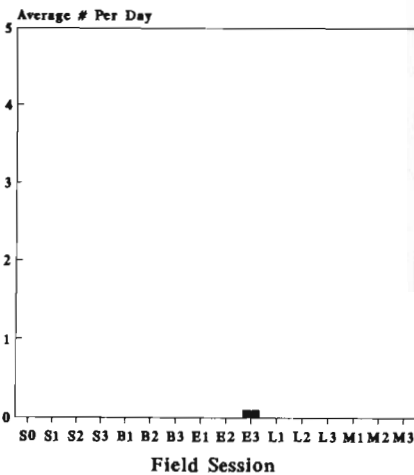
BLTE

Chlidonias niger

An adult feeding on an inland pond at B on 23 Aug was unusual, as the species is rare on the HB coast. More typical was a migrant at M on 3 Jun. This species breeds in small groups throughout the southern HBL, particularly near the JB coast.

BLTE	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					1/3 (1)
2					
3		1/12 (1)			

Black Guillemot



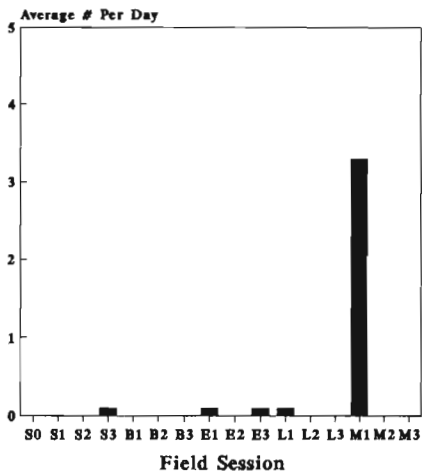
BLGU

Cepphus grylle

One bird, seen at E on 12 Sep, was the only definite record for the project. A small alcid, most likely this species, was seen at S on 20 Aug. The status of the guillemot along the Ontario coast is not well understood. Breeding has been documented near Cape Henrietta Maria (Lumsden 1959) and may occur elsewhere. They have been recorded in all seasons and from numerous points along both the JB and HB coasts and, less frequently, from large rivers as far south as Moosonee; however, the Cape region seems to be the place of greatest abundance and frequency.

BLGU	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					
2					
3			1/11 (1)		

Mourning Dove



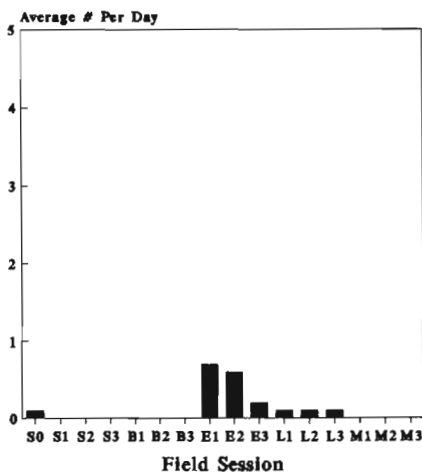
MODO

Zenaida macroura

This species was recorded at all but the B site. Singles were noted at S on 21 Aug, E on 14 Jun and 9 Sep and L on 10 Jun. These were wandering individuals, far beyond the normal breeding range. At M, larger numbers were found. Normally this species occurs annually in small numbers, but the 1991 season saw a dramatic increase in sightings. During our study, up to four birds were recorded in a day during the first session. Other observations from outside our study indicate that a minimum of 12 birds were present in Moosonee and courting and copulating pairs were observed. One male was even heard singing on territory from an old burn over 1 km from human habitation. While no actual nests were found, it seems likely that breeding did occur or that it will commence shortly if expansion continues. At present, the nearest breeding locations are located in the clay belt region (Armstrong *in* Cadman et al. 1987).

MODO	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1			1/9 (1)	1/11 (1)	3/3 (4)
2					
3	1/11 (1)		1/11 (1)		

Great Horned Owl



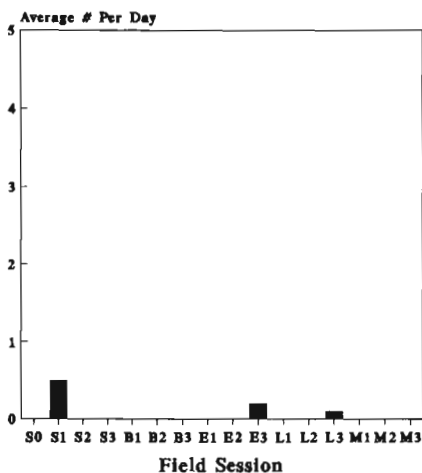
GHOW

Bubo virginianus

A bird heard calling at S on 29 May was the only report from that site. At E, the species was recorded in all sessions and two fledged young were observed. A nest, believed to have been used by this family group, was discovered after it was vacated. Three sightings of single birds at L on 12 Jun, 30 Jul and 13 Sep suggest a regular presence there as well. While no birds were recorded during the M fieldwork, a pair were located south of the quarry in Apr. Great Horned Owls likely breed wherever they are found, so our records of birds at all forested sites suggest a broad breeding distribution, albeit in low densities.

GHOW	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	1/13 (1)				
1			3/9 (4)	1/11 (1)	
2			4/10 (2)	1/8 (1)	
3			1/11 (2)	1/10 (1)	

Northern Hawk Owl



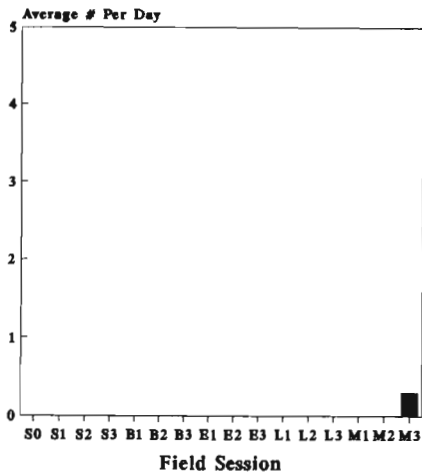
NOHO

Surnia ulula

One pair was present at S and a recently used but empty nest was located. Though young were not seen, agitated behaviour of the adults indicated that fledged young were hidden nearby. Singles at E on 4-5 Sep and at L on 6 Sep likely refer to birds dispersing from breeding sites. During the study period, small mammals were found in extremely low densities (Knight *in* prep.) so the data show low numbers of avian predators. This species has been found nesting at various sites throughout the HBL and can be expected to occur and breed wherever suitable habitat is found.

NOHO	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1	2/8 (3)				
2					
3			2/11 (1)	1/10 (1)	

Great Gray Owl



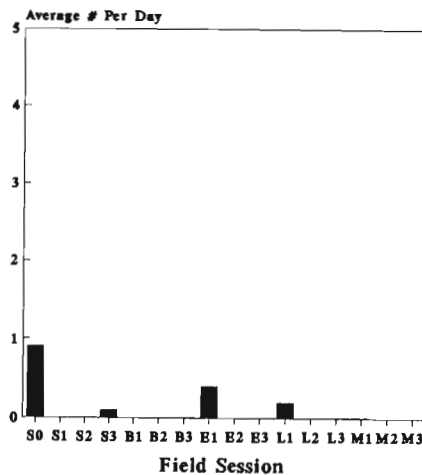
GGOW

Strix nebulosa

One seen at M on 3 Sep was the only report. This species likely occurs throughout the HBL in "good" small mammal years, and could be expected to breed wherever suitable old nests of other birds can be found. One of the few nests found in the province was near Moosonee on an artificial nest platform (Peck and James 1983). The scarcity of this species during our study may relate to the low small mammal populations encountered.

GGOW	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					
2					
3					1/3 (1)

Short-eared Owl



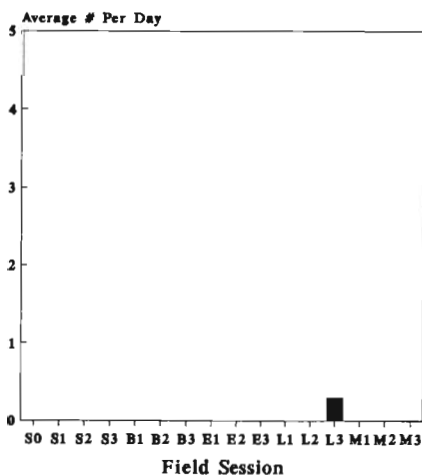
SEOW

Asio flammeus

The lack of small mammals probably accounts for the few observations of this species, whose centre of abundance in Ontario is the coastal strip of the HBL. At S, birds were recorded on scattered dates during the first session, with up to three in one day. Most interesting was a bird observed migrating at high altitude on 4 Jun. It was flying east overhead at the edge of visibility with a 40x scope. One bird on 21 Aug was the only other observation from S. No birds were reported at B, an area where they could be expected in numbers during a high small mammal year. Three on 13 Jun and one the next day were the only reports from E. One bird seen on 7 and 11 Jun at L was the only report there. Clearly, this species was under-represented during our study.

SEOW	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	6/13 (3)				
1			2/9 (3)	2/11 (1)	
2					
3	1/11 (1)				

Boreal Owl



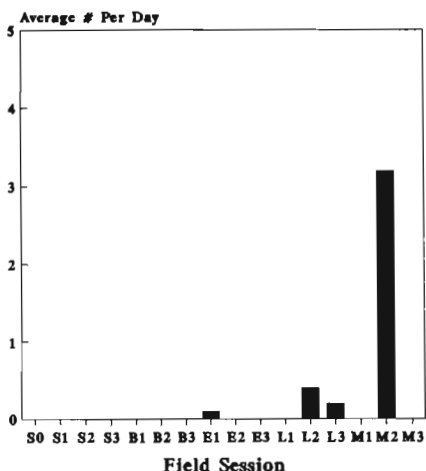
BOOW

Aegolius funereus

One bird was observed on 6, 9 and 11 Sep at L. The Boreal Owl probably breeds throughout the HBL, wherever suitable nest cavities can be found, and could potentially nest at all but the B study site. They are very difficult to detect when not singing, and even more so given that our study years coincided with a widespread small mammal population reduction.

BOOW	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					
2					
3				3/10 (1)	

Common Nighthawk



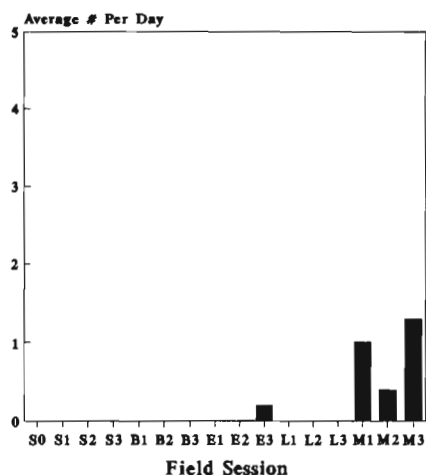
CONI

Chordeiles minor

This species could be expected to occur inland from the HB coast in lichen-rich woodlands, but none were recorded at our two northern sites. One on 12 Jun at E was likely a spring migrant and was somewhat early. At L, several were observed during the second and final sessions, with singles on 27 and 31 Jul, 1 Aug and on 6 and 7 Sep. Most if not all of these likely refer to fall migrants. At M, birds were found during the second session only, with ten on 21 Jul and six the next day. Although no nests were found, nighthawks have previously been found breeding in the M area (Peck and James 1983), and are also given probable breeding status in the Atlas square containing L (Mills in Cadman et al. 1987).

CONI	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1			1/9 (1)		
2				3/8 (1)	2/5 (10)
3				2/10 (1)	

Belted Kingfisher



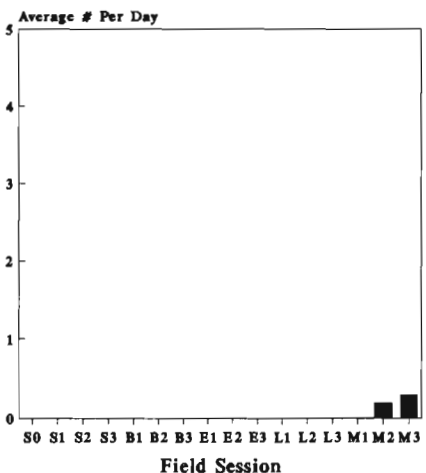
BEKI

Ceryle alcyon

The kingfisher breeds throughout the province (Read in Cadman et al. 1987) wherever suitable riverbank nesting habitat can be found; however, it's presence in our study was only detected at E and M. It would appear that the coastal and tundra habitats of our sites are not attractive to this species but they likely occur inland from the coast along the Little Shagamu and Brant rivers. The only E report was of a single bird on 4 and 9 Sep. At M, small numbers were seen regularly and two nests were located. Other pairs were observed and suspected of nesting at several other M sites.

BEKI	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					2/3 (2)
2					2/5 (1)
3			2/11 (1)		2/3 (3)

Downy Woodpecker



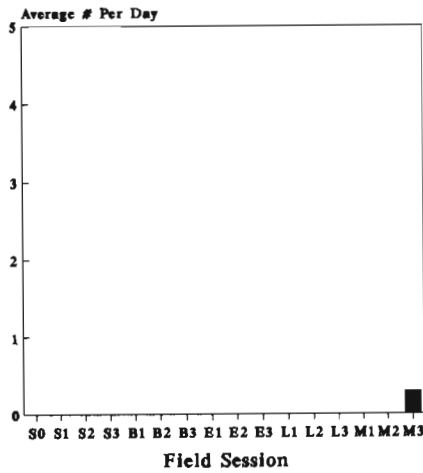
DOWO

Picoides pubescens

Our only records were of single birds at M on 23 Jul and 1 Sep. This species is a fairly common resident of mixed forests in the southern portion of the HBL, with breeding confirmed north to Fort Albany (Parker in Cadman et al. 1987). It could, therefore, have been expected more frequently at M and should have been recorded at L as well. Very few of the transects covered highly suitable Downy Woodpecker habitat and, at L, most non-transect fieldwork was devoted to coastal regions.

DOWO	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					
2					1/5 (1)
3					1/3 (1)

Hairy Woodpecker



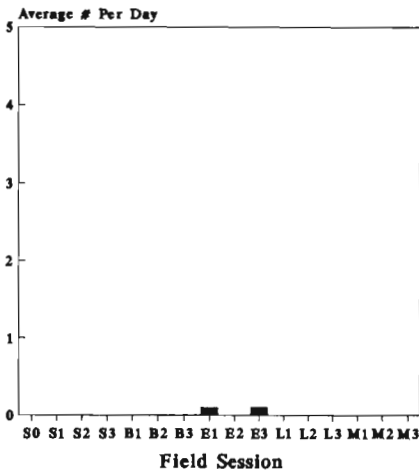
HAWO

One bird on 1 Sep at M was the only study record. What has been said for Downy Woodpecker applies for this species as well. Peck and James (1983) show breeding records from the vicinity of L and as far north as the Sutton Ridges. In addition, a bird was observed excavating a nest cavity near the quarry at M in Apr 1991 (McRae pers. obs.).

Picoides villosus

HAWO	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					
2					
3					1/3 (1)

Three-toed Woodpecker



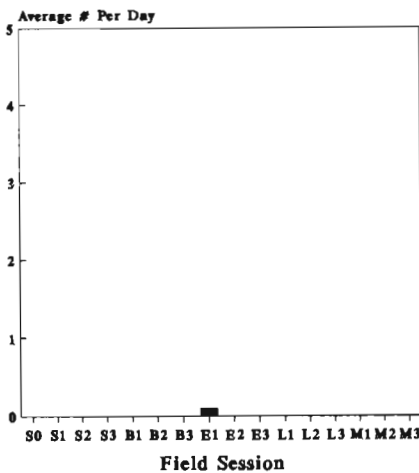
TTWO

Singles on 16 Jun and 7 Sep at E were the only birds reported during the study. This species is rather inconspicuous and can be easily missed without intensive effort. An occurrence during the breeding season likely indicates local nesting. The species could be expected to occur throughout the HBL, wherever large conifers are found. Several birds were reported in the M area independent of our project and the large spruce forest just south west of our L study site appears suitable for this species as well. Intensive forest work in addition to the transect lines appear to be necessary to accurately determine the status of this species.

Picoides tridactylus

TTWO	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1			1/9 (1)		
2					
3			1/11 (1)		

Black-backed Woodpecker



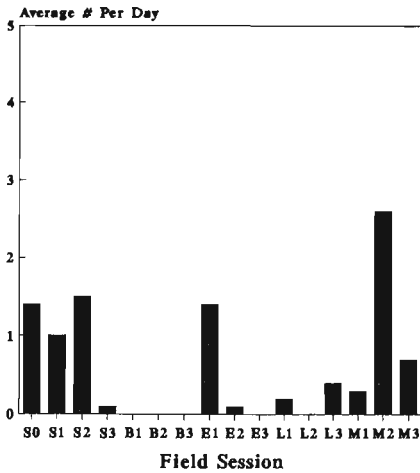
BBWO

A female at E on 19 Jun was the only report. Much of what was said for Three-toed Woodpecker also applies to this species. Birds are frequently seen in M, and the species could be expected at L as well.

Picoides arcticus

BBWO	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1			1/9 (1)		
2					
3					

Northern Flicker



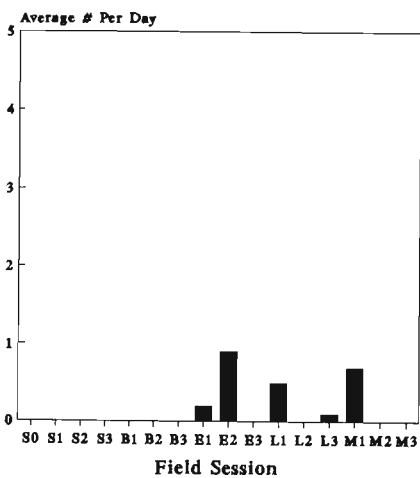
NOFL

Colaptes auratus

Flickers were reported at all sites but on the open tundra of B. Small numbers were seen regularly at S during the first three sessions and one nest was located. One on 21 Aug was the only report of the final S session. At E, one or two were seen on a near daily basis during the first session, but became rare afterwards, with one on 2 Aug being the only other observation. Although no nests were located, breeding here seems likely considering the frequency of sightings in the first E session. Flickers were surprisingly scarce at L, possibly due to the relative lack of large forest near the camp area. Singles on 10 and 12 Jun may have been late migrants or breeding individuals at the edge of their territory. None were reported during the second L session. Single birds reported on 5, 6, 7 and 12 Sep were fall migrants. At M, this bird was observed regularly during all sessions and one nest was found. Flickers are generally common birds throughout the HBL, wherever large trees with some open areas can be found.

NOFL	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	7/13 (6)				
1	4/8 (4)		8/9 (2)	2/11 (1)	1/3 (1)
2	5/8 (5)		1/10 (1)		4/5 (4)
3	1/11 (1)			4/10 (1)	2/3 (1)
CD					28 June - 5 July

Olive-sided Flycatcher



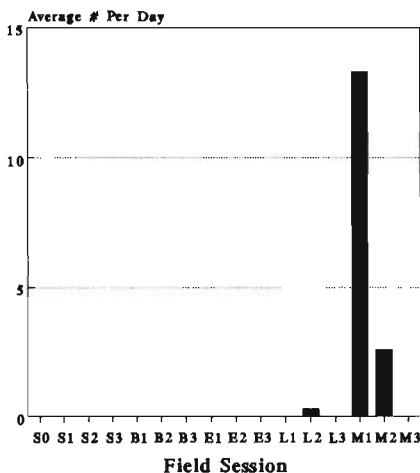
OSFL

Contopus borealis

This species was not recorded at HB sites, presumably due to the lack of substantial forest. At E, a bird on territory was observed during the first period and presumably bred. Several more, likely migrants, were seen sporadically throughout the second E period and no birds were reported in the final period. At least one territorial bird was present at L during the first session. None were recorded in the second L period and a bird there on 12 Sep represents an unusually late record. A single bird was noted on territory in M during the first session but not afterwards. Olive-sided Flycatchers are likely well distributed breeding birds throughout the HBL in large areas of forest.

OSFL	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1			2/9 (1)	6/11 (1)	2/3 (1)
2			6/10 (2)		
3				1/10 (1)	

Yellow-bellied Flycatcher



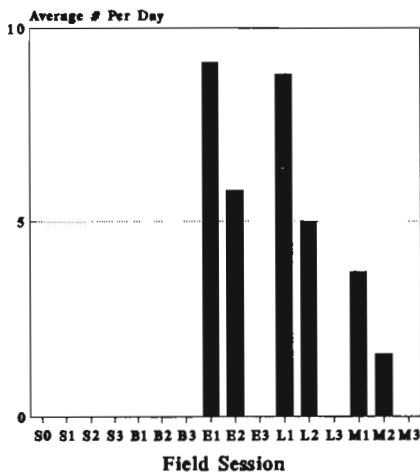
YBFL

Empidonax flaviventris

Two birds seen on 30 Jul at L were the only reports from that site and were likely migrants. At M, territorial birds were common, particularly in the spruce/tamarack fens, where up to 15 were heard along the three transects. This species is notoriously difficult to confirm as a breeding bird, so it is not surprising that no nests were located. Yellow-bellied Flycatchers likely occur wherever large forest areas are found throughout the HBL, as evidenced by earlier breeding records north to Fort Severn (Peck and James 1987).

YBFL	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					3/3 (15)
2				1/8 (2)	4/5 (5)
3					

Alder Flycatcher



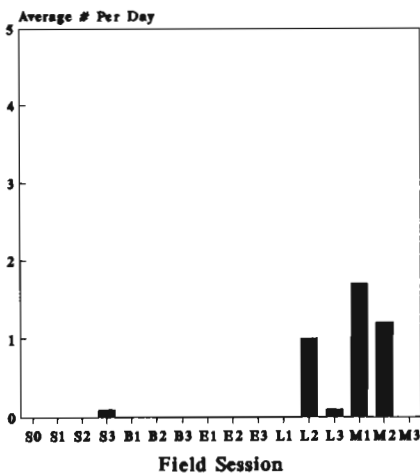
ALFL

Alder Flycatchers were found on territory at the three southern-most sites. The graphs show, fairly well, the number of singing males typically encountered - especially during the first sessions. The numbers decreased as singing dissipated and no birds were reported during the final period, when most individuals would have left the region. Breeding undoubtedly occurred wherever birds were found, but definite proof is unavailable. This species likely occurs along most of the forest edge on the HB coast as well, having been previously found breeding at Fort Severn (Peck and James, 1987), but was not reported during our study.

ALFL	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1			9/9 (15)	10/11 (20)	3/3 (5)
2			9/10 (10)	7/8 (9)	4/5 (3)
3					

Empidonax alnorum

Least Flycatcher



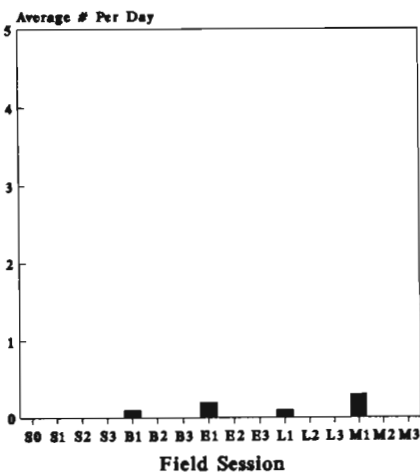
LEFL

One bird seen at S on 21 Aug was north of its usual range, but Atlas field work revealed a small presence in the north-west HBL, particularly in deciduous thickets inland along river banks (Fraser in Cadman et al. 1987), which may help explain this record. At L, none were found on territory but breeding likely took place nearby as migrants, including adults and immatures, were observed in small numbers throughout the second period. A single bird on 5 Sep was the final L report. Small numbers were found at M during the first two periods and breeding was presumed to occur here, although no proof was obtained.

LEFL	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					2/3 (3)
2				3/8 (4)	2/5 (4)
3	1/11 (1)			1/10 (1)	

Empidonax minimus

Eastern Kingbird



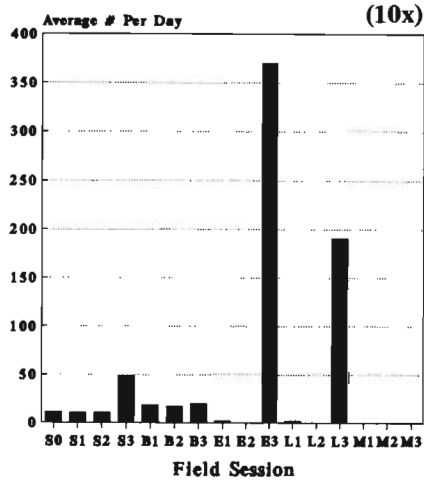
EAKI

Single kingbirds were seen at all sites but S. Birds were at B on 24 Jun, E on 15 and 16 Jun, L on 11 Jun and M on 3 Jun. These records likely pertain to spring "overshoots" but breeding is possible, as evidenced by isolated nesting records from the Moosonee area and northern JB (Helleiner in Cadman et al. 1987). The B sighting is particularly interesting, as it corresponded to the arrival of several other southern species such as Tennessee Warbler, Chipping Sparrow, Red-winged Blackbird, Pine Grosbeak, and White-winged Crossbill. These species were believed to have moved on to the tundra in response to numerous fires burning to the south and west.

EAKI	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1		1/12 (1)	2/9 (1)	1/11 (1)	1/3 (1)
2					
3					

Tyrannus tyrannus

Horned Lark

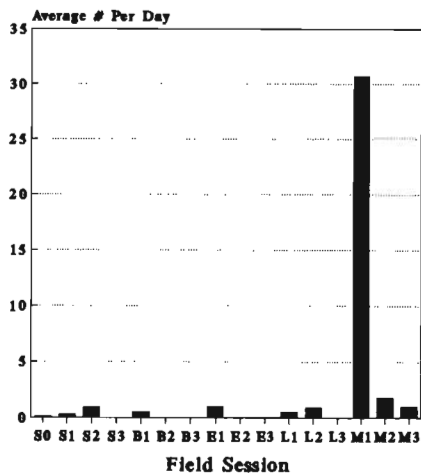


HOLA

Small numbers were reported throughout the first three S sessions and breeding was established. By Sep, migrants were obvious, with a high count of 160 on 30 Aug. On the tundra at B, Horned Larks were found on most gravel areas and nesting was substantiated. No noticeable migration was observed, likely due to the inland location of the study site. At E, they were less common, but a few pairs were found and likely bred, although proof is lacking. Migrants were abundant by early Sep, with the highest E count being 900 on 7 Sep. Small numbers were seen erratically during the first L session and none were found during the next period. The species has bred nearby (Peck and James 1987), but it is unclear whether any nested at L. By the final L period, they were common, with the high count being 500 on 11 and 12 Sep. None were found inland at M and it is unknown if any nesting occurs in the vicinity.

HOLA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	11/13 (30)				
1	8/8 (30)	12/12 (40)	8/9 (3)	5/11 (9)	
2	8/8 (20)	10/10 (27)	5/10 (4)		
3	11/11 (160)	12/12 (52)	10/11 (900)	9/10 (500)	
ED	8-28 June	19 June - 17 July			
CD		10-12 July			

Tree Swallow

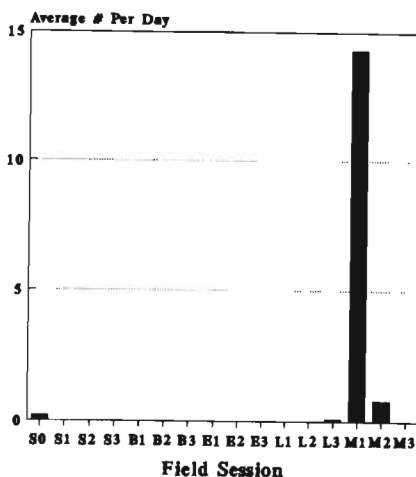


TRES

This species was found at all sites. At S, a single bird was seen on 6 Jun, followed by two on 26 Jun, two on 12 Jul, four on 13 Jul and one on 14 Jul. At B, two were seen on 21 Jun and four on 26 Jun. These sightings represent birds that were out of their typical range but would breed if artificial nest cavities could be found, as breeding is known from the coastal communities (Quinney and Dunn in Cadman et al. 1987). Similarly, Tree Swallows were scarce at E, although natural cavities might be found here. At E, nine birds were seen on five dates, all in the first period, with three on 12 Jun being the maximum. Birds were seen on five dates at L from 3 Jun to 1 Aug, with five birds on the latter date being the high count. Only at M, where numerous nest boxes and other unnatural cavities are available, were Tree Swallows common. The apparent scarcity during the Jul M session is likely a result of limited coverage in the townsite, where they are most common.

TRES	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	1/13 (1)				
1	1/8 (2)	2/12 (4)	5/9 (3)	2/11 (4)	3/3 (60)
2	3/8 (4)			3/8 (5)	2/5 (8)
3					1/3 (3)

Bank Swallow



BANS

In the HBL, Bank Swallows are restricted primarily to rivers with soft banks (Brewer in Cadman et al. 1987) - so it is not surprising that few were found away from the M site. Two on 9 Jun was the only report from S and one on 12 Sep was the only report from L. Breeding birds were seen commonly during the first M session. Colonies were discovered at the junction of Butler Creek and the Moose River, and at the quarry, while others were suspected.

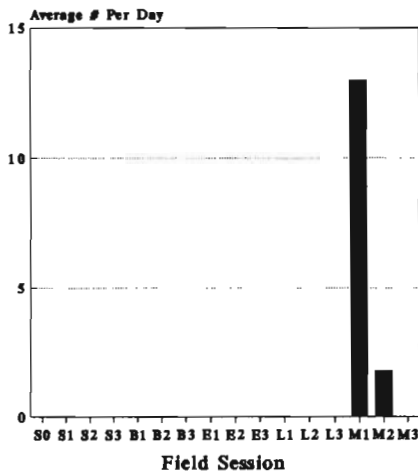
BANS	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	1/13 (2)				
1					3/3 (25)
2					2/5 (3)
3				1/10 (1)	

Eremophila alpestris

Tachycineta bicolor

Riparia riparia

Cliff Swallow



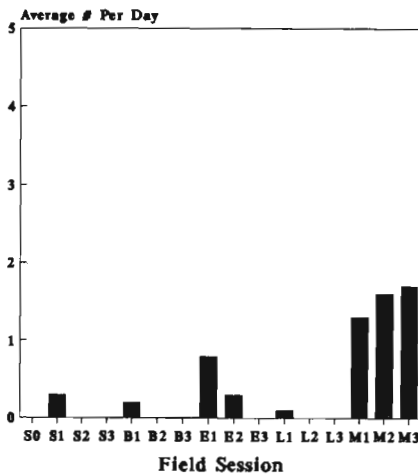
CLSW

Small numbers were reported at M during the first two sessions, with a high count of 25 on 4 Jun. A colony, with at least six active nests, was found on the Moosonee Lodge and several single nests were located on townsite buildings. Interestingly, this colony has been known since at least 1965 (Scheuler et al. 1974). This species is fairly rare in the HBL and is generally found only around structures. A natural colony of about 12 pairs, discovered on the Attawapiskat River about 100 km from JB, is the only natural nesting site known in the HBL (Taylor in Cadman et al. 1987).

Hirundo pyrrhonota

CLSW	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					3/3 (25)
2					3/5 (6)
3					

Barn Swallow



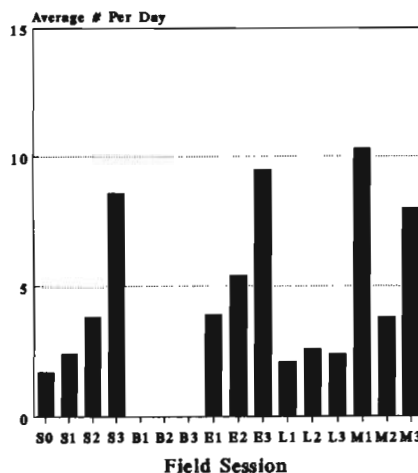
BARS

This species was reported from all sites, although nesting was only documented at M. It was least common on the HB coast, where two were seen at S on 24 Jun and singles were observed at B on 19 and 23 Jun. At E, 10 birds were seen on six dates between 14 Jun and 1 Aug. One on 9 Jun was the only L report. Small numbers were seen regularly at M, reflecting the small local nesting population. This species has bred at a number of coastal sites where suitable nest structures occur (Clark and Clark in Cadman et al. 1987).

Hirundo rustica

BARS	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1	1/8 (2)	2/12 (1)	4/9 (3)	1/11 (1)	2/3 (2)
2			2/10 (2)		2/5 (6)
3					1/3 (5)

Gray Jay



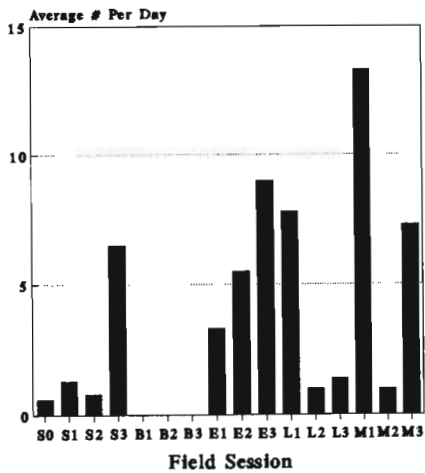
GRAJ

Gray Jays were found in expected numbers at all forested sites. Breeding was confirmed at L and M when family groups were observed, but nesting was presumed to occur at E and S as well. A general trend towards higher numbers in the later periods is likely a result of less secretive behaviour of adults with young, and wandering young that have been expelled from family groups.

Perisoreus canadensis

GRAJ	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	6/13 (6)				
1	4/8 (6)		8/9 (9)	7/11 (6)	3/3 (12)
2	7/8 (8)		8/10 (10)	7/8 (7)	5/5 (8)
3	10/11 (14)		8/11 (20)	9/10 (4)	3/3 (17)

American Crow



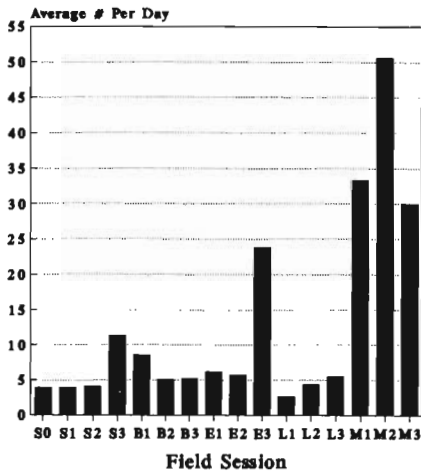
AMCR

Corvus brachyrhynchos

Like the preceding species, crows were found at all forested sites and presumed to be nesting, although absolute proof was not obtained at any location. Numbers were generally low, with later periods showing some increases, due to an influx of migrants. This was particularly noticeable at E, where high counts of 22 and 42 on 9 and 12 Sep, respectively, were made.

AMCR	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	5/13 (2)				
1	6/8 (2)		9/9 (6)	11/11 (20)	3/3 (20)
2	4/8 (2)		10/10 (9)	5/8 (3)	4/5 (2)
3	8/11 (12)		9/11 (42)	7/10 (2)	3/3 (10)

Common Raven



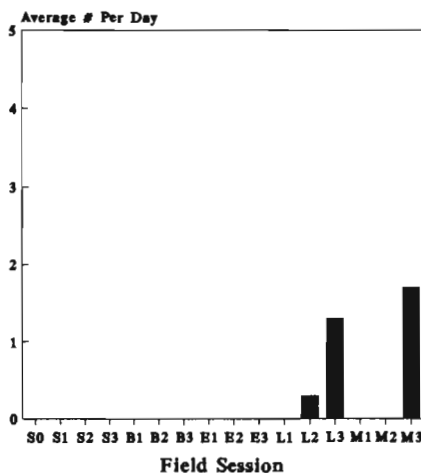
CORA

Corvus corax

The Common Raven was seen in small numbers at all sites, with the exception of M, where they were quite common, a result of large numbers gathering at the town dump. The only nests found were at S and M. None were believed to breed at B due to lack of trees or a suitable structure and it is unclear whether birds at E and L were local breeders or wandering birds. A distinct increase in numbers was seen at E in the final session, with a high count of 45 on 7 Sep.

CORA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	12/13 (8)				
1	8/8 (7)	12/12 (20)	9/9 (12)	10/11 (9)	3/3 (70)
2	8/8 (6)	10/10 (9)	10/10 (8)	7/8 (9)	5/5 (170)
3	11/11 (20)	12/12 (14)	11/11 (45)	10/10 (10)	3/3 (40)
CD	5-27 June				25 May

Black-capped Chickadee



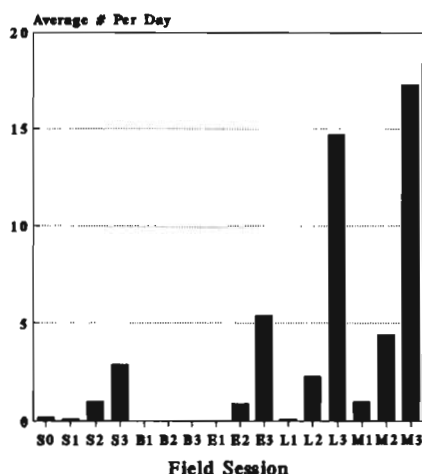
BCCH

Parus atricapillus

This species reaches its northern limit in the southern portion of the HBL, so it is not surprising that it was found only at L and M. Two on 1 Aug was the first observation at L, but they were regular in small numbers during the final session. At M, they were seen in small numbers only in the final session. No evidence of breeding was found but the species is known to nest in the area (McLaren in Cadman et al. 1987). Black-capped Chickadees appeared to be in lower numbers during the 1991 season than in some other years, although this can not be quantified.

BCCH	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					
2				1/8 (2)	
3				6/10 (3)	2/3 (3)

Boreal Chickadee



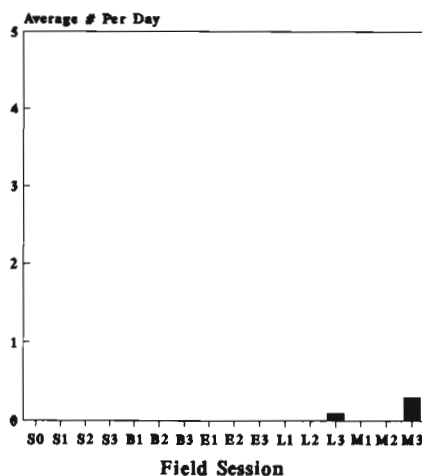
BOCH

Parus hudsonicus

Boreal Chickadees were found at all forested sites and presumably bred as well, although a family group at S was the only actual proof obtained. Numbers recorded were generally low, with a trend toward greater numbers in the final period, when young have fledged and a post-breeding movement occurs. This was particularly noticeable in M, where a high count of 21 was reported on 3 Sep.

BOCH	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	2/13 (2)				
1	1/8 (1)			1/11 (1)	2/3 (2)
2	2/8 (5)		6/10 (3)	5/8 (8)	5/5 (8)
3	7/11 (11)		8/11 (20)	10/10 (30)	3/3 (21)

Red-breasted Nuthatch



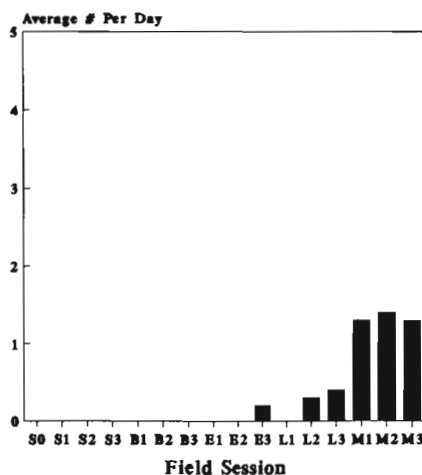
RBNU

Sitta canadensis

Single birds at L and M, on 6 Sep and 3 Sep respectively, were the only reports from the study. Like the Black-capped Chickadee, this species reaches its northern limits in the southern portion of the HBL. It is somewhat surprising that more were not found and it seemed that they were present in smaller than normal numbers in 1991. This species could be expected to breed at M and perhaps L.

RBNU	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					
2					
3				1/10 (1)	1/3 (1)

Brown Creeper



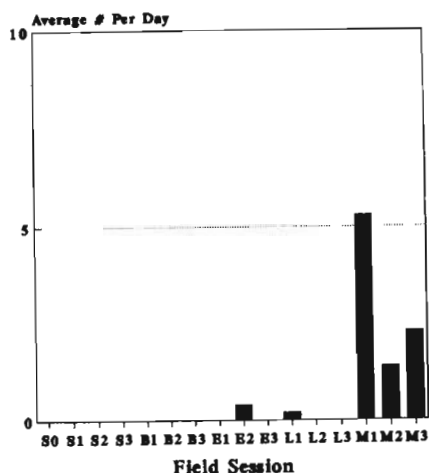
BRCR

Certhia americana

Single birds on 5 and 11 Sep were the only reports from E. This is somewhat north of the northern limit given in the Atlas, and some distance from a supposed disjunct population in the Sutton Ridges (Blomme in Cadman et al. 1987). While this sighting likely pertained to a fall migrant, unknown populations may exist in large forests, especially along rivers. A few creepers were reported during the final two L periods and may represent birds that nested in large forests just inland from the study sites or may be migrants from further afield. At M, several birds held territories in the lichen-rich spruce forest along Store Creek and small numbers were seen in all periods. While breeding undoubtedly occurred here, no proof was established.

