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Marine bird observations at Cape St. Mary's and Placentia and St. Mary's bays, Newfoundland, winter 1978–79

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Introduction

Little detail has been published about marine birds wintering and staging around the coasts of insular Newfoundland, although it is generally accepted that significant numbers of Common Eiders (*Somateria mollissima*), Oldsquaws (*Clangula hyemalis*), alcids, and gulls winter there. Few locations with high densities of wintering birds have been specifically identified.

During 1973–75, W. T. Threlfall, Memorial University of Newfoundland, directed a study of marine birds in Placentia Bay to provide baseline data for future assessments of seabird susceptibility to environmental impacts resulting from developments such as the Come-by-Chance oil refinery and the phosphorous plant at Long Harbour. Extensive boat surveys offshore were coupled with observations from headlands along the Cape Shore (Cape St. Mary's to Argentia). Data from that study have not been analyzed as yet. In 1978–79, I attempted to repeat the pattern of observations from shore used in the 1973–75 surveys (Fig. 1), following advice from John Maunder[2], who made the original observations under Threlfall's supervision. Because all the observation points along the Cape Shore were revisited except Argentia, the data should be directly comparable. The St. Mary's Bay shore (sites A and B) was not included in the original 1973–75 surveys.

The objectives of the present study were to provide some insight on:

(1) the occurrence in space and time and the relative abundance of wintering bird species in specific areas, and the relative importance of these areas to wintering populations in Newfoundland;
(2) estimated populations and marine bird use by extrapolation to adjacent areas;
(3) year-to-year fluctuations in population or species use of an area (assuming continued surveys);
(4) susceptibility of these bird concentrations to ecological disasters (e.g., oil spills or toxic pollutants).

I hoped to obtain data that would be directly comparable to those from the earlier surveys. Repetition of surveys over a period of years could provide a useful population index for various species. With the increasing threats to marine bird populations wintering around Newfoundland's coast, such monitoring capability is important.

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Methods

One observer (the author) using a Bushnell 20 – 45X zoom spotting scope visually identified and counted birds at each observation point, with each observation taking an average of 30 min. I estimated effective coverage to be up to 1 km from the point of observation. Many sites were easily inspected from a vehicle, while others required walking to a suitable vantage point. Observation points averaged 100 m above sea level. Because observations took place as the weather permitted, the intervals between surveys ranged irregularly from 7 to 35 days. Time of day remained consistent with a 09:00–17:00 regime from sites A to L. I made observations on 13 dates between 6 November and 6 April, a period of 153 days, but could not survey all areas on all 13 days as high winds and expecially fog sometimes interfered with or prevented observations. I recorded results only if I felt coverage had been effective.

Observations were extrapolated to estimate wintering use and potential mean population of marine birds in a 1-km wide belt of water along the entire coastal area sampled (Fig. 1). I calculated bird-days (individuals × days) by averaging results from each successive pair of surveys, multiplying them by the number of days separating the surveys, and summing such figures for each species over the entire survey period.

Results

Table 1 summarizes observations by section for the various species encountered. Table 2 outlines the calculated marine bird use by species (or group of similar species) for each area during the survey period. Waterfowl, mainly eiders, made up 52% of the total of 1 608 000 marine bird-days, with auks and gulls also of major importance. I extrapolated marine bird-days and potential population for 1-km wide unsurveyed areas between observation points (Fig. 1) to obtain an estimate of potential marine bird populations (Table 3).

Discussion

Visual estimates for the study areas were undoubtedly low because:

(1) some species, especially eiders, tended to concentrate near the coast in early morning and move out of observation range during the remainder of the day, sometimes returning in the evening; timing of observations varied between areas and to some extent between surveys;
(2) many birds, especially Oldsquaws, might have been submerged when a particular piece of water was observed;

