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Waders and wildfowl on the Ythan Estuary 1997/1998

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**WADERS AND WILDFOWL ON THE
YTHAN ESTUARY 1997/98
A REPORT TO SNH**

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INTRODUCTION

The wader and wildfowl counts in this report are a direct continuation of the series started in 1989/90, with the same objective of monitoring the bird populations of the Ythan estuary by means of twice-monthly surveys of numbers and distribution. The counts were carried out from 14 July 1997 to 29 June 1998, using the same methods as in previous years (Patterson and Laing 1992, 1993, 1994, 1995, 1996; Patterson and Cosgrove 1997; Appendix 1). Since the field surveys in 1997/98 were again carried out by a specialist ornithologist, it was possible to include counts of species which occur less commonly on the Ythan.

RESULTS

a) Individual species

As in previous reports, the data are presented in separate species accounts, arranged in taxonomic order. For each species, a table shows the number of birds found in each section of the estuary from the mouth upstream (ie, Mouth, Inches, Quay, Tarty, Sleek, Haddo, Snub, Machar, and Logie), as defined in Patterson and Laing (1992; Figure 1), and the total on the whole estuary on each count date. The data are summarised and peak numbers are compared with those in the previous year. Only the commoner species, which were included in previous reports, are dealt with in this section; the species recorded less commonly during the year are tabulated in section d).

HERON *Ardea cinerea*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
14 7 97	0	1	0	0	1	4	0	0	0	6
26 7 97	0	0	1	0	0	0	0	1	0	2
11 8 97	0	2	2	0	10	2	2	0	1	19
21 8 97	0	0	0	19	0	1	1	1	0	22
14 9 97	2	5	3	1	4	2	2	4	3	26
23 9 97	1	6	3	0	4	2	2	0	0	18
17 10 97	0	2	2	1	1	2	1	0	0	9
25 10 97	1	9	2	0	4	0	1	1	1	19
14 11 97	0	2	1	0	0	1	0	0	0	4
2 12 97	0	1	2	0	0	0	0	0	0	3
21 12 97	0	2	1	0	0	0	1	0	1	5
15 1 98	1	3	2	0	3	0	0	0	0	9
30 1 98	2	1	0	0	0	0	0	0	0	3
14 2 98	1	2	0	1	1	0	0	0	1	6
2 3 98	0	1	0	1	0	0	0	0	0	2
8 3 98	0	2	2	0	1	0	0	0	1	6
20 3 98	0	1	0	0	1	1	0	0	0	3
11 4 98	0	2	1	0	0	0	0	0	3	6
25 4 98	0	2	0	1	1	1	0	0	0	5
11 5 98	0	5	1	0	2	2	2	0	0	12
11 6 98	1	2	0	1	0	1	0	0	1	6
29 6 98	0	1	2	3	2	1	2	0	0	11

Hérons were seen throughout the year in all parts of the estuary, with highest numbers in autumn. The peak of 26 birds on 14 September was lower than the highest count of 37 in 1996/97.

MUTE SWAN *Cygnus olor*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
14 7 97	0	0	0	0	0	4	10	0	0	14
26 7 97	0	0	0	0	0	2	9	2	5	18
11 8 97	0	0	0	0	0	0	2	0	0	2
21 8 97	0	0	0	0	0	0	0	0	1	1
14 9 97	0	0	0	0	0	2	0	0	0	2
23 9 97	0	0	0	0	0	0	2	0	2	4
25 10 97	1	0	0	0	0	0	2	0	0	3
14 11 97	0	0	0	0	5	0	0	0	0	5
2 12 97	0	0	1	0	17	16	4	0	0	38
8 12 97	0	0	0	0	0	32	0	0	0	32
21 12 97	0	0	0	0	11	4	8	0	0	23
15 1 98	0	0	0	6	4	23	1	0	0	34
30 1 98	0		0	0	5	4	2	10	4	25
14 2 98	0	0	0	0	0	9	0	2	0	11
2 3 98	0	0	0	0		0	0	9	0	9
8 3 98	0	0	0	0	7	16	14	0	0	37
20 3 98	0	0	0	0	2	0	0	0	0	2
11 4 98	0	4	0	0	0	0	0	0	0	4
25 4 98	0	0	0	0	1	10	6	0	2	19
11 5 98	0	7	0	0	19	0	10	18	0	54
29 5 98	0	0	0	2	22	7	2	2	0	35
11 6 98	0	0	0	0	18	0	19	1	4	42
29 6 98	0	0	0	0	2	12	7	0	0	21

Mute Swans were also found throughout the year, mainly in the upper half of the estuary. The highest count of 54 birds on 11 May was similar to the peak of 58 on 1996/97.

SHELDUCK *Tadorna tadorna*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
14 7 97	0	0	4	0	39	0	4	8	10	65
26 7 97	0	0	5	0	12	0	0	0	5	22
11 8 97	0	6	0	0	19	0	0	0	0	25
21 8 97	0	0	0	0	0	0	0	0	3	3
14 9 97	0	0	0	0	9	4	0	0	1	14
23 9 97	0	0	0	0	1	3	1	0	0	5
17 10 97	0	0	0	0	4	3	0	0	0	7
25 10 97	0	0	1	0	0	0	1	0	0	2
14 11 97	0	0	0	0	0	6	0	0	0	6
2 12 97	0	1	0	0	0	0	0	0	0	1
8 12 97	0	0	0	0	11	0	0	0	0	11
21 12 97	0	0	0	0	37	0	0	0	0	37
15 1 98	0	0	5	0	62	0	0	0	0	67
30 1 98	0	3	7	0	55	0	2	0	0	67
14 2 98	0	2	10	2	19	29	2	0	7	71
2 3 98	0	4	4	6	32	60	0	2	0	108
8 3 98	0	4	10	0	105	0	2	3	2	126
20 3 98	0	1	13	7	25	22	2	14	2	86
11 4 98	0	5	3	0	24	26	3	14	6	81
25 4 98	0	2	10	2	6	12	4	3	0	39
11 5 98	0	2	8	3	4	0	15	7	11	50
29 5 98	0	2	3	5	9	5	10	13	15	62
11 6 98	1	2	3	5	11	2	21	10	1	56
29 6 98	0	1	5	0	18	28	6	7	2	67

Shelducks were seen in all months, although numbers were very low between August and December. The peak count of 126 on 8 March 1998 was a little higher than the peak of 119 in the preceding year, continuing the increase over the last three years. Most Shelducks were seen in the middle stretches of the estuary. As in previous years, the counts do not include the whole breeding population, since birds on freshwater pools, in the Forvie dunes and on the Ythan above Logie Buchan bridge were not counted.

