

Finally, it is often important to know more precisely how energy is apportioned across the frequency spectrum. The usual way this is shown is with some measure of amplitude, intensity, or sound pressure on the vertical axis, and frequency on the horizontal. Figure 3 shows a typical plot for nuptial calls of three male Least Sandpipers (*Calidris minutilla*).

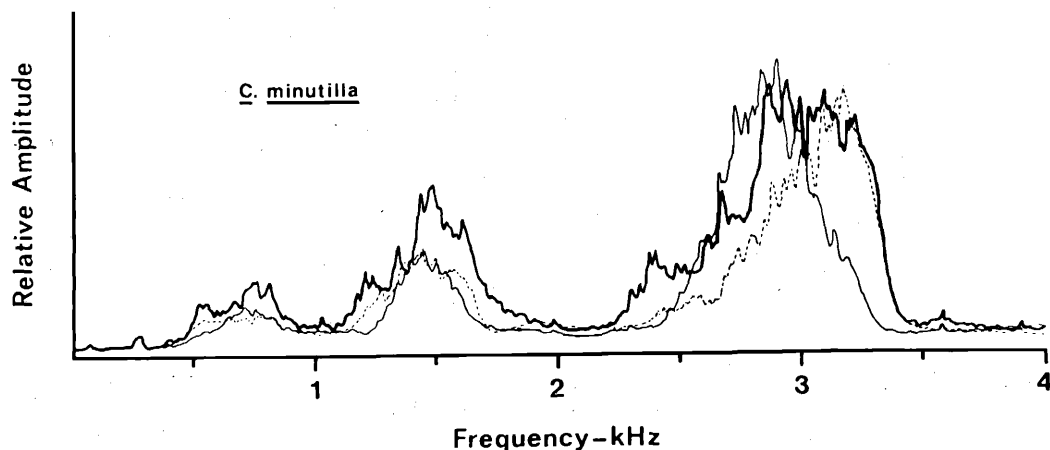


Figure 3. Plot of relative amplitude versus frequency for nuptial calls of three male Least Sandpipers *Calidris minutilla*. See text for discussion.

Physical description is a necessary first step toward our understanding of the biological significance of shorebird sounds. A glance through Cramp *et al.* (1983) or Glutz von Blotzheim *et al.* (1975, 1977) should be sufficient to impress one with the sensitivity of such description in pointing to differences among species, and to the diversity of call types within species. In the next article, I shall discuss the extent and importance of some species-specific calls. Further information on analysis and description can be found in Marler (1969) and Watkins (1967). A good reference concerned with tape recording is Wickstrom (1982).

#### References

- Cramp, S. and Simmonds, K.E.L. 1983. *Handbook of the Birds of Europe, the Middle East and North Africa. The birds of the Western Palearctic. Vol. III. Waders to Gulls.* Oxford University Press.
- Glutz von Blotzheim, U.N., Bauer, K.M. and Bezzel, E. 1975. *Handbuch der Vögel Mitteleuropas. Band 6. Charadriiformes (I. Teil).* Akad. Verlagsgesellschaft, Wiesbaden.
- Glutz von Blotzheim, U.N., Bauer, K.M. and Bezzel, E. 1977. *Handbuch der Vögel Mitteleuropas. Band 7. Charadriiformes (2. Teil).* Akad. Verlagsgesellschaft, Wiesbaden.
- Mace, T.R. 1981. Causation, function, and variation of the vocalizations of the Northern Jacana, *Jacana spinosa*. Ph.D. thesis, University of Montana.
- Marler, P.R. 1969. Tonal quality of bird sounds. Pp. 5-18 in R.A.Hinde (editor), *Bird Vocalizations: Their Relation to Current Problems in Biology and Psychology.* Cambridge Univ. Press.
- Miller, E.H. 1983. Structure of aerial displays in three species of Calidridinae (Scolopacidae). *Auk* 100 (in press).
- Miller, E.H., *et al.* (1983). Geographic variation in aerial song of the Short-billed Dowitcher, *Limnodromus griseus*. *Can. J. Zool.* (in press).
- Watkins, W.A. 1967. The harmonic interval; fact or artifact in spectral analysis of pulse trains. Pp. 15-43 in W.N.Tavolga (editor), *Marine Bioacoustics, vol. 2.* Pergamon Press.
- Wickstrom, D.C. 1982. Factors to consider in recording avian sounds. Pp. 1-52 in D.E.Kroodsma and E.H.Miller (editors), *Acoustic Communication in Birds, vol. 1.* Academic Press.