BRCR	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					2/3 (2)
2				2/8 (1)	4/5 (3)
3			2/11 (1)	2/10 (3)	3/3 (2)

Winter Wren



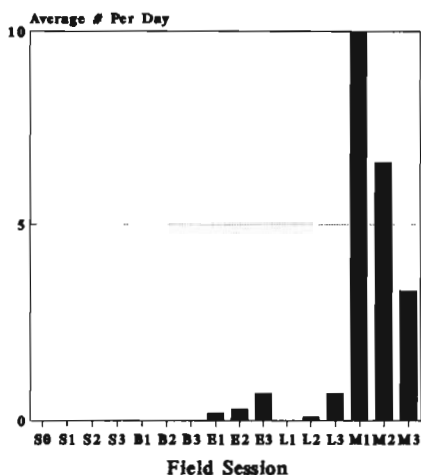
WIWR

Troglodytes troglodytes

A singing male was heard on four dates during the second E period. Considering the late date to be establishing a territory, this bird may have been a failed breeder from some other location. Two singing birds were heard in the large forest at L on 6 Jun, suggesting that birds may have bred here, although further observations from this site are lacking. In M, several pairs were on territory along Store Creek and were encountered in all sessions. In work unrelated to this project, the species was found commonly in a Black Spruce swamp just south of town. It seems likely that wherever there are areas of substantial forest, Winter Wrens will be found.

WIWR	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1				1/11 (2)	3/3 (7)
2			4/10 (1)		4/5 (2)
3					1/3 (7)

Golden-crowned Kinglet



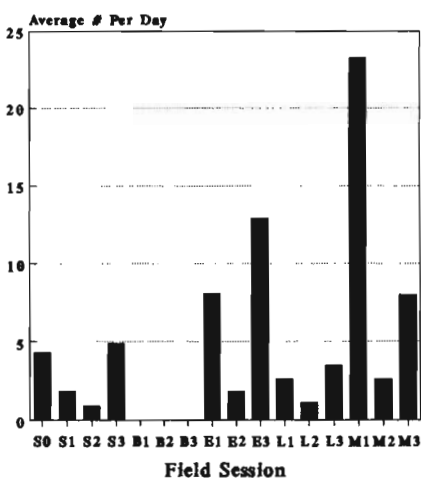
GCKI

Regulus satrapa

This species shares a similar distribution to the preceding species. At E, a pair were seen in suitable breeding habitat during the first session and several were seen in each of the following periods, some of which may pertain to migrants. One seen on 26 Jul and singles on four dates in Sep were the only reports from L and likely involve migrants. This species was encountered fairly often in M, particularly in areas with large trees, such as the lichen-rich spruce forest adjacent to Store Creek, where up to 12 were reported on 3 Jun. No proof of breeding was established at M, but is assumed to have occurred here.

GCKI	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1			1/9 (2)		3/3 (12)
2			3/10 (1)	1/8 (1)	5/5 (10)
3			4/11 (3)	3/10 (5)	1/3 (10)

Ruby-crowned Kinglet



RCKI

Regulus calendula

At S, this species was seen in small numbers during all time periods, with slight increases in the first and final periods, presumably due to migrants. Breeding was presumed to occur at S, although no direct evidence was found. Not surprising, it was absent from the tundra region of B. Kinglets were regular, and presumably breeding, at the three remaining sites, with the greatest numbers occurring at M, where the largest trees could be found. The graphs demonstrate well how the recorded numbers decline after song frequency drops, then pick up again once migrants begin to augment daily counts.

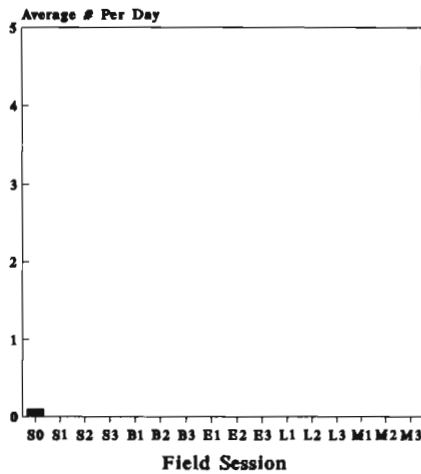
RCKI	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	7/13 (20)				
1	3/8 (6)		8/9 (15)	10/11 (5)	3/3 (25)
2	3/8 (4)		8/10 (4)	5/8 (3)	4/5 (5)
3	8/11 (20)		9/11 (30)	9/10 (10)	3/3 (13)

Blue-gray Gnatcatcher

BGGN

Poliotila caerulea

One of the most exceptional vagrant sightings from this project was a male Blue-gray Gnatcatcher observed at S on 2 Jun. In Ontario, this species is generally restricted to areas south of the Canadian Shield and primarily along the north shore of Lakes Erie and Ontario (Sutherland and Gartshore in Cadman et al. 1987), so its presence on the HB coast is astonishing. Incredibly, there are two other records for the Lowland, one at Netitishi Point, southern JB, on 16 Oct 1981 (Goodwin 1982) and one in Moosonee on 29 Apr 1990 (Weir 1990).



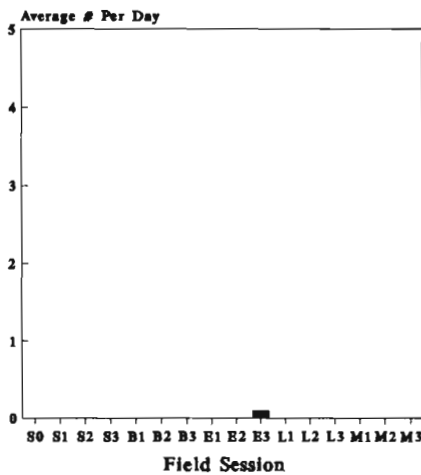
BGGN	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	1/13 (1)				
1					
2					
3					

Northern Wheatear

NOWH

Oenanthe oenanthe

An adult male at E on 12 Sep was the only project report. Interestingly, an immature was seen at Moose Factory on 1 Sep 1990 (Curry 1991). There are a number of reports for the region, particularly from townsites, suggesting that this "Old World" species may be a regular but rare fall migrant on the JB coast.



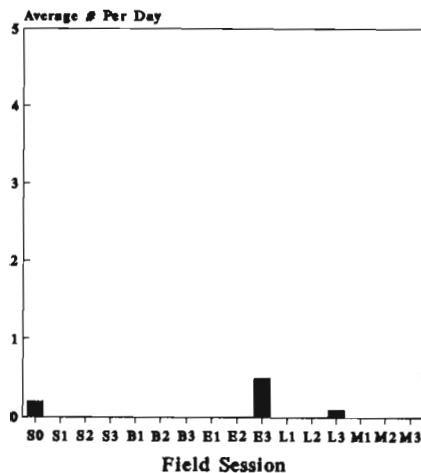
NOWH	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					
2					
3			1/11 (1)		

Gray-cheeked Thrush

GCTH

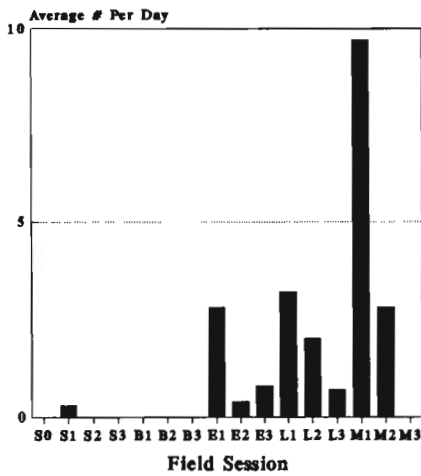
Catharus minimus

At S, single birds on 5, 6 and 8 Jun were the only reports from this site, the only study area where breeding could be expected. The fact that birds were present in suitable habitat at that time of year suggests that they were in fact breeding. It is very difficult to confirm breeding with this species, as it sings for only a brief period in the early morning and is otherwise very difficult to locate. Six birds, seen on five Sep dates at E, all pertain to fall migrants. One bird at L on 8 Sep was the only other observation.



GCTH	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	3/13 (1)				
1					
2					
3			5/11 (2)	1/10 (1)	

Swainson's Thrush



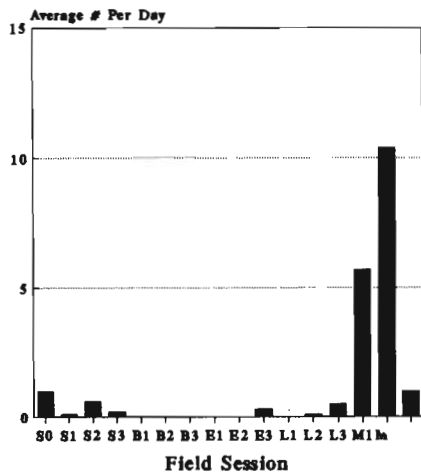
SWTH

Catharus ustulatus

Two birds recorded at S on 23 Jun were the only observations from that site, and were suspected to be nesting. The species is known to nest at both Fort Severn and Winisk (Peck and James 1987). Several birds held regular territories at E and were presumed to nest, although no direct proof was found. Similarly, at L, small numbers were on territory and presumably bred. Swainson's Thrushes were most common at M, where up to ten males were heard on the transects on 3 Jun. Interestingly, none were seen during the final session, perhaps reflecting the lack of concentrating influences away from the JB coast.

SWTH	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1	1/8 (2)		6/9 (6)	9/11 (8)	3/3 (15)
2			3/10 (2)	6/8 (4)	4/5 (9)
3			4/11 (4)	4/10 (3)	

Hermit Thrush



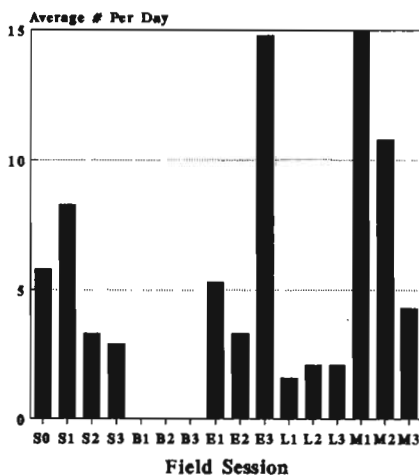
HETH

Catharus guttatus

Small numbers were seen irregularly throughout the four S sessions, including a surprising high of seven on 6 Jun. Whether these were all local birds or some migrants is unclear, but breeding was suspected. One bird on 5 Sep and two on 12 Sep were the only E observations and pertain to migrants. Similarly, at L, a single bird on 27 Jul and five birds on three Sep dates are presumed migrants. The M site reported the largest numbers of Hermit Thrushes, where up to nine males were heard singing on 4 Jun. Birds remained common during the second M period, but were less conspicuous in Sep.

HETH	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	5/13 (7)				
1	1/8 (1)				3/3 (9)
2	4/8 (2)			1/8 (1)	5/5 (12)
3	2/11 (1)		2/11 (2)	3/10 (2)	2/3 (2)

American Robin



AMRO

Turdus migratorius

Robins were recorded at all forested sites and, while breeding was proven only at S, it is assumed to have bred at all locations. Numbers were lowest at L, where transects did not enter much large forest, and were highest in M, likely a result of the townsites urban influence. Migrants at E resulted in a significant increase in the final period, with day totals of up to 60 birds on 12 Sep.

AMRO	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	12/13 (15)				
1	8/8 (15)		9/9 (10)	9/11 (5)	3/3 (20)
2	8/8 (6)		9/10 (9)	7/8 (6)	5/5 (15)
3	7/11 (9)		9/11 (60)	8/10 (5)	3/3 (7)
ED	6-25 June				

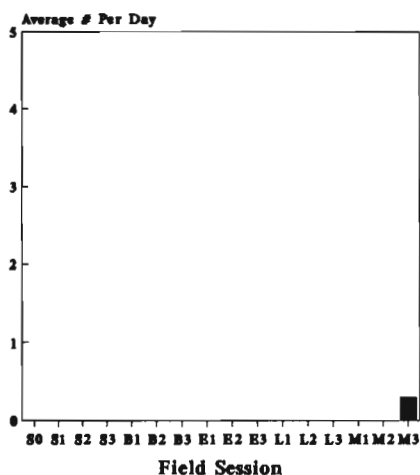
Gray Catbird

GRCA

Dumetella carolinensis

One bird at M on 1 Sep was the only report for the study and another was seen in late May 1991 in M, but was not associated with the study periods from this project. The Gray Catbird is an annual but rare visitor in the region, usually in spring. There is one breeding occurrence for the HBL, an adult feeding young near North Point in the 1970's (Wormington, pers. com.).

GRCA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					
2					
3					1/3 (1)



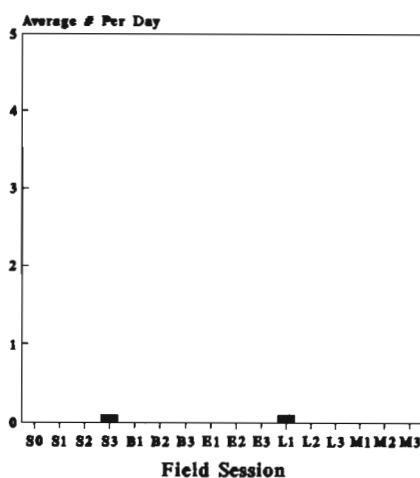
Brown Thrasher

BRTH

Toxostoma rufum

This species is found principally south of the continuous Boreal Forest region (Curry in Cadman et al. 1987), although it occurs annually in small numbers in the HBL, usually as a spring overshoot, so breeding may occur from time to time. Two were reported during the project: one at S on 28 Aug constituting a rare fall occurrence and more typically, one at L on 6 Jun. In addition, a bird was seen in M in early May 1991.

BRTH	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1				1/11 (1)	
2					
3	1/11 (1)				



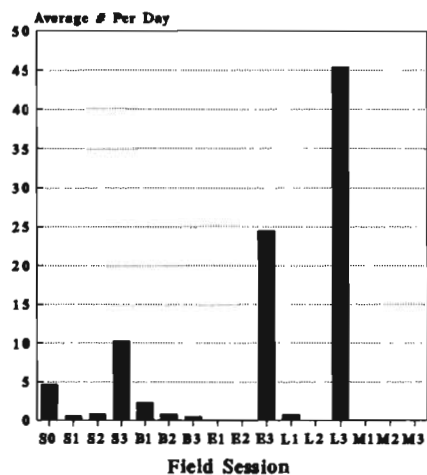
American Pipit

AMPI

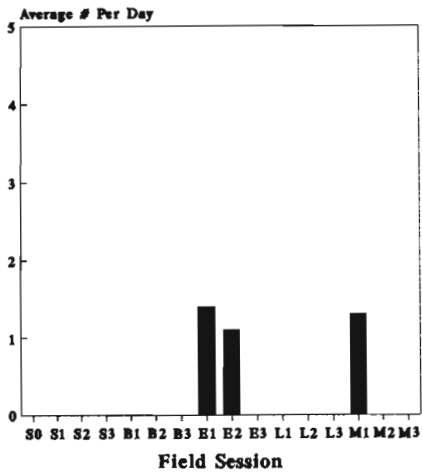
Anthus rubescens

At S, migrants were recorded in the first and final periods and the small number which remained throughout the summer were presumably breeders, although direct proof was lacking. Smaller numbers were recorded at B and, if any were breeding, they were located outside the main study area. The only E report during the first period was a single bird on 19 Jun, an unusually late date for a migrant. In Ontario, this species is restricted to nesting along the HB coast and in the Cape Henrietta Maria region only (Peck and James 1987, Peck in Cadman et al. 1987). Migrants had arrived by the final E period, with a high count of 80 on 12 Sep. Three and five birds on 8 and 9 Jun at L were late spring migrants. Fall migrants were common during the final period, with the high count being 100 on 11 Sep. None were reported from M, although the species is generally a common migrant there.

AMPI	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	13/13 (22)				
1	4/8 (2)	9/12 (7)	1/9 (1)	2/11 (5)	
2	5/8 (2)	3/10 (6)			
3	10/11 (25)	2/12 (5)	11/11 (60)	10/10 (100)	



Bohemian Waxwing



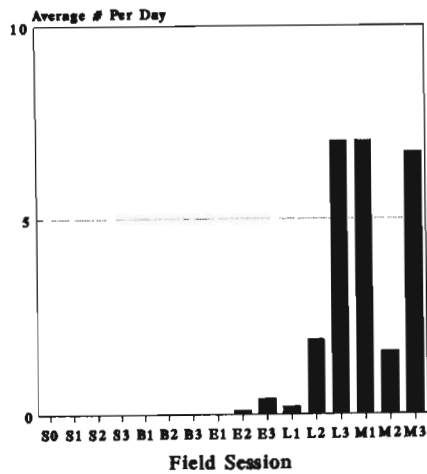
BOWA

Bombycilla garrulus

At E, Bohemian Waxwings were reported erratically in small numbers during the first two sessions, with a high count of 10 on 14 Jun. Considering that birds were observed until the end of Jul, it seems likely that breeding took place somewhere nearby. Four birds, observed in the tamarack fen at M on 4 Jun, are likely late migrants, though the possibility of breeding here should not be discounted.

BOWA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1			3/9 (10)		1/3 (4)
2			3/10 (6)		
3					

Cedar Waxwing



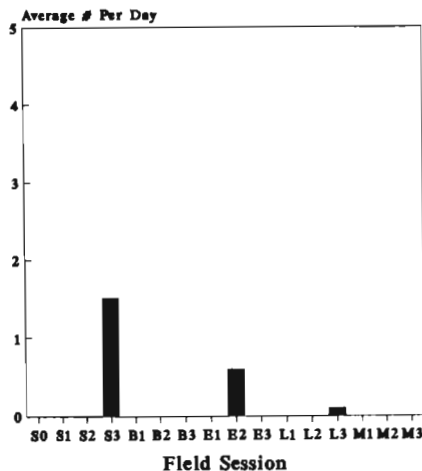
CEDW

Bombycilla cedrorum

This species was reported from the three southern sites. One on 29 Jul and two on 4-5 Sep were the only E reports and likely represent birds wandering from further south. Two on 13 Jun were the only L reports from the first period. Small numbers were recorded during the second L period and they were regular in the final session, with a high of 15 on 9 Sep. A flock of 21 on 4 Jun were the first of the year at M. Small numbers were noted in the last two periods. While breeding was not discovered, there are previous reports for the southern HBL (Mountjoy and John *in* Cadman et al. 1987).

CEDW	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1				1/11 (2)	1/3 (21)
2			1/10 (1)	4/8 (8)	3/5 (4)
3			2/11 (2)	9/10 (15)	3/3 (10)

Northern Shrike



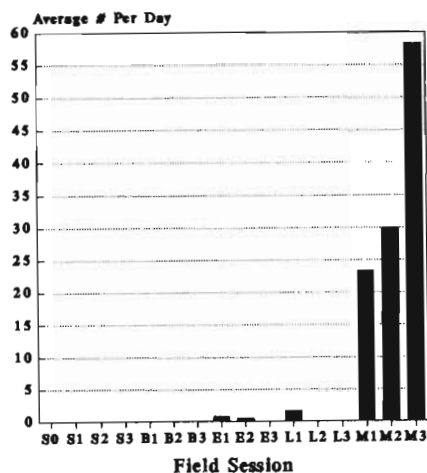
NSHR

Lanius excubitor

Shrikes were not seen at S until the final session, when they became regular in small numbers, with a high count of four on 22 Aug. At E, up to two birds were present in late Jul and early Aug. These may have been migrants or possibly birds that bred nearby. One bird at L on 9 Sep was the only other report and probably pertains to a migrant. Shrikes are scarce breeders in the HBL, primarily in the north-west section (Cadman *in* Cadman et al. 1987), but with breeding records south to North Point (Peck and James 1987) and possibly M (Scheuler et al. 1974).

NSHR	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					
2			4/10 (2)		
3	9/11 (4)			1/10 (1)	

European Starling



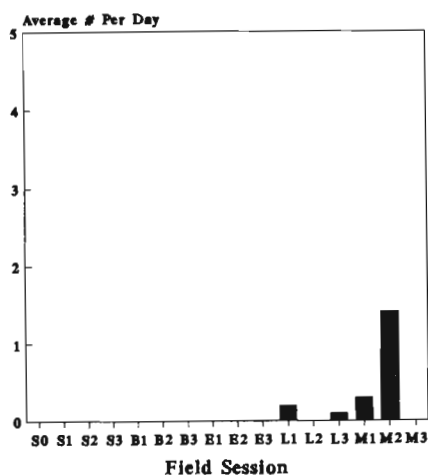
EUST

No starlings were found along the HB coastal sites, although this might not have been totally unexpected, as small numbers have nested in communities and structures in this region (Bowman *in* Cadman et al. 1987, Peck and James 1987). Six birds and a single, all moving south, were seen at E on 16 and 19 Jun, respectively. In the second E period, five birds were noted on three dates. At L, birds were reported on five dates between 6 and 14 Jun, with up to eight birds on 12 Jun. Starlings were a common nesting species in Moosonee. After fledging, numbers built up considerably, with the highest count being 150 on 3 Sep.

Sturnus vulgaris

EUST	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1			2/9 (6)	5/11 (8)	2/3 (35)
2			3/10 (2)		4/5 (80)
3					2/3 (150)

Solitary Vireo



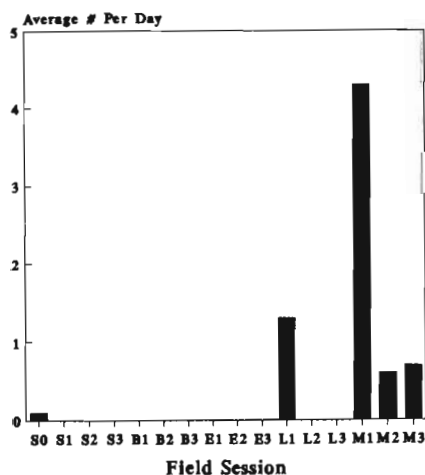
SOVI

Single birds, at L, on 8 and 10 Jun may have been migrants but were more likely territorial individuals. No evidence of breeding was found, but likely occurs in the large spruce forest south of camp. One observed on 7 Sep was the only other L report. At M, one singing male was located in the lichen-rich spruce forest along Store Creek on 4 Jun and seven birds were reported on three dates in Jul. In addition, several birds observed outside the study were known to be on territory, and presumably breeding, along Butler Creek.

Vireo solitarius

SOVI	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1				2/11 (1)	1/3 (1)
2					3/5 (4)
3				1/10 (1)	

Philadelphia Vireo



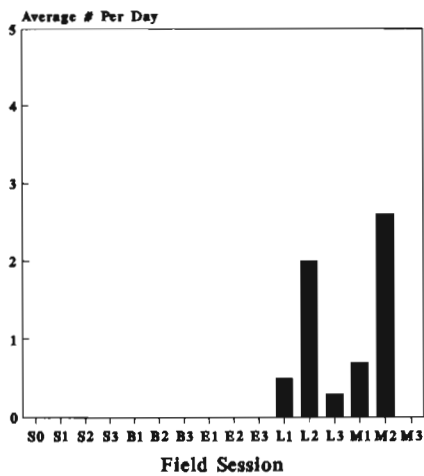
PHVI

This species breeds north to the southern portion of the HBL (James *in* Cadman et al. 1987), so one bird seen at S on 5 Jun was unexpected. At L, a few were found throughout the first session and likely represented breeding birds, although no proof was obtained and none were recorded after singing stopped. From two to six were observed at M during the first session and, like L, they presumably bred here. The last sighting was of two on 3 Sep when the M study ended.

Vireo philadelphicus

PHVI	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	1/13 (1)				
1				9/11 (3)	3/3 (6)
2					1/5 (3)
3					1/3 (2)

Red-eyed Vireo



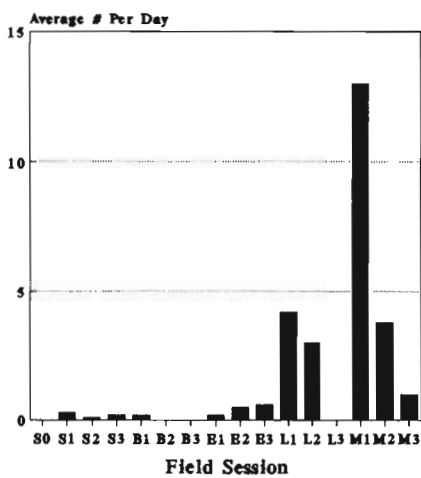
REVI

Vireo olivaceus

Five individuals were reported on four dates during the first L period and, by the second session, small numbers were seen on a daily basis. Breeding undoubtedly occurred, but no positive proof was found. Two on 5 Sep and one the next day were the final observations. At M, a few were found on territory and were assumed to have nested. Red-eyed Vireos are more common than indicated at M but the coverage did not include prime habitat for this species.

REVI	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1				4/11 (2)	1/3 (2)
2				6/8 (4)	5/5 (6)
3				2/10 (2)	

Tennessee Warbler



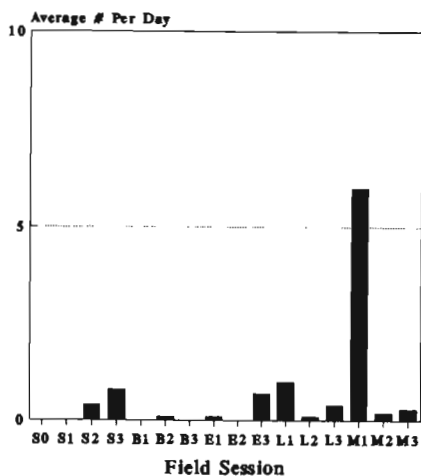
TEWA

Vermivora peregrina

Territorial single males were located in forest areas on 22 and 27 Jun at S, suggesting that breeding took place. Birds seen on 11 Jul, 22 and 30 Aug may have been local birds or migrants. The only report at B was of two birds on 24 Jun, the same day that many other forest species appeared, presumably in response to several fires burning to the south and west. Tennessee's were surprisingly scarce at E. During the first period, single birds were observed on only two dates and it is not clear whether these were territorial or not. Most other sightings were of single birds from late Jul until the study finished in mid Sep and are primarily migrants. At L, the species was more common and was seen regularly during the first session, with up to seven males on territory. Birds were still present during the second L period and breeding is assumed, although not proven. Strangely, the species went unrecorded during the final L period. At M, birds were common, with up to 15 territorial males heard in early Jun and sightings remained frequent in the following periods. Like L, no evidence of breeding was secured but is presumed to have occurred. This species was found breeding throughout all forested sections of the HBL during the Atlas study (Welsh *in* Cadman et al. 1987).

TEWA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1	2/8 (1)	1/12 (2)	2/9 (1)	9/11 (7)	3/3 (15)
2	1/8 (1)		4/10 (2)	6/8 (7)	4/5 (7)
3	2/11 (1)		5/11 (2)		2/3 (2)

Orange-crowned Warbler



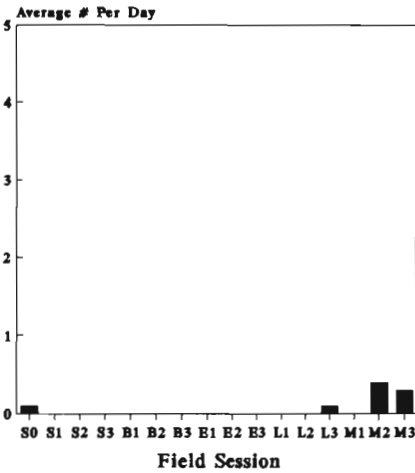
OCWA

Vermivora celata

The first reports at S were single birds on 11, 14 and 17 Jul and may involve both fall migrants and previously undetected breeding birds. Small numbers of migrants were seen infrequently during the final S period. The only B report was of one bird on 18 Jul, presumably a migrant. One bird, on 14 Jun at E, was the only sighting during the first session, but it is unclear whether this was a local breeding bird or not. The only other E observations were of fall migrants in the final session. At L, up to three males were on territory during the first period but only one was seen in the next period, probably a result of reduced singing and observer effort directed more at coastal species. Four birds on two dates in Sep were fall migrants. At M, Orange-crowned Warblers were fairly common, with up to eight territorial males located during the first period; however, only one observation of a single bird was made in the following M sessions. This demonstrates well how a forest species can become very hard to detect once singing stops.

Nashville Warbler

OCWA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1			1/9 (1)	8/11 (3)	3/3 (8)
2	3/8 (1)	1/10 (1)		1/8 (1)	1/5 (1)
3	4/11 (4)		3/11 (5)	2/10 (3)	1/3 (1)



NAWA

One bird observed at S on 8 Jun was well north of the known breeding range (Peck and James 1987); however, Atlas data reveals that small numbers may breed in the north-west interior of the HBL (McLaren *in* Cadman et al. 1987). Singles at L on 5 Sep and at M on 21 and 24 Jul and 3 Sep were likely migrants. Outside the study, only one Nashville Warbler territory was located in M during 1991.

Vermivora ruficapilla

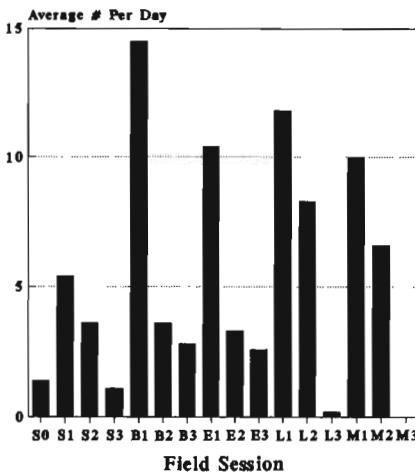
NAWA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	1/13 (1)				
1					
2					2/5 (1)
3				1/10 (1)	1/3 (1)

Yellow Warbler

YWAR

This species is unquestionably the most common and well distributed warbler in coastal regions. While actual nests were found only at S, it is presumed to have bred at all sites. Numbers were generally highest during the first sessions, when singing was at its peak. Interestingly, the area with the greatest number of territorial birds was B.

Dendroica petechia



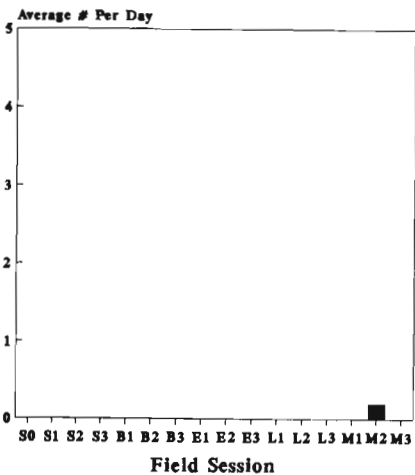
YWAR	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	6/13 (5)				
1	6/8 (12)	12/12 (35)	9/9 (18)	11/11 (19)	3/3 (15)
2	8/8 (5)	10/10 (11)	9/10 (6)	8/8 (16)	5/5 (10)
3	4/11 (4)	8/12 (7)	5/11 (10)	2/10 (1)	
ED	27 June				

Chestnut-sided Warbler

CSWA

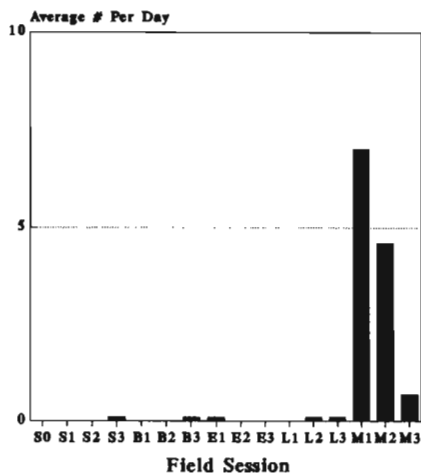
Fieldwork associated with the Atlas revealed a 100 km range extension of this species to Moosonee (Martin *in* Cadman et al. 1987). During our study, one bird was located there on 25 Jul and an additional male on territory was known from 1991 work outside of our study. Clearly, this is a rare species in the HBL.

Dendroica pensylvanica



CSWA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					
2					1/5 (1)
3					

Magnolia Warbler



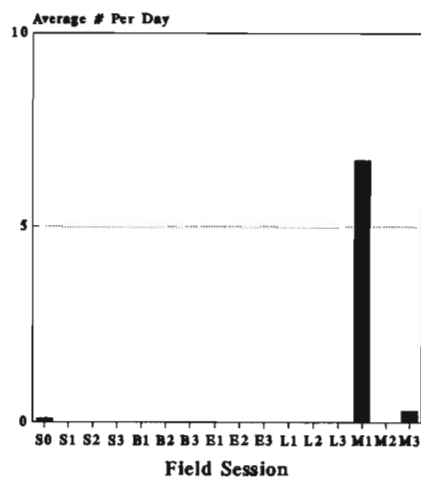
MAWA

Dendroica magnolia

Magnolia Warblers were recorded at all sites, but were frequent only at M. Single birds were seen at S on 22 Aug, B on 22 Aug and E on 14 Jun. The latter bird appeared to be a territorial male and may have been a local breeder that went undetected upon the cessation of singing. Single birds at L on 31 Jul and 7 Sep were presumed migrants. At M, Magnolia Warblers were common, with up to ten birds heard on the transects in early Jun. They remained frequent during the second M session, but had dropped considerably in the final period. Breeding here is assumed, although proof is lacking. This species breeds commonly throughout much of the southern half of the HBL, but becomes scarce or absent along much of the HB coastal region (Welsh in Cadman et al. 1987).

MAWA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1			1/9 (1)		3/3 (10)
2				1/8 (1)	5/5 (8)
3	1/11 (1)	1/12 (1)		1/10 (1)	1/3 (2)

Cape May Warbler



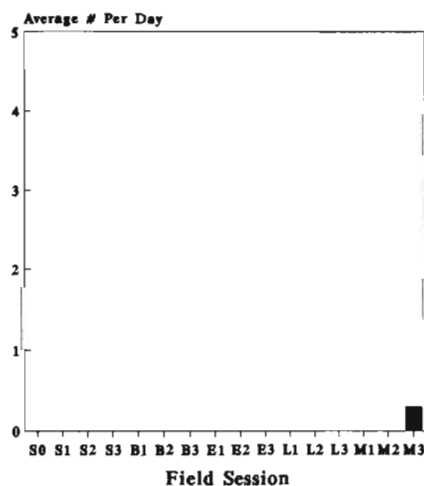
CMWA

Dendroica tigrina

A bird at S on 2 Jun was well north of the known range and is likely a spring overshoot. The only other reports were from M, where Cape May's are fairly common within suitable habitat, with up to ten males heard on the transects in Jun. Once singing stopped, birds went virtually undetected, with a fall migrant on 2 Sep being the only observation. This species is well known to fluctuate dramatically in numbers in response to outbreaks of spruce budworm and can therefore vary considerably from year to year.

CMWA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	1/13 (1)				
1					3/3 (10)
2					
3					1/3 (1)

Black-throated Blue Warbler



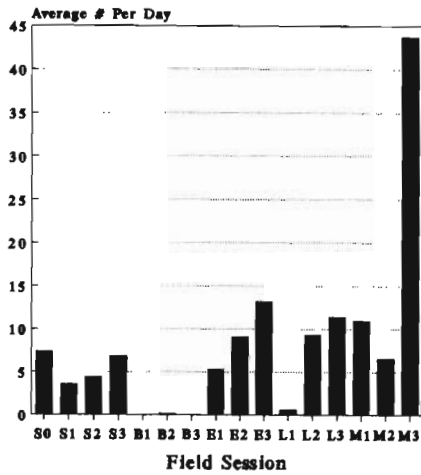
BTBW

Dendroica caerulescens

A female observed at M on 3 Sep is one of only a few M area reports. The species breeds just south of the HBL, so its occasional appearance here could be expected.

BTBW	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					
2					
3					1/3 (1)

Yellow-rumped Warbler



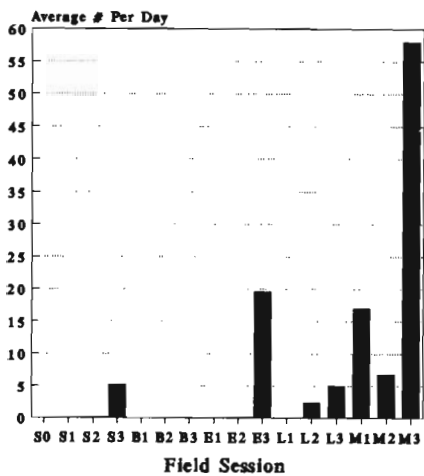
YRWA

This common species is found in all forested parts of the HBL. At S, the largest numbers were reported in the first and final sessions, when migrants augmented local territorial birds. One bird at B on 16 Jul was somewhat out of place but perhaps not surprising considering the species' abundance and the relatively close proximity of forest to this site. It was regular at E, with increasing numbers being found as the study progressed. The comparative lack of substantial forest accounts for the low number of territorial birds during the first L session, but migrants had brought the totals up by the final two sessions. Yellow-rumped Warblers were common at M, particularly in large forested areas. Large numbers of migrants were reported in the final period, with the highest count being 71 on 3 Sep. While no hard evidence of breeding was obtained, it is assumed to have occurred at all sites except B.

YRWA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	9/13 (20)				
1	4/8 (12)		7/9 (12)	5/11 (2)	3/3 (15)
2	6/8 (8)	1/10 (1)	9/10 (19)	7/8 (38)	5/5 (10)
3	9/11 (25)		8/11 (30)	9/10 (31)	3/3 (71)

Dendroica coronata

Palm Warbler



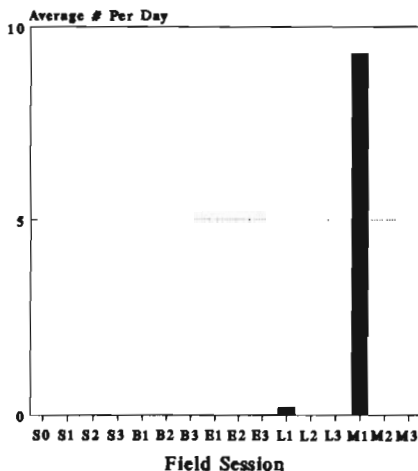
PAWA

Palm Warblers were reported as fall migrants from all sites, but breeding was suspected only at M. Studies revealed this to be the second most common breeding warbler in the extensive tamarack fen inland from Moosonee. This species is known to breed throughout the HBL but avoids the coastal strip, accounting for the lack of breeding records at those sites.

PAWA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					3/3 (20)
2				7/8 (5)	4/5 (15)
3	8/11 (19)	1/12 (1)	9/11 (60)	10/10 (15)	3/3 (122)

Dendroica palmarum

Bay-breasted Warbler



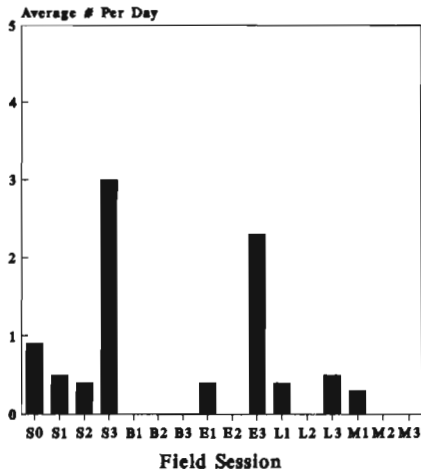
BBWA

Two singing males at L were the only birds reported from that site. While they may have been migrants, breeding should not be discounted, since forest coverage was limited primarily to transects and once singing stopped, a single pair or two would be hard to detect. At M, they were fairly common along the lichen-rich spruce forest along Store Creek, with up to 10 birds found in early Jun. It seems likely that they bred here, although no observations were made in the next two sessions.

BBWA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1				1/11 (2)	3/3 (10)
2					
3					

Dendroica castanea

Blackpoll Warbler



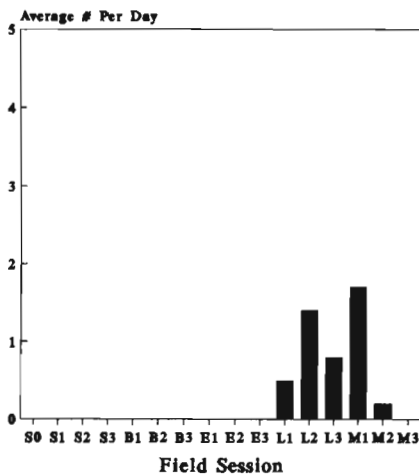
BLPW

This species was found most consistently at S. The graph shows how migrants were present in both the first and final periods, while local birds, presumably breeders, were recorded in smaller numbers during Jun and Jul. None were noted on the tundra at B. Two birds on 14 Jun and singles on 15 and 19 Jun at E were presumed to be late migrants, although this site is within the known breeding range as described by Peck and James (1987). Likewise, birds observed in the first and final L sessions were believed to be migrants rather than nesting birds. The only M report was of a singing male on 3 Jun which was assumed to be a migrant. While breeding south to Moosonee has been suggested (Peck and James 1987), we found no evidence to support this.

BLPW	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	5/13 (5)				
1	2/8 (3)		3/9 (2)	4/11 (1)	1/3 (1)
2	3/8 (1)				
3	6/11 (17)		3/11 (15)	5/10 (1)	

Dendroica striata

Black-and-white Warbler



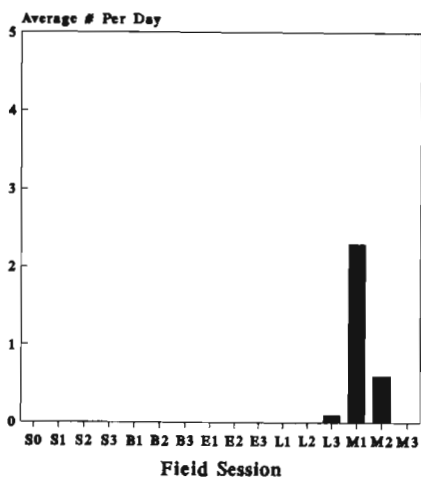
BAWW

This species reaches its northern limit in the southern HBL (Cartwright *in* Cadman et al. 1987), so it is not surprising that it was recorded only from L and M. At L, small numbers were present throughout and breeding is presumed, although not proven. A few birds were on territory in the lichen-rich spruce forest along Store Creek, but became very hard to locate once singing stopped. This species is known to be fairly common in the Moosonee area, but the study transects did not sample the favoured habitat.