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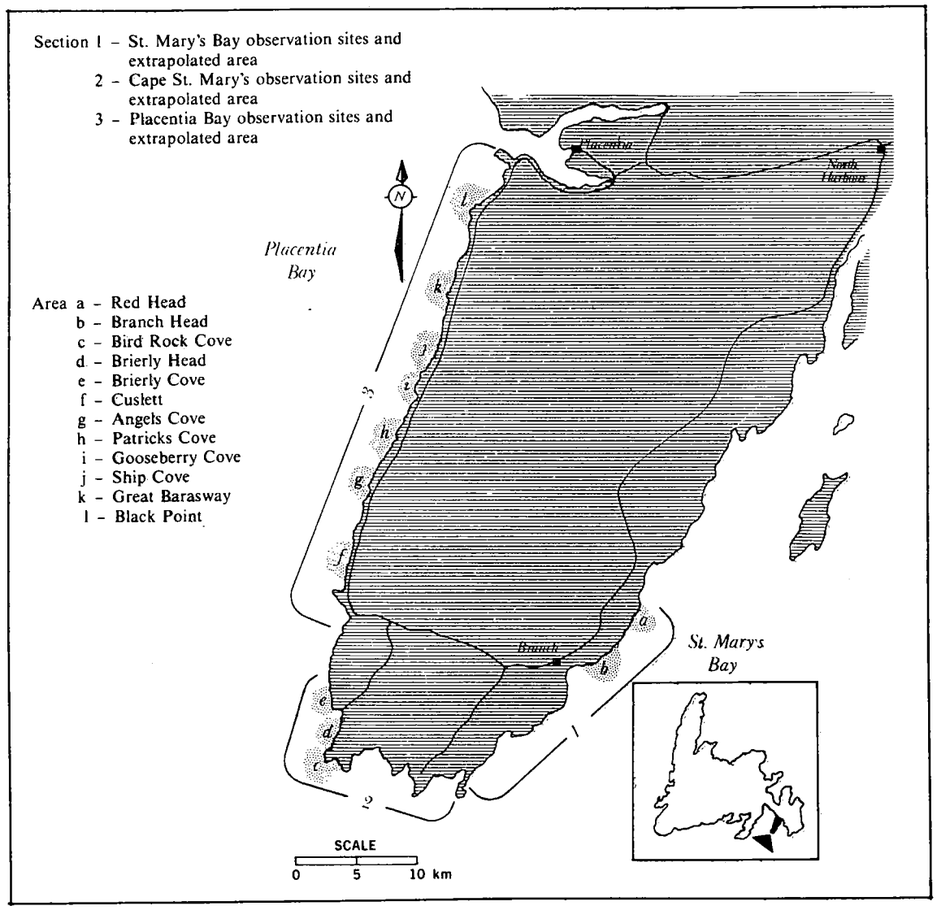
Figure 1
Observation points at Cape St. Mary's and Placentia and St. Mary's bays, winter 1978–79



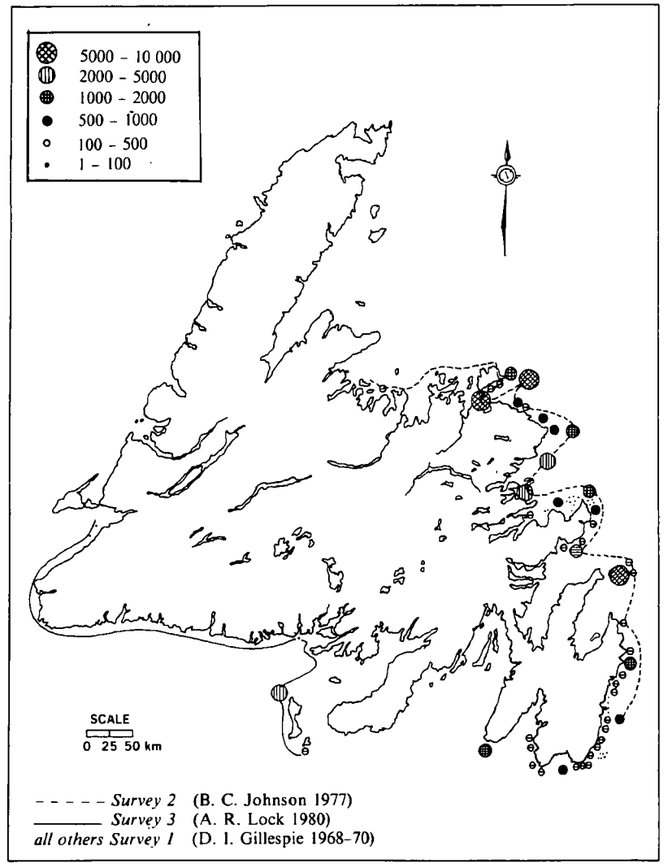
(3) birds in large numbers were difficult to estimate accurately, especially when they were well dispersed (e.g., 20 000 murres (*Uria* spp.) at Cape St. Mary's on 6 April);
(4) large concentrations tended to distract attention from scattered birds of scarcer species;
(5) bad weather tended to reduce the accuracy and completeness of observations.