E.H.Miller, Vertebrate Zoology Division, B.C. Provincial Museum, Victoria, British Columbia V8V 1X4, Canada.

## SHOREBIRD MIGRATION AT MONTREAL, CANADA

by S. Holohan

Montreal (45° 30'N 73° 36'W) is situated on islands in the St. Lawrence River, 145 km from the nearest area of tidal influence and at least 330 km overland from the closest ocean area. The district has an average of 112 days snow cover per year and 157 frost free days (Powe 1969). The part of the St. Lawrence Valley where the city is situated has several hundred kilometres of river and lakeside habitat but only a small fraction of this is suitable for shorebirds. Only a small portion of shorebird habitat is studied by ornithologists, usually at weekends. Most habitat in the Montreal district can be considered marginal for shorebirds, with the best areas available as melting snow causes the rivers to flood from April to June and on the wave washed shores of the 110 islands in the St. Lawrence between Montreal and Lac St. Pierre. One of these islands, Ile du Moine, near Sorel, has been visited on a regular basis.

Table 1. Shorebird Migration in the Montreal Area: Summary to 31 December 1980 (Sequence follows AOU 1982)

	Mean Birds Recorded Per Year 1970-80	Comments	No. of years of data examined North South	Largest Flock Recorded	Individual Birds Recorded (where known)
Black-bellied Plover	138-261+		24	250	
Lesser Golden Plover	128-550+		0	400	
Semipalmated Plover	155-518+		28	200	
Piping Plover		Recorded 1916	0		1
Killdeer		Nesting Common	65	300	
American Avocet	0-1	Recorded 1980	1		1
Greater Yellowlegs	42-154+		43	20	
Lesser Yellowlegs	281-551+		24	500	
Solitary Sandpiper	7-9		51	15	
Willet	0-3		8	2	20
Spotted Sandpiper	130-238+	Nesting Common	65		
Upland Sandpiper	45-75+	Nesting Uncommon	30		
Eskimo Curlew		Before 1896	0		
Whimbrel	0-21		3	20	60
Hudsonian Godwit	0-6		2	7	49+
Marbled Godwit	0-2		6		12
Ruddy Turnstone	46-87+		22	200	
Red Knot	40-80+		10	45	
Sanderling	30-207+		9	50	
Semipalmated Sandpiper	705-3750		26	3000	
Western Sandpiper	0-1		0		3
Least Sandpiper	370-750+		39	300	
White-rumped Sandpiper	28-75+		12	175	
Baird's Sandpiper	11-25		0	8	
Pectoral Sandpiper	61-254+		15	200	
Purple Sandpiper	0-3		2	3	22+
Dunlin	115-496+		22	400	
Stilt Sandpiper	0-11		3	9	53
Buff-breasted Sandpiper	0-5		0	5	25
Ruff	0-2		1		4
Short-billed Dowitcher	55-123+		21	500	
Long-billed Dowitcher	0-1		1		2+
Common Snipe	429-816+	Nesting Common	55	315	
Eurasian Woodcock		Recorded 1882	0		1
American Woodcock	19-26+	Nesting Under-recorded	66		
Wilson's Phalarope	25-51+	Nesting increasing	13	25	
Red-necked Phalarope	1-77		10	50	279+
Red Phalarope	0-10		0	9	20

Table 2. Shorebird Migration in the Montreal Area (to 31 December 1980)