EIDER *Somateria mollissima*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
14 7 97	697	267	154	2	0	9	0	0	0	1129
25 7 97	1445	0	33	0	0	0	0	0	0	1478
13 8 97	665	0	0	0	0	0	0	0	0	665
21 8 97	367	0	0	0	0	0	0	0	0	367
14 9 97	703	2	0	0	1	0	0	0	0	706
24 9 97	1109	21	308	0	0	0	0	0	0	1438
16 10 97	1129	489	0	0	28	0	0	0	0	1646
25 10 97	352	275	10	0	0	0	0	0	0	637
12 11 97	82	809	0	0	3	0	0	0	0	894
29 11 97	1071	416	0	0	0	0	0	0	0	1487
11 12 97	227	847	221	0	4	0	0	0	0	1299
28 12 97	1	444	25	3	0	0	0	0	0	473
8 1 98	938	358	0	3	0	0	0	0	0	1299
27 1 98	31	119	1070	0	31	0	0	0	0	1251
7 2 98	111	856	205	0	22	0	0	0	0	1194
27 2 98	46	744	328	0	42	0	0	0	0	1160
11 3 98	114	90	1056	0	73	0	0	0	0	1333
21 3 98	1093	275	13	0	39	0	0	0	0	1420
10 4 98	564	1	735	0	167	2	0	0	0	1469
16 4 98	1557	150	590	0	46	0	0	0	0	2343
25 4 98	1049	185	179	0	64	4	0	0	0	1481
2 5 98	659	1549	271	0	16	2	2	0	0	2499
8 5 98	1890	843	481	2	58	6	0	0	0	3280
15 5 98	2363	1292	338	20	54	8	0	0	0	4075
22 5 98	1837	1767	347	34	47	1	0	0	0	4033
29 5 98	2131	600	575	44	3	2	0	0	0	3355
5 6 98	2368	651	138	0	46	0	0	0	0	3203
11 6 98	1887	285	196	0	12	0	0	0	0	2380
22 6 98	1334	266	84	20	16	0	0	0	0	1720
29 6 98	1148	192	104	0	6	2	0	0	0	1452

Eiders were found on the estuary throughout the year, mainly between the Mouth and Waterside Bridge. The peak count of 4,075 on 15 May 1998 was higher than the peak of 3,709 in 1997. Numbers were variable over the winter, with a low of 473 on 28 December. Fledging success was much better in 1998 than in the previous two years, with 309 ducklings fledged (including those on the sea coast), compared to only 31 in both 1997 and 1996.

WIGEON *Anas penelope*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
14 7 97	0	0	0	0	0	4	0	0	0	4
21 8 97	0	0	0	0	2	3	0	0	0	5
14 9 97	0	1	0	0	5	0	0	20	0	26
23 9 97	0	0	0	0	24	0	0	0	0	24
17 10 97	53	3	8	0	99	0	0	0	0	163
25 10 97	101	18	69	0	13	0	0	0	0	201
14 11 97	176	35	58	0	5	0	0	0	0	274
2 12 97	164	47	64	0	0	0	0	0	0	275
8 12 97	80	68	32	0	0	0	0	0	0	180
21 12 97	85	58	122	0	19	0	0	0	0	284
15 1 98	140	5	25	0	200	0	0	0	0	370
30 1 98	122	30	103	0	0	0	0	0	0	255
14 2 98	124	38	108	0	0	0	0	0	0	270
2 3 98	0	29	0	0	92	0	0	0	0	121
8 3 98	14	10	26	0	101	0	0	0	0	151
20 3 98	0	0	0	0	81	0	1	0	0	82
11 4 98	0	0	0	0	68	6	0	0	0	74
25 4 98	0	0	0	0	28	0	0	0	0	28
11 5 98	0	0	0	0	2	0	0	0	0	2
29 5 98	0	0	0	0	4	0	0	0	0	4

Wigeon were seen between July and May, a peak of 370 on 15 January. This represented a considerable decrease on the 1996/97 peak of 674 and a return to levels of earlier years. Very few were found in July, August and May. The species was found mainly in the lower half of the estuary, and was not seen at Logie.

TEAL *Anas crecca*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
26 7 97	0	0	0	0	6	0	0	0	0	6
11 8 97	0	0	0	0	0	0	0	0	10	10
21 8 97	0	0	0	9	0	0	0	0	0	9
14 9 97	0	0	0	0	0	3	0	0	0	3
23 9 97	0	0	0	0	0	6	0	0	0	6
25 10 97	1	0	0	0	0	0	0	0	15	16
15 1 98	0	0	0	0	0	0	0	0	2	2
14 2 98	0	0	0	0	0	0	0	0	19	19
2 3 98	0	0	0	0	0	0	0	6	16	22
8 3 98	0	0	0	0	0	0	23	0	11	34
20 3 98	0	0	0	0	0	0	0	0	6	6
11 4 98	0	0	0	0	0	0	0	15	49	64
25 4 98	0	0	0	0	0	0	0	0	20	20

As in previous years, Teal were seen throughout the year in small numbers, with most in spring. The peak of 64 on 11 April was higher than the peak count in 1996/97 (45). The birds were found mainly in the upper parts of the estuary (apart from one at the Mouth on 25 October).