BAWW	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1				4/11 (2)	3/3 (3)
2				5/8 (3)	1/5 (1)
3				5/10 (3)	

Mniotilta varia

American Redstart



AMRE

A migrant, on 7 Sep, was the only sighting from L. At M, up to four redstarts were found on territory in the lichen-rich spruce forest along Store Creek during the first Jun period. Singles were seen on three dates in Jul, but the species was missed in the final M period. The American Redstart is largely absent from the HBL, except for the extreme southern end of JB. Like the preceding species, the redstart is a fairly common nesting species in the Moosonee area, but the predominantly coniferous forest studies failed to detect the true abundance of this species.

AMRE	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					3/3 (4)
2					3/5 (1)
3				1/10 (1)	

Setophaga ruticilla

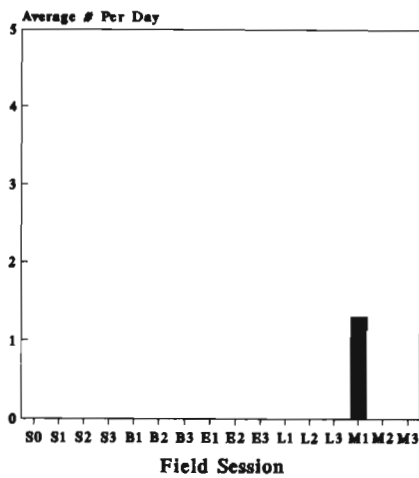
Ovenbird

OVEN

Seiurus aurocapillus

Ovenbirds were found only at M where several birds held territories during the first session. Failure to detect them subsequently was due to their shy nature and difficulty locating them once singing had stopped, rather than an actual absence. Away from the transect area, this species is common in virtually all areas of deciduous or mixed forest. It likely occurs inland from L as well, but was not found on our coastal transects.

OVEN	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					3/3 (2)
2					
3					



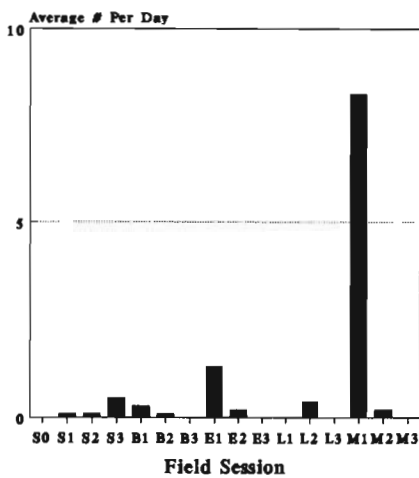
Northern Waterthrush

NOWA

Seiurus noveboracensis

This species was recorded from all of our study sites. While no direct evidence of nesting was found, it was assumed to have bred at all sites, with the exception of L, where only fall migrants were noted. Although the habitat at B might seem atypical, birds were observed in proximity to the willow thickets along the river. Numbers were generally low, with the exception of M, where up to 15 males were heard on territory for the transects alone.

NOWA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1	1/8 (1)	3/12 (1)	5/9 (4)		3/3 (15)
2	1/8 (1)	1/10 (1)	2/10 (1)	2/8 (2)	1/5 (1)
3	2/11 (3)				



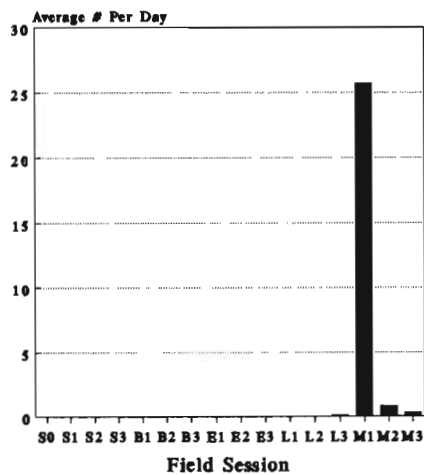
Connecticut Warbler

CONW

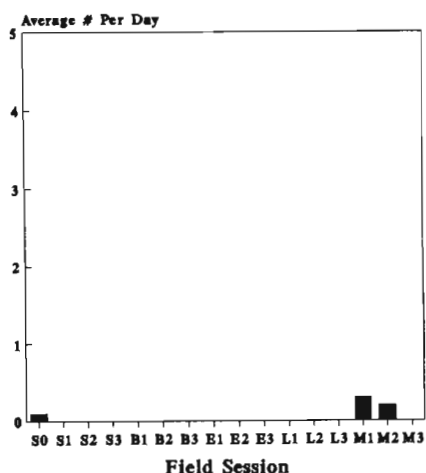
Oporornis agilis

One bird at L on 9 Sep was a fall migrant. At M, this species was the most abundant bird in the tamarack fen, with up to 12 males along a one km transect line. The highest count was of 27 on 5 Jun. Once singing stopped, the species became very difficult to locate, accounting for the small numbers in the following two M periods. The Connecticut Warbler undoubtedly breeds in the extensive tamarack fen areas inland from the Moose River, but direct proof is lacking. The nest of this species has yet to be documented in Ontario, due to its inaccessible nesting habitat and very shy demeanour. This species reaches its northern limit along the southern fringe of the HBL (Helleiner in Cadman et al. 1987) but probably breeds in the fens inland from L as well.

CONW	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					3/3 (27)
2					3/5 (2)
3				1/10 (1)	1/3 (1)



Mourning Warbler



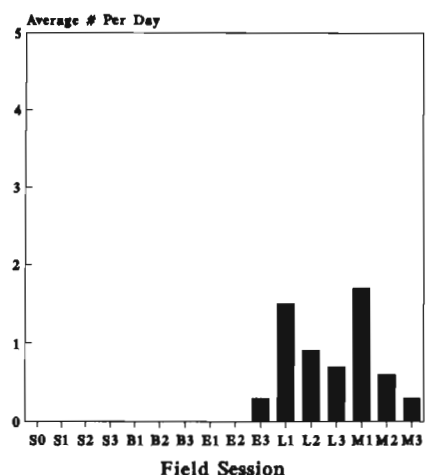
MOWA

Oporornis philadelphia

One female, seen at S on 5 Jun, is well north of the expected range and presumably represents a spring overshoot. Single birds at M on 5 Jun and 23 Jul were the only other reports. Outside of this study, several pairs were found on territory near M and presumably bred. Generally, the species is fairly common in poplar groves - especially further inland along banks of the Moose River.

MOWA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	1/13 (1)				
1					1/3 (1)
2					1/5 (1)
3					

Common Yellowthroat



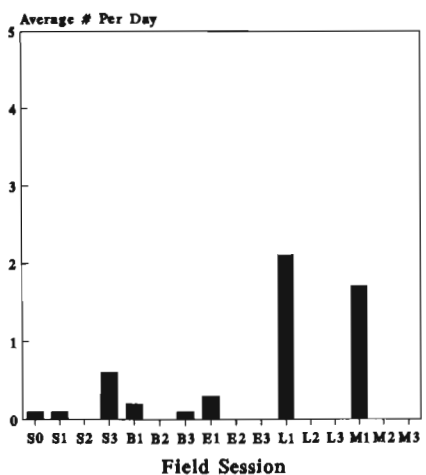
COYE

Geothlypis trichas

Single fall migrants on 7, 9 and 11 Sep were the only E reports. At L, up to three males were heard singing, apparently on territory, during the first period and smaller numbers were seen in the following periods. The situation at M was similar to that at L. While breeding was not proven at either site, it is presumed to have occurred.

COYE	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1				9/11 (3)	3/3 (2)
2				3/8 (4)	2/5 (2)
3			3/11 (1)	5/10 (3)	1/3 (1)

Wilson's Warbler



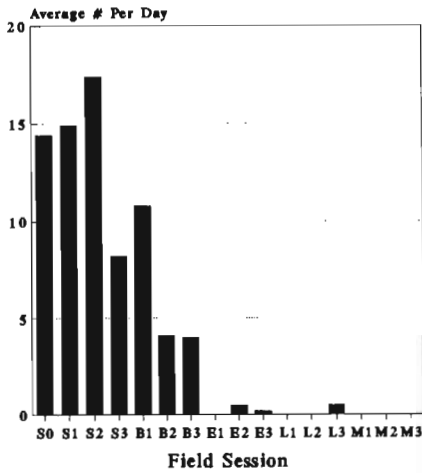
WIWA

Wilsonia pusilla

This species was reported at all sites, but was easily detected only at L and M. Single birds at S on 2 and 23 Jun could have been local breeders, but their status is uncertain. Six on 21 Aug and one on 28 Aug were more likely migrants. At B, territorial males were heard in the river bank willows on 21 and 23 Jun. They may have bred here, but the only other sighting was of a single bird on 24 Aug, providing little in the way of supporting evidence. At E, single birds were seen on 16, 18 and 19 Jun, but no subsequent observations were made. Again, it seems likely that breeding did occur here and the birds simply became hard to locate once singing had stopped. A similar situation existed at both L and M, where up to six birds were heard on territory during the first session but could not be located once singing had stopped. The Wilson's Warbler is a very common breeding species in the Moosonee area and its' low showing in the results reflects low coverage by observers in particularly favourable breeding habitat for this bird.

WIWA	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	1/13 (1)				
1	1/8 (1)	2/12 (1)	3/9 (1)	10/11 (6)	3/3 (2)
2					
3	2/11 (6)	1/12 (1)			

American Tree Sparrow



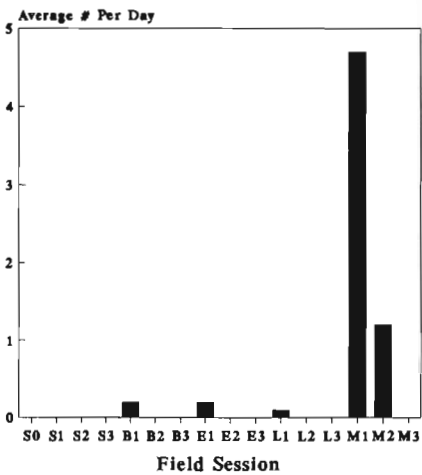
ATSP

Tree Sparrows were common breeders at both S and B. The species reaches its southern breeding limit near E (Knapton *in* Cadman et al. 1987), so sightings of five birds on four dates in late Jul may pertain to birds raised nearby or early migrants. The fact that none were seen during the first E period, when they would be most easily detected, strongly suggests that none bred on the study site itself. Two birds on 3 Sep were the first fall migrants at E. At L, five birds on three dates in Sep were considered migrants as well. While it is a common migrant in the M area, none were found during the study time periods.

Spizella arborea

ATSP	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	13/13 (25)				
1	8/8 (25)	9/12 (30)			
2	8/8 (30)	10/10 (12)	4/10 (2)		
3	11/11 (18)	7/12 (19)	1/11 (2)	3/10 (3)	
ED	23-28 June				
CD	24-28 June				

Chipping Sparrow



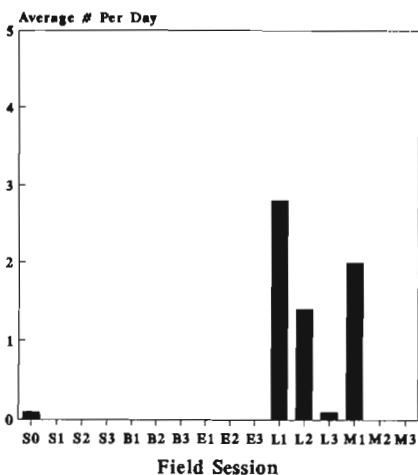
CHSP

The Chipping Sparrow was not found at S, perhaps somewhat surprising considering that this species is known to breed on the HB coast at Fort Severn (Middleton *in* Cadman et al. 1987). The only B observation, where the species is out of range, was of two birds on 24 Jun, presumably displaced by fires burning to the south and west. Single birds seen at E on 13 and 16 Jun and one at L on 14 Jun were either late migrants or unmated birds following the coast. At M, Chipping Sparrows were fairly common during the first two periods, particularly around the townsite, and one nest was found.

Spizella passerina

CHSP	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1		1/12 (2)	2/9 (1)	1/11 (1)	3/3 (6)
2					4/5 (2)
3					
CD					29-30 June

Clay-colored Sparrow



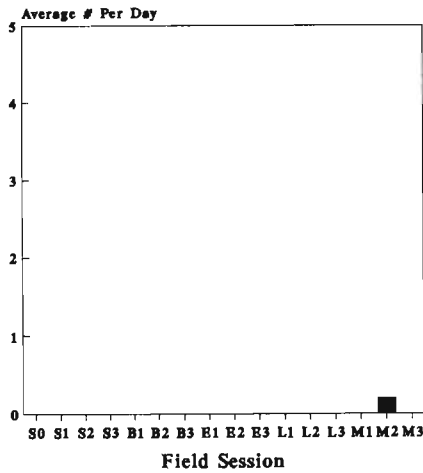
CCSP

This sparrow is primarily western in distribution but, like several other western species, there is an established population in the coastal regions of the HBL. Birds are consistently found in the southern portion of JB but there are numerous reports, often from townsites, all along Ontario's northern coast. It is therefore not surprising that one was seen at S on 5 Jun. More typically, four males held territories at L during the first and second periods. One there on 5 Sep was the last report. This species likely bred here but direct proof is lacking. At M, at least two birds held regular territories during the first period, but went undetected once singing stopped.

Spizella pallida

CCSP	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	1/13 (1)				
1				10/11 (4)	3/3 (2)
2				6/8 (4)	
3				1/10 (1)	

Vesper Sparrow



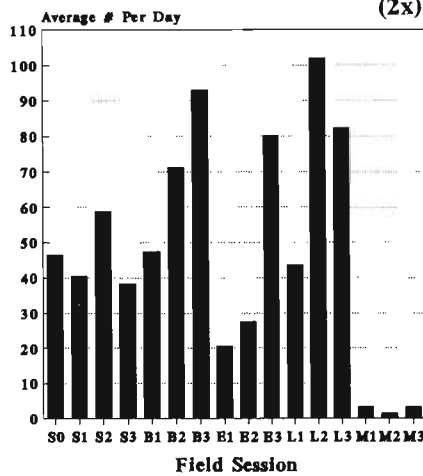
VESP

Pooecetes gramineus

The Vesper Sparrow formerly bred at Moose Factory (Manning 1952), but has been absent for many years, so a sighting of one at M on 23 Jul was most unusual and the only report for the study.

VESP	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					
2					1/5 (1)
3					

Savannah Sparrow



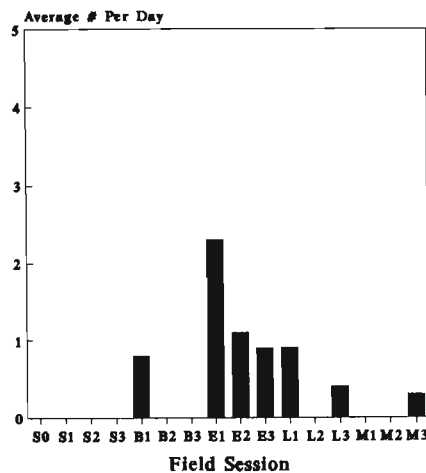
SAVS

Passerculus sandwichensis

The Savannah Sparrow was one of the most abundant nesting passerines at all coastal sites. A general trend toward larger numbers in the latter sessions is a result of increased activity by adults in conjunction with feeding young, fledged young and migrants. Only at M was this species scarce, being found primarily in the few extensive grassy areas such as the airport, but a few were heard singing in the tamarack fen. Nests were located at all sites except M.

SAVS	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	13/13 (110)				
1	8/8 (60)	12/12 (85)	9/9 (35)	11/11 (77)	2/3 (6)
2	8/8 (80)	10/10 (160)	10/10 (40)	8/8 (137)	3/5 (3)
3	11/11 (75)	12/12 (212)	11/11 (210)	10/10 (211)	3/3 (7)
ED	21 June - 17 July	18-30 June	16-17 June	11-15 June	
CD	28 June - 17 July	26 June - 10 July	27 July		

Le Conte's Sparrow



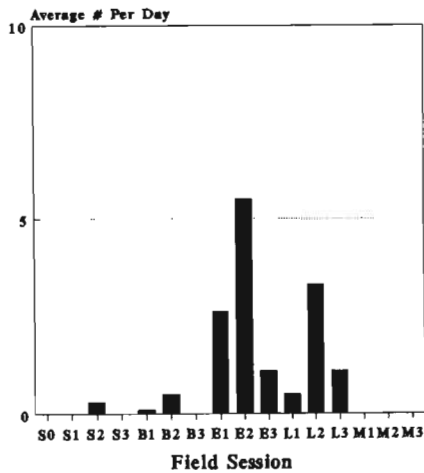
LCSP

Ammodramus leconteii

At B, two birds were heard, apparently on territory, during the first session but could not be relocated once singing stopped. Le Conte's Sparrows have previously been reported on territory along the HB coast at Winisk (Schueler et al. 1974) and further north-west at Churchill (McRae, pers. obs.) - so breeding at B could be expected. At E, up to four birds were noted on territory during the first session and were seen intermittently throughout the last two sessions. Up to five males were located at L, but once singing stopped, they were very hard to find. The only M observation was of one on 1 Sep. Outside of the study, several males were located on territory around M in 1991. Breeding undoubtedly occurred from E south, but no direct evidence was found.

LCSP	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1		5/12 (2)	8/9 (4)	4/11 (5)	
2			5/10 (3)		
3			5/11 (3)	4/10 (1)	1/3 (1)

Sharp-tailed Sparrow

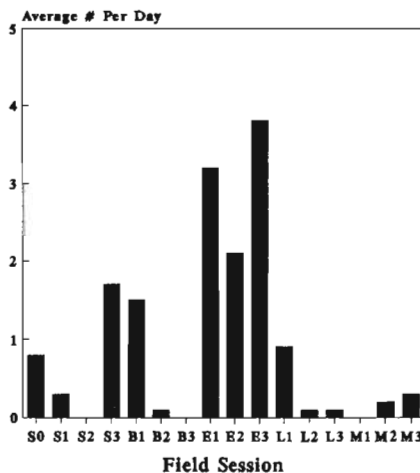


STSP

The HBL population of Sharp-tailed Sparrows (*A. c. alterus*) is one of three disjunct breeding populations. Single singing males were located at S on 11 and 14 Jul, suggesting that breeding was possible at low levels. Similarly, a singing male was found at B on 26 Jun. Further south, on the JB coast, the species was more common and predictable. At E, territorial birds were easily found during the first session. Typically, similar numbers were found in the second E session, with an unusual high of 14 located on 30 Jul. They were erratic in the final E session, with two on 9 Sep being the last report. At L, up to three territorial males were located in the first session and they were seen regularly in small numbers during the second period, including an observation of an adult and three juveniles. By the final L period, sightings were irregular, with the final one being on 12 Sep. This species appears to be common along much of the JB coast, but becomes scarce and local along the HB coast in Ontario. Sharp-tailed Sparrows are also known to hold territories, and presumably breed, as far north as Churchill, Manitoba (Jehl and Smith 1970).

STSP	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1		1/12 (1)	6/9 (7)	3/11 (3)	
2	2/8 (1)	3/10 (3)	9/10 (14)	8/8 (6)	
3			4/11 (4)	6/10 (3)	

Fox Sparrow

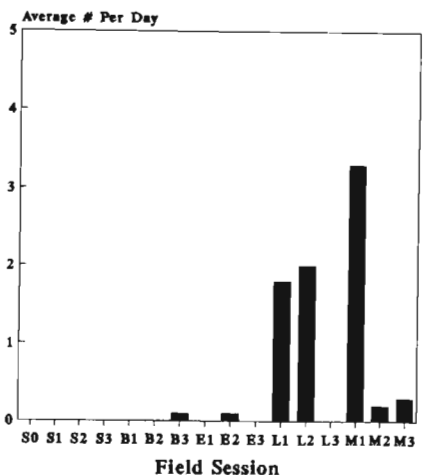


FOSP

The Fox Sparrow was scarce at S, with most records from the first and final periods referring to migrants. Two single birds on 22 and 27 Jun were likely local breeders, but no other evidence was found and the species was missed entirely in the Jul S period. At B, up to five singing birds were located along the river and presumably bred there, but, once singing stopped, they were very hard to locate. One, on 17 Jul, was the only other report. At E, they were regular in all periods, with up to four males on territory and presumably breeding. Up to three territories were noted at L, but the species was scarce afterwards, with only one observation in each of the following periods. M fieldwork revealed only two reports of individual birds on 22 Jul and 3 Sep, but, outside of this project, several territories were held in areas of large willow scrub on islands in the Moose River.

FOSP	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	4/13 (5)				
1	2/8 (1)	8/12 (5)	9/9 (4)	7/11 (3)	
2		1/10 (1)	10/10 (4)	1/8 (1)	1/5 (1)
3	5/11 (6)		11/11 (7)	1/10 (1)	1/3 (1)

Song Sparrow



SOSP

We found no direct breeding evidence at either S or B, although this species has previously been found to breed on the HB coast (Rising in Cadman et al. 1987). One bird on 27 Aug at B was the only record from the HB coast. The only E report was of a singing male on 25 Jul. It is difficult to interpret this record, but it was most likely an unmated bird. Up to three territories were found at L during the first session and birds were recorded regularly in the second period but not afterwards. Song Sparrows were observed in all three M sessions and several territories were located, mostly in the townsite and all were along shrub-edged creeks.

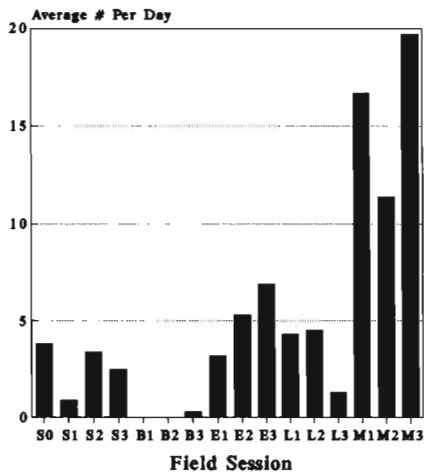
SOSP	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1				11/11 (3)	3/3 (6)
2			1/10 (1)	8/8 (4)	1/5 (1)
3		1/12 (1)			1/3 (1)

Ammodramus caudacutus

Passerella iliaca

Melospiza melodia

Lincoln's Sparrow



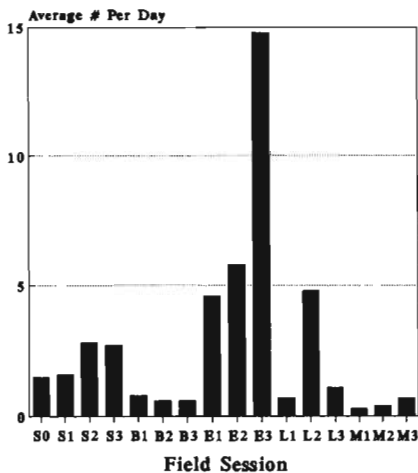
LISP

Lincoln's Sparrows were recorded in small numbers throughout the S sessions and breeding was confirmed with the discovery of a nest. Singles, on four dates in late Aug at B, were considered to be migrants. They were present in small numbers at both E and L and presumed to be breeding, although no proof was found. At M, the Lincoln's Sparrow was common, with up to 20 territorial birds being seen during the first session. They were easily found throughout the remaining M periods; migrants, appearing in Sep, provided some large counts, with the highest being 50 on 3 Sep.

Melospiza lincolnii

LISP	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	8/13 (12)				
1	3/8 (4)		8/9 (5)	10/11 (11)	3/3 (20)
2	6/8 (7)		10/10 (9)	7/8 (13)	5/5 (15)
3	9/11 (7)	4/12 (1)	10/11 (15)	8/10 (4)	3/3 (50)
ED	27 June				

Swamp Sparrow



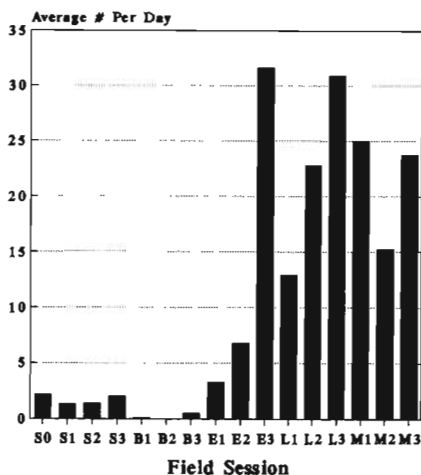
SWSP

This species was found on territory and presumably bred at all sites, although it was not common. The largest numbers were found at E, particularly during fall migration, when the high reached 40 birds on 4 Sep.

Melospiza georgiana

SWSP	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	8/13 (6)				
1	4/8 (4)	5/12 (4)	8/9 (8)	4/11 (4)	1/3 (1)
2	8/8 (5)	1/10 (6)	9/10 (12)	6/8 (16)	2/5 (1)
3	8/11 (10)	5/12 (2)	9/11 (40)	4/10 (5)	2/3 (1)

White-throated Sparrow



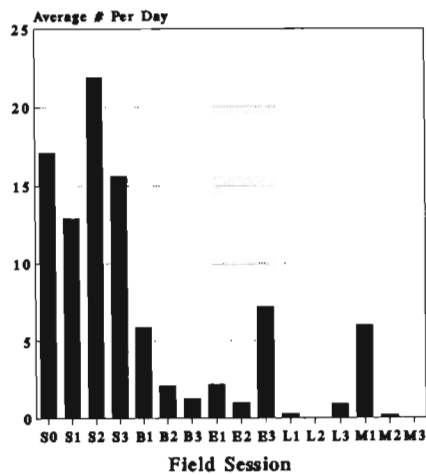
WTSP

At S, small numbers were seen in all sessions and breeding presumably occurred. At B, one bird was seen on 18 Jun and was probably a wandering, unmated bird. Six birds, observed on five dates in Aug, would be fall migrants. The status of this species changed substantially away from the HB coast, with the E site being near the transition. At E, they were present during the breeding season in moderate numbers and increased through the season as young and migrants, likely from inland sites, appeared on the coast. At both L and M, White-throated Sparrows were common and found in most habitats.

Zonotrichia albicollis

WTSP	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	8/13 (6)				
1	4/8 (4)	1/12 (1)	9/9 (6)	11/11 (25)	3/3 (30)
2	4/8 (4)		10/10 (12)	8/8 (32)	5/5 (20)
3	7/11 (8)	5/12 (2)	11/11 (80)	10/10 (52)	3/3 (36)

White-crowned Sparrow



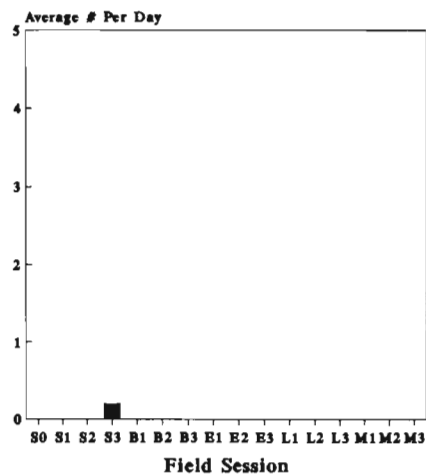
WCSP

Zonotrichia leucophrys

Interestingly, the White-crowned Sparrow shows almost the opposite pattern to the preceding species, being most common along the north coast and becoming scarcer further south. At S, they were found commonly in all periods and nests were discovered. Numbers decreased noticeably at B, perhaps limited somewhat by the scarcity of available shrub cover for nesting, but they were still easy to locate. At E, territorial birds were present, but scarce, and most birds in the final period refer to migrants. One bird on 6 Jun and two on 9 Jun at L were migrants and no territories were discovered, although L is within the known breeding range (Rising *in* Cadman et al. 1987). Fall migrants were just beginning to appear during the final L period. At M, several birds were found on territory but, interestingly, all territories were located in townsite yards. One bird seen on 22 Jul was the only second M session observation and migrants had not yet reached M by the final period.

WCSP	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	12/13 (30)				
1	8/8 (20)	11/12 (15)	7/9 (4)	2/11 (2)	3/3 (12)
2	8/8 (30)	8/10 (4)	5/10 (3)		1/5 (1)
3	11/11 (40)	7/12 (5)	7/11 (20)	6/10 (3)	
ED	27 June - 15 July				
CD	12 July				

Harris' Sparrow



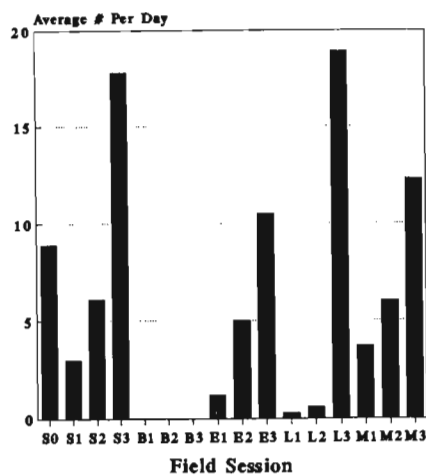
HASP

Zonotrichia querula

Single birds at S on 21 and 25 Aug are fall migrants at the eastern fringe of their range. This species was recently confirmed as an Ontario breeding species when a nest was found at Fort Severn (Cadman *in* Cadman et al. 1987).

HASP	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					
2					
3	2/11 (1)				

Dark-eyed Junco



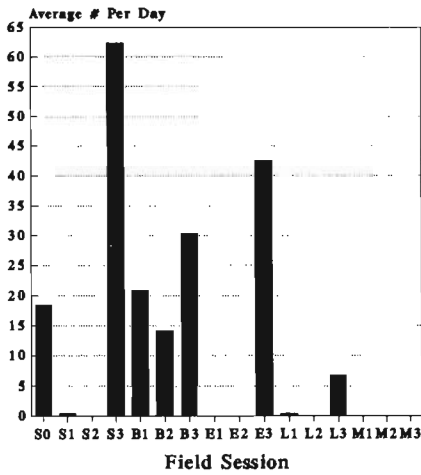
DEJU

Junco hyemalis

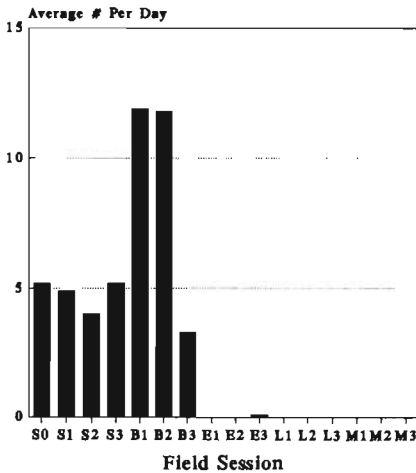
Juncos were seen regularly at S, with migrants augmenting the breeding population in both the first and final periods. None were noted on the tundra at B. This species was found on territory at the remaining three sites, with the greatest number at M and the smallest populations at L. There was a general trend toward greater numbers as the season progressed, a result of fledged young and migrants.

DEJU	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	10/13 (25)				
1	4/8 (12)		5/9 (3)	3/11 (1)	3/3 (6)
2	6/8 (12)		9/10 (14)	2/8 (4)	4/5 (12)
3	8/11 (69)		10/11 (25)	9/10 (37)	3/3 (18)
ED	2-8 June				

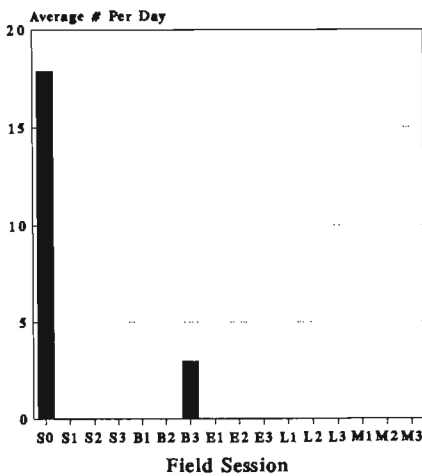
Lapland Longspur



Smith's Longspur



Snow Bunting



LALO

Spring migrants were seen during the first S session. One bird on 24 Jun and two on 28 Jun were believed to be late migrants or unmated/failed breeders, as no territorial behaviour or other evidence of breeding was documented. In Ontario, Lapland Longspurs are known to breed from Cape Henrietta Maria west to Winisk, then again in the extreme north-west corner of the province (Hussell *in* Cadman et al. 1987). This apparent gap in the Lapland Longspurs range is consistent with our findings. None were seen at S during Jul and, in the final period, migrants were just beginning to appear, with major influxes in the last few days, when 170 and 500 were seen on 29 and 30 Aug, respectively. At B, they were a common nesting species as expected. One bird at E on 14 Jun was a late spring migrant and fall migrants were present during the final session as well. Similarly three birds on 6 Jun and one on 8 Jun at L were late spring migrants and fall migrants were present in small numbers during the final period.

LALO	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	13/13 (80)				
1	2/8 (2)	12/12 (49)	1/9 (1)	2/11 (3)	
2		10/10 (26)			
3	8/11 (500)	10/12 (91)	10/11 (150)	8/10 (30)	
ED		19-27 June			
CD		27 June			

Calcarius lapponicus

SMLO

In Ontario, this species breeds along the coast of HB and extreme northern JB, so it is not surprising that they were found nesting at both S and B, with the greatest numbers being noted on the tundra of B. Most Smith's Longspurs leave Ontario undetected, likely moving southwest from breeding areas, so a fall migrant seen at E on 12 Sep is interesting.

Calcarius pictus

SMLO	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	10/13 (13)				
1	8/8 (8)	11/12 (27)			
2	8/8 (7)	10/10 (21)			
3	8/11 (15)	10/12 (13)	1/11 (1)		
ED	23-27 June	11 July			

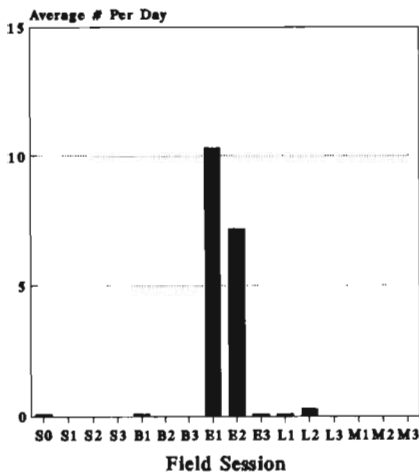
SNBU

Spring migrants were documented throughout the first S period but not afterwards. At B, the only birds recorded were 25 on 21 Aug and 11 on 27 Aug. These latter sightings are curious as they were well before the usual start of fall migration. The only proven breeding in the province to date was of a recently fledged family observed on West Pen Island on 20 Jul 1985 (Hussell *in* Cadman et al. 1987). It may be that these birds are simply early migrants from an established breeding area, but the possibility that they are family groups raised nearby should not be discounted. Snow Buntings are abundant migrants along both coasts but were not well detected on this study, as their movements occur primarily before and after the fieldwork was completed.

Plectrophenax nivalis

SNBU	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	11/13 (35)				
1					
2					
3		2/12 (25)			

Red-winged Blackbird



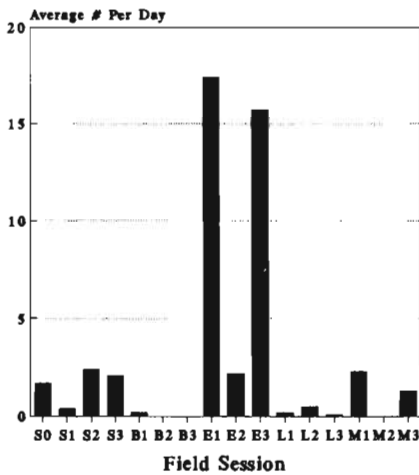
RWBL

This species is rare in the HB area, so single females at S on 31 May and B on 24 Jun were noteworthy. The B bird was associated with a number of other species that appeared in response to fires burning to the south and west. Territorial Red-wings were seen regularly in good numbers at E during the first two periods, with high counts of 30 and 20 on 14 Jun and 31 Jul, respectively. One on 4 Sep was the only report from the final E period. One bird on 6 Jun and two on 30 Jul were the only sightings at L. None were found during the study at M, but several birds were known to be frequenting townsite feeders.

Agelaius phoeniceus

RWBL	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	1/13 (1)				
1		1/12 (1)	9/9 (30)	1/11 (1)	
2			9/10 (20)	1/8 (2)	
3			1/11 (1)		

Rusty Blackbird



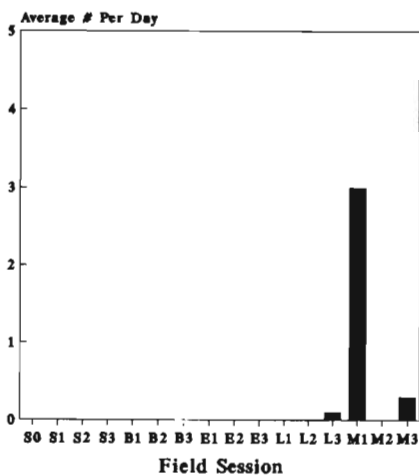
RUBL

This species was present at S in all sessions but was particularly scarce during the Jun period, with only three birds recorded on two dates. There was no evidence of breeding, though this seemed likely, as they have been found breeding along the forested HB coast previously (Flood in Cadman et al. 1987, Peck and James 1987). Two birds at B on 23 Jun were the only reports there. The following day, large numbers of passerines appeared on the tundra in association with fires to the south and west, but it is not known if this was also responsible for the Rusty Blackbirds presence on the tundra. At E, they were conspicuous in the first and final periods, but were scarce during Jul. A few were recorded in all L periods and at M in the first and last session only. It seems likely that Rusty Blackbirds breed near all forested sites, but were perhaps scarce on the immediate coast.

Euphagus carolinus

RUBL	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	4/13 (7)				
1	2/8 (2)	1/12 (2)	9/9 (30)	1/11 (2)	2/3 (5)
2	6/8 (9)		3/10 (13)	3/8 (2)	
3	8/11 (6)		9/11 (55)	1/10 (1)	3/3 (2)

Common Grackle



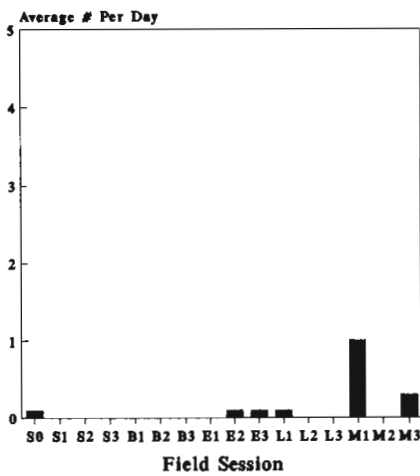
COGR

One bird at L on 5 Sep was the only sighting there. At M, up to five were seen in early Jun, mostly at townsite feeders, but one on 2 Sep was the only other observation. Historically, this species has bred within the Moosonee townsite (Peck and James 1987) and it would seem likely that a few pairs continue to breed here now.

Quiscalus quiscula

COGR	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					3/3 (5)
2					
3				1/10 (1)	1/3 (1)

Brown-headed Cowbird



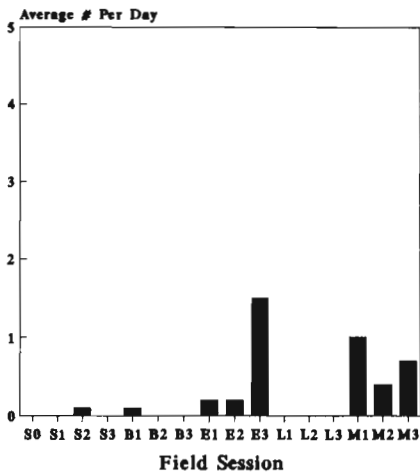
BHCO

This species is largely absent from the HBL as a breeding bird, but records were noted at four out of five study sites. A female at S on 5 Jun was the furthest from a known breeding area. At E, a fledged young of the year was seen on 25 Jul and another young of the year was noted on 8 Sep. How far these birds were from their host nest is unknown, but the 25 Jul bird may have been raised somewhere in the Lowland. A male was reported at L on 9 Jun and at M several birds, both males and females, were observed around the townsite in early Jun. One bird on 2 Sep was the only other M sighting. The only location where breeding has been confirmed in the HBL is at M (Graham *in* Cadman et al. 1987).

Molothrus ater

BHCO	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	1/13 (1)				
1				1/11 (1)	2/3 (2)
2			1/10 (1)		
3			1/11 (1)		1/3 (1)

Pine Grosbeak



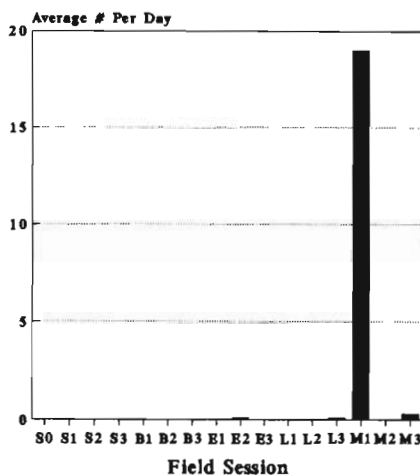
PIGR

The only S report was of a lone female plumaged bird seen on 12 Jul. A male, on the tundra at B on 26 Jun, was the only report there and was likely a result of forest fires burning to the south and west. Small numbers were recorded in all E sessions and they may have bred at or near the site, as a fledged young was seen alone on 29 Jul. At M, birds were observed on all sessions, including at least one territorial male. This species probably breeds throughout the forested HBL, possibly in varying numbers, but confirmation seems elusive and there has yet to be a nest found in Ontario (Helleiner *in* Cadman et al. 1987).