	Northward Earliest Date	Median Arrival Date	Median Departure Date	Latest Northward Departure	Southward Earliest Date	Median Arrival Date	Median Departure Date	Latest Southward Departure
Black-bellied Plover	19 April	19 May	9 June	29 June	1 July	26 July	7 November	27 November
Lesser Golden Plover				16 June	20 July	21 August	1 October	11 November
Semipalmated Plover	2 May	21 May	7 June		6 July	19 July	17 October	12 December
Piping Plover								17 September
Killdeer	27 February	26 March		1 June			10 November	25 November
American Avocet	29 May			25 June				
Greater Yellowlegs	25 March	13 April	24 May	25 June	1 July	11 July	26 October	21 November
Lesser Yellowlegs	30 March	20 April	25 May	20 June	1 July	1 July	20 October	17 November
Solitary Sandpiper	13 April	9 May	23 May	20 June	3 July	21 July	24 August	24 October
Willet	5 May	26 May	5 June	6 June	8 July	14 August	30 August	1 September
Spotted Sandpiper	28 March	27 April					3 October	9 November
Upland Sandpiper	9 April	27 April					25 August	24 October
Eskimo Curlew						August	September	
Whimbrel	22 May			31 May	1 July	19 August	18 September	24 September
Hudsonian Godwit	20 June			22 June	23 July	12 August	7 October	7 November
Marbled Godwit	7 May	12 May	2 June	23 June	1 July	19 August	11 September	14 September
Ruddy Turnstone	14 May	25 May	6 June	25 June	14 July	3 August	27 September	12 November
Red Knot	24 May	30 May	5 June	10 June	1 July	19 August	15 September	21 October
Sanderling	1 May	28 May	2 June	5 June	1 July	31 July	13 October	21 November
Semipalmated Sandpiper	11 April	25 May	11 June	24 June	1 July	11 July	10 October	22 November
Western Sandpiper					7 September			1 October
Least Sandpiper	24 April	9 May	5 June	28 June	1 July	5 July	21 September	12 November
White-rumped Sandpiper	7 May	25 May	9 June	23 June	21 July	8 August	6 November	23 November
Baird's Sandpiper					2 August	18 August	24 September	
Pectoral Sandpiper	30 March	16 April	31 May	10 June	6 July	25 July	23 October	15 November
Purple Sandpiper	7 May			25 May	12 September			15 December
Dunlin	2 May	17 May	2 June	15 June	29 July	30 August	15 November	10 December
Stilt Sandpiper	27 May			29 May	5 July	25 August	14 September	16 September
Buff-breasted Sandpiper					12 August	23 August	10 September	26 September
Ruff	5 May	25 May	1 June	25 June	9 July	14 July	24 September	25 July
Short-billed Dowitcher	5 May			27 June	1 July			27 October
Long-billed Dowitcher	20 May				17 September			21 September
Common Snipe	24 February	29 March					21 November	1 December
Eurasian Woodcock								
American Woodcock	11 March	30 March					1 November	16 December
Wilson's Phalarope	4 May	27 May					18 August	1 October
Red-necked Phalarope	24 May	25 May	1 June	5 June	6 July	17 August	8 September	2 November
Red Phalarope					31 August	27 September	17 October	2 December

This paper attempts to give a quantitative estimate of shorebird migration in the Montreal area. Many papers give species accounts in very general terms without attempting to estimate numbers of birds recorded. This may be due to inadequate data, or an unwillingness to estimate the numbers of a given species. Estimating numbers can be problematic, since only a small fraction of the birds passing through an area are usually seen.

### Methods

Between 1968 and 1980 counts were made on one or two days per week from early April to early June, three or four days per week from July to mid September and one or two days per week until late November. For the Montreal area there are no records for any species of shorebird between 15 December and 24 February.

Weekly counts were made on Ile du Moine between late May and mid September for the period 1970-78. These counts showed the Montreal area does not have a summering population of non-breeding Arctic nesting migrants.

All the published literature on the shorebirds of the Montreal area has been researched (Wintle 1896, Terrill 1951, Ouellet 1974 and bird club reports (see reference list)). Some records have not been included here as the published information is inadequate, or in some cases incorrect.