MALLARD *Anas platyrhynchos*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
26 7 97	0	2	0	0	0	0	0	0	0	2
23 9 97	0	0	0	0	0	0	0	0	3	3
17 10 97	0	0	0	0	0	1	0	0	0	1
25 10 97	1	0	10	0	2	0	0	0	4	17
14 11 97	0	0	0	0	0	0	0	0	36	36
2 12 97	2	0	6	0	2	0	0	0	0	10
8 12 97	0	0	0	0	0	2	0	0	0	2
21 12 97	0	0	0	0	2	0	0	0	0	2
15 1 98	0	0	10	0	3	1	0	0	2	16
30 1 98	2	0	0	0	0	0	0	0	0	2
14 2 98	0	0	0	0	0	0	0	0	9	9
2 3 98	0	0	6	0	0	25	0	0	0	31
8 3 98	0	0	2	2	6	0	0	0	2	12
20 3 98	0	2	0	0	0	2	0	0	3	7
11 4 98	0	0	0	0	7	4	0	0	2	13
11 5 98	0	0	0	0	0	0	0	2	2	4
29 5 98	0	0	0	0	3	0	0	0	0	3
11 6 98	0	2	0	0	0	0	0	4	0	6

Mallard occurred in all months except August, in rather erratic numbers, with a peak of 36 on 14 November, the same number as the previous year. The species was found throughout the estuary.

GOLDENEYE *Bucephala clangula*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
25 10 97	4	0	8	0	18	0	0	0	0	30
14 11 97	2	0	0	0	2	0	0	0	0	4
2 12 97	18	7	6	0	0	0	0	0	0	31
8 12 97	12	0	0	0	2	3	0	0	0	17
21 12 97	19	5	4	0	6	0	0	0	0	34
15 1 98	35	3	11	0	3	2	0	0	0	54
30 1 98	27	3	4	0	5	0	0	2	0	41
14 2 98	6	2	4	0	7	1	1	3	3	27
2 3 98	2	0	3	0	4	0	1	5	0	15
8 3 98	12	4	16	0	11	0	0	0	2	45
20 3 98	0	0	0	0	5	9	0	1	4	19
11 4 98	0	0	4	0	5	4	1	3	1	18
25 4 98	0	0	0	0	0	1	6	0	3	10
11 5 98	0	0	0	0	0	0	2	0	0	2
29 5 98	0	0	0	0	0	0	0	1	0	1

Small numbers of Goldeneye occurred throughout the estuary from October to May, with a peak of 54 on 25 January, considerably higher than the peak of 29 in 1996/97.

RED-BREASTED MERGANSER *Mergus serrator*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
11 8 97	2	0	0	0	0	0	0	0	0	2
21 8 97	1	0	0	0	0	0	0	0	0	1
14 9 97	2	0	0	0	0	0	0	0	0	2
23 9 97	1	8	0	0	0	0	1	0	0	10
17 10 97	3	2	1	0	0	0	0	0	0	6
25 10 97	13	5	14	0	3	0	0	0	0	35
14 11 97	11	0	14	0	0	0	0	0	0	25
2 12 97	2	4	9	0	8	0	0	0	0	23
8 12 97	4	3	0	0	2	1	0	0	0	10
21 12 97	1	4	8	0	1	0	0	0	0	14
15 1 98	12	4	4	0	1	0	0	0	0	21
30 1 98	7	2	3	0	5	0	0	0	0	17
14 2 98	6	4	3	0	1	0	0	0	0	14
2 3 98	2	3	3	0	3	1	0	0	0	12
8 3 98	0	5	6	0	2	0	0	0	0	13
20 3 98	4	3	9	0	5	1	0	0	0	22
11 4 98	1	0	1	0	5	1	0	0	0	8
25 4 98	0	6	1	0	0	0	0	0	0	7
11 5 98	0	0	0	0	2	0	0	0	0	2
29 6 98	0	0	10	0	0	0	0	0	0	10

Mergansers were recorded throughout the estuary, from August onwards, with a peak of 35 on 25 October, slightly higher than the highest count in the previous year (28).

OYSTERCATCHER *Haematopus ostralegus*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
14 7 97	34	137	2	9	18	13	14	0	0	227
26 7 97	105	211	9	2	2	15	6	0	0	350
11 8 97	188	78	9	0	12	5	7	0	0	299
21 8 97	131	99	0	0	18	0	0	3	0	251
14 9 97	228	219	16	0	2	0	3	0	0	468
23 9 97	240	133	11	0	6	0	4	0	0	394
17 10 97	255	44	0	0	0	0	0	0	0	299
25 10 97	242	202	5	0	1	0	0	2	0	452
14 11 97	211	39	3	0	1	0	0	0	0	254
2 12 97	277	72	0	0	8	0	0	0	0	357
8 12 97	138	104	11	4	1	2	0	0	0	260
21 12 97	153	84	23	1	20	0	0	0	0	281
15 1 98	246	68	12	0	0	0	9	0	0	335
30 1 98	245	50	0	0	5	0	0	0	0	300
14 2 98	269	96	29	0	16	0	27	0	0	437
2 3 98	155	56	13	0	4	3	2	0	0	233
8 3 98	105	69	15	6	7	6	0	5	0	213
20 3 98	32	30	16	1	5	2	6	2	0	94
11 4 98	82	4	8	0	49	0	2	13	0	158
25 4 98	67	14	4	0	1	3	5	14	1	109
11 5 98	31	19	0	0	0	0	5	0	0	55
29 5 98	43	29	4	0	1	0	0	0	0	77
11 6 98	52	94	0	2	0	3	0	0	0	151
29 6 98	14	122	4	0	12	2	2	3	2	161

Oystercatchers were found mainly in the lower part of the estuary throughout the year, with a peak of 468 on 14 September, a small increase from the peak of 456 in 1996/97.

RINGED PLOVER *Charadrius hiaticula*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
26 7 97	0	0	2	0	0	0	0	0	0	2
11 8 97	0	0	21	0	0	0	0	0	0	21
21 8 97	0	7	53	0	0	0	0	0	0	60
14 9 97	0	13	0	0	0	0	0	0	0	13
25 10 97	0	10	0	0	0	0	0	0	0	10
14 11 97	0	0	1	0	0	1	0	0	0	2
2 12 97	0	0	1	0	0	0	0	0	0	1
14 2 98	0	1	0	0	0	0	0	0	0	1
2 3 98	0	6	0	0	0	1	0	0	0	7
8 3 98	0	3	3	0	0	0	0	0	0	6
20 3 98	0	8	0	0	0	10	0	0	0	18
11 4 98	0	26	0	0	0	9	7	0	0	42
25 4 98	0	1	3	0	0	0	16	0	0	20
11 5 98	9	28	35	0	0	0	0	0	0	72
29 5 98	0	0	0	0	0	0	82	0	0	82
29 6 98	0	0	0	0	0	1	0	0	0	1

Ringed Plovers were found in most parts of the estuary, except Tarty, Sleek, Machar and Logie. Numbers were generally low in winter. The peak of 82 on 29 May was lower than the exceptional peak of 100 in 1996/97.