Pinicola enucleator

PIGR	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1		1/12 (1)	1/9 (2)		3/3 (1)
2	1/8 (1)		2/10 (1)		1/5 (2)
3			3/11 (13)		1/3 (2)

Purple Finch



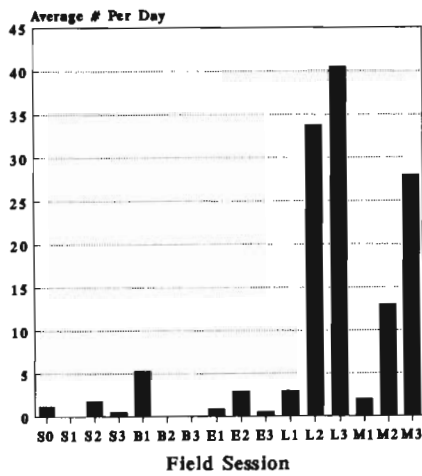
PUFI

This species reaches its northern limit at the southern fringe of the HBL (Middleton *in* Cadman et al. 1987). Away from M, the only reports were of single birds at E and L on 1 Aug and 10 Sep, respectively. At M, up to 30 birds were present during the first session, mostly at town feeders, but including some apparently territorial males as well. However, none were reported in the next M session and one on 2 Sep was the only one documented in the final period, so it is not clear whether this species bred or not.

Carpodacus purpureus

PUFI	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					3/3 (30)
2			1/10 (1)		
3				1/10 (1)	1/3 (1)

White-winged Crossbill



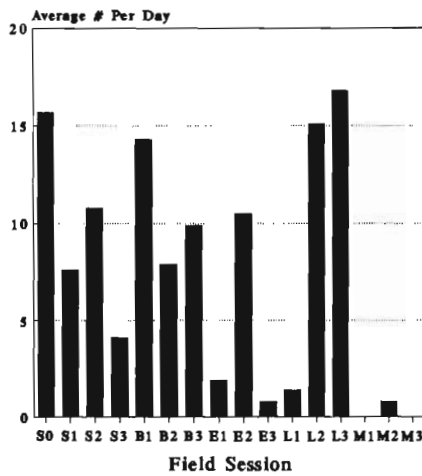
WWCR

This interesting bird was found at all sites, but its' numbers and seasonal distribution varied considerably. At S, small numbers were seen in all periods, but there was no strong indication of nesting activity. The only B report was of 64 birds seen on 24 Jun. These B birds were observed in groups of two to five flying north-west, a few feet above the tundra, presumably in response to fires burning to the south and west. Small numbers were reported at E in all sessions, but, like S, there was no indication of breeding. In 1991, the pattern of sightings at L and M was similar, with small numbers in the first periods then building gradually until fairly large numbers were present in the final sessions. Again, no evidence of breeding was found.

WWCR	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	5/13 (6)				
1		1/12 (64)	3/9 (4)	3/11 (20)	2/3 (4)
2	3/8 (7)		7/10 (13)	7/8 (100)	5/5 (23)
3	3/11 (3)		2/11 (4)	10/10 (120)	3/3 (38)

Loxia leucoptera

Common Redpoll



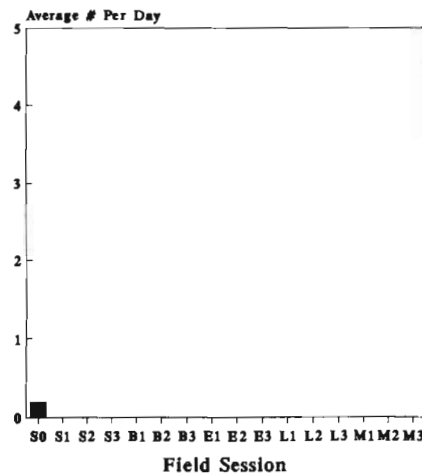
CORE

This species, like the crossbill, is difficult to interpret. Redpolls were seen in variable numbers throughout the season at S and one nest was found. Similar numbers were present at B and breeding was presumed, although not proven. At E, a few were noted daily during the first period, but increased in the second session, with up to 22 reported on 1 Aug. No evidence of breeding was found and they had become irregular and scarce by the final period. A similar pattern was documented at L, with low numbers in the first period and more in the second, with a high of 32 on 28 Jul. Numbers were small and erratic in the final period, but a flock of 75 on 12 Sep influenced the graph substantially. The only M reports were of four birds on three dates in Jul and no evidence of breeding was found. This species' status at any one place in the HBL likely varies substantially from year to year.

CORE	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	13/13 (55)				
1	7/8 (20)	11/12 (74)	8/9 (4)	6/11 (4)	
2	8/8 (18)	9/10 (14)	9/10 (22)	7/8 (32)	3/5 (2)
3	9/11 (11)	10/12 (40)	6/11 (4)	5/10 (75)	

Carduelis flammea

Hoary Redpoll



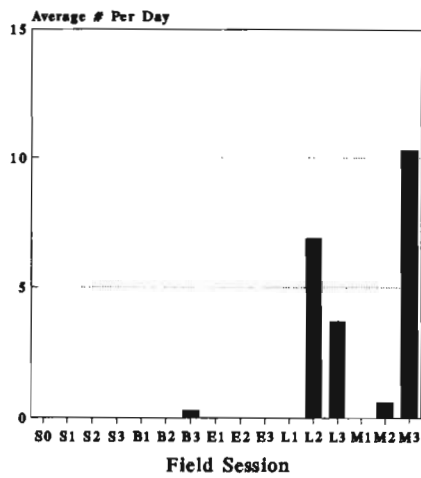
HORE

Three birds at S on 31 May were the only reports during the study and were likely tardy migrants that wintered on the Lowland. Circumstantial breeding evidence has been reported from the extreme western coast and near the Brant River (Middleton *in* Cadman et al. 1987), but we recorded no indication of breeding behaviour.

HORE	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0	1/13 (3)				
1					
2					
3					

Carduelis hornemanni

Pine Siskin



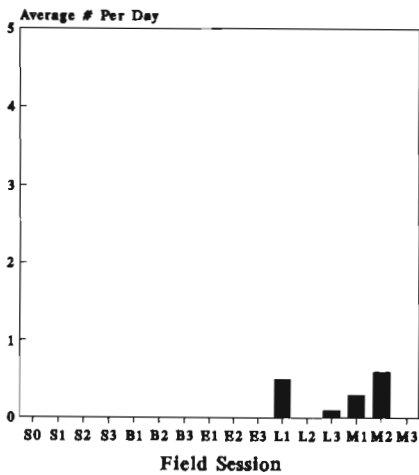
PISI

Carduelis pinus

One bird on 21 Aug and two on 23 Aug at B were well north of their expected range. At L, none were recorded in the first session, but they were regular in the final two periods, with respective high counts of 20 on 29 Jul and 15 on 8 Sep. At M, the first birds appeared in small numbers during the second session and they were common by the final period, with a high count of 30 on 1 Sep.

PISI	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1					
2				6/8 (20)	3/5 (1)
3		2/12 (2)		7/10 (15)	2/3 (30)

American Goldfinch



AMGO

Carduelis tristis

Single goldfinches were recorded on five dates in Jun at L and one more was reported on 6 Sep. At M, one was seen on 5 Jun, two on 21 Jul and one on 24 Jul. While this species is of annual occurrence in the southern JB region, they remain scarce and there was no evidence to suggest that breeding occurred during the atlas period (Middleton in Cadman et al. 1987). Breeding has since been confirmed at M in 1992 (P. Tozer, pers. comm.).

AMGO	SHAGAMU	BRANT	EKWAN	LONGRIDGE	MOOSONEE
0					
1				5/11 (1)	1/3 (1)
2					2/5 (2)
3				1/10 (1)	

Management Considerations

It is obvious that two field study years will not provide us with all of the information necessary for the effective management of bird populations in the Lowland. It should, however, be useful as a baseline for future studies and as a record of point-in-time data. Only by having records of the past history of events can we monitor declines or increases in population sizes or address anomalies. The international significance of this area as a migration route for arctic and sub-arctic breeding birds is clearly known and should be a priority for protection when assessing developmental impacts.

1. Continued Population Monitoring (minimally, once every 10-15 years)

The Hudson Bay Lowland in Ontario is a vast, remote ecosystem for which relatively little biological information is available. Costs associated with working in this area and the unique logistics involved have been a detriment to long term studies, with the exception of Canada Goose studies which have received international funding commitments. Only by continuing to build our information database can more informed management and planning decisions be made.

The ideal situation would be to monitor bird populations on a yearly basis at various sites in the Lowland. This could be partially achieved by promoting and supporting, to some extent, a long term migration monitoring station in southern James Bay. Migration information collected on a yearly basis would provide us with abundance trend over time by species. Assessment of impacts to the migration flyway by man-made developments (hydroelectric, mining, etc.) or natural developments (habitat degradation) would be facilitated with yearly data collection. The drawback of one monitoring station is that further information on habitat use and breeding in the rest of the Lowland would go undocumented.

Minimally, it is recommended that studies similar to this one be repeated every 10 to 15 years to assess the status of birds using this area. The data presented in this report can now be used to compare with future studies. Detailed methods for this study have been documented in a Wildlife Sampling Procedure Manual (Wilson 1990). Adjustments can be made to eliminate the differences found between survey years by studying all sites each year for two or three years. This would require extensive logistic support, and still may not be feasible to study even 5 sites within the same year. There was no problem of recruiting experienced volunteer naturalists to collect the data for the two week periods; however, we suspect that very few would be able to devote a greater amount of time than this.

2. Focused Research Initiatives

Every effort should be made to support and encourage future research initiatives in the Hudson Bay Lowland. By forming partnerships with universities or other interest groups, we can obtain specific information on bird populations or habitat requirements to build on our existing database. Any studies which will add to our current knowledge of species

use of this unique area should be encouraged. These research initiatives should be driven by other organizations or persons, with OMNR support when possible.

3. Western Hemisphere Shorebird Reserve Network (WHSRN)

- Site Candidate Proposal

Great numbers of shorebirds concentrate in a few key locations along their ancestral migratory routes. These locations are indispensable and irreplaceable. The Western Hemisphere Shorebird Reserve Network is a voluntary collaboration of private and government organizations that are committed to shorebird conservation. WHSRN gives international recognition to critically important shorebird habitats and promotes cooperative management. Two types of sites are differentiated by WHSRN: a Hemispheric Site (used by 250,000 or more shorebirds on an annual basis or supports at least 30% of a flyway population of a given species) and a Regional Site (used by 20,000 or more shorebirds or at least 5% of a flyway population). Membership in the "Network" and participation in its projects are wholly voluntary; management authority and priorities remain the prerogative of the land administrator.

Shorebird biologists from the Canadian Wildlife Service agree that the western coast of James Bay should be recognized as a "Hemispheric Site". To date, infrequent shorebird surveys have not documented the numbers required for Hemispheric recognition; however, there is strong circumstantial support that the eastern Arctic populations of both the Hudsonian Godwit and Red Knot use this James Bay migration route almost exclusively (G. Morrison, pers.comm.). The shorebird numbers recorded during this project may provide additional support for the Hemispheric category.

Canadian Wildlife Service (Ken Ross, pers. comm.) is currently amalgamating background information for a WHSRN proposal. A cooperative partnership between Canadian Wildlife Service, Ontario Ministry of Natural Resources and the affected First Nations should be pursued when sufficient supportive data are obtained. Once again, membership in this organization does not dictate the management of the area, it does reflect that the organizations involved realize the importance of the area to shorebirds and have made a commitment to ensure its preservation.

CONCLUSIONS

During this study, 197 species of birds were recorded, for which annotated notes have been presented. This work documented the first observations of Eurasian Wigeon (at Ekwan) and American Avocet (at Longridge) for the Ontario Hudson Bay Lowland, as well as the first summer observations of a small number of Rock Ptarmigan (at Shagamu). Based on the number of documented sightings during the course of this field work, the Long-billed Dowitcher was removed from the Ontario Bird Records Committee review list for northern Ontario. A new or previously undocumented mainland breeding colony of Ring-billed Gulls and Common Terns was

discovered at the extreme tip of Longridge Point. A large northward migration (400+) of Red-throated Loons was documented off of Ekwan. Special consideration and future research initiatives should be directed to locating all gull and tern colonies associated with the OHBL and to the disjunct populations of prairie bird species (Sharp-tailed Sparrow, Le Conte's Sparrow, Wilson's Phalarope, Marbled Godwit).

All study sites were found to have distinct assemblages of bird groups (waterbirds, shorebirds, raptors, seabirds, passerines, others) over the different study times and between sites during the same time period. This is not surprising given the different physiognomic and ecological characteristics of each site and their geographic separation. The major groups using the coastal sites were shorebirds and waterbirds. The value of the tundra for waterbirds during all seasons (nesting, moulting, staging) was noted. The importance of the James Bay sites to migrant shorebirds has been well documented in this study. The interior sites hosted greater proportions of passerine species. All study sites are probably representative of similar habitats and sites elsewhere in the HBL. We are, however, limited to only five type sites and there are many different compositions of habitat within the HBL.

In general, sites with diverse, three-dimensional structure (trees, shrub) provided habitat for a greater number of species than the more two-dimensional open tundra habitat. Where tree coverage was the most extensive (Moosonee), species numbers were thought to be reduced by visibility difficulties once leaf-out had occurred and reduced song activity after the breeding season.

During the study time which most closely represented the breeding season (time 1), all sites except Longridge had similar densities of birds using the study areas. Longridge had much higher numbers during this same period, perhaps due to the "collective" nature of the point. Coastal sites hosted large numbers of migrant birds species, while the inland sites showed little difference in numbers from the breeding season time period.

The species diversity index was highest at the inland sites, which were less impacted by large individual numbers of migrant species. The shorebird migration was best documented along the James Bay coast and that, in conjunction with a relatively low representation of other species, resulted in lower diversity indices for these two sites. Similarly, the massive Snow Goose migration documented at Shagamu in the final study session contributed to the lowest diversity index found at any site.

The base-line information provided in this report attempts to establish a quantitative record of present bird species use of the HBL, to which future studies can be compared. This information will be of value to present and future managers and planners working within the Hudson Bay Lowland.

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APPENDIX 1

The following tables present the results of statistical testing of the data. The order of these tables corresponds to the various topics presented in the "Distribution of Birds" section of this report. The statistical tests performed are described for each section.

BIRD GROUP ASSEMBLAGES:

Statistical analysis of this categorical data (waterbirds, shorebirds, raptors, seabirds, passerines, others) involved the use of 2x6 chi-squared contingency tables. The tables below present the X^2 values for each of the associated tests. All X^2 values greater than 11.1 (95% CI, $df=5$) indicate a significant difference in avian community composition (bold face type).

Table A. Comparison of avian community composition in different time periods for five sites in the Hudson Bay Lowland, during 1990 and 1991.

Time Comparison	Shagamu	Brant	Ekwan	Longridge	Moosonee
0 to 1	491.3				
0 to 2	1906.0				
0 to 3	2683.9				
1 to 2	2037.7	92.4	10662.7	23993.8	389.8
1 to 3	2563.3	817.0	2130.0	2110.3	369.8
2 to 3	7941.0	652.4	12873.9	23112.2	13.3

Table B. Comparison of avian community composition at five different sites in the Hudson Bay Lowland for similar time periods, during 1990 and 1991.

Site Comparison	Time 1	Time 2	Time 3
S to B	967.6	1600.3	11316.3
S to E	322.1	6573.0	14719.0
S to L	793.3	10812.9	10886.9
S to M	4707.5	3685.5	17578.2
B to E	680.4	9503.1	5786.2
B to L	3136.9	14974.6	2753.2
B to M	3250.9	1550.7	2138.1
E to L	656.1	1222.3	5569.9
E to M	4088.9	7305.8	6857.9
L to M	9848.9	7916.2	3934.3

APPENDIX 1 (Continued)

The following tables present the results of statistical testing of the data. The order of these tables corresponds to the various topics presented in the "Distribution of Birds" section of this report. The statistical tests performed are described for each section.

NUMBER OF BIRD SPECIES:

Analysis of variance (ANOVA) was completed on these data to test for differences in the number of bird species recorded within a site at different times, and between sites during the same time period. The mean number of species observed is listed in the tables for each site and time period. Probabilities (P) are derived from investigation of Type III SS and significant differences have been identified in bold face type (95% CI).

Table C. Comparison of number of bird species observed among time periods at five sites in the Hudson Bay Lowland, during 1990 and 1991.

Site	0	1	2	3	P
S	60.692 AB	52.625 B	57.000 AB	63.364 A	0.1579
B		37.917 A	32.700 AB	27.833 B	0.0064
E		62.889 A	58.900 A	58.273 A	0.6192
L		57.182 A	56.625 A	59.200 A	0.8595
M		67.333 A	40.400 B	39.333 B	0.0015

* Means followed by the same letter are not significantly different between time periods for each site (Duncan's Multiple Range test, $\alpha = 0.05$).

Table D. Comparison of number of bird species observed among sites at three different time periods in the Hudson Bay Lowland, during 1990 and 1991.

Time	S	B	E	L	M	P
1	52.625 B	37.917 C	62.889 AB	57.182 AB	67.333 A	0.0001
2	57.000 A	32.700 B	58.900 A	56.625 A	40.400 B	0.0001
3	63.364 A	27.833 C	58.273 A	59.200 A	39.333 B	0.0001

* Means followed by the same letter are not significantly different between sites for each time period (Duncan's Multiple Range test, $\alpha = 0.05$).

APPENDIX 1 (Continued)

The following tables present the results of statistical testing of the data. The order of these tables corresponds to the various topics presented in the "Distribution of Birds" section of this report. The statistical tests performed are described for each section.

NUMBER OF BIRDS:

Analysis of variance (ANOVA) was completed on these data to test for differences in the number of birds recorded within a site at different times, and between sites during the same time period. The mean number of birds observed is listed in the tables for each site and time period. Probabilities (P) are derived from investigation of Type III SS and significant differences have been identified in bold face type (95% CI).

Table E. Comparison of number of birds observed among time periods at five sites in the Hudson Bay Lowland, during 1990 and 1991.

Site	0	1	2	3	P
S	2240.0 B	1124.0 B	1168.0 B	6703.0 A	0.0001
B		635.0 A	466.0 A	731.5 A	0.2320
E		905.0 B	1677.0 B	5824.0 A	0.0045
L		1990.5 A	2946.3 A	2812.6 A	0.3271
M		749.0 A	256.2 B	396.7 AB	0.0472

* Means followed by the same letter are not significantly different between time periods for each site (Duncan's Multiple Range test, $\alpha = 0.05$).

Table F. Comparison of number of birds observed among sites at three different time periods in the Hudson Bay Lowland, during 1990 and 1991.

Time	S	B	E	L	M	P
1	1123.7 B	635.0 B	904.8 B	1990.5 A	749.0 B	0.0023
2	1168.0 BC	466.0 C	1677.1 B	2946.3 A	256.2 C	0.0001
3	6703.0 A	732.0 C	5824.0 AB	2813.0 BC	397.0 C	0.0004

* Means followed by the same letter are not significantly different between sites for each time period (Duncan's Multiple Range test, $\alpha = 0.05$).

APPENDIX 1 (Continued)

The following tables present the results of statistical testing of the data. The order of these tables corresponds to the various topics presented in the "Distribution of Birds" section of this report. The statistical tests performed are described for each section.

SPECIES DIVERSITY:

Analysis of variance (ANOVA) was completed on these data to test for differences in the species diversities within a site at different times, and between sites during the same time period. The mean species diversity is listed in the tables for each site and time period. Probabilities (P) are derived from investigation of Type III SS and significant differences have been identified in bold face type (95% CI).

Table G. Comparison of the relative species diversity index [J] among time periods at five sites in the Hudson Bay Lowland, during 1990 and 1991.

Site	0	1	2	3	P
S	0.6259 B	0.6300 B	0.7641 A	0.3883 C	0.0001
B		0.7244 A	0.7789 A	0.7077 A	0.1872
E		0.7380 A	0.6237 B	0.5865 B	0.0026
L		0.5212 B	0.6557 A	0.6422 A	0.0004
M		0.8230 A	0.8062 A	0.7703 A	0.7025

* Means followed by the same letter are not significantly different between time periods for each site (Duncan's Multiple Range test, $\alpha = 0.05$).

Table H. Comparison of the relative species diversity index [J] among sites at three different time periods in the Hudson Bay Lowland, during 1990 and 1991.

Time	S	B	E	L	M	P
1	0.6300 BC	0.7244 AB	0.7380 AB	0.5212 C	0.8230 A	0.0001
2	0.7641 A	0.7789 A	0.6237 B	0.6557 B	0.8062 A	0.0001
3	0.3883 D	0.7077 AB	0.5865 C	0.6422 BC	0.7703 A	0.0001

* Means followed by the same letter are not significantly different between sites for each time period (Duncan's Multiple Range test, $\alpha = 0.05$).

APPENDIX 2

*List of the bird species observed during the 1990 field season at the SHAGAMU site. Species codes have been included for reference purposes. Time periods are referenced, in chronological order, by the numbers 0-3 (**). An "X" under any of these numbers indicates that the species was observed during that time period.*

<u>WATERBIRDS:</u>		0	1	2	3	<u>RAPTORS:</u>		0	1	2	3	<u>OTHERS:</u>		0	1	2	3		
Red-throated Loon	RTLO	X	X	X		Osprey	OSPR	X	X	X		Clay-colored Sparrow	CCSP	X					
Pacific Loon	PALO	X	X	X	X	Bald Eagle	BAEA	X	X	X		Savannah Sparrow	SAVS	X	X	X	X		
Common Loon	COLO	X	X	X	X	Northern Harrier	NOHA	X	X	X	X	Sharp-tailed Sparrow	STSP		X				
Horned Grebe	HOGR		X			Sharp-shinned Hawk	SSHA			X		Fox Sparrow	FOSP	X	X		X		
Tundra Swan	TUSW	X	X	X		Northern Goshawk	NOGO			X		Lincoln's Sparrow	LISP	X	X	X	X		
Snow Goose	SNGO	X	X	X	X	Rough-legged Hawk	RLHA	X				Swamp Sparrow	SWSP	X	X	X	X		
Ross' Goose	ROGO	X		X		Golden Eagle	GOEA	X		X	X	White-throated Sparrow	WTSP	X	X	X	X		
Brant	BRAN			X	X	American Kestrel	AMKE	X				White-crowned Sparrow	WCSP	X	X	X	X		
Canada Goose	CAGO	X	X	X	X	Merlin	MERL	X	X	X	X	Harris' Sparrow	HASP				X		
Green-winged Teal	GWTE	X	X	X	X	Peregrine Falcon	PEFA	X		X		Dark-eyed Junco	DEJU	X	X	X	X		
American Black Duck	ABDU	X	X	X	X	Gyrfalcon	GYRF			X		Lapland Longspur	LALO	X	X		X		
Mallard	MALL	X	X	X	X	Great Horned Owl	GHOW	X				Smith's Longspur	SMLO	X	X	X	X		
Northern Pintail	NOPI	X	X	X	X	Northern Hawk Owl	NOHO		X			Snow Bunting	SNBU	X					
Northern Shoveler	NSHO	X	X	X	X	Short-eared Owl	SEOW	X		X		Red-winged Blackbird	RWBL	X					
American Wigeon	AMWI	X	X	X	X	<u>SEABIRDS, TERNS AND PELAGICS:</u>						Rusty Blackbird	RUBL	X	X	X	X		
Ring-necked Duck	RNDU	X				Parasitic Jaeger	PAJA	X		X	X	Brown-headed Cowbird	BHCO	X					
Greater Scaup	GRSC	X	X	X	X	Long-tailed Jaeger	LTJA	X	X			Pine Grobeak	PIGR				X		
Lesser Scaup	LESC	X	X	X	X	Little Gull	LIGU			X		White-winged Crossbill	WWCR	X	X		X		
Oldsquaw	OLDS	X	X	X	X	Bonaparte's Gull	BOGU	X	X	X	X	Common Redpoll	CORE	X	X	X	X		
Black Scoter	BLSC	X	X	X	X	Ring-billed Gull	RBGU	X	X	X	X	Hoary Redpoll	HORE	X					
Surf Scoter	SUSC	X	X	X	X	Herring Gull	HERG	X	X	X	X	<u>OTHERS:</u>							
White-winged Sooter	WWSC	X	X	X	X	Thayer's Gull	THGU	X				Spruce Grouse	SPGR	X					
Common Goldeneye	COGO	X	X	X	X	Glaucous Gull	GLGU	X	X	X		Willow Ptarmigan	WIPT	X	X	X	X		
Bufflehead	BUFF	X	X			Sabine's Gull	SAGU	X	X	X		Rock Ptarmigan	ROPT	X	X		X		
Hooded Merganser	HOME	X	X	X	X	Arctic Tern	ARTE	X	X	X	X	Mourning Dove	MODO				X		
Common Merganser	COME	X	X	X	X	<u>PASSERINES:</u>						Northern Flicker	NOFL	X	X	X	X		
Red-breasted Merganser	RBME	X	X	X	X	Least Flycatcher	LEFL				X	**TIME PERIODS**							
<u>MARSH AND SHOREBIRDS:</u>						Horned Lark	HOLA	X	X	X	X	0 -> May 28 - June 9							
American Bittern	AMBI	X	X	X		Tree Swallow	TRES	X	X	X		1 -> June 21-28							
Great Blue Heron	GTBH			X	X	Bank Swallow	BANS	X				2 -> July 10-18							
Yellow Rail	YERA	X	X	X		Barn Swallow	BARS		X			3 -> August 20-30							
Sora	SORA	X				Gray Jay	GRAJ	X	X	X	X								
Sandhill Crane	SACR	X	X	X	X	American Crow	AMCR	X	X	X	X								
Black-bellied Plover	BBPL	X	X	X		Common Raven	CORA	X	X	X	X								
Lesser Golden Plover	LEGP	X	X	X	X	Boreal Chickadee	BOCH	X	X	X	X								
Semipalmated Plover	SEPL	X	X	X	X	Ruby-crowned Kinglet	RCKI	X	X	X	X								
Killdeer	KILL	X	X	X	X	Blue-gray Gnatcatcher	BGGN	X											
Greater Yellowlegs	GRYE	X	X	X	X	Gray-checked Thrush	GCTH	X											
Lesser Yellowlegs	LEYE	X	X	X	X	Swainson's Thrush	SWTH		X										
Solitary Sandpiper	SOSA	X	X	X	X	Hermit Thrush	HETH	X	X	X	X								
Spotted Sandpiper	SPSA	X	X	X	X	American Robin	AMRO	X	X	X	X								
Whimbrel	WHIM	X	X	X	X	Brown Thrasher	BRTH				X								
Hudsonian Godwit	HUGO	X	X	X	X	American Pipit	AMPI	X	X	X	X								
Marbled Godwit	MAGO	X	X			Northern Shrike	NSHR				X								
Ruddy Turnstone	RUTU	X	X	X		Philadelphia Vireo	PHVI	X											
Red Knot	REKN	X	X	X	X	Tennessee Warbler	TEWA		X	X	X								
Sanderling	SAND	X	X	X	X	Orange-crowned Warbler	OCWA			X	X								
Semipalmated Sandpiper	SESA	X	X	X	X	Nashville Warbler	NAWA	X											
Least Sandpiper	LESA	X	X	X	X	Yellow Warbler	YWAR	X	X	X	X								
White-rumped Sandpiper	WRSA	X		X		Magnolia Warbler	MAWA				X								
Baird's Sandpiper	BASA	X	X	X	X	Cape May Warbler	CMWA	X											
Pectoral Sandpiper	PESA	X	X	X	X	Yellow-rumped Warbler	YRWA	X	X	X	X								
Purple Sandpiper	PUSA			X		Palm Warbler	PAWA				X								
Dunlin	DUNL	X	X	X	X	Blackpoll Warbler	BLPW	X	X	X	X								
Stilt Sandpiper	STSA	X	X	X	X	Northern Waterthrush	NOWA			X	X	X							
Buff-breasted Sandpiper	BBSA			X	X	Mourning Warbler	MOWA	X											
Short-billed Dowitcher	SBDO	X	X	X	X	Wilson's Warbler	WTWA	X	X	X	X								
Long-billed Dowitcher	LBDO	X	X	X	X	American Tree Sparrow	ATSP	X	X	X	X								
Common Snipe	COSN	X	X	X	X														
Wilson's Phalarope	WIPH			X															
Red-necked Phalarope	RNPH	X	X	X	X														

APPENDIX 2 (Continued)

List of the bird species observed during the 1991 field season at the **BRANT** site. Species codes have been included for reference purposes. Time periods are referenced, in chronological order, by the numbers 1-3 (**). An "X" under any of these numbers indicates that the species was observed during that time period.

WATERBIRDS:

		1	2	3
Red-throated Loon	RTLO	X	X	
Pacific Loon	PALO	X	X	X
Common Loon	COLO	X	X	X
Tundra Swan	TUSW	X	X	X
Snow Goose	SNGO	X	X	X
Canada Goose	CAGO	X	X	X
Green-winged Teal	GWTE	X	X	X
American Black Duck	ABDU	X	X	X
Mallard	MALL	X	X	X
Northern Pintail	NOPI	X	X	X
Blue-winged Teal	BWTE		X	
Northern Shoveler	NSHO	X	X	X
American Wigeon	AMWI	X	X	
Ring-necked Duck	RNDU	X	X	
Greater Scaup	GRSC	X	X	
Lesser Scaup	LESC	X	X	X
Oldsquaw	OLDS	X	X	X
White-winged Scooter	WWSC	X	X	X
Common Goldeneye	COGO	X	X	X
Bufflehead	BUFF	X	X	
Hooded Merganser	HOME	X		
Common Merganser	COME		X	
Red-breasted Merganser	RBME	X	X	

MARSH AND SHOREBIRDS:

American Bittern	AMBI	X	X	
Great Blue Heron	GTBH		X	
Sora	SORA	X	X	X
Sandhill Crane	SACR		X	
Black-bellied Plover	BBPL		X	
Lesser Golden Plover	LEGP		X	
Semipalmated Plover	SEPL	X	X	
Killdeer	KILL	X		
Greater Yellowlegs	GRYE	X	X	X
Lesser Yellowlegs	LEYE		X	
Solitary Sandpiper	SOSA	X		
Spotted Sandpiper	SPSA	X	X	X
Whimbrel	WHIM	X	X	X
Hudsonian Godwit	HUGO	X	X	X
Ruddy Turnstone	RUTU		X	
Red Knot	REKN	X	X	
Semipalmated Sandpiper	SESA	X	X	X
Least Sandpiper	LESA	X	X	
Pectoral Sandpiper	PESA		X	
Dunlin	DUNL	X	X	
Silt Sandpiper	STSA	X	X	
Common Snipe	COSN	X	X	X
Red-necked Phalarope	RNPH	X	X	

RAPTORS:

Osprey	OSPR	X	X	
Bald Eagle	BAEA		X	
Northern Harrier	NOHA	X	X	X
Northern Goshawk	NOGO		X	
Rough-legged Hawk	RLHA	X		
Merlin	MERL	X	X	X

SEABIRDS, TERNS AND PELAGICS:

		1	2	3
Parasitic Jaeger	PAJA	X	X	X
Long-tailed Jaeger	LTJA	X		
Bonaparte's Gull	BOGU		X	
Herring Gull	HERG	X	X	X
Arctic Tern	ARTE	X	X	
Black Tern	BLTE			X

PASSERINES:

Eastern Kingbird	EAKI	X		
Horned Lark	HOLA	X	X	X
Tree Swallow	TRES	X		
Barn Swallow	BARS	X		
Common Raven	CORA	X	X	X
American Pipit	AMPI	X	X	X
Tennessee Warbler	TEWA	X		
Orange-crowned Warbler	OCWA	X		
Yellow Warbler	YWAR	X	X	X
Magnolia Warbler	MAWA		X	
Yellow-rumped Warbler	YRWA	X		
Palm Warbler	PAWA	X		
Northern Waterthrush	NOWA	X	X	
Wilson's Warbler	WTWA	X	X	
American Tree Sparrow	ATSP	X	X	X
Chipping Sparrow	CHSP	X		
Savannah Sparrow	SAVS	X	X	X
LeConte's Sparrow	LCSP	X		
Sharp-tailed Sparrow	STSP	X	X	
Fox Sparrow	FOSP	X	X	
Song Sparrow	SOSP		X	
Lincoln's Sparrow	LISP		X	
Swamp Sparrow	SWSP	X	X	X
White-throated Sparrow	WTSP	X	X	
White-crowned Sparrow	WCSP	X	X	X
Lapland Longspur	LALO	X	X	X
Smith's Longspur	SMLO	X	X	X
Snow Bunting	SNBU		X	
Red-winged Blackbird	RWBL	X		
Rusty Blackbird	RUBL	X		
Pine Grosbeak	PIGR	X		
White-winged Crossbill	WWCR	X		
Common Redpoll	CORE	X	X	X
Pine Siskin	PISI		X	

OTHERS:

Willow Ptarmigan	WIPT	X	X	X
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****TIME PERIODS****

1 -> June 17-28

2 -> July 9-18

3 -> August 19-30

APPENDIX 2 (Continued)

List of the bird species observed during the 1990 field season at the **EKWAN** site. Species codes have been included for reference purposes. Time periods are referenced, in chronological order, by the numbers 1-3 (**). An "X" under any of these numbers indicates that the species was observed during that time period.

<u>WATERBIRDS:</u>		1	2	3	<u>RAPTORS:</u>		1	2	3	<u>OTHERS:</u>		1	2	3	
Red-throated Loon	RTLO	X			Osprey	OSPR	X	X		Yellow-rumped Warbler	YRWA	X	X	X	
Common Loon	COLO	X	X	X	Bald Eagle	BABA	X	X		Palm Warbler	PAWA			X	
Tundra Swan	TUSW			X	Northern Harrier	NOHA	X	X	X	Blackpoll Warbler	BLPW	X		X	
Snow Goose	SNGO	X	X	X	Sharp-shinned Hawk	SSHA	X	X		Northern Waterthrush	NOWA	X	X		
Brant	BRAN	X	X	X	Northern Goshawk	NOGO			X	Common Yellowthroat	COYE			X	
Canada Goose	CAGO	X	X	X	Red-tailed Hawk	RTHA	X	X	X	Wilson's Warbler	WIWA	X			
Green-winged Teal	GWTE	X	X	X	Rough-legged Hawk	RLHA	X			American Tree Sparrow	ATSP		X	X	
American Black Duck	ABDU	X	X	X	Golden Eagle	GOEA			X	Chipping Sparrow	CHSP	X			
Mallard	MALL	X	X	X	American Kestrel	AMKE	X	X		Savannah Sparrow	SAVS	X	X	X	
Northern Pintail	NOPI	X	X	X	Merlin	MERL	X	X	X	LeConte's Sparrow	LCSP	X	X	X	
Blue-winged Teal	BWTE	X	X		Peregrine Falcon	PEFA			X	Sharp-tailed Sparrow	STSP	X	X	X	
Northern Shoveler	NSHO	X			Gyr Falcon	GYRF			X	Fox Sparrow	FOSP	X	X	X	
Eurasian Wigeon	EUWI	X			Great Horned Owl	GHOW	X	X	X	Song Sparrow	SOSP			X	
American Wigeon	AMWI	X	X	X	Northern Hawk Owl	NOHO			X	Lincoln's Sparrow	LISP	X	X	X	
Greater Scaup	GRSC			X	Short-eared Owl	SEOW	X			Swamp Sparrow	SWSP	X	X	X	
Lesser Scaup	LESC			X	<u>SEABIRDS, TERNS AND PELAGICS:</u>						White-throated Sparrow	WTSP	X	X	X
Eider sp.				X	Parasitic Jaeger	PAJA			X	White-crowned Sparrow	WCSP	X	X	X	
Oldsquaw	OLDS	X			Bonaparte's Gull	BOGU			X	Dark-eyed Junco	DEJU	X	X	X	
Black Scoter	BLSC	X	X	X	Ring-billed Gull	RBGU	X	X	X	Lapland Longspur	LALO	X	X	X	
Surf Scoter	SUSC	X	X		Herring Gull	HERG	X	X	X	Smith's Longspur	SMLO			X	
White-winged Scoter	WWSC	X			Thayer's Gull	THGU			X	Red-winged Blackbird	RWBL	X	X	X	
Common Goldeneye	COGO	X	X	X	Great Black-backed Gull	GBBG			X	Rusty Blackbird	RUBL	X	X	X	
Hooded Merganser	HOME			X	Caspian Tern	CATE	X	X	X	Brown-headed Cowbird	BHCO			X	
Common Merganser	COME	X	X	X	Arctic Tern	ARTE	X	X	X	Pine Grosbeak	PIGR	X	X	X	
Red-breasted Merganser	RBME	X	X	X	Black Guillemot	BLGU			X	Purple Finch	PUFI			X	
<u>MARSH AND SHOREBIRDS:</u>					<u>PASSERINES:</u>					<u>OTHERS:</u>					
American Bittern	AMBI	X			Olive-sided Flycatcher	OSFL	X	X		Spruce Grouse	SPGR	X	X	X	
Great Blue Heron	GTBH		X	X	Alder Flycatcher	ALFL	X	X		Mourning Dove	MODO	X		X	
Yellow Rail	YERA	X	X		Eastern Kingbird	EAKI	X			Common Nighthawk	CONI	X			
Sora	SORA	X	X	X	Horned Lark	HOLA	X	X	X	Belted Kingfisher	BEKI			X	
Sandhill Crane	SACR	X	X	X	Tree Swallow	TRES	X			Three-toed Woodpecker	TTWO	X		X	
Black-bellied Plover	BBPL	X	X	X	Barn Swallow	BARS	X	X		Black-backed Woodpecker	BBWO	X			
Lesser Golden Plover	LEGP	X	X	X	Gray Jay	GRAJ	X	X	X	Northern Flicker	NOFL	X	X		
Semipalmated Plover	SEPL		X	X	American Crow	AMCR	X	X	X	**TIME PERIODS**					
Killdeer	KILL	X	X	X	Common Raven	CORA	X	X	X	1 -> June 12-20					
Greater Yellowlegs	GRYE	X	X	X	Boreal Chickadee	BOCH	X	X	X	2 -> July 24 - August 2					
Lesser Yellowlegs	LEYE	X	X	X	Brown Creeper	BRCR			X	3 -> September 3-13					
Solitary Sandpiper	SOSA	X	X		Winter Wren	WTWR	X								
Spotted Sandpiper	SPSA	X	X		Golden-crowned Kinglet	GCKI	X	X	X						
Whimbrel	WHIM	X	X	X	Ruby-crowned Kinglet	RCKI	X	X	X						
Hudsonian Godwit	HUGO	X	X	X	Northern Wheatear	NOWH			X						
Marbled Godwit	MAGO	X	X	X	Gray-checked Thrush	GCTH			X						
Ruddy Turnstone	RUTU	X	X	X	Swinson's Thrush	SWTH	X	X	X						
Red Knot	REKN	X	X	X	Hermit Thrush	HETH			X						
Sanderling	SAND	X	X	X	American Robin	AMRO	X	X	X						
Semipalmated Sandpiper	SESA	X	X	X	American Pipit	AMPI	X		X						
Least Sandpiper	LESA	X	X		Bohemian Waxwing	BOWA	X	X							
White-rumped Sandpiper	WRSA	X	X	X	Cedar Waxwing	CEDW	X	X	X						
Baird's Sandpiper	BASA	X	X		Northern Shrike	NSHR			X						
Pectoral Sandpiper	PESA	X	X	X	European Starling	EUST	X	X							
Dunlin	DUNL	X	X	X	Tennessee Warbler	TEWA	X	X	X						
Stilt Sandpiper	STSA		X	X	Orange-crowned Warbler	OCWA	X	X	X						
Buff-breasted Sandpiper	BBSA		X	X	Yellow Warbler	YWAR	X	X	X						
Short-billed Dowitcher	SBDO	X	X	X	Magnolia Warbler	MAWA	X								
Long-billed Dowitcher	LBDO			X											
Common Snipe	COSN	X	X	X											
Wilson's Phalarope	WIPH	X	X												
Red-necked Phalarope	RNPH	X	X	X											

APPENDIX 2 (Continued)

List of the bird species observed during the 1991 field season at the **LONGRIDGE** site. Species codes have been included for reference purposes. Time periods are referenced, in chronological order, by the numbers 1-3 (**). An "X" under any of these numbers indicates that the species was observed during that time period.