For these reasons, numbers listed in the tables must be considered minimal.

Tables 1, 2, and 3 show the relative significance to wintering marine birds of the various locations. Cape St. Mary's (observation points C to E) was by far the most important area, accounting for 97.5% of the total bird-days calculated. The frequency and quantity of observations declined northward from Cape St. Mary's. The relative isolation and steep 100–150-m cliffs at Cape St. Mary's prevent any major hunting pressure, and the general area of Bird Rock is a provincial bird sanctuary. Marine birds therefore can safely congregate in the shelter of these headlands, where presumably food supplies are plentiful. False Cape, Brierly Head, and Lears Cove (part of Brierly Cove area) are practically the only areas near Cape St. Mary's where sea ducks are hunted from land, although local people told me that large numbers of murres are often killed from boats in the Cape St. Mary's area.

Ducks accounted for 51% of the bird-days at Cape St. Mary's (areas C–E). Eider numbers peaked there on 15 December – 31 January and 27 February – 6 April. The scarcity of eiders at the Cape during early February was probably owing to local movements along the east coast of Placentia Bay. Observations of eiders at points F–L increased dramatically during this period. The

Figure 2
Distribution and numbers of eiders recorded on aerial censuses of coastal Newfoundland



build-up of eider numbers at Cape St. Mary's after 27 February likewise coincided with a decrease at the other observation points (Table 3).

Gillespie and Learning (1974) suggested that significant numbers of eiders arrive off the Avalon Peninsula during mid December. My study appears to confirm that. Gillespie's aerial survey work during 1968–70 also suggested that concentration of eiders in winter on the Cape Shore was primarily at Cape St. Mary's (Fig. 2).

Significant numbers of murres appeared, mainly at Cape St. Mary's, at the end of February, and continued to build up during March and April (Tables 1 and 3). This seems to be an important staging area for murres preparing for spring migration, since I saw many more than the local breeding population. Gaston (1980) indicated that about 4 million Thick-billed Murres (*Uria lomvia*) winter in Newfoundland waters. Build-up of ice farther north forces murres southward to eastern and southeastern Newfoundland, where large concentrations occur in late winter. The concentration observed off Cape St. Mary's probably corresponds to a gathering of Thick-billed Murres migrating to northern breeding grounds, with lesser numbers of Common Murres (*U. aalge*) of the local breeding population of 2000-3000 pairs (Brown *et al.* 1975). Concentrations of murres occurred near the shore following foggy periods. This phenomenon was also commonly observed with other pelagic seabirds.

Black-legged Kittiwakes (*Rissa tridactyla*) winter in the general area, but usually stay far offshore until they approach the breeding sites from mid February onward. Kittiwake concentrations at Cape St. Mary's, as with murres, built up from 27 February (Tables 1 and 3) corresponding to the approach of the breeding season,

when significant numbers return to this provincial seabird sanctuary (Brown *et al.* 1975).

Northern Gannets (*Morus bassanus*) recorded were only the last fall stragglers and the first spring arrivals, as this species winters in more southerly areas. A local belief that gannets start to reappear on St. Patrick's Day (17 March) is roughly supported by my data.

Harlequin Ducks (*Histrionicus histrionicus*) were limited to the Cape St. Mary's area (C–E). The presence of this relatively scarce species adds to the importance of this site.

Table 3 presents potential mean populations of the more significant marine birds extrapolated for a 1-km belt of water included in sections 1, 2, and 3 (Fig. 1). Section 2 harboured the largest potential populations with, for example, peak eider and Harlequin Duck population estimates of approximately 9000 and 30 respectively for the period 4–25 January. The Christmas bird count of 20 December 1979 (Osprey 1980) recorded sightings of 7389 eiders and 80 Harlequin Ducks from Point Lance to St. Brides. My extrapolated estimates are thus entirely plausible. The apparent low estimate of Harlequin Ducks is probably due to the small concentrations that appear to occur in more isolated sectors of Cape St. Mary's and were not sampled during this survey. I suggest that estimates of marine birds wintering inshore obtained by such sampling procedures are significant enough to encourage more extensive monitoring of coastal areas.