GOLDEN PLOVER *Pluvialis apricaria*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
26 7 97	0	121	0	0	0	598	530	0	0	1249
11 8 97	0	0	2	0	750	1	0	0	0	753
21 8 97	0	274	0	2	29	50	0	0	0	355
14 9 97	0	314	0	0	0	0	0	0	0	314
23 9 97	1034	0	0	0	700	536	0	0	0	2270
17 10 97	0	1010	0	0	0	600	0	0	0	1610
25 10 97	0	118	0	0	0	766	0	0	0	884
14 11 97	0	0	0	0	600	500	0	0	0	1100
2 12 97	0	2	0	0	155	0	0	0	0	157
8 12 97	0	460	22	0	370	0	0	0	0	852
21 12 97	0	0	0	0	0	1175	0	0	0	1175
15 1 98	0	0	0	0	1400	0	0	0	0	1400
30 1 98	0	0	0	0	0	480	0	0	0	480
14 2 98	0	0	0	0	0	0	210	0	0	210
2 3 98	0	1	0	0	0	0	0	0	0	1
8 3 98	0	23	0	0	0	0	110	0	0	133

As in previous years, Golden Plovers occasionally occurred in very high numbers, especially in September and October, with most of the birds in Inches, Sleek or Haddo. The peak count of 2,270 on 23 September was lower than the highest count of 2,891 in 1996/97.

LAPWING *Vanellus vanellus*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
14 7 97	0	3	6	2	94	97	280	10	4	496
26 7 97	0	0	274	74	700	330	1485	155	5	3023
11 8 97	0	5	80	18	196	190	112	200	0	801
21 8 97	0	35	180	350	520	377	0	120	9	1591
14 9 97	0	7	6	0	35	3	52	0	0	103
23 9 97	0	47	520	30	1038	1045	660	250	0	3590
17 10 97	0	814	0	14	119	508	16	0	0	1471
25 10 97	0	2	74	22	47	0	178	10	0	333
14 11 97	0	260	600	28	0	200	32	210	0	1330
2 12 97	0	210	102	27	17	1	1	0	0	358
8 12 97	0	0	476	0	0	0	20	0	0	496
21 12 97	0	9	160	1	310	0	1200	0	0	1680
15 1 98	0	0	788	0	1200	111	15	0	0	2114
30 1 98	0	158	215	0	368	790	50	0	0	1581
14 2 98	0	320	115	0	112	275	250	610	0	1682
8 3 98	0	0	0	0	12	68	0	0	0	80
20 3 98	0	0	0	0	0	0	0	23	0	23
11 4 98	0	0	0	0	0	1	0	0	0	1
25 4 98	0	0	0	0	0	1	0	0	0	1
11 5 98	0	0	0	3	0	0	2	1	0	6
29 5 98	0	0	0	0	0	0	0	12	0	12
11 6 98	0	0	0	0	0	0	1	0	0	1
29 6 98	0	1	1	14	14	7	1	11	4	53

Lapwings also occurred erratically in high numbers, with a peak of 3,590 on 23 September, much higher than the peak of 2,195 in the previous year. Golden Plovers also occurred in large numbers on 23 September, suggesting a general movement of plovers. Numbers were low from March to June. The species tended to occur closer to the mouth of the estuary in winter.

KNOT *Calidris canutus*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
26 7 97	0	16	0	0	18	0	0	0	0	34
11 8 97	78	0	0	0	1	0	0	0	0	79
21 8 97	3	0	0	0	0	0	0	0	0	3
14 9 97	80	0	0	0	0	0	0	0	0	80
23 9 97	271	0	0	0	0	0	0	0	0	271
17 10 97	217	0	0	0	0	0	0	0	0	217
25 10 97	195	0	0	0	0	0	0	0	0	195
14 11 97	41	0	0	0	0	0	0	0	0	41
2 12 97	158	0	20	0	0	0	0	0	0	178
8 12 97	120	0	0	0	0	0	90	0	0	210
21 12 97	345	0	0	0	0	0	0	0	0	345
15 1 98	170	0	0	0	0	0	0	0	0	170
30 1 98	285	0	0	0	0	0	0	0	0	285
14 2 98	270	0	0	0	0	0	0	0	0	270
2 3 98	118	0	0	0	0	0	0	0	0	118
8 3 98	132	0	6	0	0	0	0	0	0	138
20 3 98	5	72	0	0	0	0	0	0	0	77
11 4 98	0	45	0	0	0	0	0	0	0	45
25 4 98	2	25	0	0	0	0	0	0	0	27

Knot were found on the estuary from July to April, most commonly at the Mouth or Inches. The highest count of 345 on 21 December was very much higher than the peak of 92 in 1996/97.

DUNLIN *Calidris alpina*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
14 7 97	0	0	0	0	11	13	0	0	0	24
26 7 97	0	0	0	0	86	50	1	0	0	137
11 8 97	0	0	35	0	2	0	12	23	0	72
21 8 97	0	18	8	0	0	10	7	20	0	63
23 9 97	0	1	2	0	225	0	36	2	0	266
17 10 97	2	36	0	0	128	1	4	0	0	171
25 10 97	1	7	0	0	0	5	0	0	0	13
14 11 97	34	0	172	0	0	0	0	76	0	282
2 12 97	98	0	15	0	5	0	31	0	0	149
8 12 97	20	0	0	0	3	0	20	0	0	43
21 12 97	40	1	200	0	0	0	143	0	0	384
15 1 98	190	0	60	0	400	0	0	0	0	650
30 1 98	76	0	36	0	0	114	230	0	0	456
14 2 98	30	40	87	0	0	0	56	180	0	393
2 3 98	16	0	0	0	0	0	0	0	0	16
8 3 98	48	1	96	0	0	86	0	0	0	231
20 3 98	0	0	0	0	0	0	0	70	0	70
11 4 98	0	0	0	0	0	0	26	0	0	26
11 5 98	11	12	15	0	0	0	0	0	0	38
29 5 98	0	0	0	0	0	0	3	0	0	3
29 6 98	0	0	0	0	0	0	0	1	0	1

Dunlin occurred in all months and were found throughout the estuary (except at Logie). The highest numbers were seen in December to February, with the peak count of 650 on 15 January very much lower than the peak of 1,585 in the previous year, when there was evidence of a large cold-weather influx of Dunlin in mid-winter.