WATERBIRDS:

		1	2	3
Pacific Loon	PALO		X	
Common Loon	COLO	X	X	X
Red-necked Grebe	RNGR		X	
Snow Goose	SNGO	X	X	
Ross' Goose	ROGO		X	
Brant	BRAN	X	X	
Canada Goose	CAGO	X	X	X
Green-winged Teal	GWTE	X	X	X
American Black Duck	ABDU	X	X	X
Mallard	MALL	X	X	X
Northern Pintail	NOPI	X	X	X
Blue-winged Teal	BWTE	X	X	X
Northern Shoveler	NSHO		X	
American Wigeon	AMWI	X	X	X
Greater Scaup	GRSC	X	X	
Lesser Scaup	LESC	X		
Oldsquaw	OLDS	X		
Black Sooter	BLSC	X	X	X
Surf Sooter	SUSC	X		
White-winged Sooter	WWSC	X	X	
Common Goldeneye	COGO	X	X	X
Hooded Merganser	HOME		X	
Common Merganser	COME	X	X	X
Red-breasted Merganser	RBME	X	X	X

MARSH AND SHOREBIRDS:

American Bittern	AMBI		X	
Great Blue Heron	GTBH	X	X	X
Yellow Rail	YERA		X	
Sandhill Crane	SACR	X	X	X
Black-bellied Plover	BBPL	X	X	X
Lesser Golden Plover	LEGP	X	X	X
Semipalmated Plover	SEPL	X	X	X
Killdeer	KILL	X	X	X
American Avocet	AMAV		X	
Greater Yellowlegs	GRYE	X	X	X
Lesser Yellowlegs	LEYE	X	X	X
Solitary Sandpiper	SOSA	X	X	
Spotted Sandpiper	SPSA	X	X	
Whimbrel	WHIM	X	X	X
Hudsonian Godwit	HUGO	X	X	X
Marbled Godwit	MAGO	X	X	
Ruddy Turnstone	RUTU	X	X	X
Red Knot	REKN	X	X	X
Sanderling	SAND	X	X	X
Semipalmated Sandpiper	SESA	X	X	X
Least Sandpiper	LESA	X	X	X
White-rumped Sandpiper	WRSA	X	X	X
Pectoral Sandpiper	PESA		X	X
Dunlin	DUNL	X	X	X
Buff-breasted Sandpiper	BBSA		X	X
Short-billed Dowitcher	SBDO	X	X	X
Common Snipe	COSN	X	X	X
Wilson's Phalarope	WIPH		X	
Red-necked Phalarope	RNPH		X	

RAPTORS:

Osprey	OSPR	X	X	X
Northern Harrier	NOHA	X	X	X
Sharp-shinned Hawk	SSHA	X		X

		1	2	3
Northern Goshawk	NOGO		X	
Red-tailed Hawk	RTHA		X	
Rough-legged Hawk	RLHA		X	
Merlin	MERL	X	X	X
Peregrine Falcon	PEFA		X	
Great Horned Owl	GHOW	X	X	X
Northern Hawk Owl	NOHO		X	
Short-eared Owl	SEOW		X	
Boreal Owl	BOOW			X

SEABIRDS, TERNS AND PELAGICS:

Double-crested Cormorant	DCCO		X	X
Parasitic Jaeger	PAJA		X	
Long-tailed Jaeger	LITJ		X	
Little Gull	LIGU	X	X	
Common Black-headed Gull	CBHG		X	
Bonaparte's Gull	BOGU	X	X	X
Ring-billed Gull	RBGU	X	X	X
Herring Gull	HERG	X	X	X
Iceland Gull	ICGU		X	
Glaucous Gull	GLGU		X	
Caspian Tern	CATE	X	X	X
Common Tern	COTE	X	X	X
Arctic Tern	ARTE	X	X	X

PASSERINES:

Olive-sided Flycatcher	OSFL	X	X	
Yellow-bellied Flycatcher	YBFL		X	
Alder Flycatcher	ALFL	X	X	
Least Flycatcher	LEFL		X	X
Eastern Kingbird	EAKI	X	X	
Horned Lark	HOLA	X	X	
Tree Swallow	TRES	X	X	
Bank Swallow	BANS		X	X
Barn Swallow	BARS		X	
Gray Jay	GRAJ	X	X	X
American Crow	AMCR	X	X	X
Common Raven	CORA	X	X	X
Black-capped Chickadee	BCCH	X	X	
Boreal Chickadee	BOCH	X	X	X
Red-breasted Nuthatch	RBNU		X	
Brown Creeper	BRCR		X	X
Winter Wren	WTWR		X	
Golden-crowned Kinglet	GCKI		X	X
Ruby-crowned Kinglet	RCKI	X	X	X
Gray-cheeked Thrush	GCTH		X	
Swainson's Thrush	SWTH	X	X	X
Hermit Thrush	HETH		X	X
American Robin	AMRO	X	X	X
Brown Thrasher	BRTH		X	
American Pipit	AMPI	X	X	
Cedar Waxwing	CEDW	X	X	X
Northern Shrike	NSHR		X	
European Starling	EUST		X	
Solitary Vireo	SOVI	X	X	X
Philadelphia Vireo	PHVI		X	
Red-eyed Vireo	REVI	X	X	X
Tennessee Warbler	TEWA	X	X	
Orange-crowned Warbler	OCWA	X	X	X

		1	2	3
Nashville Warbler	NAWA			X
Yellow Warbler	YWAR	X	X	X
Magnolia Warbler	MAWA		X	X
Yellow-rumped Warbler	YRWA	X	X	X
Palm Warbler	PAWA		X	X
Bay-breasted Warbler	BBWA		X	
Blackpoll Warbler	BLPW	X	X	
Black-and-white Warbler	BAWW	X	X	X
American Redstart	AMRE		X	
Northern Waterthrush	NOWA		X	
Connecticut Warbler	CONW		X	
Common Yellowthroat	COYE	X	X	X
Wilson's Warbler	WTWA		X	
American Tree Sparrow	ATSP		X	X
Chipping Sparrow	CHSP		X	
Clay-colored Sparrow	CCSP	X	X	X
Savannah Sparrow	SAVS	X	X	X
LeConte's Sparrow	LCSP	X	X	X
Sharp-tailed Sparrow	STSP	X	X	X
Fox Sparrow	FOSP	X	X	X
Song Sparrow	SOSE	X	X	
Lincoln's Sparrow	LISP	X	X	X
Swamp Sparrow	SWSP	X	X	X
White-throated Sparrow	WTSP	X	X	X
White-crowned Sparrow	WCSP	X	X	
Dark-eyed Junco	DEJU	X	X	X
Lapland Longspur	LALO	X	X	X
Red-winged Blackbird	RWBL	X	X	
Rusty Blackbird	RUBL	X	X	X
Common Grackle	COGR		X	
Brown-headed Cowbird	BHCO		X	
Purple Finch	PUFI		X	X
White-winged Crossbill	WWCR	X	X	X
Common Redpoll	CORE	X	X	X
Pine Siskin	PISI		X	X
American Goldfinch	AMGO	X	X	X

OTHERS:

Ruffed Grouse	RUGR		X	
Mourning Dove	MODO		X	
Common Nighthawk	CONI		X	X
Northern Flicker	NOFL	X	X	X

****TIME PERIODS****

1 -> June 5-15

2 -> July 26 - August 2

3 -> September 4-13

APPENDIX 2 (Continued)

List of the bird species observed during the 1991 field season at the MOOSONEE site. Species codes have been included for reference purposes. Time periods are referenced, in chronological order, by the numbers 1-3 (**). An "X" under any of these numbers indicates that the species was observed during that time period.

<u>WATERBIRDS:</u>		1	2	3			1	2	3
Canada Goose	CAGO	X	X		Golden-crowned Kinglet	GCKI	X	X	X
Green-winged Teal	GWTE		X		Ruby-crowned Kinglet	RCKI	X	X	X
Mallard	MALL	X	X	X	Swainson's Thrush	SWTH	X	X	
American Wigeon	AMWI	X			Hermit Thrush	HETH	X	X	X
Common Goldeneye	COGO	X	X		American Robin	AMRO	X	X	X
Red-breasted Merganser	RBME	X			Gray Catbird	GRCA			X
					Bohemian Waxwing	BOWA	X		
					Cedar Waxwing	CEDW	X	X	X
					European Starling	EUST	X	X	X
					Solitary Vireo	SOVI	X	X	
					Philadelphia Vireo	PHVI	X	X	X
					Red-eyed Vireo	REVI	X	X	
					Tennessee Warbler	TEWA	X	X	X
					Orange-crowned Warbler	OCWA	X	X	X
					Nashville Warbler	NAWA		X	X
					Yellow Warbler	YWAR	X	X	
					Chestnut-sided Warbler	CSWA	X		
					Magnolia Warbler	MAWA	X	X	X
					Cape May Warbler	CMWA	X	X	
					Black-throated Blue Warbler	BTBW			X
					Yellow-rumped Warbler	YRWA	X	X	X
					Palm Warbler	PAWA	X	X	X
					Bay-breasted Warbler	BBWA	X		
					Blackpoll Warbler	BLPW	X		
					Black-and-white Warbler	BAWW	X	X	
					American Redstart	AMRE	X	X	
					Ovenbird	OVEN	X		
					Northern Waterthrush	NOWA	X	X	
					Connecticut Warbler	CONW	X	X	X
					Mourning Warbler	MOWA	X	X	
					Common Yellowthroat	COYE	X	X	X
					Wilson's Warbler	WIWA	X		
					Chipping Sparrow	CHSP	X	X	
					Clay-coloured Sparrow	CCSP	X		
					Vesper Sparrow	VESP	X		
					Savannah Sparrow	SAVS	X	X	X
					LeConte's Sparrow	LCSP	X		
					Fox Sparrow	FOSP	X	X	
					Song Sparrow	SOSP	X	X	X
					Lincoln's Sparrow	LISP	X	X	X
					Swamp Sparrow	SWSP	X	X	X
					White-throated Sparrow	WTSP	X	X	X
					White-crowned Sparrow	WCSP	X	X	
					Dark-eyed Junco	DEJU	X	X	X
					Rusty Blackbird	RUBL	X	X	
					Common Grackle	COGR	X	X	
					Brown-headed Cowbird	BHCO	X	X	
					Pine Grosbeak	PIGR	X	X	X
					Purple Finch	PUFI	X	X	
					White-winged Crossbill	WWCR	X	X	X
					Common Redpoll	CORE	X		
					Pine Siskin	PISI	X	X	
					American Goldfinch	AMGO	X	X	
					<u>OTHERS:</u>				
					Spruce Grouse	SPGR	X	X	
					Mourning Dove	MODO	X		
					Common Nighthawk	CONI	X		
					Belted Kingfisher	BEKI	X	X	X
					Downy Woodpecker	DOWO	X	X	
					Hairy Woodpecker	HAWO	X		
					Northern Flicker	NOFL	X	X	X

TIME PERIODS

1 -> June 3-5

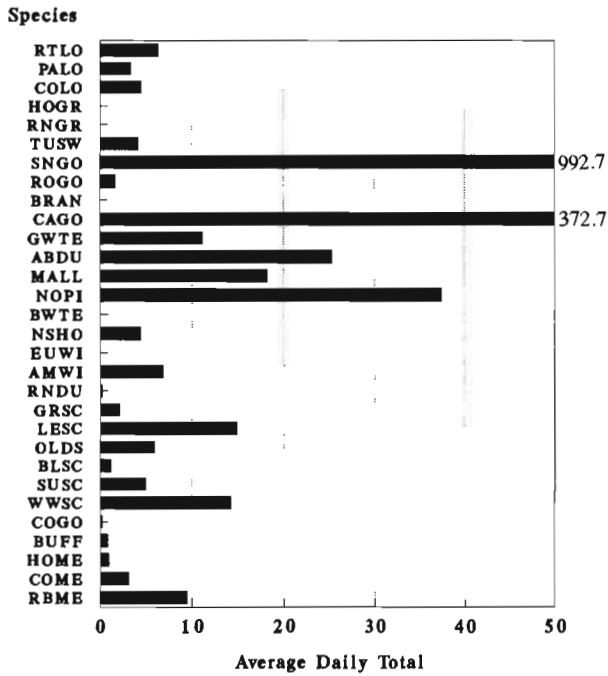
2 -> July 21-25

3 -> September 1-3

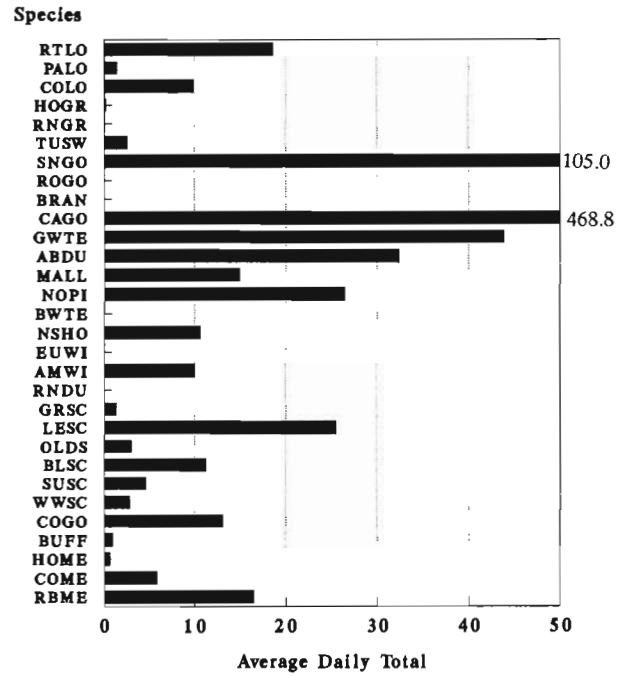
APPENDIX 3

Average daily totals for WATERBIRD species found during each study period at the SHAGAMU site in 1990. Graphs have been set to a maximum of 50 waterbirds per day for site comparison purposes and so that less common species will be detected at this scale. Those species which exceed this maximum have the average daily total listed to the right of the bar graphs.

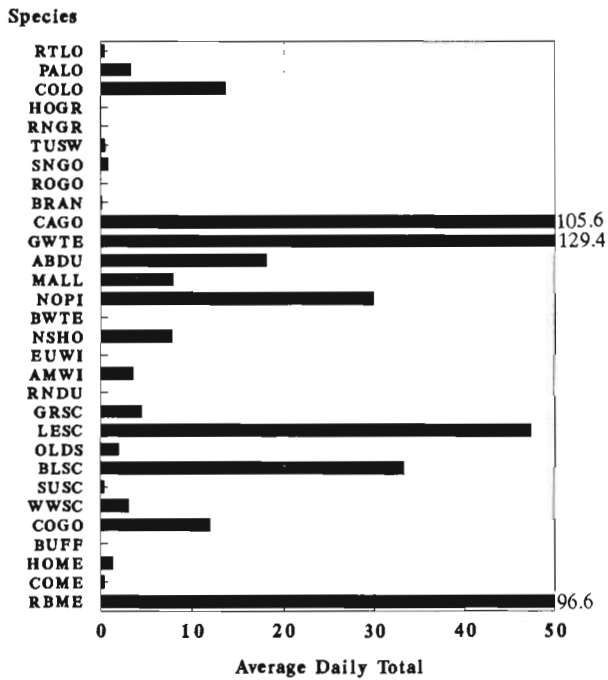
S0 (Waterbirds)



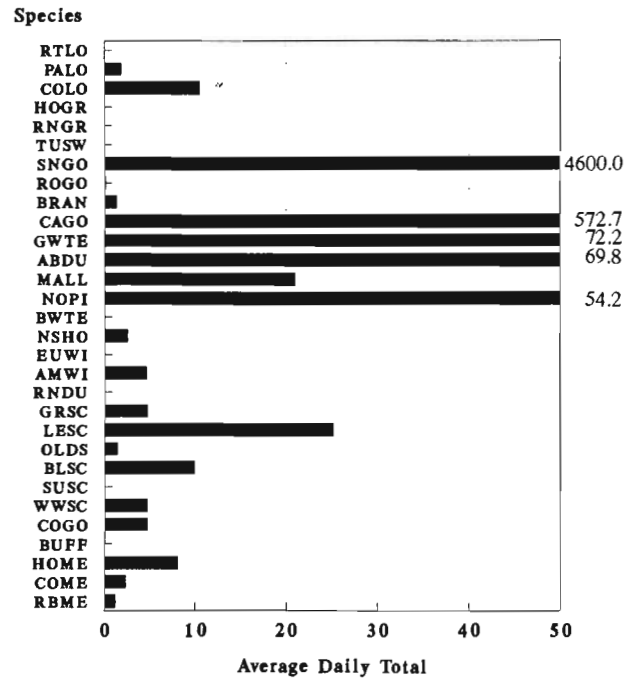
S1 (Waterbirds)



S2 (Waterbirds)



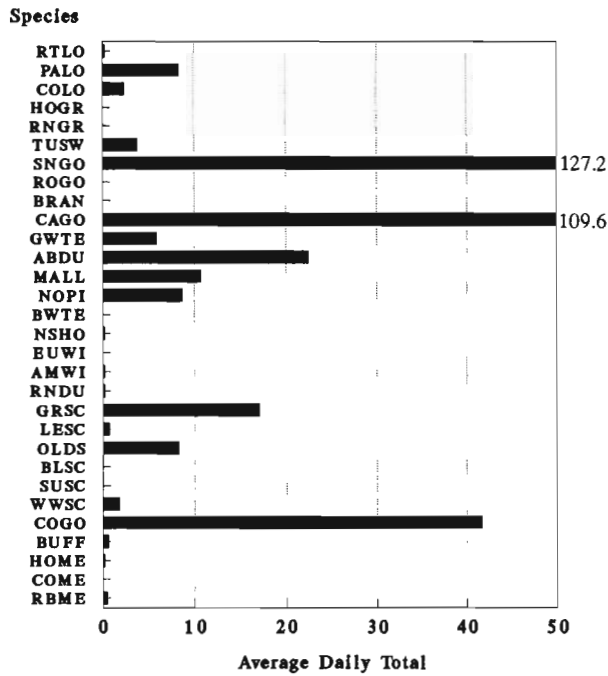
S3 (Waterbirds)



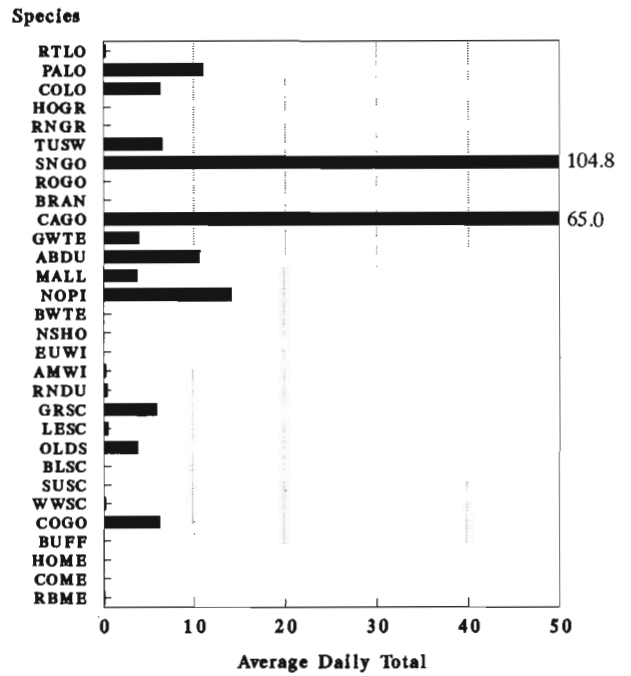
APPENDIX 3 (Continued)

Average daily totals for WATERBIRD species found during each study period at the BRANT site in 1991. Graphs have been set to a maximum of 50 waterbirds per day for site comparison purposes and so that less common species will be detected at this scale. Those species which exceed this maximum have the average daily total listed to the right of the bar graphs.

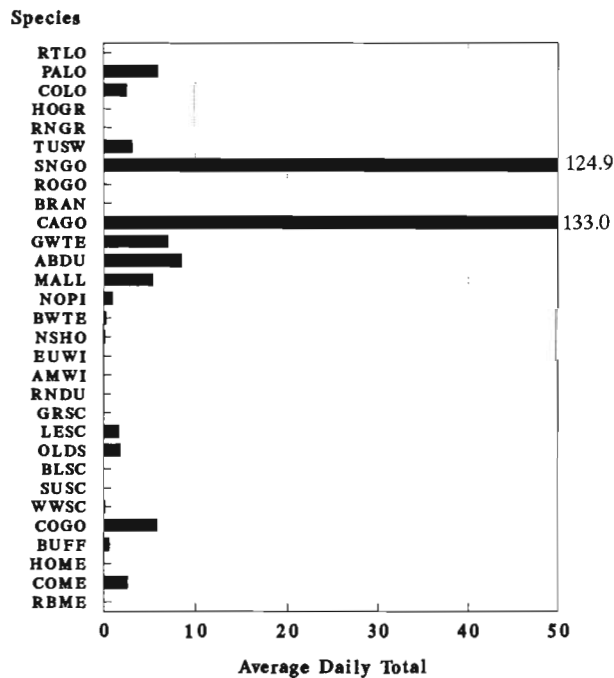
B1 (Waterbirds)



B2 (Waterbirds)



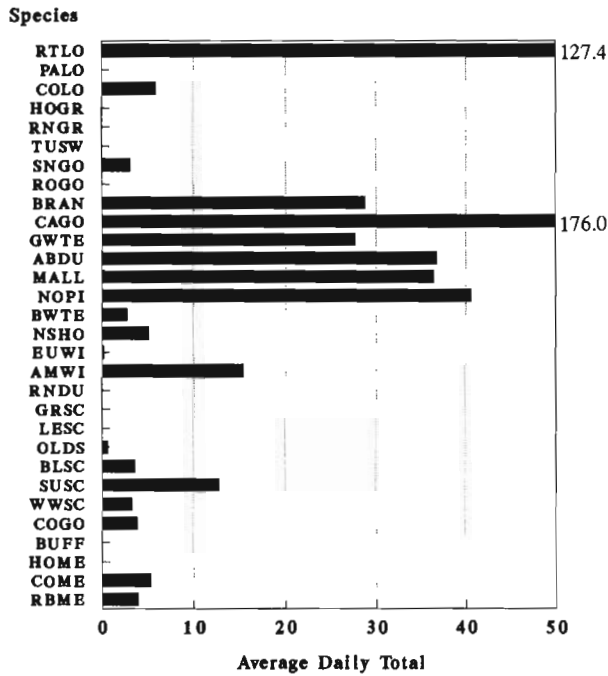
B3 (Waterbirds)



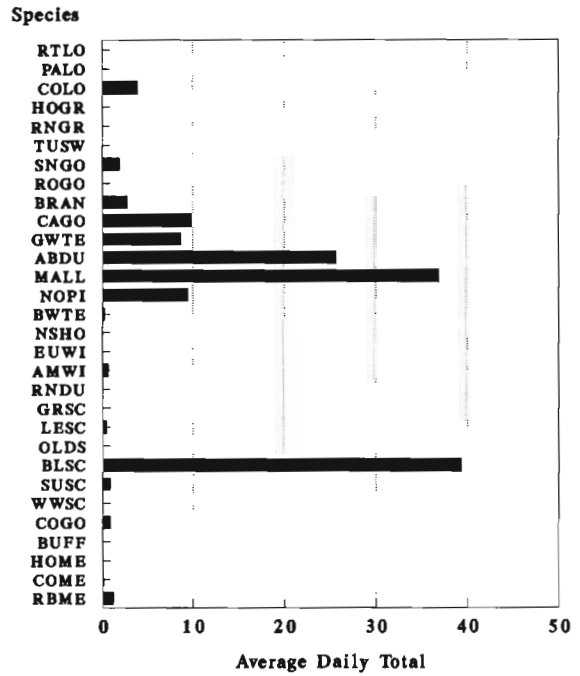
APPENDIX 3 (Continued)

Average daily totals for WATERBIRD species found during each study period at the EKWAN site in 1990. Graphs have been set to a maximum of 50 waterbirds per day for site comparison purposes and so that less common species will be detected at this scale. Those species which exceed this maximum have the average daily total listed to the right of the bar graphs.

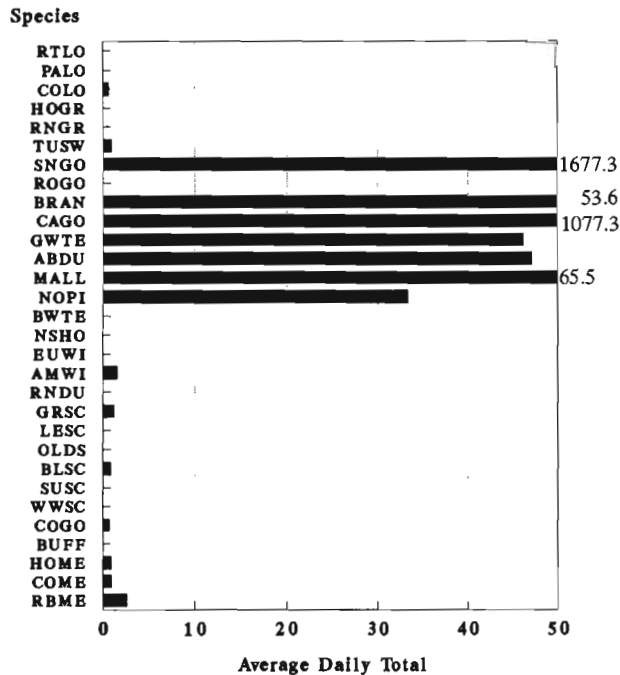
E1 (Waterbirds)



E2 (Waterbirds)



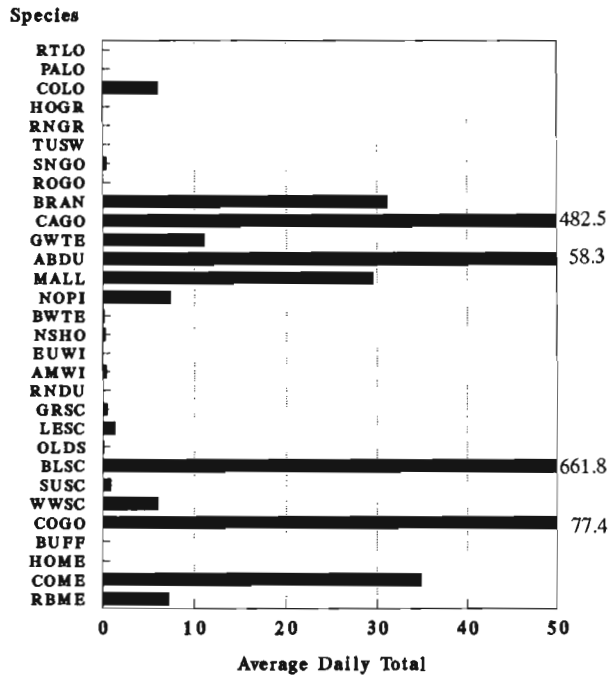
E3 (Waterbirds)



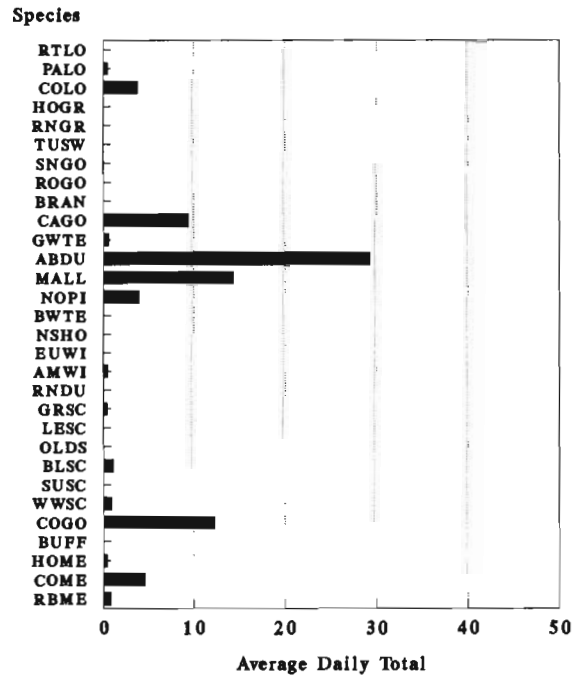
APPENDIX 3 (Continued)

Average daily totals for WATERBIRD species found during each study period at the LONGRIDGE site in 1991. Graphs have been set to a maximum of 50 waterbirds per day for site comparison purposes and so that less common species will be detected at this scale. Those species which exceed this maximum have the average daily total listed to the right of the bar graphs.

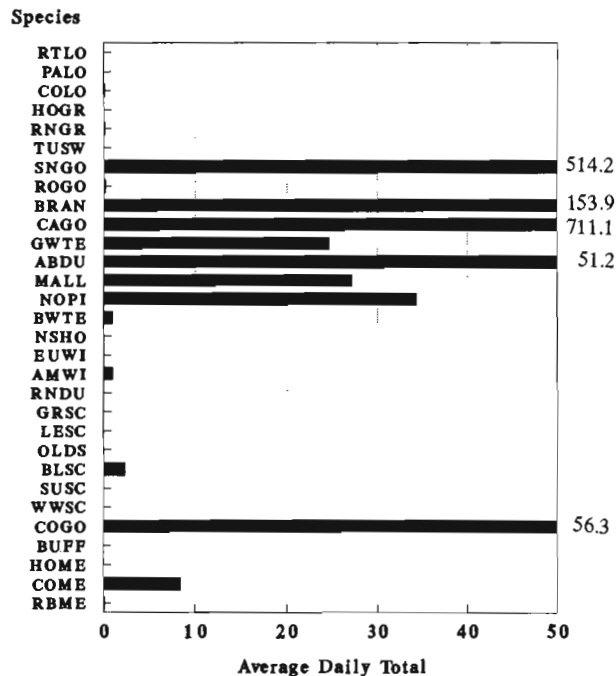
L1 (Waterbirds)



L2 (Waterbirds)



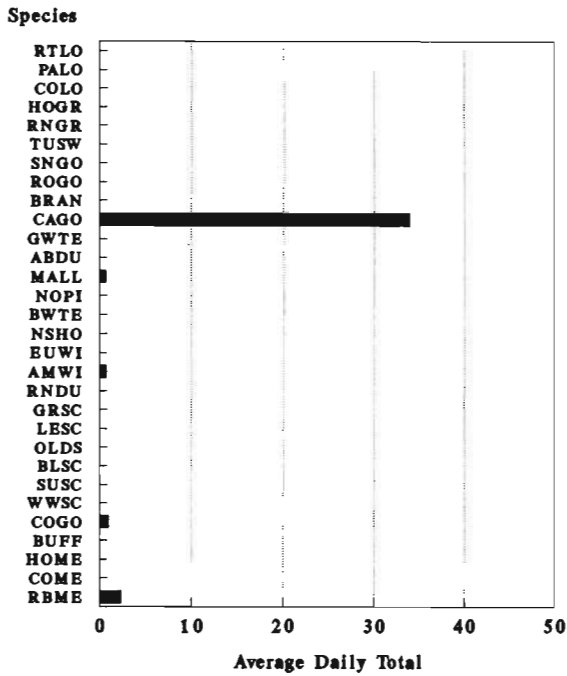
L3 (Waterbirds)



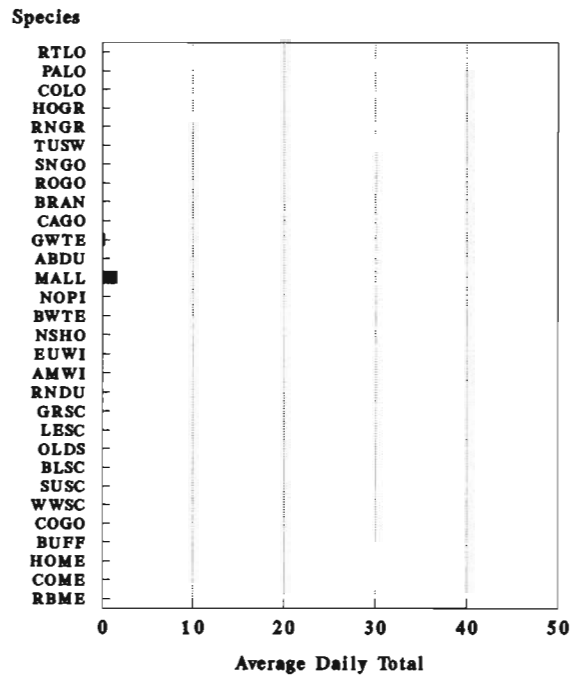
APPENDIX 3 (Continued)

Average daily totals for **WATERBIRD** species found during each study period at the **MOOSONEE** site in 1991. Graphs have been set to a maximum of 50 waterbirds per day for site comparison purposes and so that less common species will be detected at this scale. Those species which exceed this maximum have the average daily total listed to the right of the bar graphs.

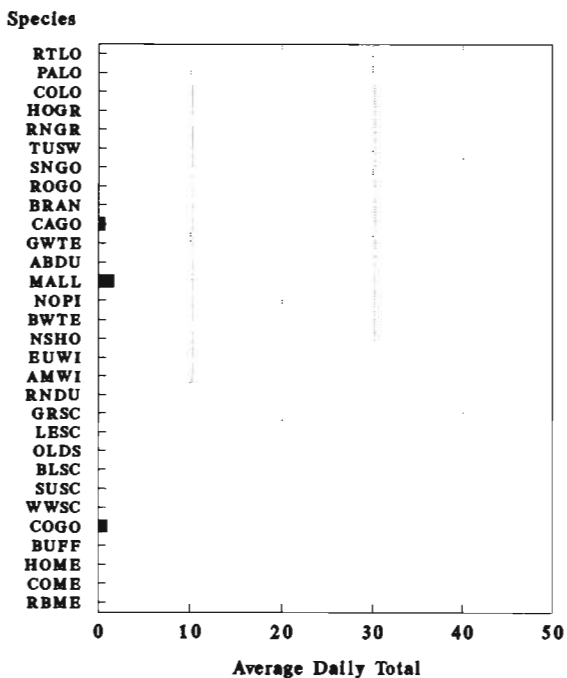
M1 (Waterbirds)



M2 (Waterbirds)



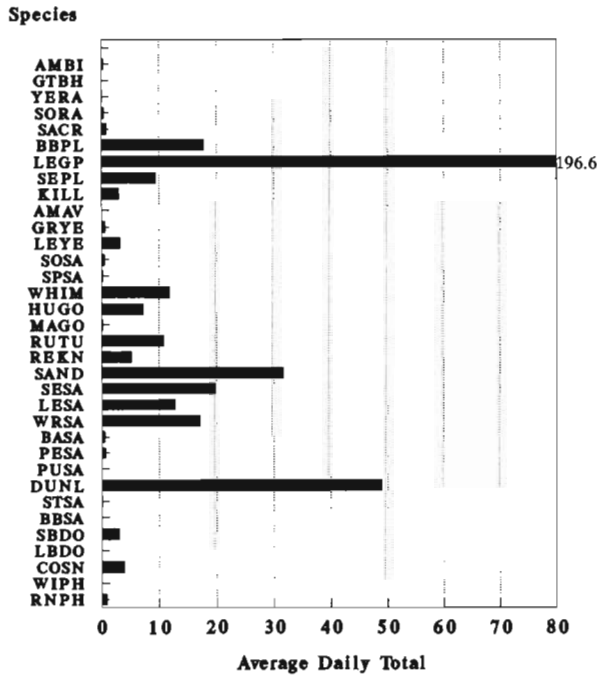
M3 (Waterbirds)



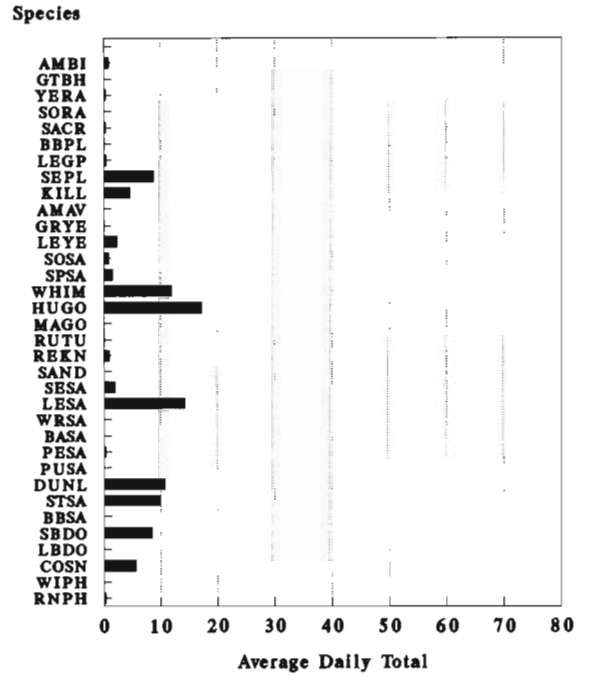
APPENDIX 4

Average daily totals for *SHOREBIRD* species found during each study period at the *SHAGAMU* site in 1990. Graphs have been set to a maximum of 80 shorebirds per day for site comparison purposes and so that less common species will be detected at this scale. Those species which exceed this maximum have the average daily total listed to the right of the bar graphs.

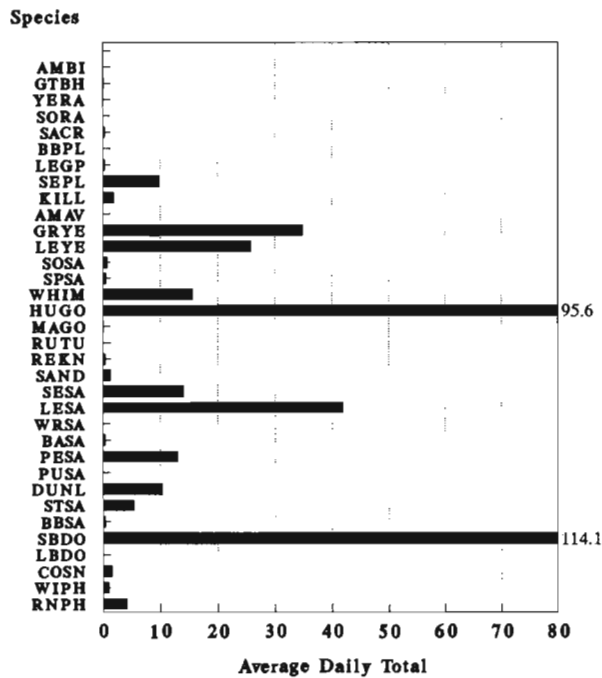
S0 (Shorebirds)



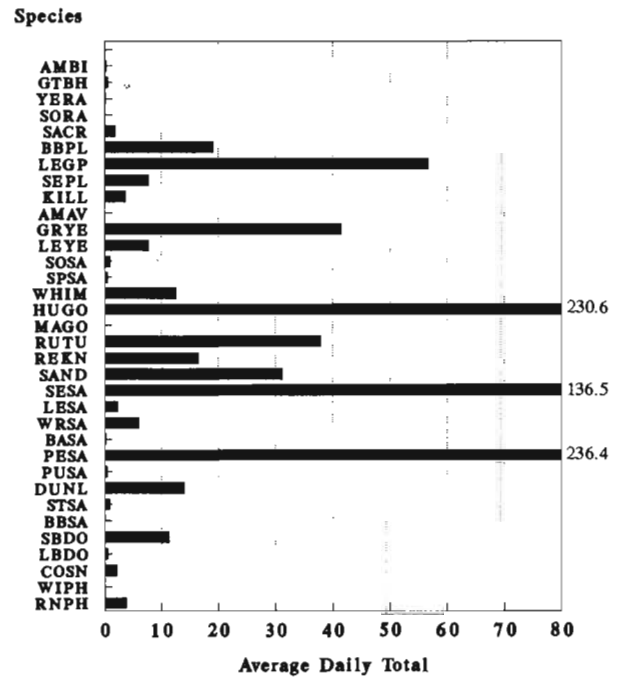
S1 (Shorebirds)



S2 (Shorebirds)



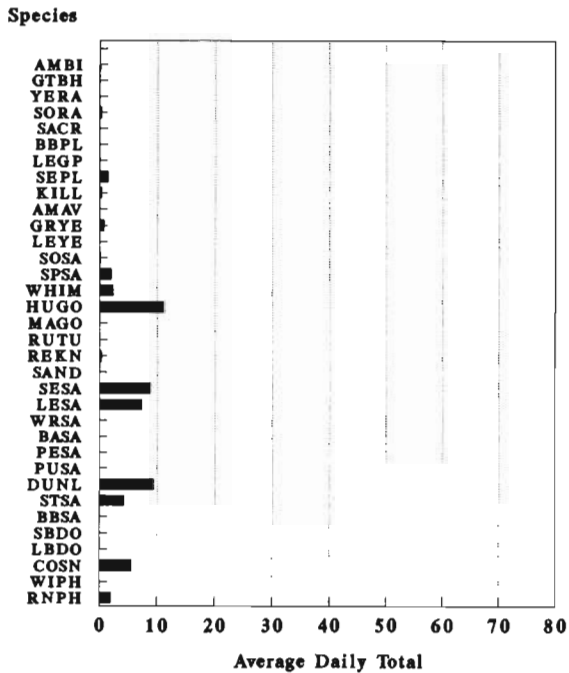
S3 (Shorebirds)



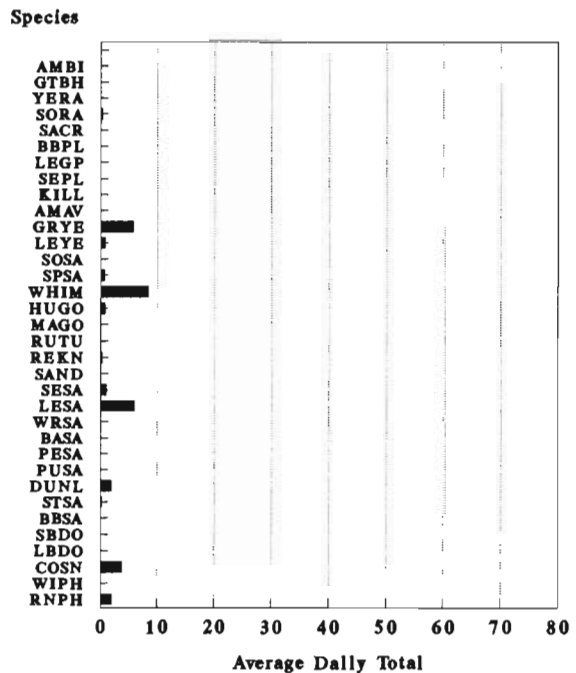
APPENDIX 4 (Continued)

Average daily totals for *SHOREBIRD* species found during each study period at the *BRANT* site in 1991. Graphs have been set to a maximum of 80 shorebirds per day for site comparison purposes and so that less common species will be detected at this scale. Those species which exceed this maximum have the average daily total listed to the right of the bar graphs.