The highlight of this study is the demonstrated importance of Cape St. Mary's to wintering marine birds, with very significant concentrations of eiders, murres, kittiwakes and Harlequin Ducks. Unpublished results of aerial surveys by D. I. Gillespie in 1968-70, B. C. Johnson in 1977, and A. R. Lock in 1980 provided some data on distribution and numbers of eiders (Fig. 2). Data from these surveys, although preliminary, indicated at least seven areas of significant concentrations of eider ducks: near Fogo Island (49°40′N, 54°15′W), Wadham Islands (49°33′N, 53°50′W), Cape Bonavista (48°42′N, 53°05′W), Baccalieu Island (48°10′N, 52°50′W), Witless Bay (47°12′N, 52°50′W), Cape St. Mary's (45°50′N, 54°14′W) and Miquelon Island (47°07′N, 56°25′W). Such areas characteristically support large eider concentrations that vary according to time of year, weather conditions, freeze-up, and pack-ice conditions.

Annual monitoring of bird numbers in these areas should be a priority in view of increasing exploration and development of offshore petroleum resources. The increasing likelihood of oil spills and human disturbance emphasizes the need for planning and management of these areas now.

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Table 1
Total observations, mean numbers and standard deviations of marine birds counted at Cape St. Mary's and Placentia and St. Mary's bays, Nfld., winter 1978-79

Period	Sites	Common Eider	Scoter spp. §	Oldsquaw	Red-breasted Merganser	Harlequin Duck
6 Nov.	A–B	- 4/1/2	24/6/2.16	30/7.5/6.14	—	—
– 7 Dec.	C–E	196/66.33/113.16	62/20.7/14.5	46/15.3/13.61	3/1/1.73	4/1.3/2.31
	F–L	—	20/5/10	—	—	—
4 Jan.	A–B	1/0.33/0.577	86/28.7/2.31	25/8.3/7.64	—	—
– 25 Jan.	C–E	4593/1531/316.41	151/50.3/49.5	90/30/17.32	9/3/5.20	15/5/7.81
	F–L	60/30/35.36	—	20/10/2.83	2/1/1.41	—
13 Feb.	A–B	3/1.5/0.71	49/24.5/2.12	38/19/1.41	—	—
– 27 Feb.	C–E	1013/337.7/372.2	—	51/17/14.53	24/8/9.54	5/1.67/2.89
	F–L*	641/—/—	—	200/—/—	—	—
1 Mar.	A–B*	3/—/—	30/—/—	23/—/—	4/—/—	—
– 6 Apr.	C–E	2331/777/796.4	2/0.67/1.16	41/13.67/8.15	21/7.67/4.93	—
	F–L	425/213.5/293.5	—	24/12/8.49	3/1.5/0.71	—

Period	Sites	Large Gulls†	Black-legged Kittiwake	Gannet	Double-crested Cormorant	Murres‡
6 Nov.	A–B	35/8.75/14.36	—	—	—	1/0.25/0.5
– 7 Dec.	C–E	51/17/10.15	—	533/177.7/279.6	—	1/0.33/0.58
	F–L	32/8/9.76	—	—	—	—
4 Jan.	A–B	21/7/7	—	—	—	2/0.66/1.15
– 25 Jan.	C–E	93/31/23.07	—	—	4/1.33/2.31	1/0.33/0.58
	F–L	28/14/15.56	—	—	—	—
13 Feb.	A–B	32/16/19.79	—	—	—	1/0.5/0.71
– 27 Feb.	C–E	1165/388.3/163.5	6300/2100/3637.3	—	7/2.33/3.21	11 305/3768.3/6522.6
	F–L*	62/—/—	—	—	—	4/—/—
1 Mar.	A–B*	8/—/—	—	—	—	—
– 6 Apr.	C–E	581/193.6/60.4	17 710/5903.3/1936.8	46/15.33/22.37	19/6.33/2.52	29 363/9787.7/9920.3
	F–L	51/25.5/24.75	—	—	—	—

(*cont'd*)

Table 1 (*concl'd*)