BAR-TAILED GODWIT *Limosa lapponica*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
14 7 97	0	1	2	0	4	0	0	0	0	7
26 7 97	0	3	1	0	5	0	0	0	0	9
21 8 97	0	17	0	0	0	0	5	0	0	22
14 9 97	0	6	3	0	0	2	0	0	0	11
23 9 97	1	3	2	0	0	0	0	0	0	6
17 10 97	0	4	0	0	0	2	3	0	0	9
25 10 97	3	5	10	0	0	0	0	0	0	18
14 11 97	0	1	6	0	0	0	0	0	0	7
2 12 97	0	53	2	1	0	0	3	0	0	59
8 12 97	0	4	0	0	0	0	0	0	0	4
21 12 97	28	8	2	0	5	1	0	0	0	44
15 1 98	0	0	2	0	8	5	11	0	0	26
30 1 98	1	1	37	0	3	0	0	0	0	42
14 2 98	1	3	11	0	7	8	16	0	0	46
2 3 98	0	24	3	2	0	10	12	0	0	51
9 3 98	0	6	7	2	10	5	3	0	0	33
20 3 98	2	0	5	0	0	4	16	0	0	27
11 4 98	0	0	0	0	0	4	0	0	0	4
25 4 98	0	2	0	0	0	0	14	0	0	16
11 5 98	0	0	1	1	0	0	6	0	0	8
29 5 98	0	0	0	0	0	0	1	0	0	1
11 6 98	0	0	0	0	0	0	0	2	0	2
29 6 98	0	2	4	0	2	0	0	0	0	8

Bar-tailed Godwits were seen throughout the year and in most parts of the estuary, (with the exception of Machar and Logie), but they were rarely seen at Tarty. Few were recorded between March and August. The peak count of 59 on 2 December was lower than the highest count of 72 in the previous year.

CURLEW *Numenius arquata*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
14 7 97	0	92	7	1	77	277	10	0	1	465
26 7 97	2	83	0	1	1300	95	75	0	5	1561
11 8 97	1	80	4	44	404	54	35	0	1	623
21 8 97	2	103	4	0	413	72	15	15	4	628
14 9 97	1	87	1	5	1	65	7	0	4	171
23 9 97	6	194	7	0	140	70	0	3	2	422
17 10 97	80	155	0	0	195	169	0	0	1	600
25 10 97	6	92	6	3	8	18	0	2	0	135
14 11 97	89	82	1	6	3	77	0	2	1	261
2 12 97	4	143	0	8	70	1	22	0	0	248
8 12 97	2	44	2	16	17	1	70	0	0	152
21 12 97	1	50	6	9	140	6	9	0	0	221
15 1 98	375	471	2	2	258	74	20	4	2	1208
30 1 98	249	106	14	5	14	0	12	0	0	400
14 2 98	485	7	21	172	958	42	88	45	2	1820
2 3 98	2	26	8	2	7	8	11	0	0	64
8 3 98	0	65	9	4	104	30	6	0	0	218
20 3 98	2	34	11	0	250	14	10	3	0	324
11 4 98	0	14	0	0	62	584	0	0	1	661
25 4 98	0	0	1	0	22	0	0	0	2	25
11 5 98	0	3	1	0	0	0	5	0	0	9
29 5 98	0	0	0	0	1	0	7	0	0	8
11 6 98	0	11	0	3	0	0	2	0	0	16
29 6 98	0	0	20	0	427	4	10	6	0	467

Curlew were seen in all months in all parts of the estuary, although few were found at Logie. The highest count of 1793 on 14 February was very much higher than the peak of 785 in the previous year, which itself was higher than the peak count of 241 recorded in 1995/96.

REDSHANK *Tringa totanus*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
14 7 97	0	3	27	0	447	107	80	0	0	664
26 7 97	0	16	131	0	66	105	67	0	4	389
11 8 97	2	33	98	0	56	180	172	140	0	681
21 8 97	1	133	35	17	71	118	110	40	1	526
14 9 97	8	132	9	4	278	45	64	57	4	601
23 9 97	2	25	20	1	310	97	100	30	4	589
17 10 97	11	80	0	8	390	61	106	0	5	661
25 10 97	17	88	6	84	103	64	89	82	4	537
14 11 97	6	49	2	23	27	62	60	52	1	282
2 12 97	10	23	0	73	70	40	112	0	0	328
8 12 97	2	55	6	162	147	26	260	0	0	658
21 12 97	6	37	6	31	127	27	40	15	3	292
15 1 98	0	11	0	38	18	60	64	12	2	205
30 1 98	5	29	14	45	142	35	44	35	0	349
14 2 98	4	56	2	19	182	29	90	0	4	386
2 3 98	2	90	23	79	329	110	55	3	0	691
8 3 98	2	74	7	35	226	46	54	10	2	456
20 3 98	2	95	32	41	176	142	320	130	2	940
11 4 98	1	91	8	9	293	141	55	28	1	627
25 4 98	0	34	13	25	95	79	101	78	5	430
11 5 98	5	0	0	1	0	0	0	6	2	14
29 5 98	0	0	0	0	0	0	0	1	2	3
11 6 98	0	0	0	1	0	0	1	8	0	10
29 6 98	0	0	1	0	0	0	8	70	10	89

Redshanks were recorded in all months, in all parts of the estuary (although in low numbers at Logie), with high totals in autumn and spring and low numbers in May and June. The peak count of 940 on 20 March was much lower than the highest count of 1,562 in 1996/97, but was still higher than the peak of 456 in 1995/96.