### Study Area and Results

The study area consists of the lowlands bordering the Ottawa River between Hawkesbury and Montreal, the lowlands bordering the St. Lawrence River between Dundee and Trois Rivieres, plus the areas bordering the Richlieu and Yamaska Rivers.

During the northward migration period from early April to the first week of June, there is a large area of excellent shorebird habitat available due to melting snow causing flooding of farmland near rivers. However, man-made changes to the main rivers have reduced the amount of good habitat. During the peak migration period mid May to early June many species can be found feeding by the flooded river banks. In most years by early June the water has run off the fields and the vegetation has started to grow rapidly, so making these areas unattractive to shorebirds.

Shorebird numbers seen in the Montreal area (see Table 1) are limited by the lack of suitable habitat, and also because the district does not appear to be a major staging area for any species. Some species have occurred in good sized flocks (see Table 1) but this is mostly an irregular phenomenon, and is not representative of the area. It is probable that a constant flow of shorebirds pass over the Montreal area on northward and southward migration routes, but only a small percentage of these are recorded when they are grounded by bad weather.

There are good numbers of Lesser Yellowlegs *Tringa flavipes*, Spotted Sandpiper *Actitis macularia*, Semipalmated Sandpiper *Calidris pusilla*, Least Sandpiper *Calidris minutilla* and Common Snipe *Gallinago gallinago* (see Table 1), but they are very thinly spread out over large areas, especially on the floating mats of pond weeds of the genus *Potamogeton* which form on the rivers during the southward migration from July to October.

The peak migration periods are from mid May to the first week of June and from the first week of July to mid September (Table 2). Systematic counts show that 90% of the shorebirds have gone south by mid September and do not return until mid May.

### Acknowledgements

I wish to acknowledge help and data provided by J.B.Steeves, R.J.Barnhurst, M.McIntosh, M.Gosselin, N.David, M.Ainley and H.Ouellet.

### References

- Annual Reports, 1935-1965. The Province of Quebec Society for the Protection of Birds.  
 AOU (1982). Thirty-fourth supplement to the American Ornithologists' Union Check-list of North American Birds. Auk 99(3): 1cc-16cc.  
 Bulletin (and Newsletter), 1958-1980. The Province of Quebec Society for the Protection of Birds.  
 Bulletin ornithologique, 1956-1980. Club des ornithologues du Quebec.  
 Ouellet, H. 1974. Les oiseaux des collines monteregiennes et de la region de Montreal, Quebec, Canada. Musee national des sciences naturelles. Publications de zoologie, No. 5.  
 Powe, N.N. 1969. The climate of Montreal. Information Canada. Ottawa.  
 Terrill, L.M. 1951. Shorebird migration at Montreal. Can. Field-Nat., 65(3): 87-98.  
 Tchebec, 1971, 1973-1980. The Province of Quebec Society for the Protection of Birds.  
 Wintle, E.D. 1896. The Birds of Montreal. Drysdale and Co.

S. Holohan, 267 Talbot Avenue, Apt. 17, Winnipeg, Manitoba R2L 0P7, Canada.

## UNPRECEDENTED PRESS ATTACK ON WSG EMBLEM

From the 'Daily Telegraph' 24 June 1983

### BIRD'S NEST STORY BREAKS

A pair of oystercatchers which defied 75 mph express trains to nest on a railway track in Anglesey reckoned without British Rail's enthusiasm for good publicity.

Drivers approaching Valley Station, Anglesey, noticed that two birds always flew off, squawking angrily.

British Rail officials investigated and discovered three olive-brown eggs in a nest carefully hollowed out in gravel between the lines.

Yesterday BR invited cameramen to photograph the eggs, which had survived about 24 trains a day.

But as the photocall ended,

Mr John Reay, 39, a free-lance BBC cameraman from Llandudno, trod on them with his size 7½ feet.

Last night he said: "It is the worst thing that has ever happened to me in my 20 years in the job.

"I feel I have really put my foot in it."