Period	Sites	Black Guillemot	Dovekie	Common Loon	Red-necked Grebe
6 Nov.	A–B	28/7/2.45	1/0.25/0.50	—	—
– 7 Dec.	C–E	11/3.67/3.51	2/0.67/0.58	2/0.66/1.15	—
	F–L	11/2.75/2.75	3/0.75/1.5	4/1/2	—
4 Jan.	A–B	19/6.3/5.03	—	1/0.33/0.58	—
– 25 Jan.	C–E	1/0.33/0.58	—	—	—
	F–L	14/7/1.41	2/1/1.41	6/3/4.24	6/3/2.83
13 Feb.	A–B	5/2.5/3.54	—	—	—
– 27 Feb.	C–E	4/1.33/2.31	1/0.33/0.58	—	—
	F–L*	1/—/—	—	7/—/—	1/—/—
1 Mar.	A–B*	4/—/—	—	3/—/—	—
– 6 Apr.	C–E	11/3.67/1.53	—	1/0.33/0.58	—
	F–L	12/6/0	—	10/5/5.66	7/3.5/0.71

*Only one observation because of bad weather on other dates.
†Herring, Great Black-backed, Glaucous and Icelandic gulls.
‡Mostly Thick-billed Murres, some Common Murres.
§Predominantly Black Scoters, with additional consistent sightings (30–50) of White-winged Scoters at sites A–B.

Table 2
Marine bird use of survey area in winter, 6 November 1978 to 6 April 1979 (153 days)

	Calculated bird-days*							
Location	Common Loon	Red-necked Grebe	Common Eider	Scoter spp.	Oldsquaw	Red-breasted Merganser	Harlequin Duck	Sub-totals
Red Head (A)	10	—	50	1200	100	—	—	1 360
Branch Head (B)	100	—	100	2000	1900	50	—	4 150
Bird Rock Cove (C)	—	—	741 200	4600	400	20	100	746 320
Brierly Head (D)	—	—	34 300	—	300	200	300	35 100
Brierly Cove (E)	100	—	11 600	50	2500	600	100	14 950
Cuslett (F)	—	100	6 900	—	100	30	—	7 130
Angels Cove (G)	30	30	4 200	—	2300	—	—	6 560
Patricks Cove (H)	—	—	6 100	—	20	—	—	6 120
Gooseberry Cove (I)	30	—	900	—	400	—	—	1 330
Ship Cove (J)	30	200	100	—	—	50	—	380
Great Barasway (K)	—	—	2 100	100	1900	30	—	4 130
Black Point (L)	—	—	2 200	—	—	20	—	2 220
Totals	300	330	809 750	7950	9920	1000	500	829 750

Location	Gannet	Dbl.-cr. Cormorant	Large Gulls†	Black-legged Kittiwake	Murres†	Black Guillemot	Dovekie	Sub-totals	Grand totals
Red Head (A)	—	—	300	—	10	200	—	510	1 870
Branch Head (B)	—	—	1 200	—	30	600	10	1 840	5 990
Bird Rock Cove (C)	2900	300	14 800	236 500	493 200	200	50	747 950	1 494 270
Brierly Head (D)	—	100	2 100	19 900	1 800	100	—	24 000	59 100
Brierly Cove (E)	—	—	100	100	100	20	10	330	15 280
Cuslett (F)	—	—	500	—	—	100	—	600	7 730
Angels Cove (G)	—	—	500	—	—	200	—	700	7 260
Patricks Cove (H)	—	—	800	—	100	200	30	1 130	7 250
Gooseberry Cove (I)	—	—	100	—	—	100	—	200	1 530
Ship Cove (J)	—	—	300	—	—	200	—	500	880
Great Barasway (K)	—	—	400	—	10	50	—	460	4 590
Black Point (L)	—	—	500	—	—	50	—	550	2 770
Totals	2900	400	21 600	256 500	495 250	2020	100	778 770	1 608 620

*Rounded to nearest 100, or to nearest 10 if <100.
†As in Table 1.

Table 3
Mean density (no./ha) and extrapolated mean populations of marine birds in study area