TURNSTONE *Arenaria interpres*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
26 7 97	0	9	0	0	0	0	0	0	0	9
11 8 97	1	5	5	0	0	0	0	0	0	11
21 8 97	0	4	0	0	0	0	0	0	0	4
14 9 97	0	2	0	0	0	0	0	0	0	2
23 9 97	3	2	1	0	0	0	0	0	0	6
17 10 97	5	0	2	0	0	0	0	0	0	7
25 10 97	18	0	1	0	0	0	0	0	0	19
14 11 97	10	5	0	0	0	0	0	0	0	15
2 12 97	0	1	2	0	2	0	0	0	0	5
8 12 97	1	2	0	0	0	0	0	0	0	3
21 12 97	5	3	0	0	0	0	0	0	0	8
15 1 98	0	2	1	0	0	0	0	0	0	3
30 1 98	2	0	2	0	0	0	0	0	0	4
14 2 98	1	10	0	0	0	0	0	0	0	11
2 3 98	1	1	1	0	0	0	0	0	0	3
8 3 98	5	9	4	0	0	0	0	0	0	18
20 3 98	0	3	1	0	0	0	0	0	0	4
11 4 98	0	0	10	0	0	0	0	0	0	10
25 4 98	0	2	3	0	0	0	0	0	0	5
29 5 98	0	2	1	0	2	1	2	0	0	8

Turnstones were seen in all months except June and occurred in all parts of the estuary except for Tarty, Machar and Logie. The highest count of 19 on 25 October was slightly lower than the peak of 23 in the previous year.

b) Total number of birds on the estuary

The total number of birds of all species was calculated for each count date and the mean taken for each month. Since Eiders were so numerous, they were considered separately.

Mouth	Eiders	Other species	Total
1997			
July	1304	4408	5712
August	516	3513	4029
September	1072	4907	5979
October	1142	4104	5246
November	1191	3083	4274
December	886	3883	4769
1998			
January	1275	5504	6779
February	1177	3588	4765
March	1377	1862	3239
April	1764	1367	3131
May	3448	323	3771
June	2189	596	2785

The total number of birds of all species on the estuary fluctuated around 5,000 - 6,000 over the late summer, autumn and winter, with the highest numbers in autumn and in January, resulting mainly from large changes in the numbers of species other than Eiders (Figure 2). Numbers of these species decreased markedly in spring. In contrast, Eiders were by far the commonest species in May and June.

c) Comparison between 1996/97 and 1997/98

(i) Total number of birds

The monthly mean totals of birds of all species (including Eiders) were higher in 1997/98 than in 1996/97 in all months except August and October (see section b), above). The peak count of 6,779 in January 1998 was, however, only slightly higher than the previous year's peak, of 6,559 (in August).

Although there were slightly more Eiders in 1997/98 than in the previous year, with a mean count of 3,448 in May 1998 compared to only 3,287 in May 1997, the numbers of birds of other species was similar in the two years. The peak monthly mean total of these species, 5,504 in January 1998, was slightly lower than the

peak count in the previous year (5,616 in October 1996). However, as was emphasised in previous reports, such peak monthly values may be affected by year-to-year differences in the timing and extent of migratory movements and so may not be meaningful in making comparisons between years.

A less variable measure, the mean monthly total of species other than Eiders over the whole autumn and winter (August to February) showed an increase, from 3,368 in 1996/97 to 4,083 in 1997/98, although this was much less than the large increase from 1995/96 to 1996/97.

(ii) Individual species

For each of the commonly-recorded species, the mean of the three highest counts in 1997/98 was compared with the same measure for the previous year (Patterson and Cosgrove 1997).

Species	1996/97	1997/98	Change
Heron	29	22	-
Mute Swan	56	47	-
Shelduck	105	107	+
Eider	3576	3821	+
Wigeon	591	310	-
Teal	39	40	+
Mallard	25	31	+
Goldeneye	25	47	+
Red-breasted Merganser	27	28	+
Oystercatcher	414	452	+
Ringed Plover	71	71	=
Golden Plover	2332	1760	-
Lapwing	1711	2909	+
Knot	81	300	+
Dunlin	1172	500	-
Bar-tailed Godwit	55	52	-
Curlew	659	1521	+
Redshank	1460	771	-
Turnstone	18	17	-

Of the eight wildfowl species, only two (Mute Swan and Wigeon) decreased their peak numbers between 1996/97 and 1997/98, while six species increased. In

contrast, five of the 10 wader species decreased in peak numbers, while four increased and one stayed the same. These data suggest that in general wildfowl numbers increased while wader numbers remained broadly similar. This confirms the findings of the previous section, although it should be noted that some of the changes were large (eg Wigeon, Knot, Golden Plover and Lapwing), while others were very small (eg Teal, Bar-tailed Godwit and Turnstone). The data are also subject to the difficulty that some species occurred in unusually large numbers in only a few counts out of the whole year.

d) Species which occur less commonly on the Ythan, seen during the surveys

The various species recorded during the year are tabulated below. Comments are added where appropriate.

RED-THROATED DIVER *Gavia stellata*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
25 10 97	0	0	1	0	0	0	0	0	0	1

SLAVONIAN GREBE *Podiceps auritis*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
15 1 98	0	0	1	0	0	0	0	0	0	1

LITTLE GREBE *Tachybaptus ruficollis*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
14 11 97	0	0	0	0	0	0	0	0	5	5
14 2 98	0		0	0	0	0	0	0	1	1

A wintering pair remained at Logic till the spring, for the second consecutive year.

LITTLE EGRET *Egretta garzetta*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
11 5 98	0	0	0	0	0	0	1	0	0	1

A vagrant, now recorded on the Ythan for three consecutive years. There are usually only one or two Scottish records each year.

WHOOOPER SWAN *Cygnus cygnus*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
2 12 97	0	0	0	0	0	0	2	0	0	2
25 4 98	0	0	0	0	0	0	1	0	0	1

A decrease in the number of records from 1996/97, (when one bird, probably with an injured wing, remained all year and was occasionally joined by a second).