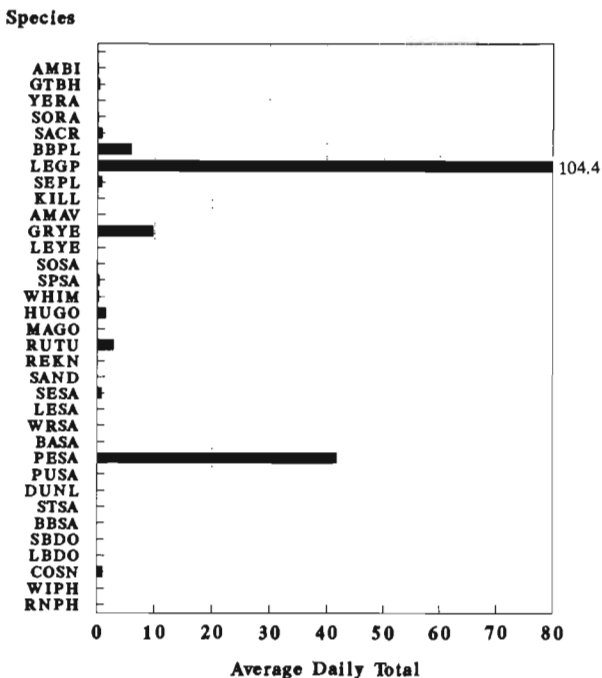
B1 (Shorebirds)



B2 (Shorebirds)



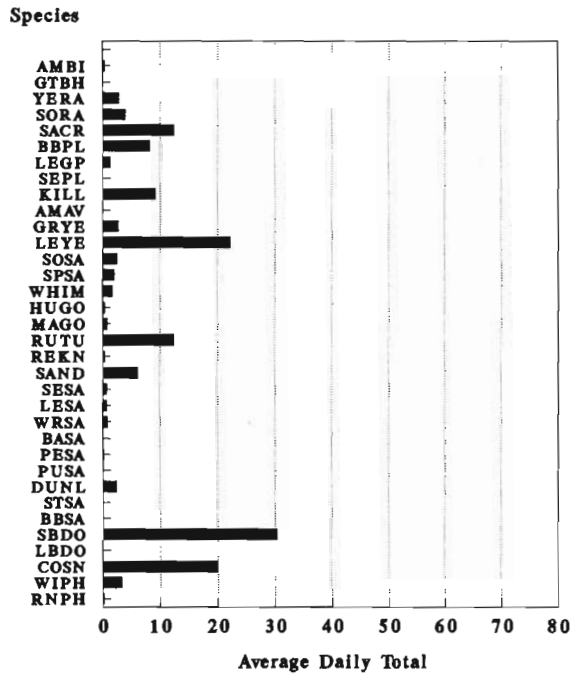
B3 (Shorebirds)



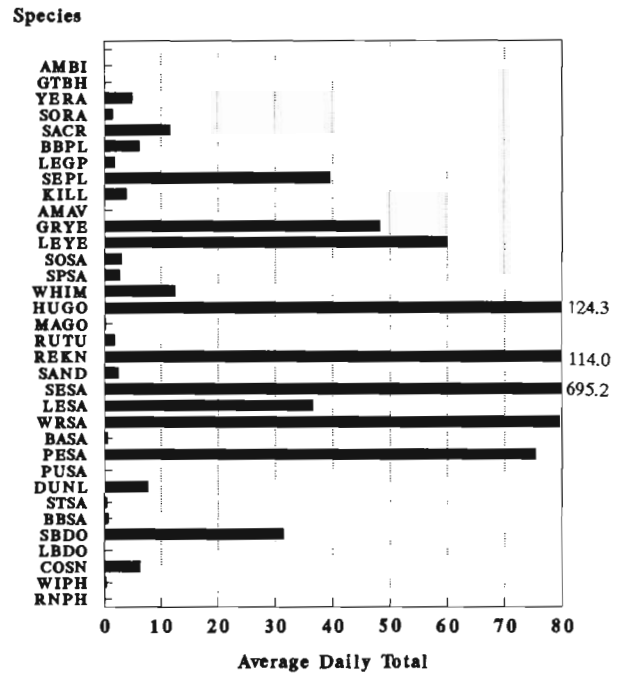
APPENDIX 4 (Continued)

Average daily totals for *SHOREBIRD* species found during each study period at the *EKWAN* site in 1990. Graphs have been set to a maximum of 80 shorebirds per day for site comparison purposes and so that less common species will be detected at this scale. Those species which exceed this maximum have the average daily total listed to the right of the bar graphs.

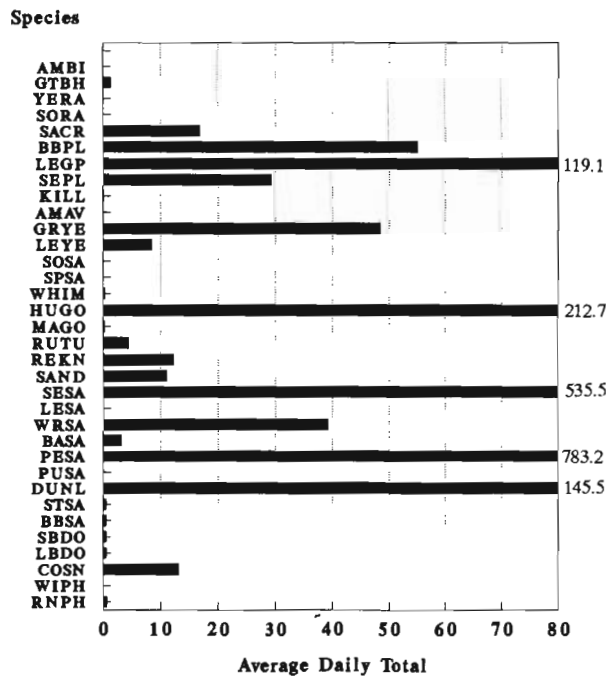
E1 (Shorebirds)



E2 (Shorebirds)



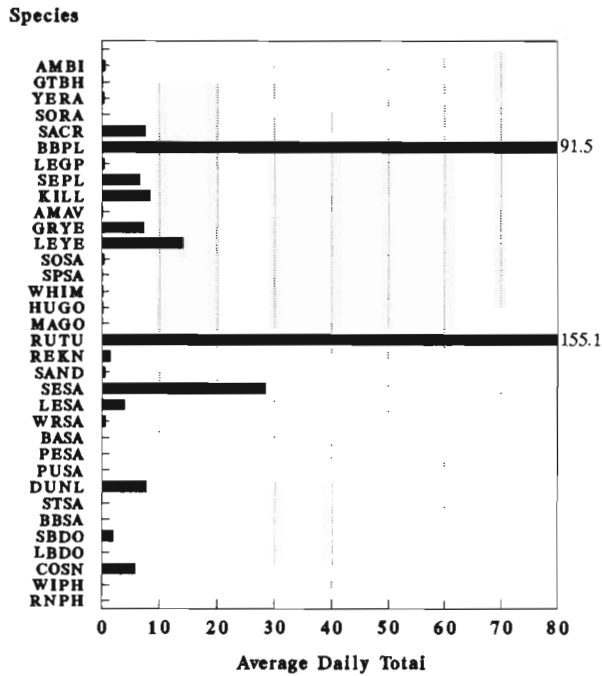
E3 (Shorebirds)



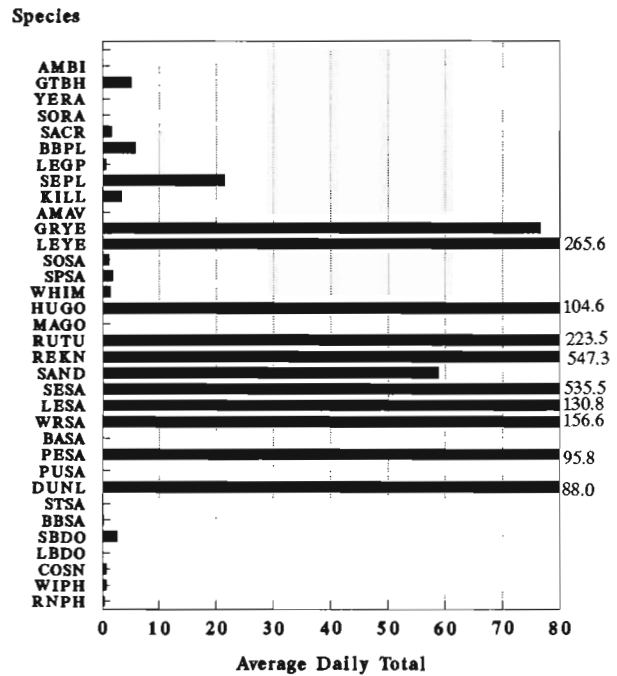
APPENDIX 4 (Continued)

Average daily totals for *SHOREBIRD* species found during each study period at the *LONGRIDGE* site in 1991. Graphs have been set to a maximum of 80 shorebirds per day for site comparison purposes and so that less common species will be detected at this scale. Those species which exceed this maximum have the average daily total listed to the right of the bar graphs.

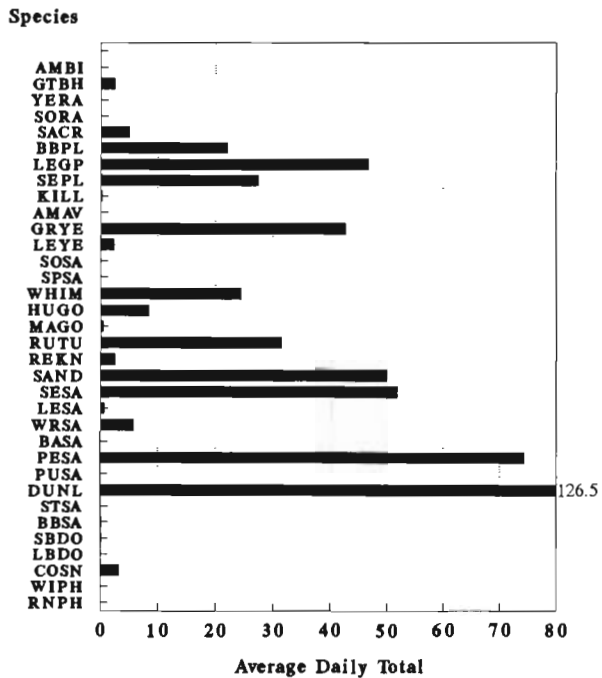
L1 (Shorebirds)



L2 (Shorebirds)



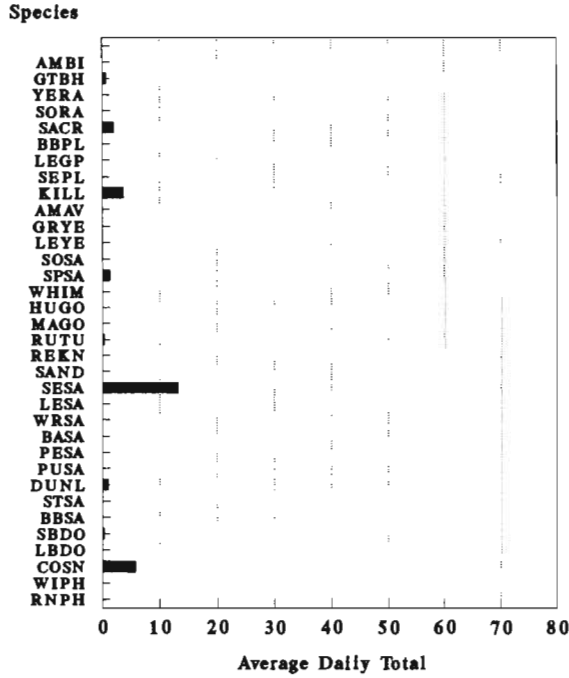
L3 (Shorebirds)



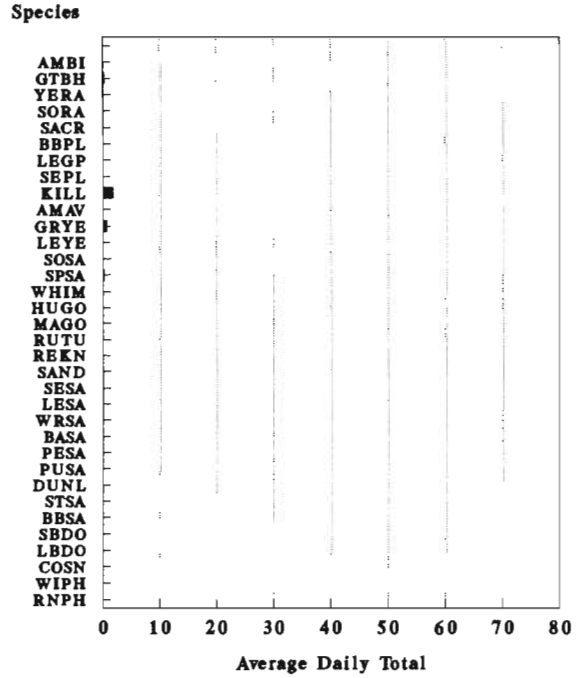
APPENDIX 4 (Continued)

Average daily totals for *SHOREBIRD* species found during each study period at the *MOOSONEE* site in 1991. Graphs have been set to a maximum of 80 shorebirds per day for site comparison purposes and so that less common species will be detected at this scale. Those species which exceed this maximum have the average daily total listed to the right of the bar graphs.

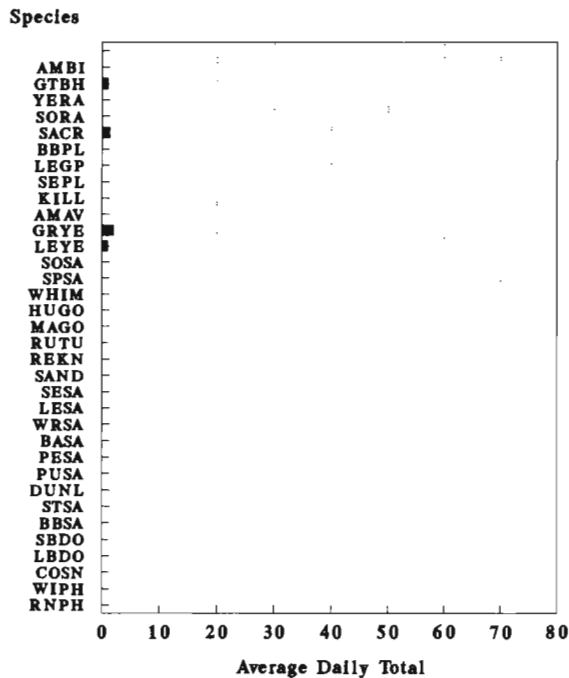
M1 (Shorebirds)



M2 (Shorebirds)



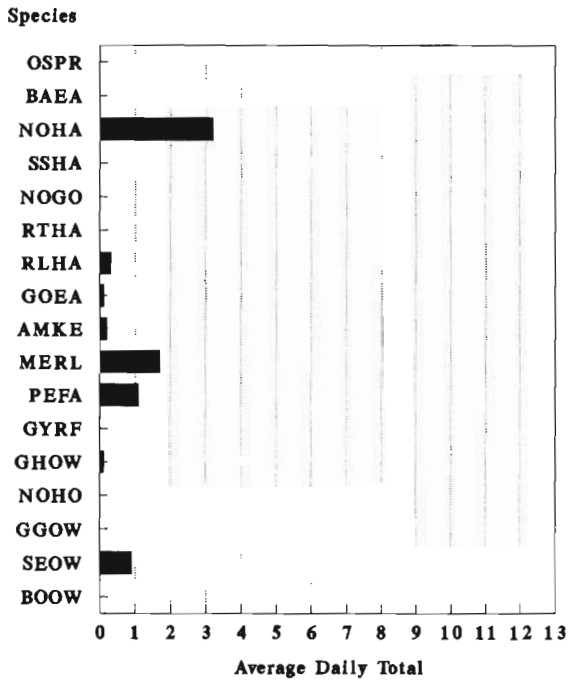
M3 (Shorebirds)



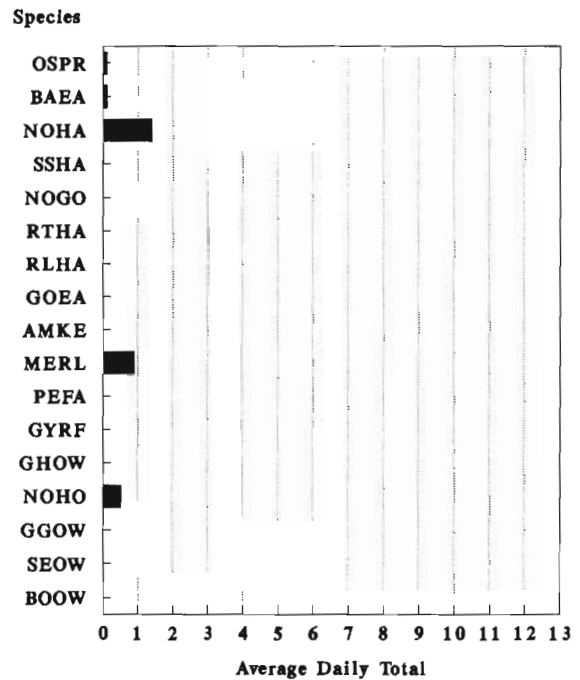
APPENDIX 5

Average daily totals for **RAPTOR** species found during each study period at the **SHAGAMU** site in 1990. Graphs have been set to a maximum of 13 raptors per day for site comparison purposes and so that less common species will be detected at this scale. Those species which exceed this maximum have the average daily total listed to the right of the bar graphs.

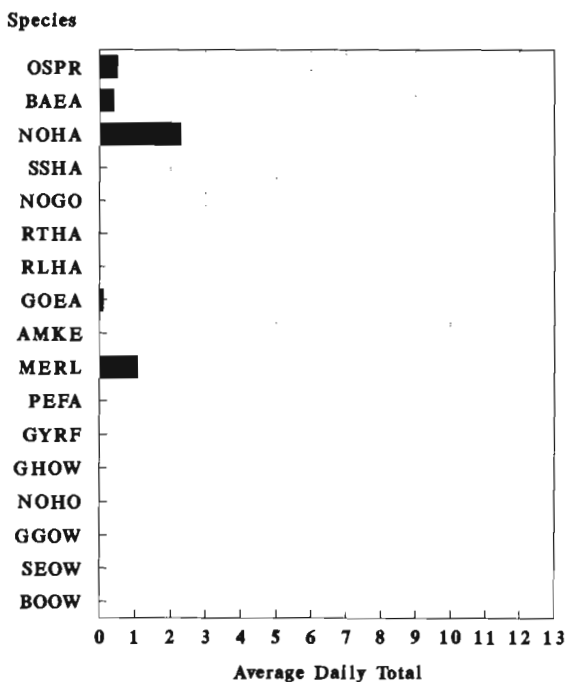
S0 (Raptors)



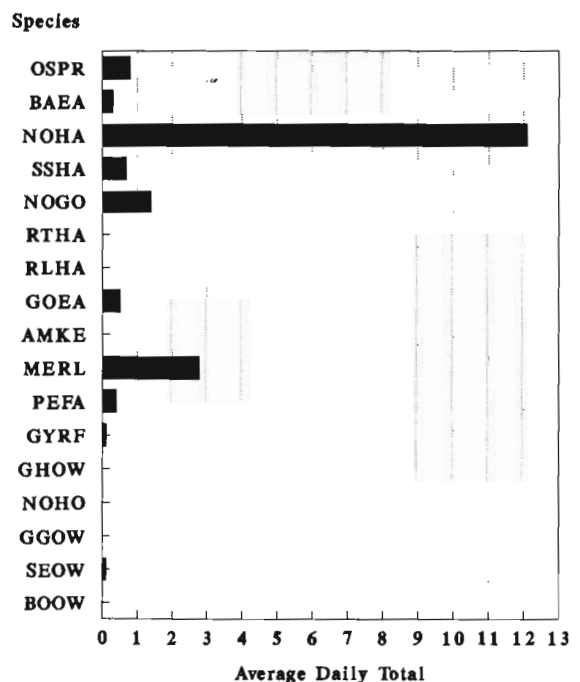
S1 (Raptors)



S2 (Raptors)



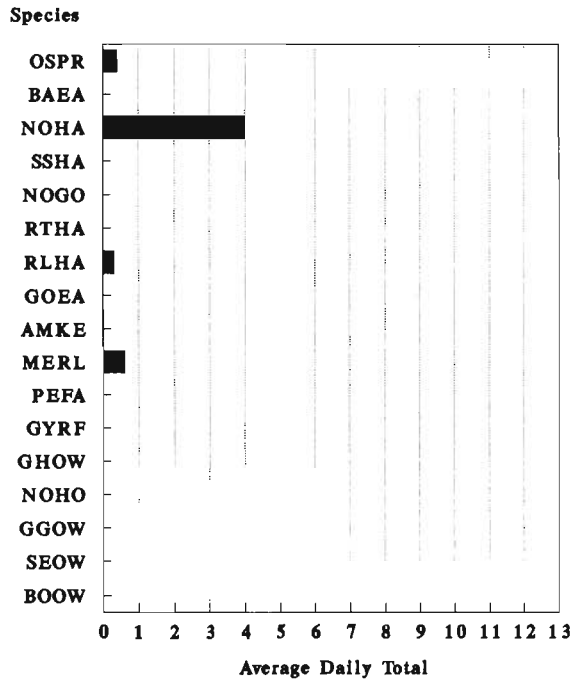
S3 (Raptors)



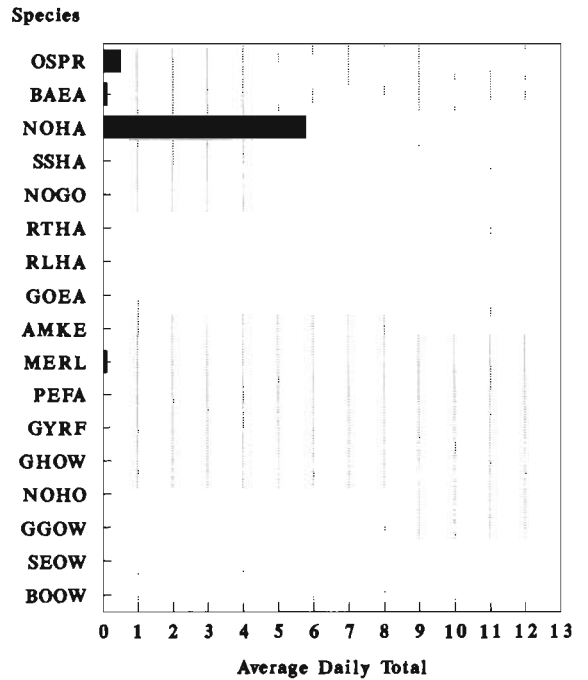
APPENDIX 5 (Continued)

Average daily totals for RAPTOR species found during each study period at the BRANT site in 1991. Graphs have been set to a maximum of 13 raptors per day for site comparison purposes and so that less common species will be detected at this scale. Those species which exceed this maximum have the average daily total listed to the right of the bar graphs.

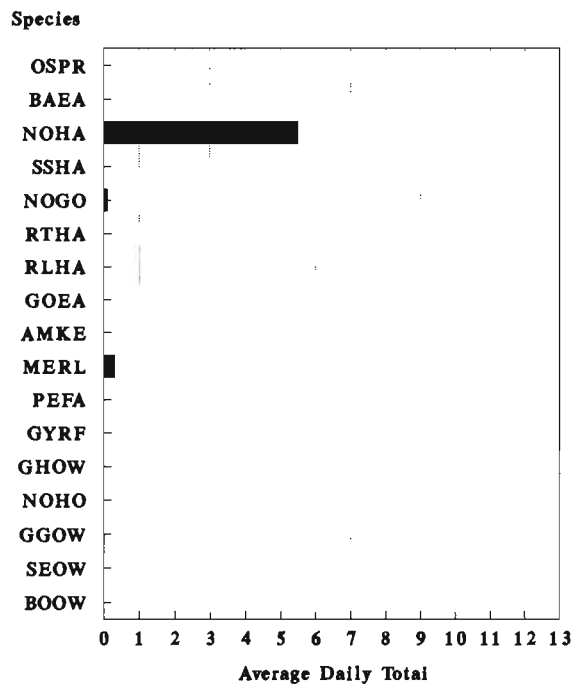
B1 (Raptors)



B2 (Raptors)



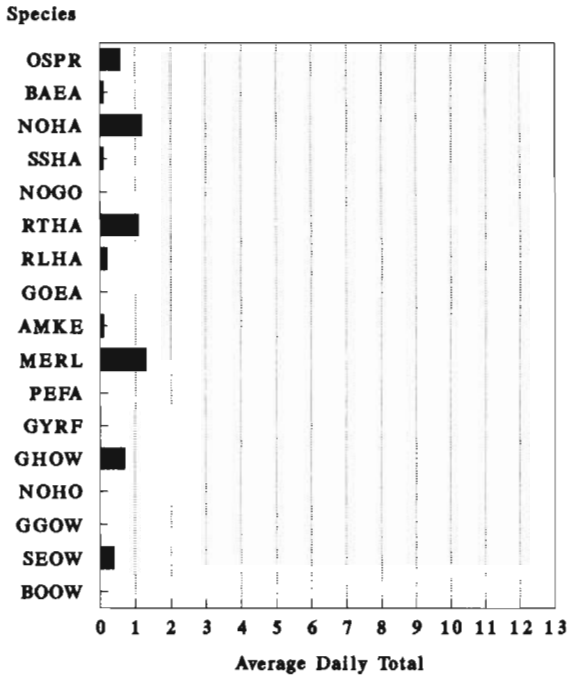
B3 (Raptors)



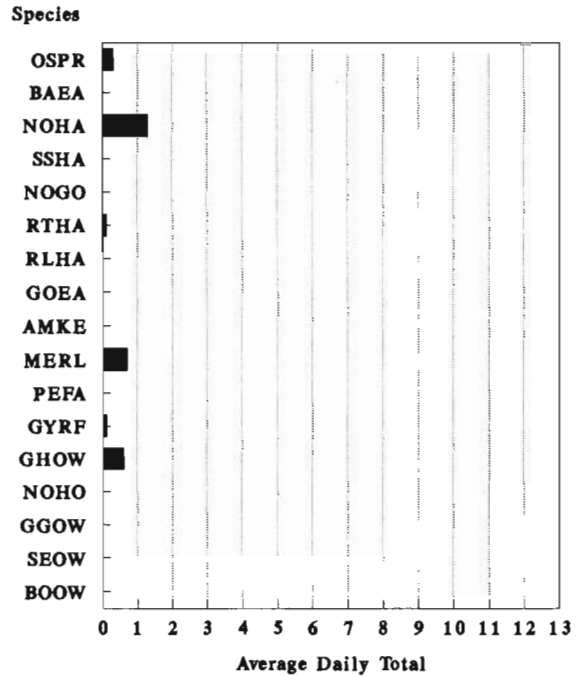
APPENDIX 5 (Continued)

Average daily totals for **RAPTOR** species found during each study period at the **EKWAN** site in 1990. Graphs have been set to a maximum of 13 raptors per day for site comparison purposes and so that less common species will be detected at this scale. Those species which exceed this maximum have the average daily total listed to the right of the bar graphs.

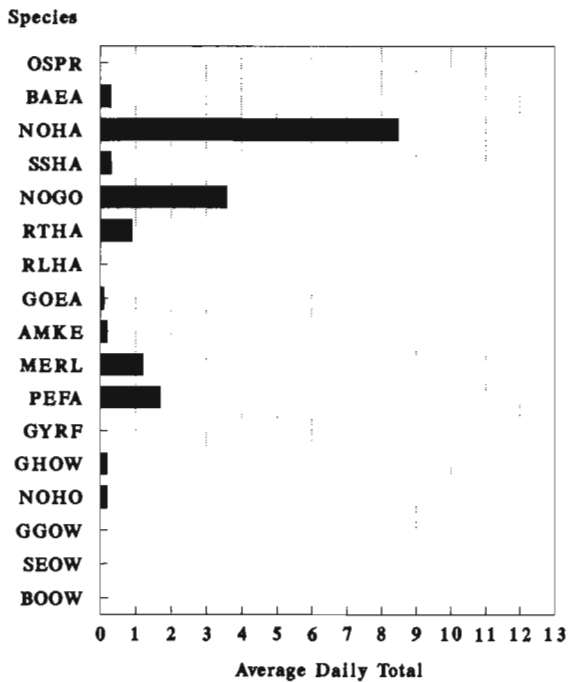
E1 (Raptors)



E2 (Raptors)



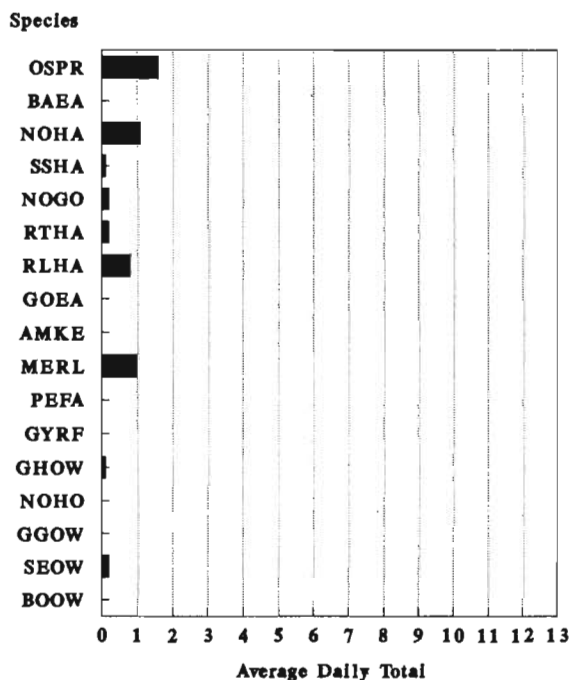
E3 (Raptors)



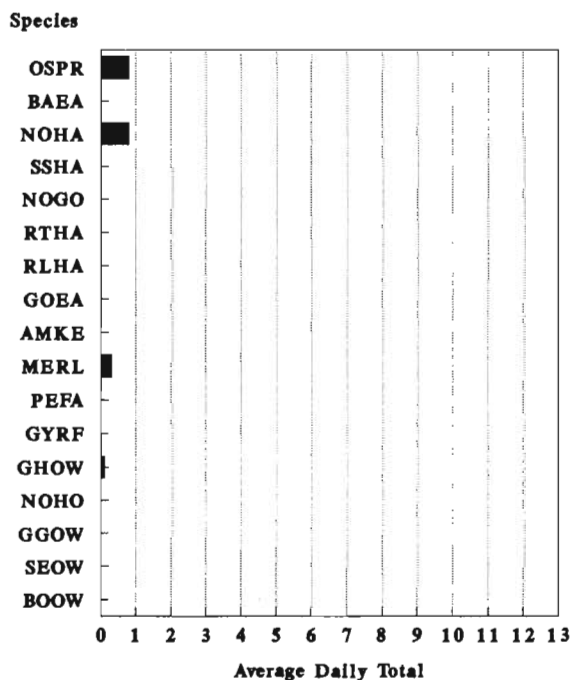
APPENDIX 5 (Continued)

Average daily totals for **RAPTOR** species found during each study period at the **LONGRIDGE** site in 1991. Graphs have been set to a maximum of 13 raptors per day for site comparison purposes and so that less common species will be detected at this scale. Those species which exceed this maximum have the average daily total listed to the right of the bar graphs.

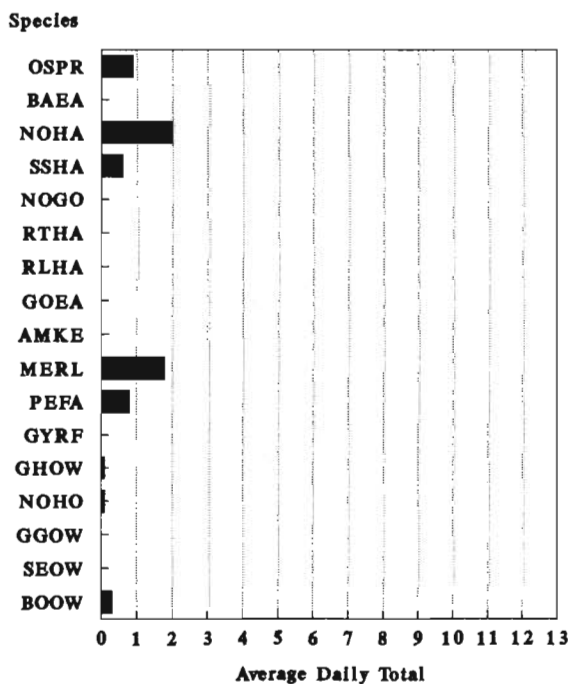
L1 (Raptors)



L2 (Raptors)



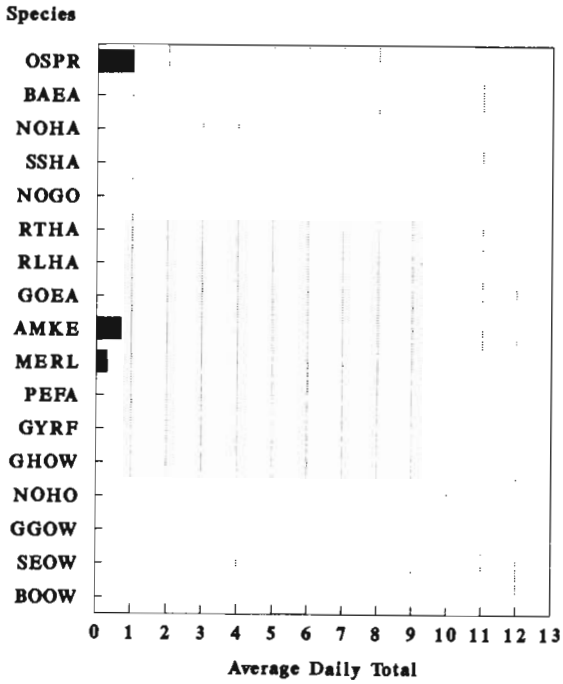
L3 (Raptors)



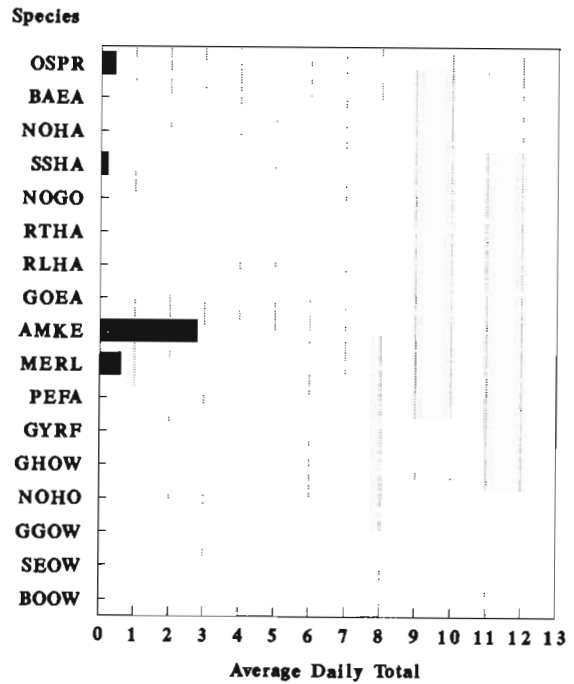
APPENDIX 5 (Continued)

Average daily totals for **RAPTOR** species found during each study period at the **MOOSONEE** site in 1991. Graphs have been set to a maximum of 13 raptors per day for site comparison purposes and so that less common species will be detected at this scale. Those species which exceed this maximum have the average daily total listed to the right of the bar graphs.

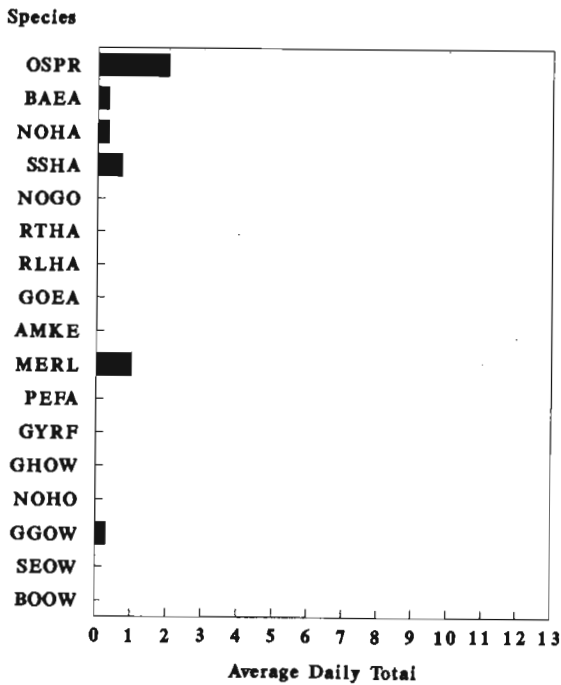
M1 (Raptors)



M2 (Raptors)



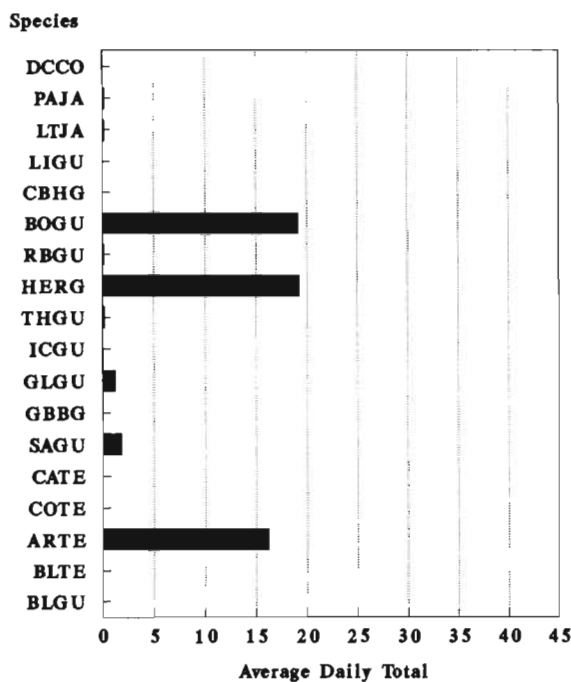
M3 (Raptors)



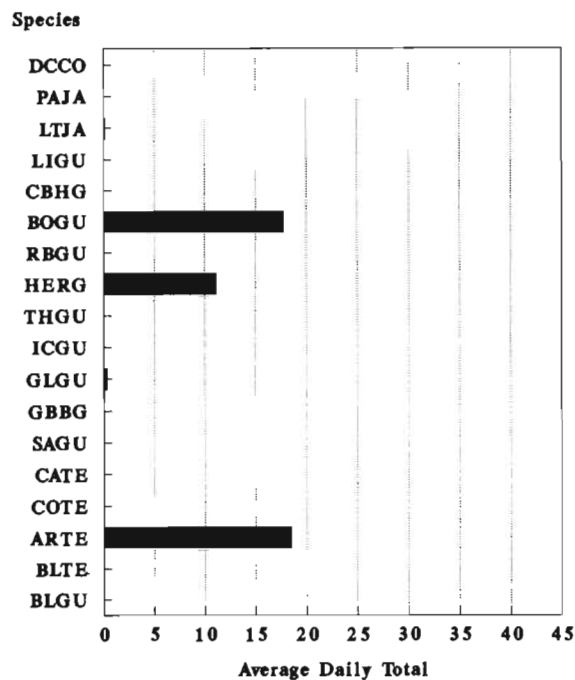
APPENDIX 6

Average daily totals for *SEABIRD* species found during each study period at the *SHAGAMU* site in 1990. Graphs have been set to a maximum of 45 seabirds per day for site comparison purposes and so that less common species will be detected at this scale. Those species which exceed this maximum have the average daily total listed to the right of the bar graphs.