Period	Sites	Common Eider		Scoter spp.		Oldsquaw		Red-breasted Merganser		Harlequin Duck	
	Sample area/ total area (ha)	Mean density	Extrap. pop'n.	Mean density	Extrap. pop'n.	Mean density	Extrap. pop'n.	Mean density	Extrap. pop'n.	Mean density	Extrap. pop'n.
6 Nov.	A–B										
– 7 Dec.	528/2614	0.002	5	0.011	30	0.014	37	—	—	—	—
	C–E										
	469/2785	0.141	394	0.044	123	0.033	91	0.001	1	0.003	8
	F–L										
	766/4063	—	—	0.007	27	—	—	—	—	—	—
4 Jan.	A–B										
– 25 Jan.	528/2614	0.001	2	0.054	142	0.016	41	—	—	—	—
	C–E										
	469/2785	3.260	9091	0.107	299	0.064	178	0.006	18	0.011	30
	F–L										
	766/4063	0.039	159	—	—	0.013	53	0.001	5	—	—
13 Feb.	A–B										
– 27 Feb.	528/2614	0.003	7	0.046	121	0.036	94	—	—	—	—
	C–E										
	469/2785	0.720	2005	—	—	0.036	101	0.017	48	0.004	10
	F–L										
	766/4063	0.837	3400	—	—	0.261	1061	—	—	—	—
1 Mar.	A–B										
– 6 Apr.	528/2614	0.006	15	0.057	149	0.044	114	0.008	20	—	—
	C–E										
	469/2785	1.657	4614	0.001	4	0.029	81	0.015	42	—	—
	F–L										
	766/4063	0.279	1132	—	—	0.016	64	0.002	8	—	—

(*cont'd*)

Table 3 (*cont'd*)

Period	Sites	Large Gulls*		Black-legged Kittiwake		Gannet		Double-crested Cormorant		Murres*	
	Sample area/ total area (ha)	Mean density	Extrap. pop'n.	Mean density	Extrap. pop'n.	Mean density	Extrap. pop'n.	Mean density	Extrap. pop'n.	Mean density	Extrap. pop'n.
6 Nov.	A–B										
–7 Dec.	528/2614	0.017	43	—	—	—	—	—	—	0.001	1
	C–E										
	469/2785	0.036	101	—	—	0.379	1055	—	—	0.001	1
	F–L										
	766/4063	0.010	42	—	—	—	—	—	—	—	—
4 Jan.	A–B										
–25 Jan.	528/2614	0.013	35	—	—	—	—	—	—	0.001	3
	C–E										
	469/2785	0.066	184	—	—	—	—	0.003	8	0.001	2
	F–L										
	766/4063	0.018	74	—	—	—	—	—	—	—	—
13 Feb.	A–B										
–27 Feb.	528/2614	0.030	79	—	—	—	—	—	—	0.001	3
	C–E										
	469/2785	0.828	2306	4.478	12 470	—	—	0.005	14	8.035	22 377
	F–L										
	766/4063	0.081	329	—	—	—	—	—	—	0.005	21
1 Mar.	A–B										
–6 Apr.	528/2614	0.015	40	—	—	—	—	—	—	—	—
	C–E										
	469/2785	0.413	1150	12.587	35 055	0.033	91	0.013	38	20.869	58 121
	F–L										
	766/4063	0.033	135	—	—	—	—	—	—	—	—

(*cont'd*)

Table 3 (*concl'd*)

Period	Sites: Sample area/ total area (ha)	Black Guillemot: Mean density	Black Guillemot: Extrap. pop'n.	Dovekie: Mean density	Dovekie: Extrap. pop'n.	Common Loon: Mean density	Common Loon: Extrap. pop'n.	Red-necked Grebe: Mean density	Red-necked Grebe: Extrap. pop'n.
6 Nov.	A–B								
–7 Dec.	528/2614	0.013	35	0.001	1	—	—	—	—
	C–E								
	469/2785	0.008	22	0.001	1	0.001	1	—	—
	F–L								
	766/4063	0.004	15	0.001	4	0.001	5	—	—
4 Jan.	A–B								
–25 Jan.	528/2614	0.012	31	—	—	0.001	2	—	—
	C–E								
	469/2785	0.001	2	—	—	—	—	—	—
	F–L								
	766/4063	0.009	37	0.001	5	0.004	16	0.004	16
13 Feb.	A–B								
–27 Feb.	538/2614	0.001	3	—	—	—	—	—	—
	C–E								
	469/2785	0.003	8	0.001	2	—	—	—	—
	F–L								
	766/4063	0.001	5	—	—	0.009	37	0.001	5
1 Mar.	A–B								
–6 Apr.	528/2614	0.008	20	—	—	0.006	15	—	—
	C–E								
	469/2785	0.008	22	—	—	0.001	2	—	—
	F–L								
	766/4063	0.008	32	—	—	0.007	27	0.005	19

*As in Table 1