PINK-FOOTED GOOSE *Anser brachyrhynchus*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
26 7 97	0	0	0	0	0	0	2	0	0	2
11 8 97	0	0	0	0	0	0	0	12	0	12
17 10 97	0	33	0	0	0	0	0	0	0	33
25 4 98	0	0	0	0	112	0	0	0	0	112

GREYLAG GOOSE *Anser anser*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
26 7 97	0	0	0	0	5	0	0	0	0	5
11 8 97	0	0	0	0	0	0	0	23	0	23
15 1 98	0	0	0	0	0	1	0	0	0	1
30 1 98	0	1	0	0	0	0	0	0	0	1
29 6 98	0	0	0	0	0	0	1	0	0	1

CANADA GOOSE *Branta canadensis*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
29 6 98	0	0	0	0	0	1	0	0	0	1

Probably the flock normally seen around the Meikle Loch.

BARNACLE GOOSE *Branta leucopsis*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
2 12 97	2	0	0	0	0	0	0	0	0	2

Probably birds stopping on migration between Svalbard and the Solway

GADWALL *Anas strepera*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
14 9 97	0	0	0	0	0	2	0	0	0	2
25 4 98	0	0	0	0	0	0	1	0	0	1

TUFTED DUCK *Aythya fuligula*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
25 10 97	0	0	4	0	0	0	0	0	0	4
2 12 97	3	0	0	0	0	0	0	0	0	3
15 1 98	1	0	0	0	0	0	0	0	0	1
30 1 98	2	0	0	0	0	0	0	0	0	2
14 2 98	1	0	0	0	0	0	0	0	0	1
25 4 98	0	0	0	0	0	0	3	0	0	3

SCAUP *Aythya marila*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
14 7 97	4	0	1	0	0	0	0	0	0	5
17 10 97	0	2	0	0	0	0	0	0	0	2
25 10 97	0	0	2	0	0	0	0	0	0	2
2 12 97	1	0	0	0	0	0	0	0	0	1
21 12 97	4	0	0	0	0	0	0	0	0	4
15 1 98	3	0	0	0	0	0	0	0	0	3
30 1 98	6	0	0	0	0	0	0	0	0	6
14 2 98	5	0	0	0	0	0	0	0	0	5
2 3 98	0	0	0	0	6	0	0	0	0	6
11 4 98	0	1	0	0	0	0	0	0	0	1
11 5 98	0	0	0	0	2	0	0	0	0	2

Although regularly seen in the Ythan in winter, the spring records, which included a pair displaying, were exceptional. The male was seen later on Cotehill Loch for at least two days, leading to speculation about attempted breeding on or around the reserve.

KING EIDER

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
20 3 98	0	1	0	0	0	0	0	0	0	1
25 4 98	0	1	0	0	0	0	0	0	0	1

The bird arrived on the estuary with a group of Eiders on 20 March and remained for the whole spring, departing for the moulting area at Murcar/Blackdog in late spring.

GOOSANDER *Mergus merganser*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
29 5 98	0	0	0	0	13	0	0	0	0	13

A similar small party (5) were seen in spring 1997.

GREY PLOVER *Pluvialis squatarola*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
21 8 97	0	2	0	0	0	0	0	0	0	2
17 10 97	1	0	0	0	0	0	0	0	0	1
21 12 97	1	0	0	0	0	0	0	0	0	1
14 2 98	1	0	0	0	0	0	0	0	0	1
8 3 98	1	0	0	0	0	0	0	0	0	1

Considerably lower numbers than the previous year.

SANDERLING *Calidris alba*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
21 8 97	2	0	0	0	0	0	0	0	0	2
14 2 98	1	0	0	0	0	0	0	0	0	1

LITTLE STINT

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
26 7 97	0	0	0	0	0	1	0	0	0	1
14 9 97	0	0	0	0	2	0	0	0	0	2
23 9 97	0	0	0	0	2	0	0	0	0	2
29 5 98	0	0	0	0	0	0	1	0	0	1

Typical numbers and dates of this irregular passage migrant.

CURLEW SANDPIPER *Calidris ferruginea*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
11 8 97	1	0	0	0	0	0	0	0	0	1
14 9 97	0	0	0	0	0	2	0	0	0	2
23 9 97	0	0	0	0	0	2	0	0	0	2

Typical numbers and dates of this passage migrant in the area.

RUFF *Philomachus pugnax*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
11 8 97	0	0	0	0	0	0	0	4	0	4
21 8 97	0	0	0	2	0	0	0	0	0	2
14 9 97	0	0	0	20	0	1	0	0	0	21
23 9 97	0	0	0	0	11	2	0	0	0	13
14 11 97	3	0	0	0	0	0	0	0	0	3

Unusually high numbers of this passage migrant.

SNIPE *Gallinago gallinago*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
23 9 97	0	0	0	0	0	0	0	0	1	1
17 10 97	0	2	0	0	0	0	0	0	0	2
25 10 97	0	5	0	0	0	0	0	0	0	5
30 1 98	0	1	0	0	0	0	0	0	0	1
11 6 98	0	0	0	0	0	0	0	1	0	1

BLACK-TAILED GODWIT *Limosa limosa*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
14 7 97	0	1	0	0	0	1	0	0	0	2
26 7 97	0	0	2	0	0	0	0	0	0	2
11 8 97	0	0	0	0	1	0	0	0	0	1
21 8 97	0	0	0	7	0	0	0	0	0	7
14 9 97	0	0	0	0	20	0	0	0	0	20
23 9 97	0	0	0	0	4	0	0	0	0	4
11 4 98	0	1	0	0	0	4	1	0	0	6
29 6 98	0	0	1	0	0	0	0	0	0	1

Unusually high autumn numbers of a species which is generally scarce in the area.

WHIMBREL *Numenius phaeopus*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
14 7 97	0	0	1	0	2	0	0	0	0	3
26 7 97	0	1	0	0	0	0	4	0	0	5
11 8 97	0	0	0	2	0	0	0	0	0	2
21 8 97	0	0	0	0	1	0	0	0	0	1
25 4 98	0	0	0	0	3	0	0	0	0	3
29 6 98	0	0	0	0	2	0	0	0	0	2

More typical numbers, after the exceptionally high counts made in 1996/97.