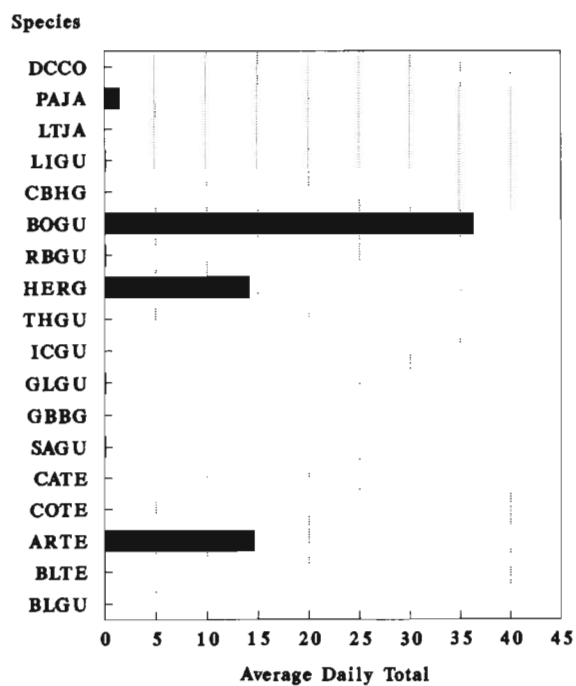
S0 (Seabirds)



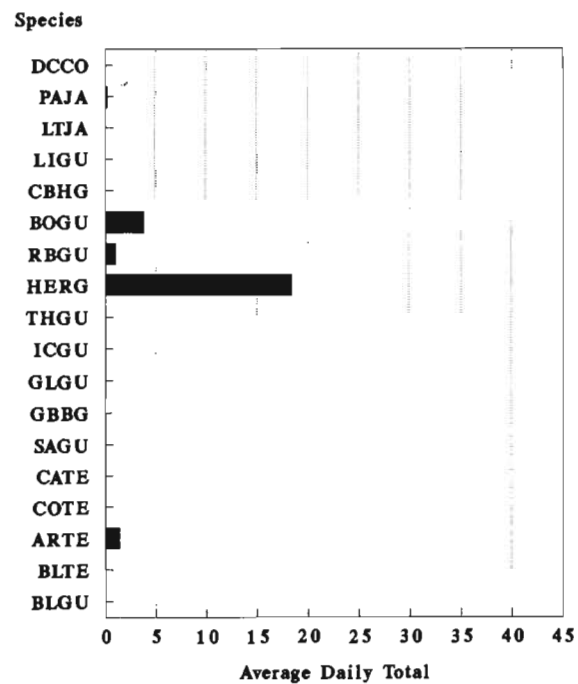
S1 (Seabirds)



S2 (Seabirds)



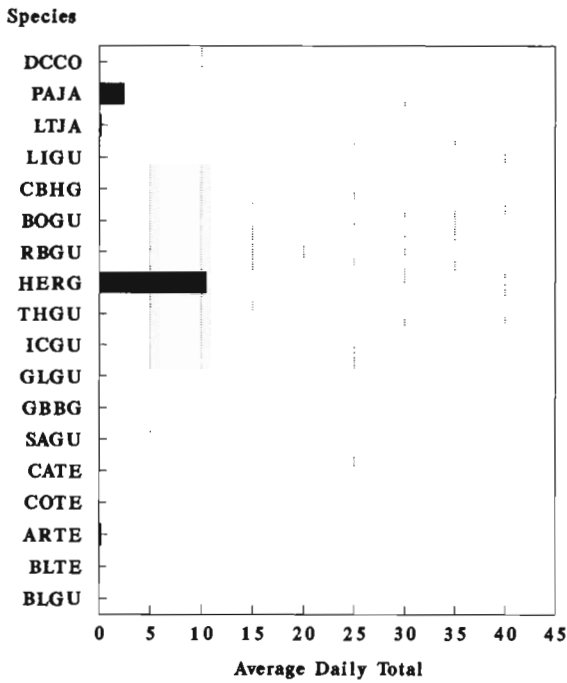
S3 (Seabirds)



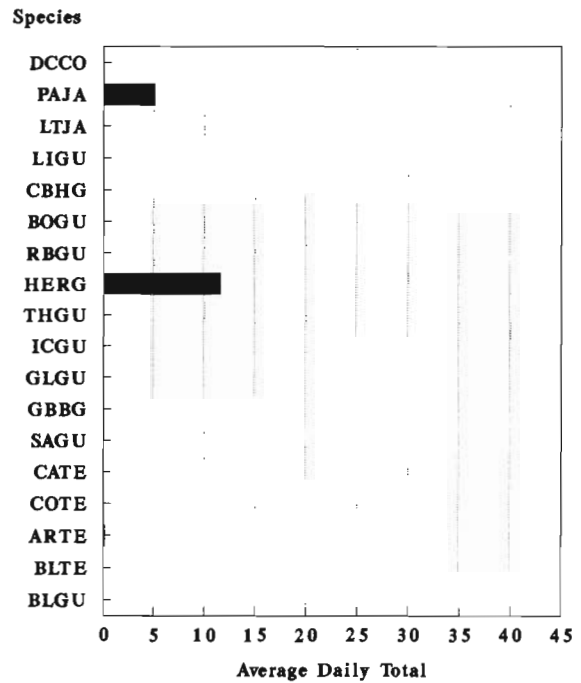
APPENDIX 6 (Continued)

Average daily totals for SEABIRD species found during each study period at the BRANT site in 1991. Graphs have been set to a maximum of 45 seabirds per day for site comparison purposes and so that less common species will be detected at this scale. Those species which exceed this maximum have the average daily total listed to the right of the bar graphs.

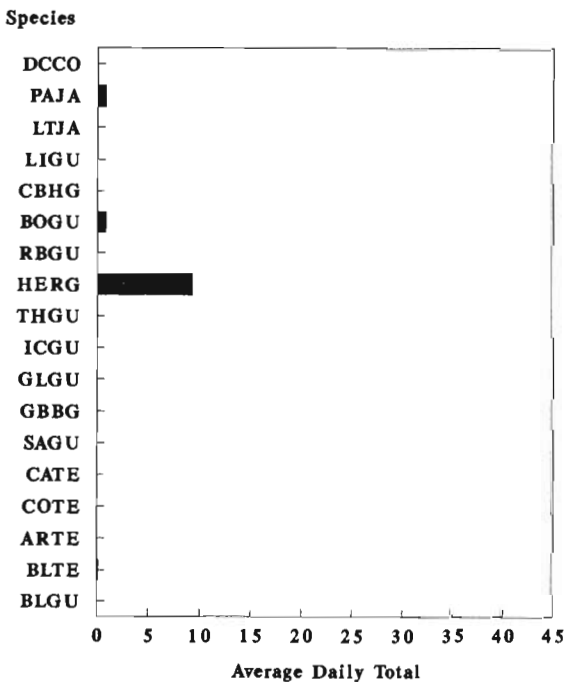
B1 (Seabirds)



B2 (Seabirds)



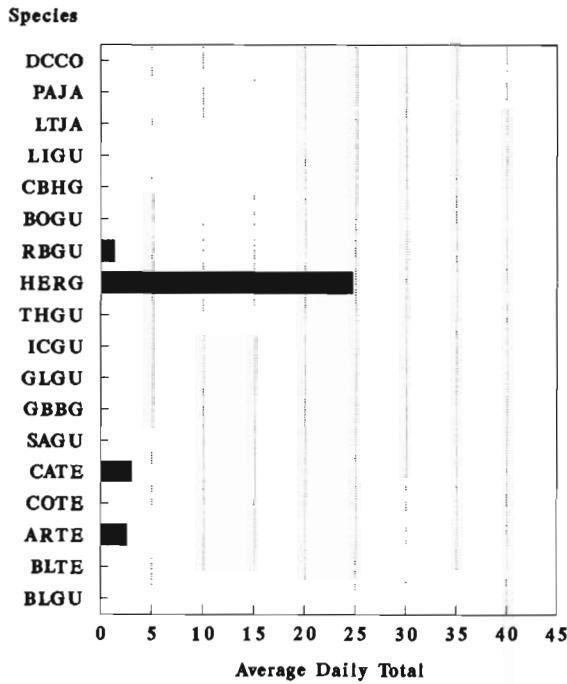
B3 (Seabirds)



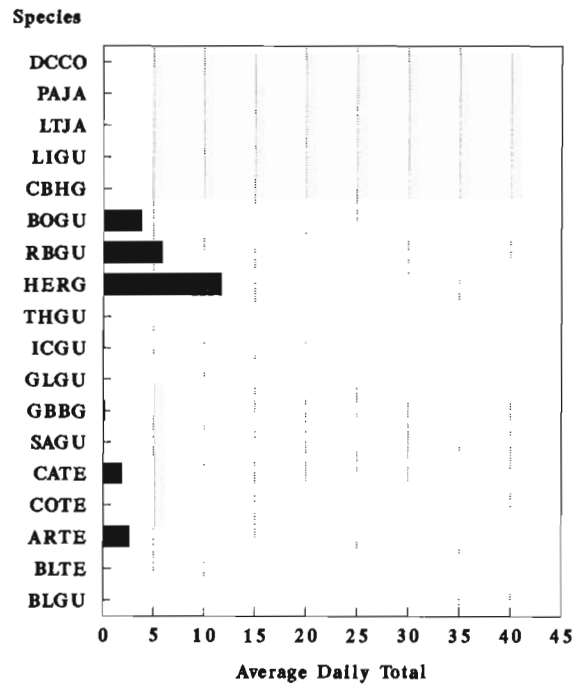
APPENDIX 6 (Continued)

Average daily totals for **SEABIRD** species found during each study period at the **EKWAN** site in 1990. Graphs have been set to a maximum of 45 seabirds per day for site comparison purposes and so that less common species will be detected at this scale. Those species which exceed this maximum have the average daily total listed to the right of the bar graphs.

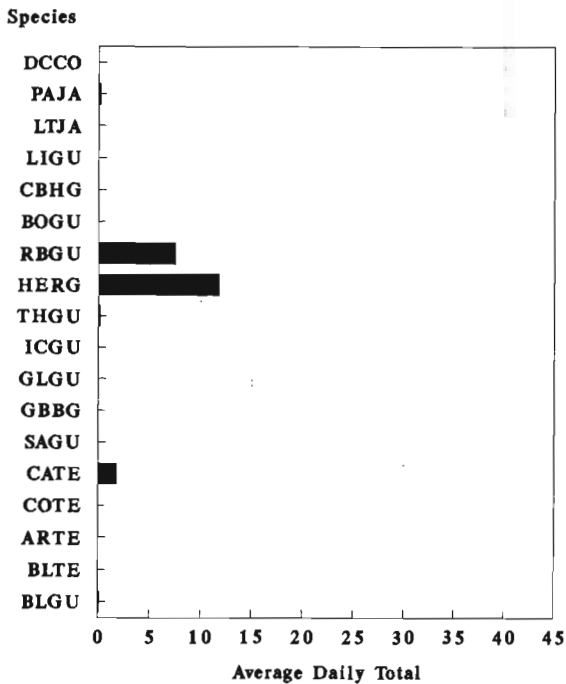
E1 (Seabirds)



E2 (Seabirds)



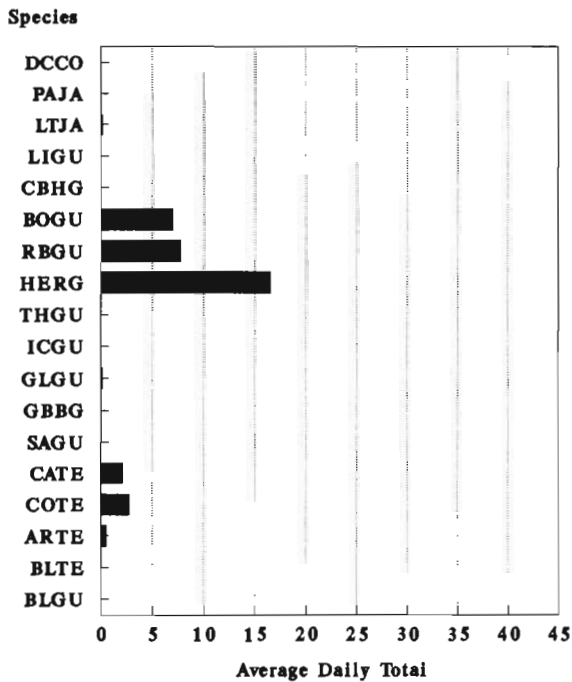
E3 (Seabirds)



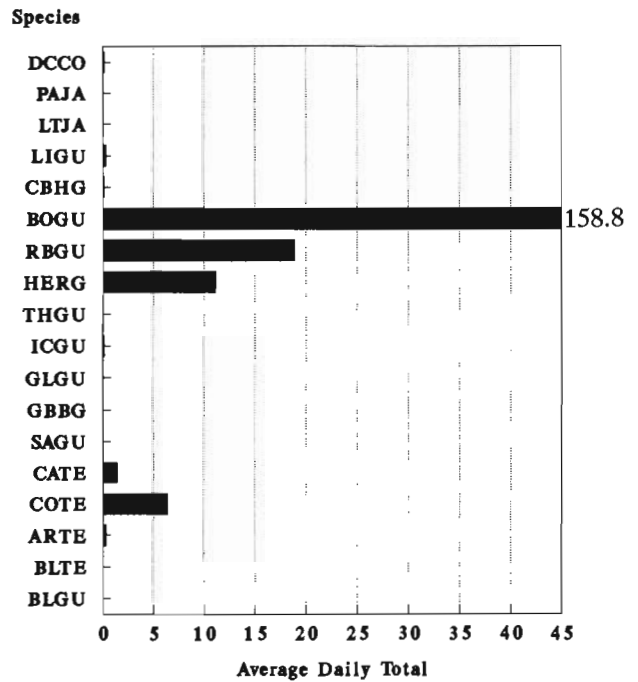
APPENDIX 6 (Continued)

Average daily totals for *SEABIRD* species found during each study period at the *LONGRIDGE* site in 1991. Graphs have been set to a maximum of 45 seabirds per day for site comparison purposes and so that less common species will be detected at this scale. Those species which exceed this maximum have the average daily total listed to the right of the bar graphs.

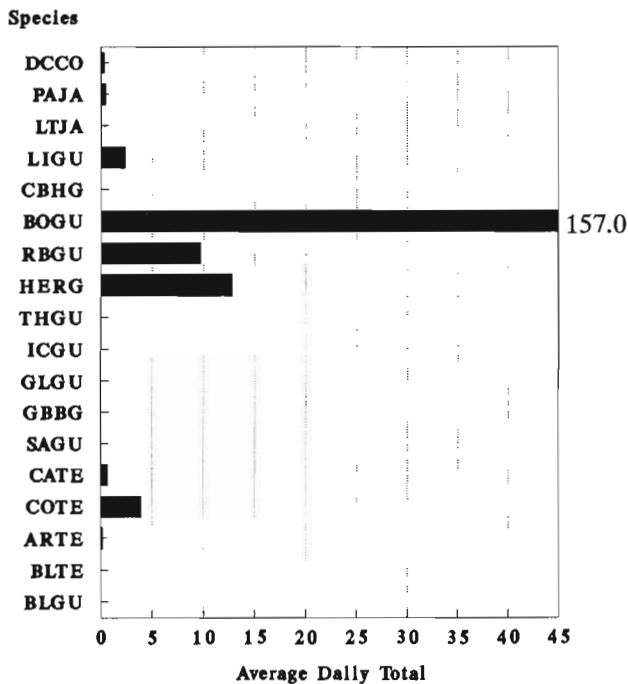
L1 (Seabirds)



L2 (Seabirds)



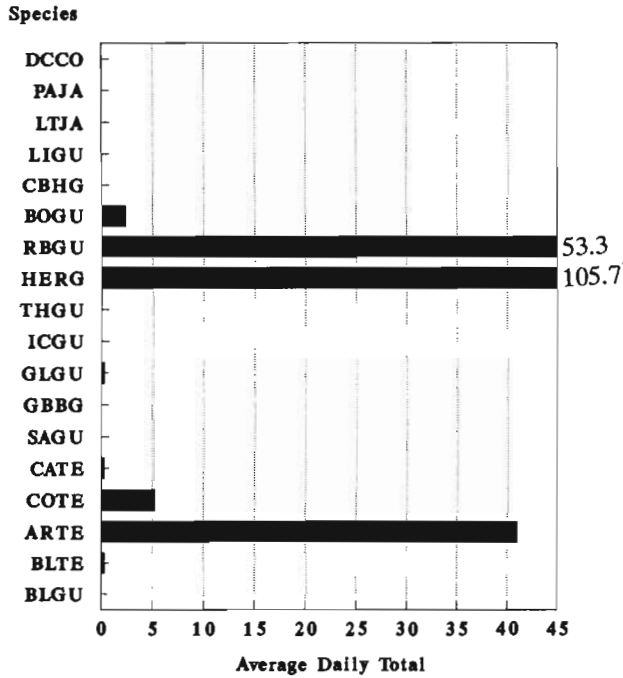
L3 (Seabirds)



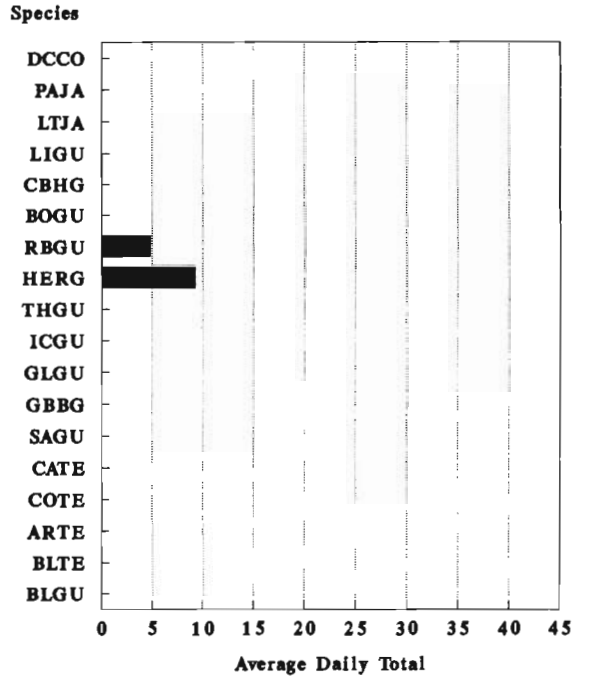
APPENDIX 6 (Continued)

Average daily totals for **SEABIRD** species found during each study period at the **MOOSONEE** site in 1991. Graphs have been set to a maximum of 45 seabirds per day for site comparison purposes and so that less common species will be detected at this scale. Those species which exceed this maximum have the average daily total listed to the right of the bar graphs.

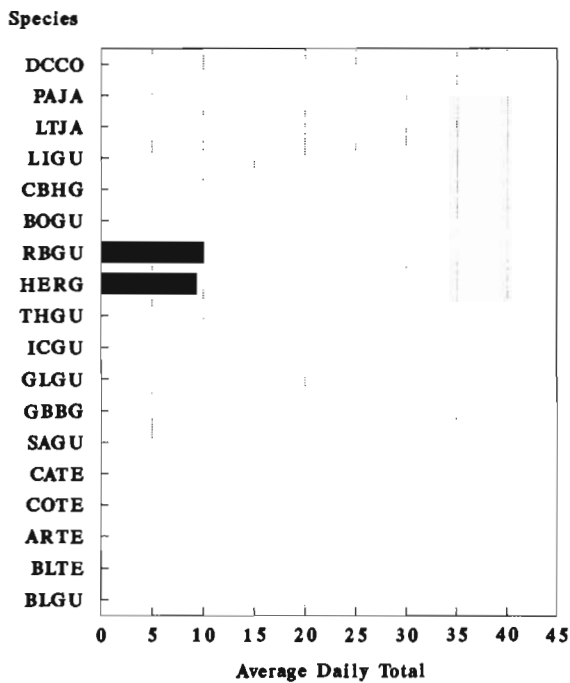
M1 (Seabirds)



M2 (Seabirds)



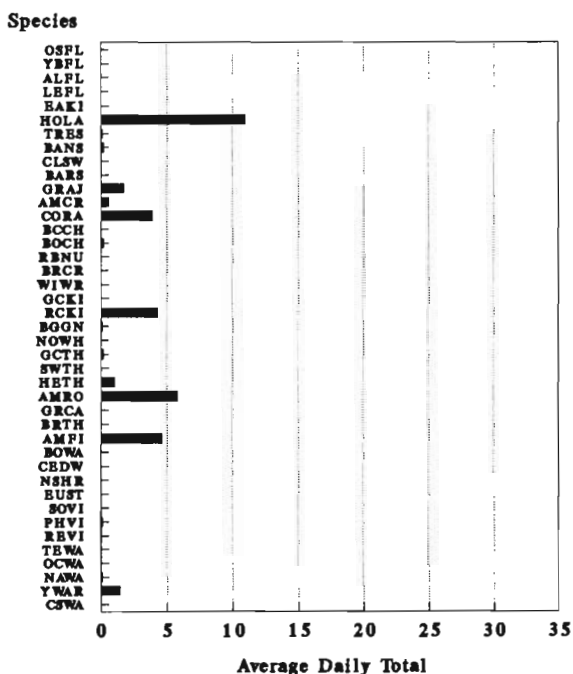
M3 (Seabirds)



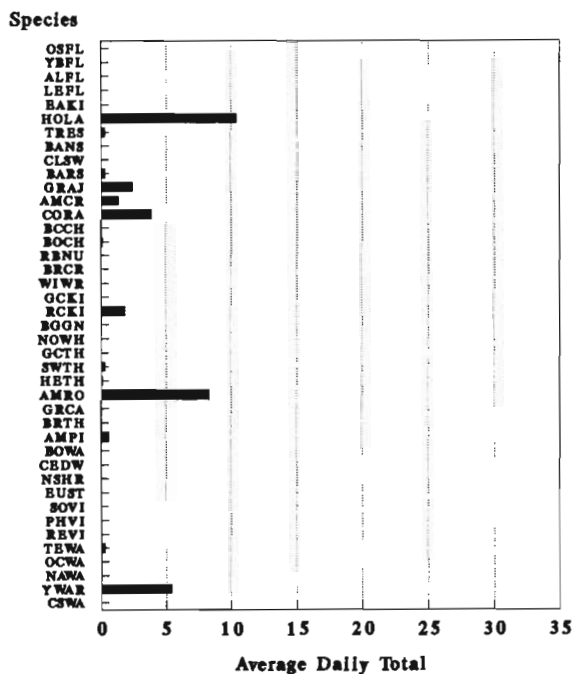
APPENDIX 7

Average daily totals for *PASSERINE* species found during each study period at the *SHAGAMU* site in 1990. Graphs have been set to a maximum of 35 passerines per day for site comparison purposes and so that less common species will be detected at this scale. Those species which exceed this maximum have the average daily total listed to the right of the bar graphs.

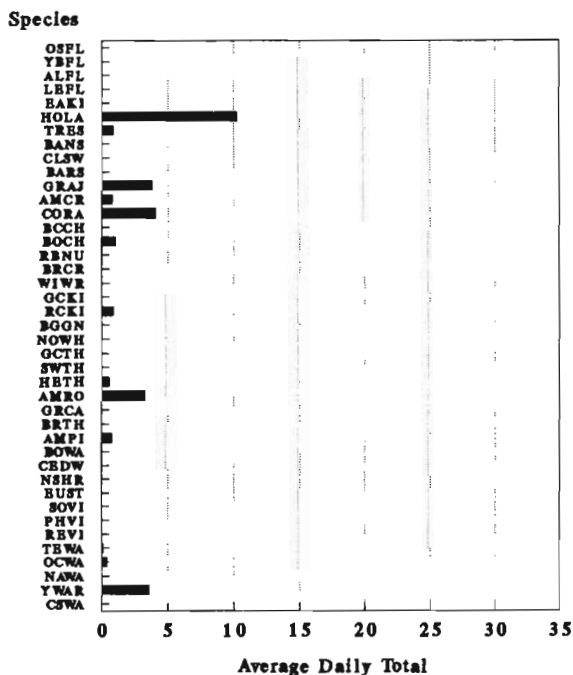
S0 (Passerines I)



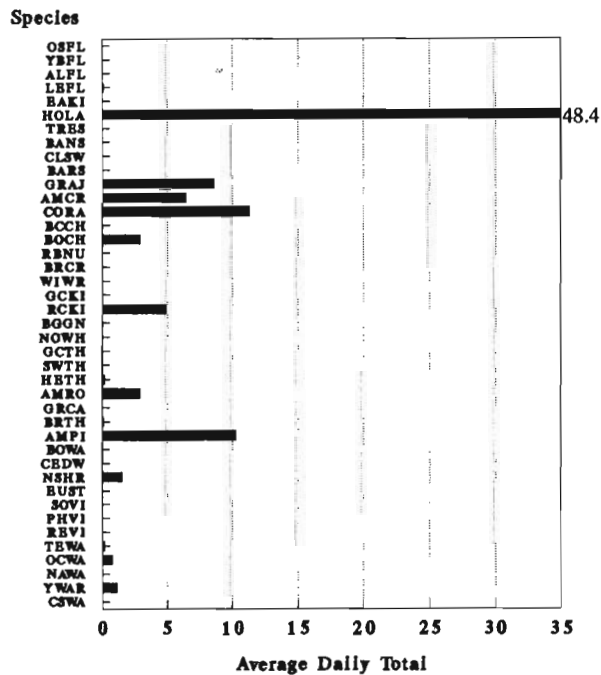
S1 (Passerines I)



S2 (Passerines I)

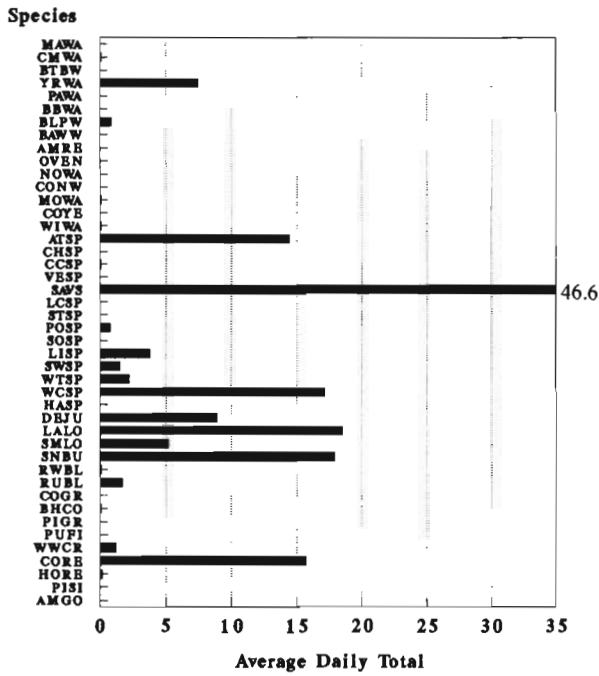


S3 (Passerines I)

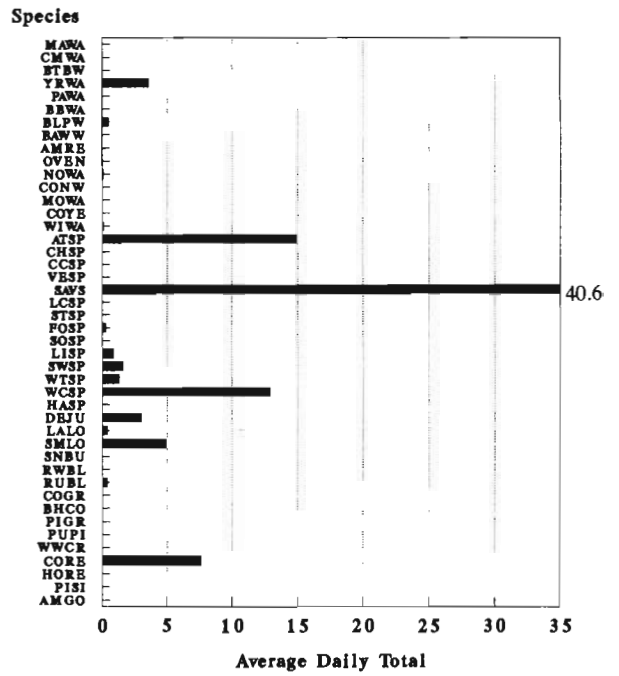


APPENDIX 7 (Continued)

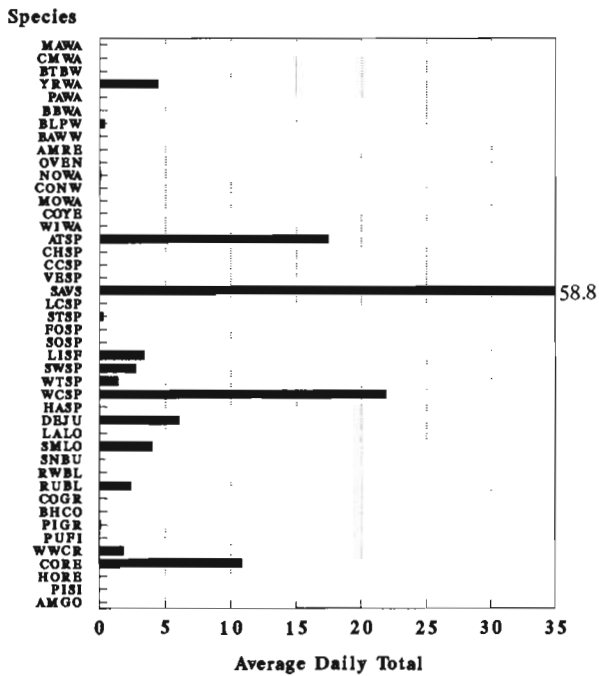
S0 (Passerines II)



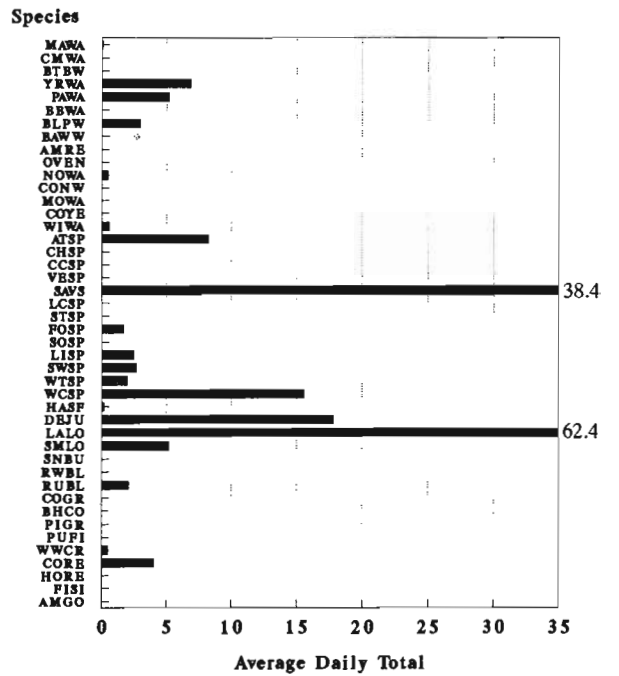
S1 (Passerines II)



S2 (Passerines II)



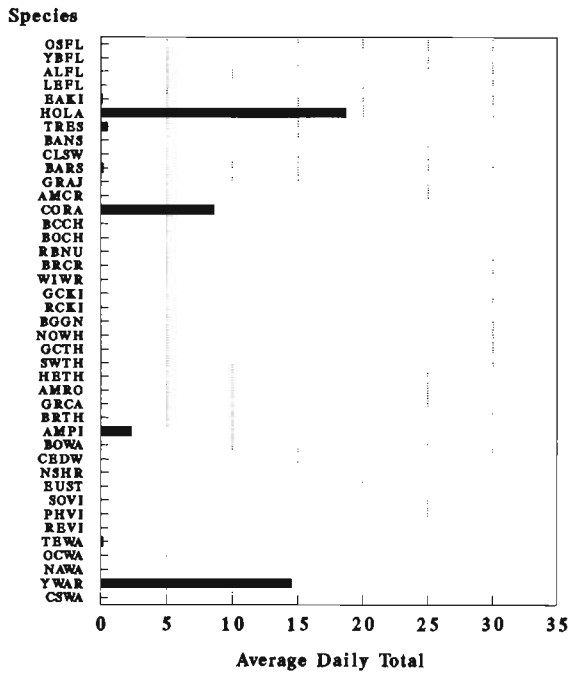
S3 (Passerines II)



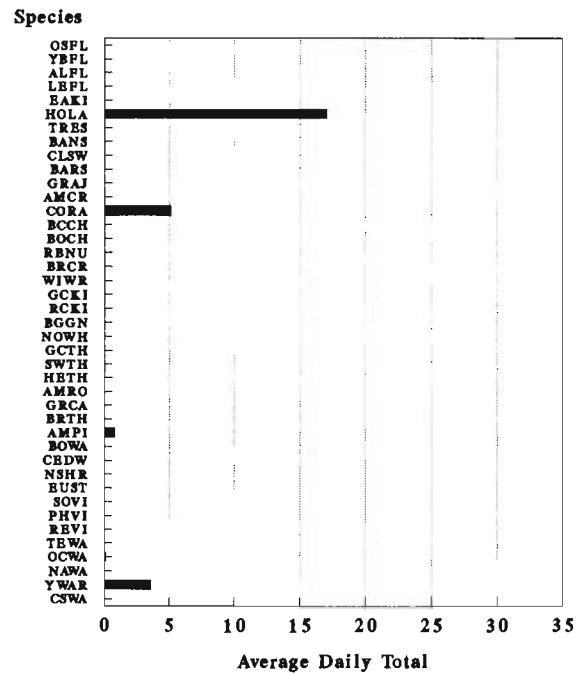
APPENDIX 7 (Continued)

Average daily totals for *PASSERINE* species found during each study period at the **BRANT** site in 1991. Graphs have been set to a maximum of 35 passerines per day for site comparison purposes and so that less common species will be detected at this scale. Those species which exceed this maximum have the average daily total listed to the right of the bar graphs.

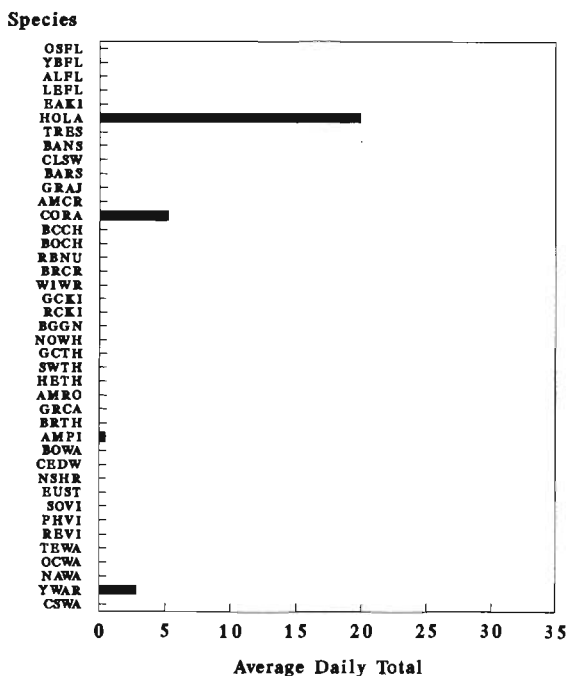
B1 (Passerines I)



B2 (Passerines I)

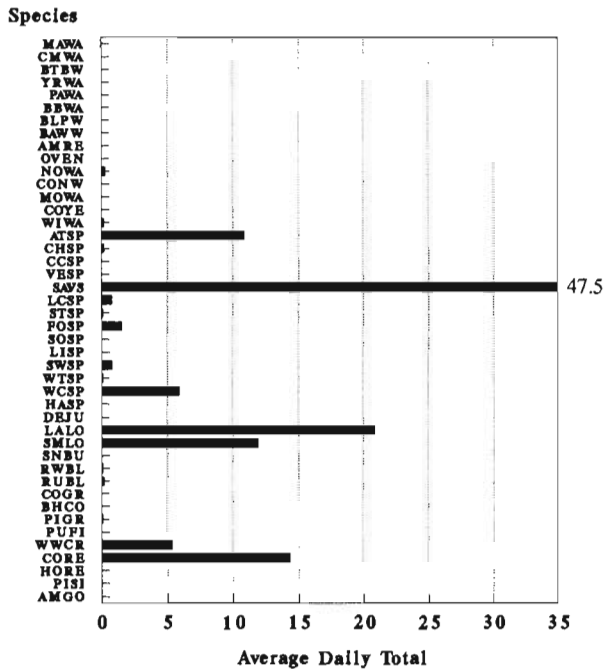


B3 (Passerines I)

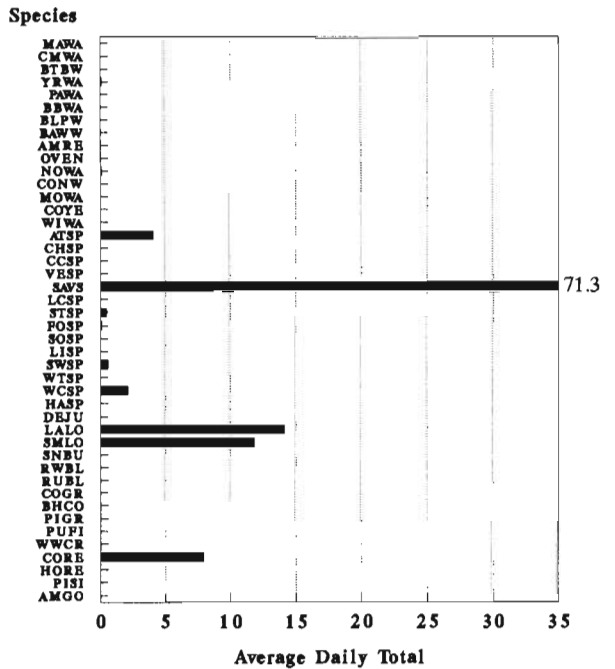


APPENDIX 7 (Continued)

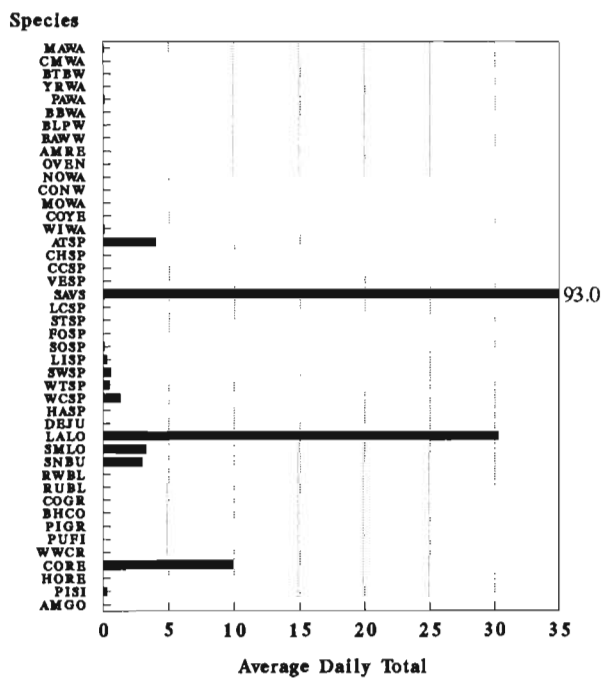
B1 (Passerines II)



B2 (Passerines II)



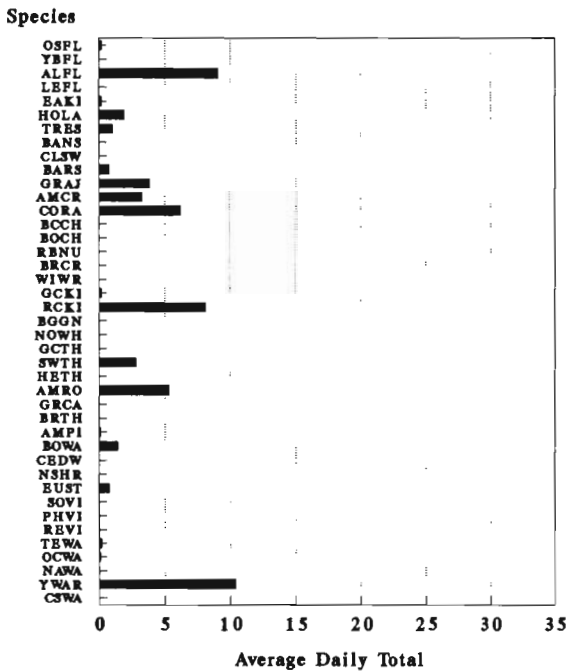
B3 (Passerines II)



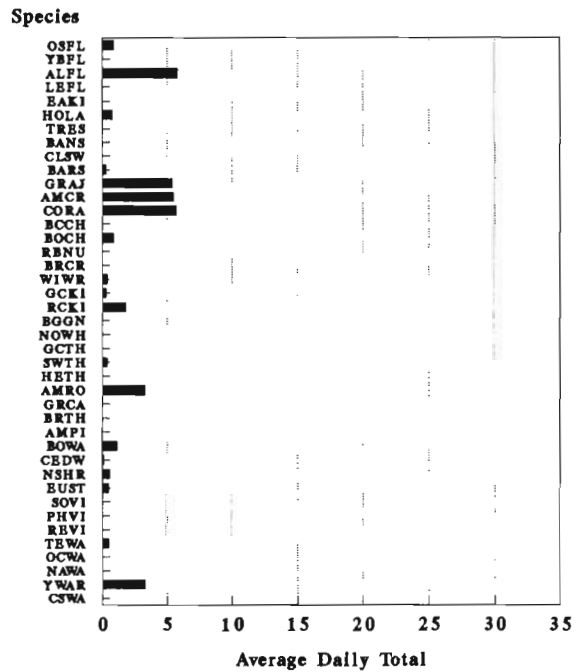
APPENDIX 7 (Continued)

Average daily totals for *PASSERINE* species found during each study period at the *EKWAN* site in 1990. Graphs have been set to a maximum of 35 passerines per day for site comparison purposes and so that less common species will be detected at this scale. Those species which exceed this maximum have the average daily total listed to the right of the bar graphs.

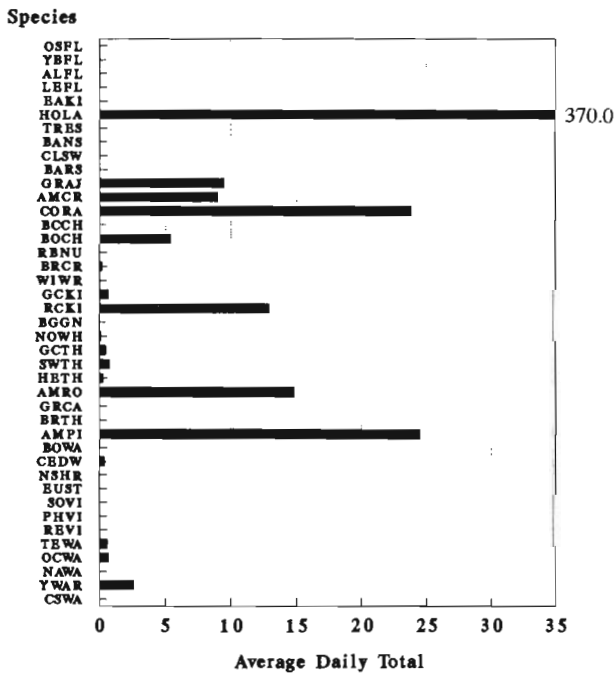
E1 (Passerines I)



E2 (Passerines I)

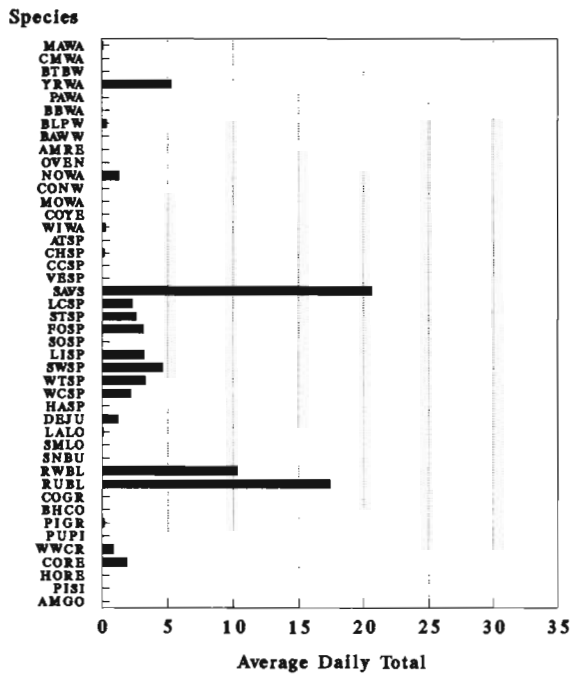


E3 (Passerines I)

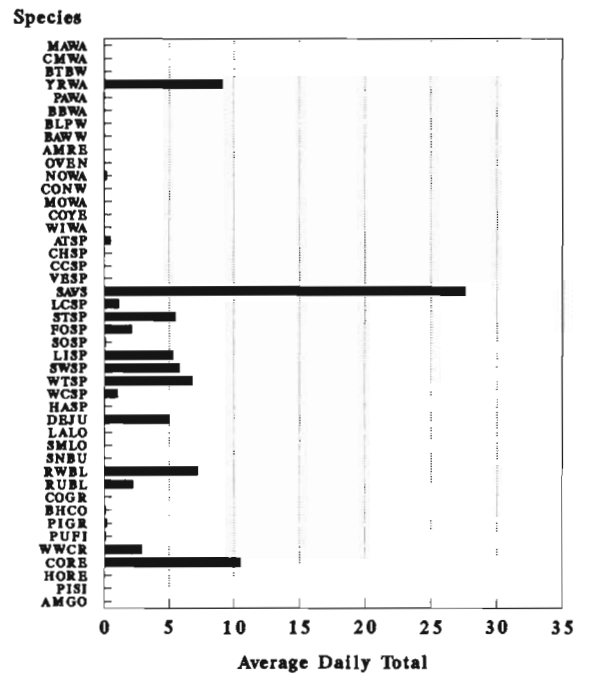


APPENDIX 7 (Continued)

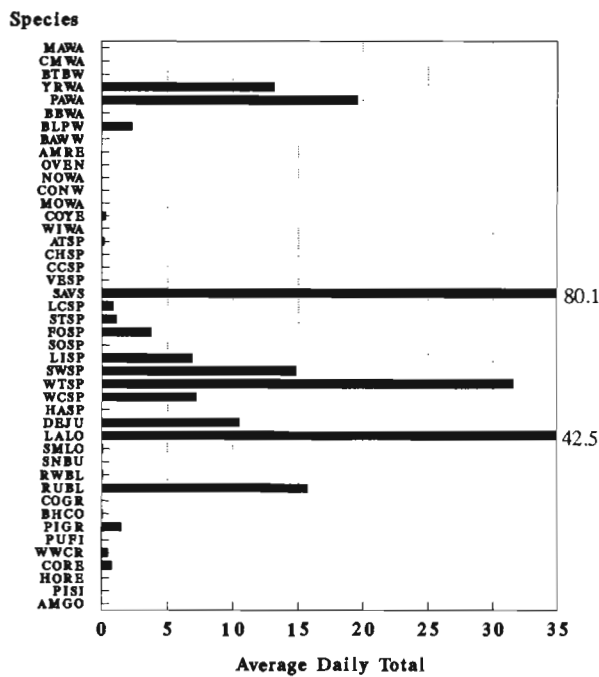
E1 (Passerines II)



E2 (Passerines II)



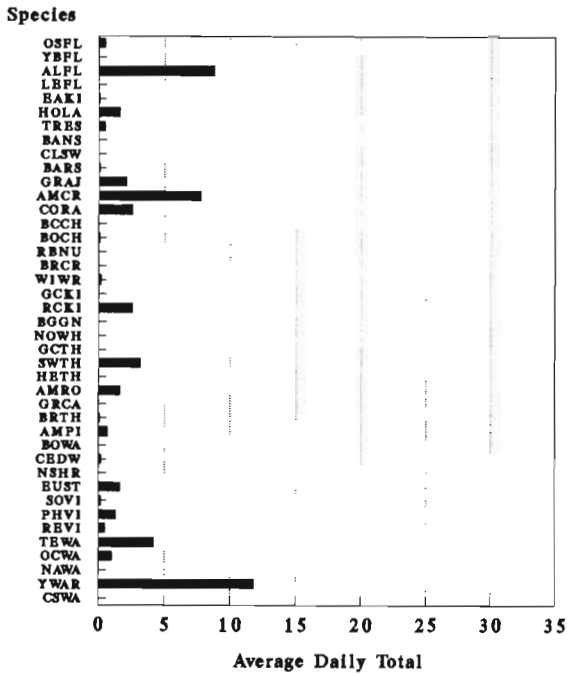
E3 (Passerines II)



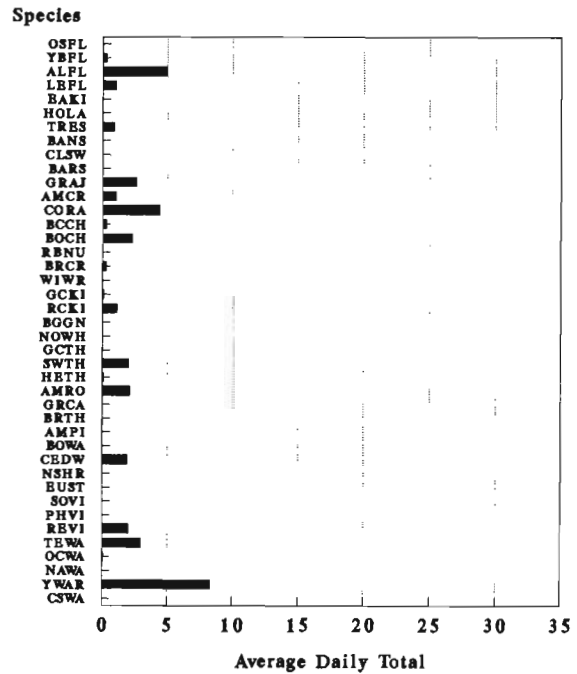
APPENDIX 7 (Continued)

Average daily totals for *PASSERINE* species found during each study period at the *LONGRIDGE* site in 1991. Graphs have been set to a maximum of 35 passerines per day for site comparison purposes and so that less common species will be detected at this scale. Those species which exceed this maximum have the average daily total listed to the right of the bar graphs.

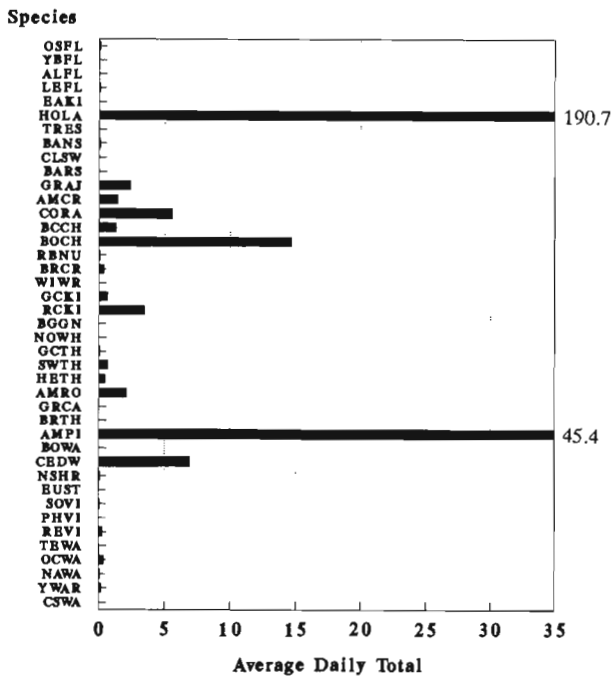
L1 (Passerines I)



L2 (Passerines I)

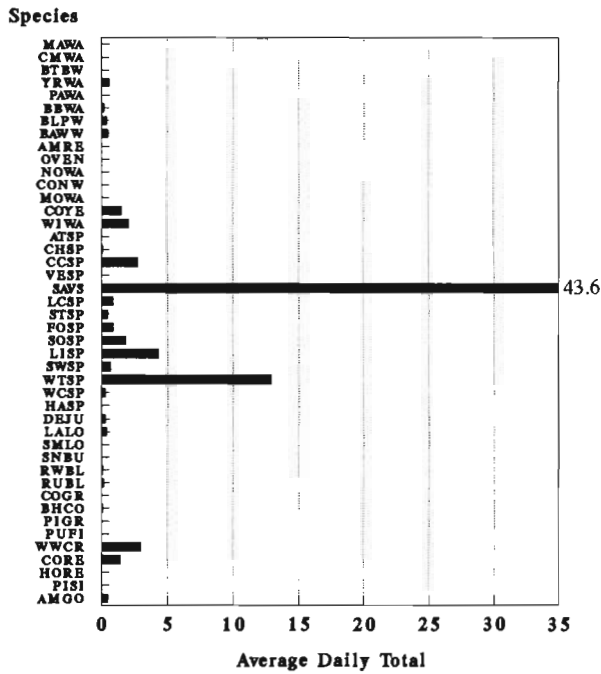


L3 (Passerines I)

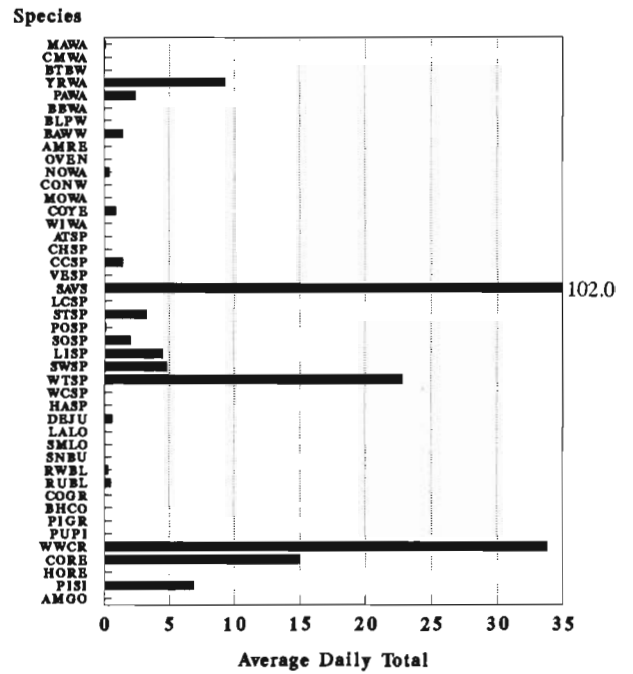


APPENDIX 7 (Continued)

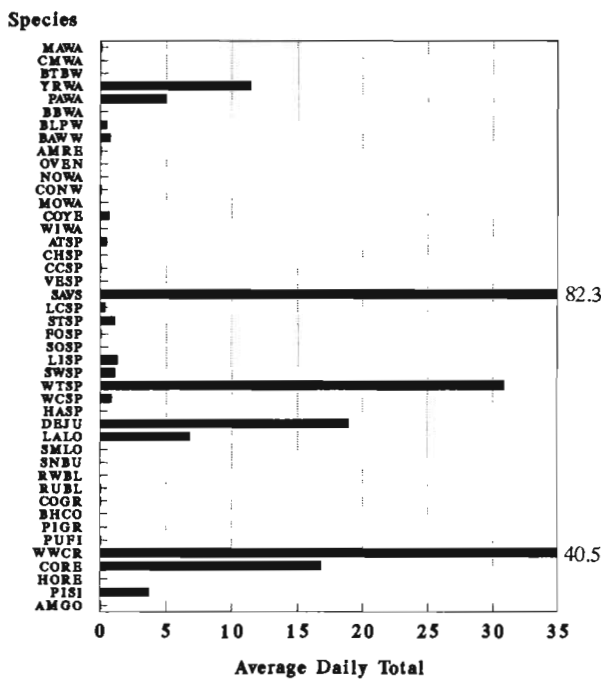
L1 (Passerines II)



L2 (Passerines II)



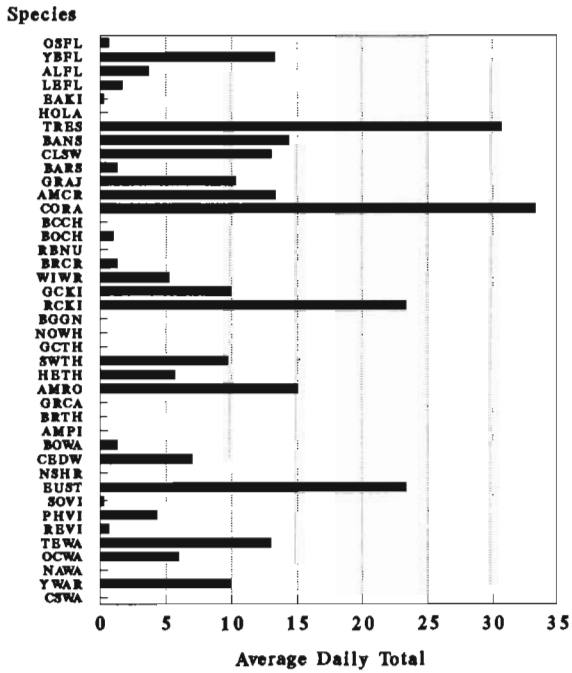
L3 (Passerines II)



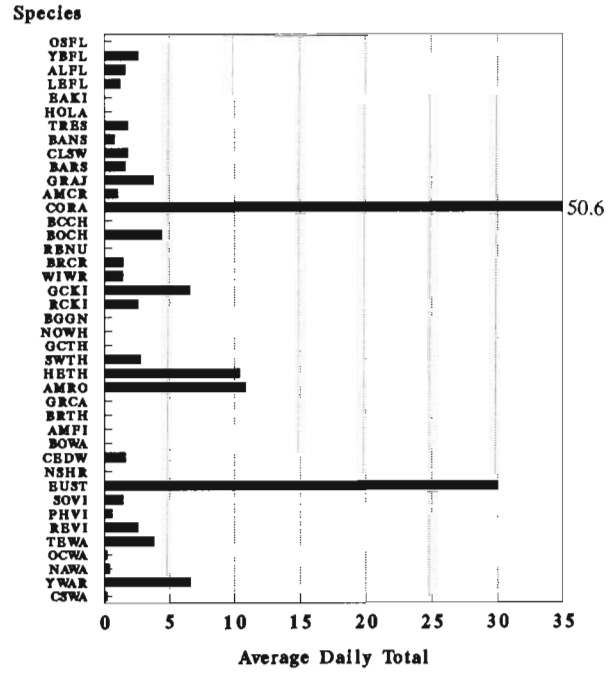
APPENDIX 7 (Continued)

Average daily totals for *PASSERINE* species found during each study period at the *MOOSONEE* site in 1991. Graphs have been set to a maximum of 35 passerines per day for site comparison purposes and so that less common species will be detected at this scale. Those species which exceed this maximum have the average daily total listed to the right of the bar graphs.

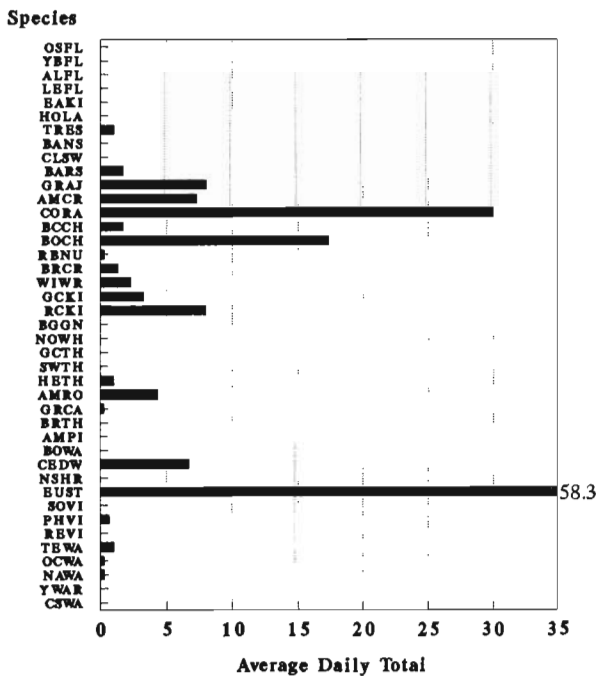
M1 (Passerines I)



M2 (Passerines I)

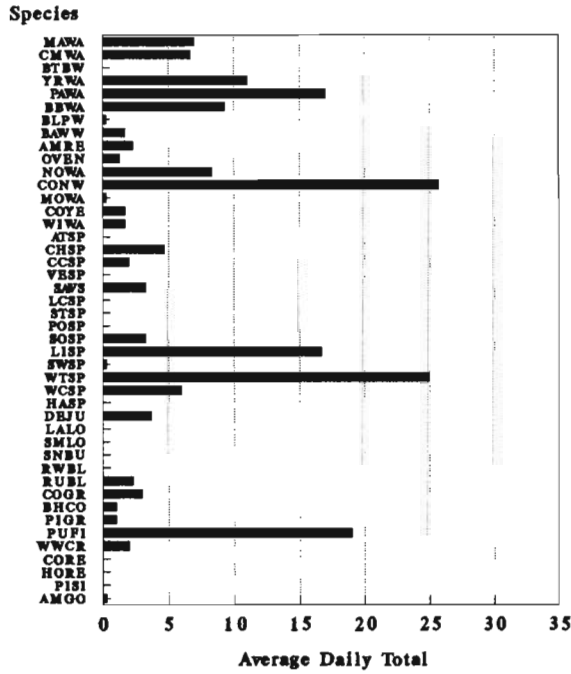


M3 (Passerines I)

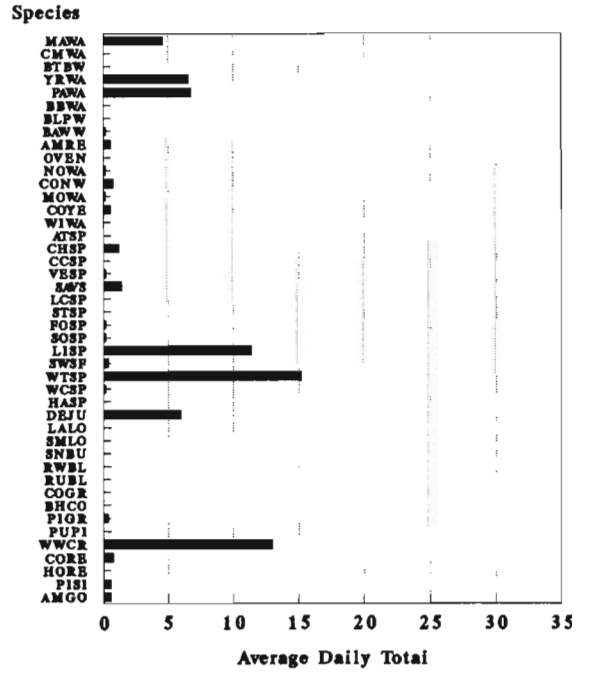


APPENDIX 7 (Continued)

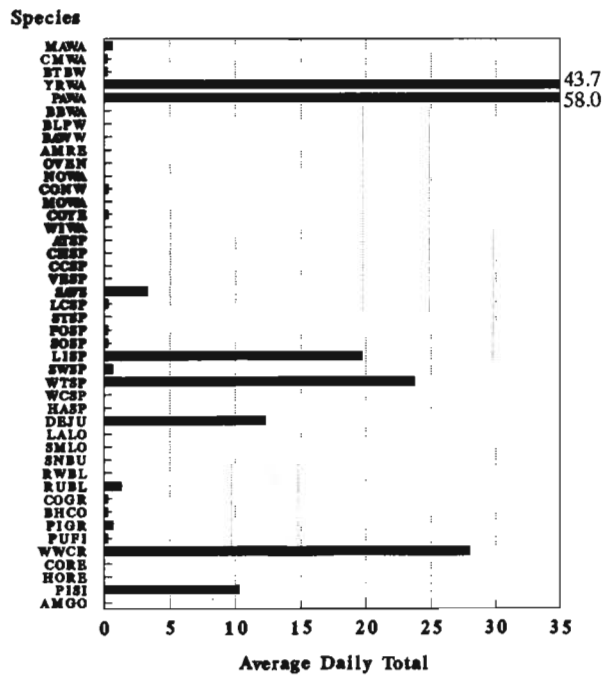
M1 (Passerines II)



M2 (Passerines II)



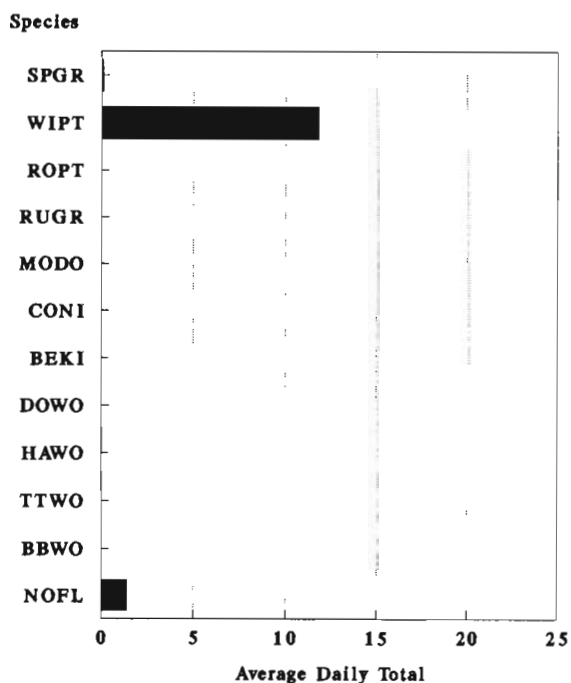
M3 (Passerines II)



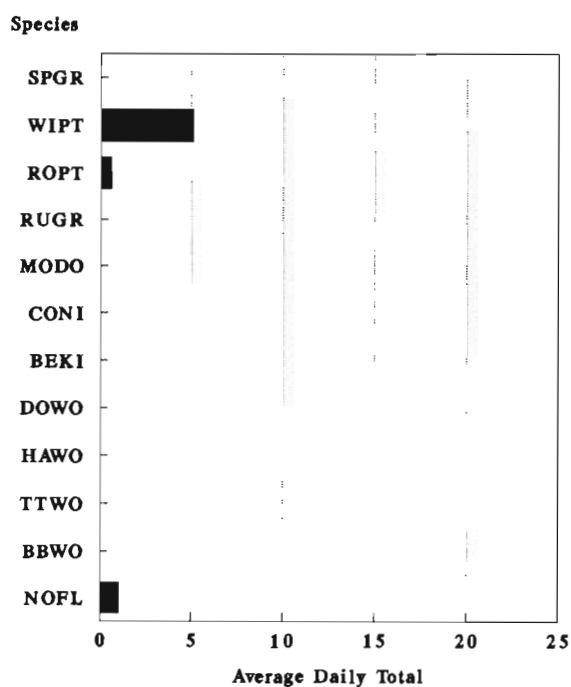
APPENDIX 8

Average daily totals for *OTHER* species found during each study period at the SHAGAMU site in 1990. Graphs have been set to a maximum of 25 "others" per day for site comparison purposes and so that less common species will be detected at this scale. Those species which exceed this maximum have the average daily total listed to the right of the bar graphs.

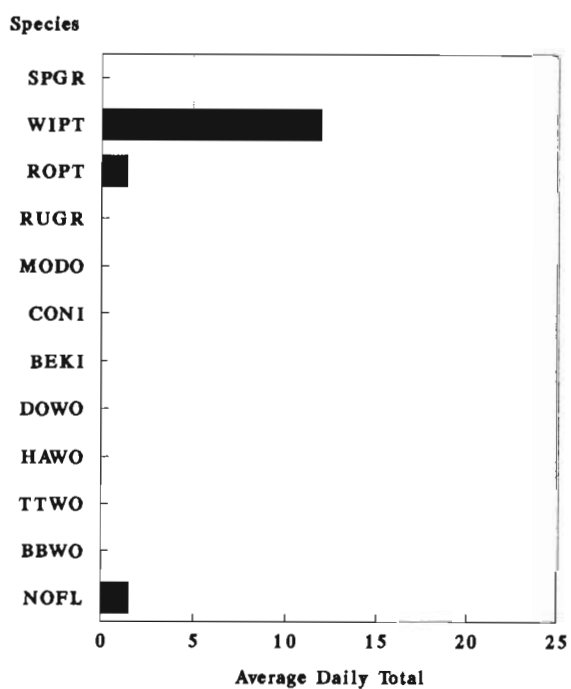
S0 (Others)



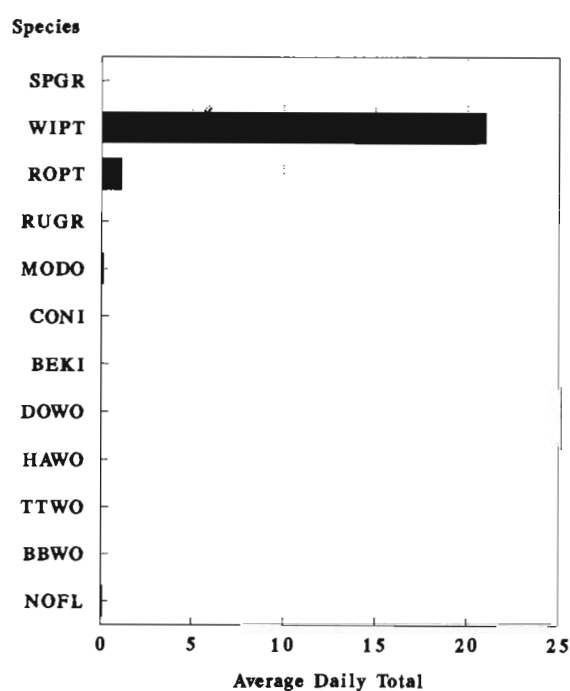
S1 (Others)



S2 (Others)



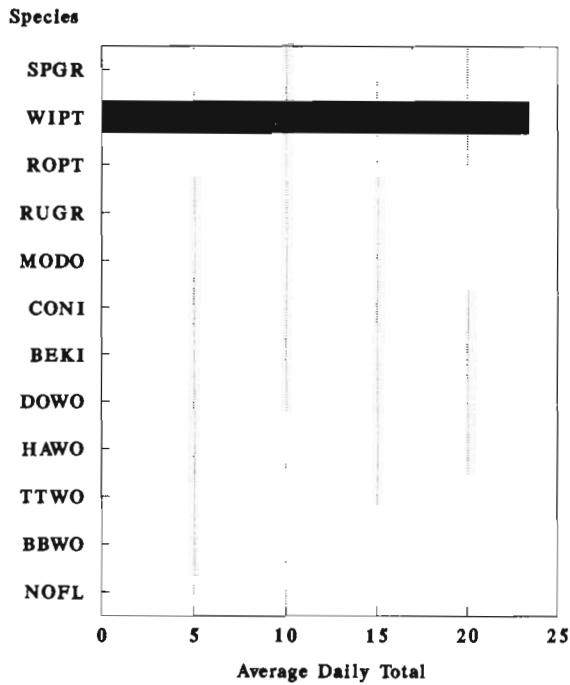
S3 (Others)



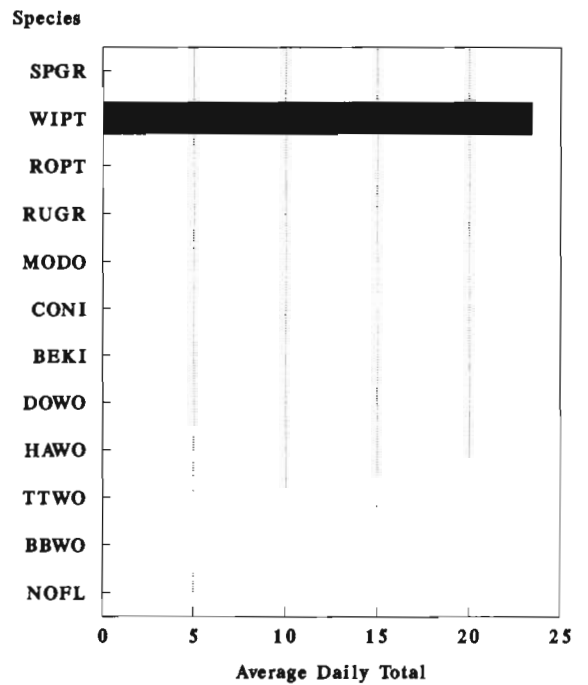
APPENDIX 8 (Continued)

Average daily totals for *OTHER* species found during each study period at the *BRANT* site in 1991. Graphs have been set to a maximum of 25 "others" per day for site comparison purposes and so that less common species will be detected at this scale. Those species which exceed this maximum have the average daily total listed to the right of the bar graphs.

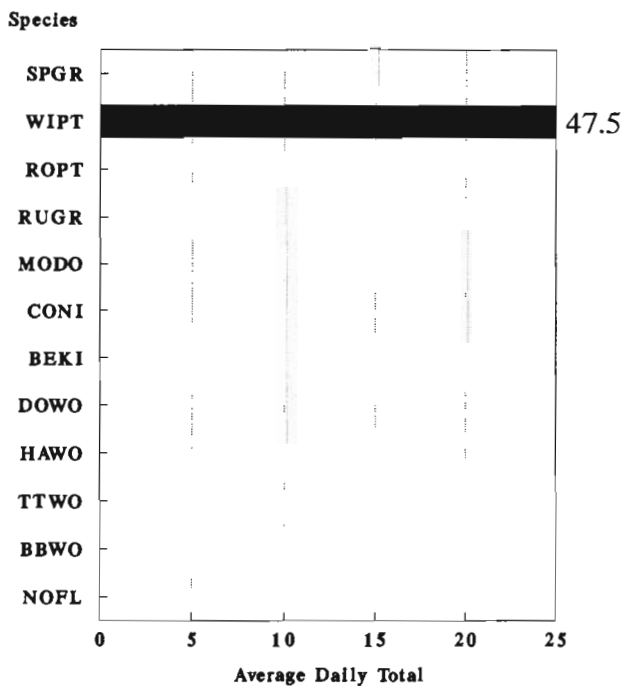
B1 (Others)



B2 (Others)



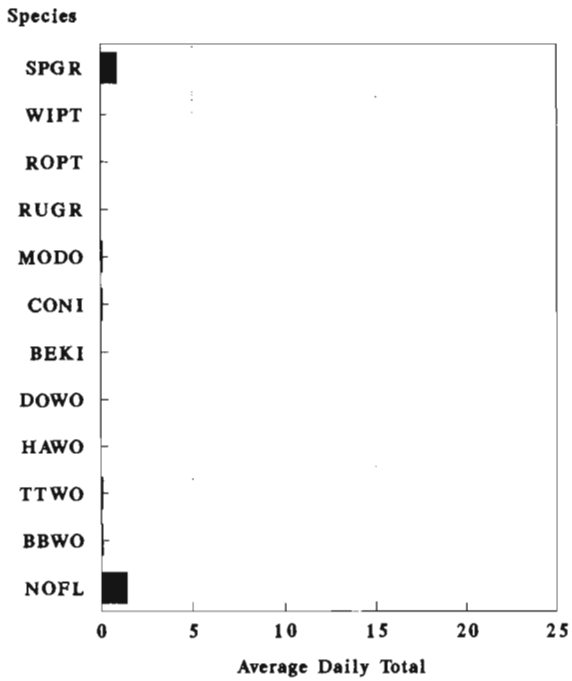
B3 (Others)



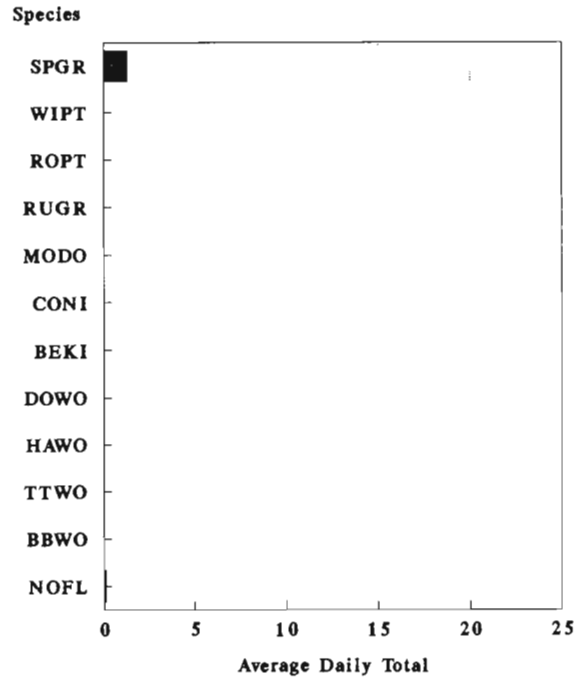
APPENDIX 8 (Continued)

Average daily totals for *OTHER* species found during each study period at the *EKWAN* site in 1990. Graphs have been set to a maximum of 25 "others" per day for site comparison purposes and so that less common species will be detected at this scale. Those species which exceed this maximum have the average daily total listed to the right of the bar graphs.

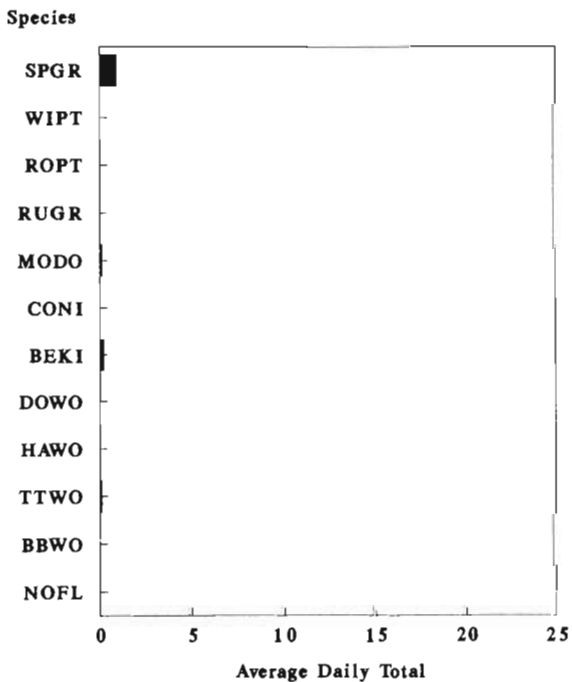
E1 (Others)



E2 (Others)



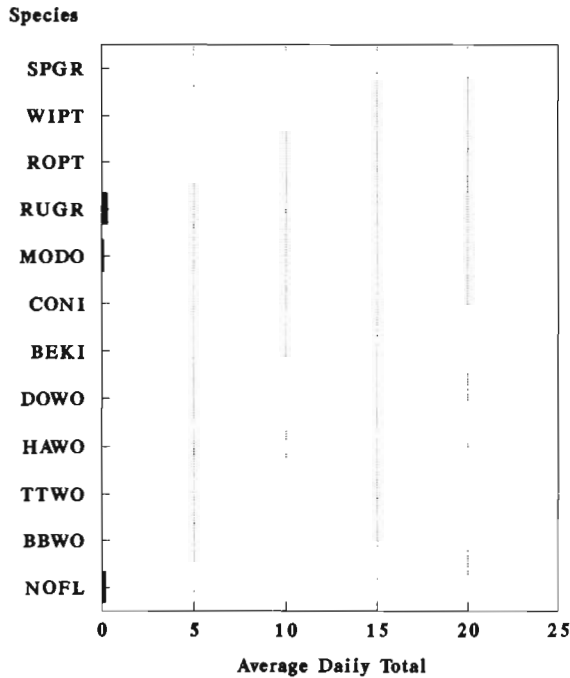
E3 (Others)



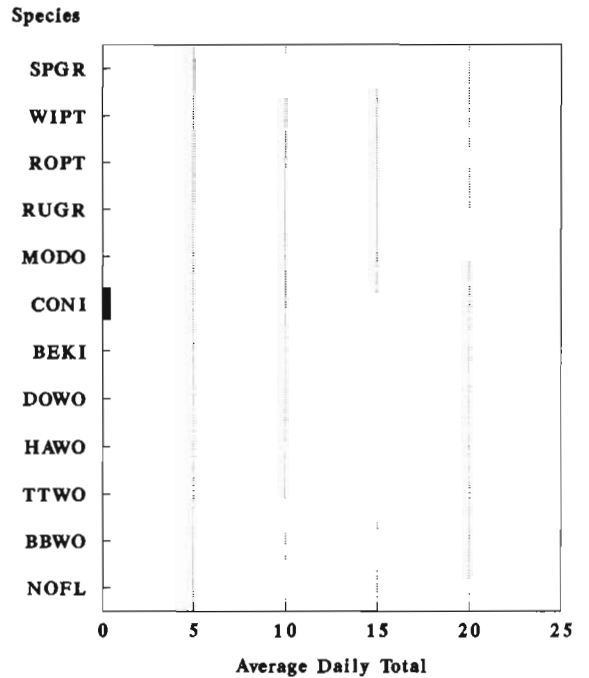
APPENDIX 8 (Continued)

Average daily totals for **OTHER** species found during each study period at the **LONGRIDGE** site in 1991. Graphs have been set to a maximum of 25 "others" per day for site comparison purposes and so that less common species will be detected at this scale. Those species which exceed this maximum have the average daily total listed to the right of the bar graphs.

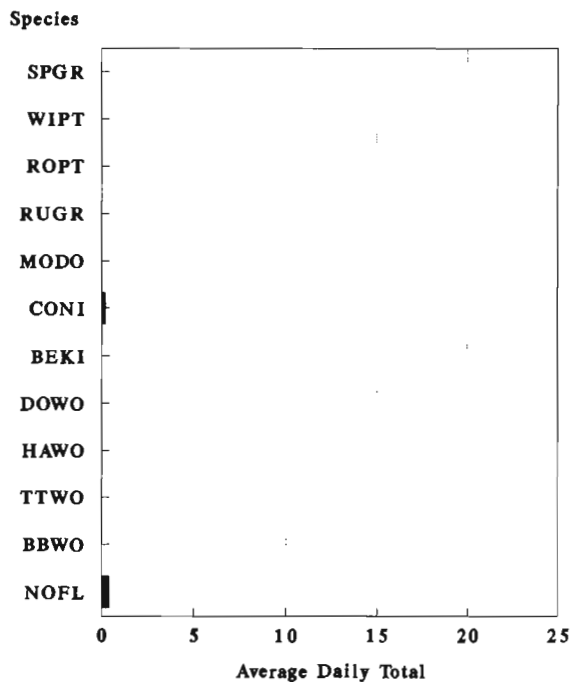
L1 (Others)



L2 (Others)



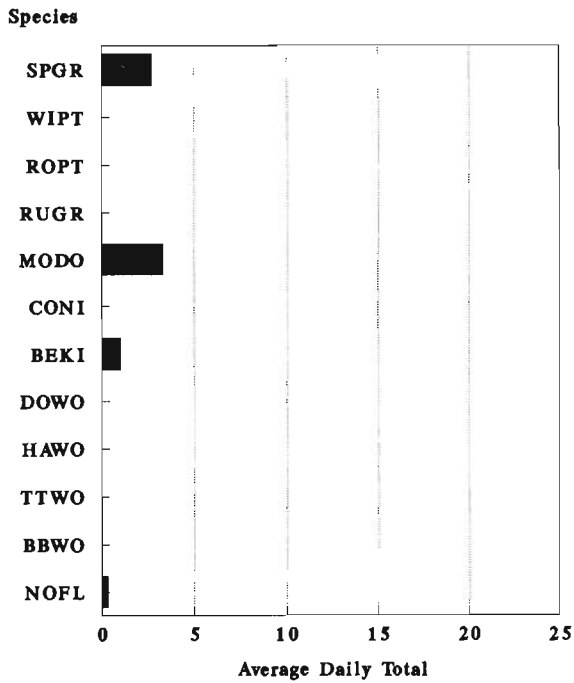
L3 (Others)



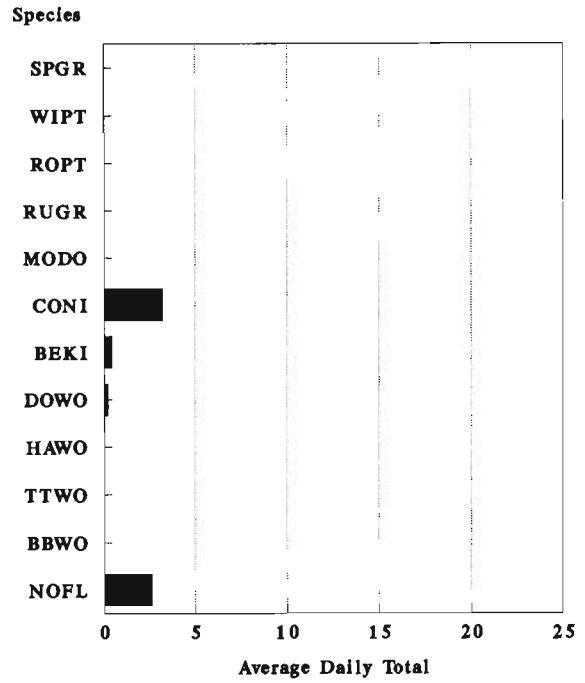
APPENDIX 8 (Continued)

Average daily totals for *OTHER* species found during each study period at the *MOOSONEE* site in 1991. Graphs have been set to a maximum of 25 "others" per day for site comparison purposes and so that less common species will be detected at this scale. Those species which exceed this maximum have the average daily total listed to the right of the bar graphs.

M1 (Others)



M2 (Others)



M3 (Others)