SPOTTED REDSHANK *Tringa erythropus*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
14 9 97	0	0	0	0	0	2	0	0	0	2
23 9 97	0	0	0	0	0	1	0	0	0	1

GREENSHANK *Tringa nebularia*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
14 7 97	0	0	0	0	3	0	0	0	0	3
26 7 97	0	0	0	1	0	1	0	0	0	2
11 8 97	0	0	0	2	4	1	3	1	1	12
21 8 97	0	1	0	1	2	3	0	2	0	9
14 9 97	0	1	0	2	1	3	0	0	2	9
23 9 97	0	0	0	0	1	5	0	0	0	6
17 10 97	0	0	0	3	0	1	0	0	0	4
25 10 97	1	0	0	0	1	0	0	0	0	2
25 4 98	0	1	0	0	0	0	1	0	0	2
29 6 98	0	0	0	0	3	0	1	0	0	4

The usual numbers seen on the regular autumn passage.

GREEN SANDPIPER

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
17 10 97	0	0	0	0	0	0	0	0	1	1

COMMON SANDPIPER *Arctitis hypoleucos*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
29 6 98	0	0	0	0	2	0	0	0	0	2

DISCUSSION

As in previous years, the large month-to-month fluctuations in the numbers of some of the most abundant species on the estuary makes it difficult to compare overall bird numbers between 1996/97 and 1997/98, especially since many of the fluctuations may have been the result of large-scale movements, eg cold-weather effects or post-breeding dispersal, not related to conditions on the Ythan itself. Year-to-year comparisons must therefore be interpreted cautiously.

However, given the above caveats, it seems reasonable to conclude that there was some increase in wildfowl, including Eiders, between 1996/97 and 1997/98, while overall wader numbers remained largely unchanged. This, insofar as it reflects conditions within the estuary, may suggest that the considerably decreased coverage of *Enteromorpha* in the summer of 1996 (only 32% of the mean for 1992 - 1995) had a lasting beneficial effect on invertebrate populations, helped by a continuing lower weed coverage in summer 1997 (71% of the 1992 - 1995 mean; Raffaelli *et al.* 1998).

In the previous report (Patterson and Cosgrove 1997) it was suggested that the median count for each species, during the main period it was on the estuary, would be a more reliable measure of year-to-year changes in abundance than the mean of the three peak counts. In practice, fluctuating numbers made it difficult to define a main period of occurrence for many of the species and it was found to be more practical to use the median of the counts (including zero counts) in the period from 1 September to 31 March, the main counting period of the WEBS counts. The only exceptions to this were the two main breeding duck species, Eider and Shelduck,

which have a brief peak in numbers in spring; in these species, the peak counts, presented earlier, seem to offer the best estimate of the resident population.

The median counts of wildfowl (Appendix 2) indicate a rather different comparison between 1996/97 and 1997/98, compared to that based on peak values, with decreases in all of the species apart from Goldeneye (although the increases in Eider and Shelduck should also be considered). Three species (Mute Swan, Wigeon and Goldeneye) showed the same trend in both measures, while the remaining three showed decreases in their median counts but increases in their peak ones. Among the waders, however, the overall comparison was fairly similar, with six species increasing in median counts while four decreased. The individual wader species showed the same year-to-year trends in both peak and median values, apart from Redshank, which had a decrease in peak numbers but an increase in the median. The total of the median counts of the individual species showed a decrease for wildfowl from 424 in 1996/97 to 246 in 1997/98, while the total for waders increased from 1,855 to 3,052 (Appendix 2).

The comparison of the two analyses confirms that there was little overall change in wader abundance between 1996/97 and 1997/98, but suggests that wildfowl had more complex changes, with several species increasing their peak numbers, while median counts decreased. It would seem to be useful to use both measures to assess year-to-year changes in bird numbers on the estuary.

RECOMMENDATIONS

The same methods used in all of the surveys so far (Appendix 1) should be continued in 1998/99, so as to maintain comparability of the counts. Median counts over the winter (1 September to 31 March) should be used, in addition to peak values, to assess differences between years.

It is strongly recommended that annual aerial photography of weed cover, omitted in 1998, be reinstated, to allow analysis of year-to-year changes in wader and wildfowl populations in relation to the amount of weed in the preceding summer.

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APPENDIX 1. Survey methods

Eiders were counted at high tide, when they were roosting on the shore or in sheltered bays, so that errors due to movement and diving would be minimised. All of the other species were counted at low tide, when they were feeding and so were dispersed over the intertidal area; roost counts at high tide were not practicable because roost sites were dispersed (some of them not known) and because some waders were known to feed in fields at high tide in mid-winter.

All surveys started at the estuary mouth and proceeded upstream, so as to minimise the risk of the count being curtailed by the incoming tide. Counts were made from standard observation points (Figure 1) and the counts were subdivided into eight areas of the estuary (Figure 1), so that the distribution of each species could be described. The observer moved quickly by car from one observation point to the next, so as to minimise errors due to birds moving between sections during the survey. Any such movements seen while driving were noted and allowed for in the counts.

The count data were recorded on a pro-forma recording sheet and later stored on computer in a dBase database. At the end of the survey year (after 30 June) the data were checked, sorted and analysed, using dBase functions and specially-written dBase programs.

APPENDIX 2. Medians of the 14 counts (including zero values) between 1 September 1997 and 31 March 1998, for the common species (apart from Eider and Shelduck).

Species	1996/97	1997/98	Change
Heron	7	6	-
Mute Swan	17	10	-
Wigeon	365	191	-
Teal	5	3	-
Mallard	6	5	-
Goldeneye	15	23	+
Merganser	16	14	-
Wildfowl total	424	246	-
Oystercatcher	214	300	+
Ringed Plover	2	1	-
Golden Plover	77	666	+
Lapwing	701	913	+
Knot	27	187	+
Dunlin	226	201	-
Bar-tailed Godwit	29	27	-
Curlew	204	254	+
Redshank	366	497	+
Turnstone	9	6	-
Wader total	1,855	3,052	+
Overall total	2,279	3,298	+

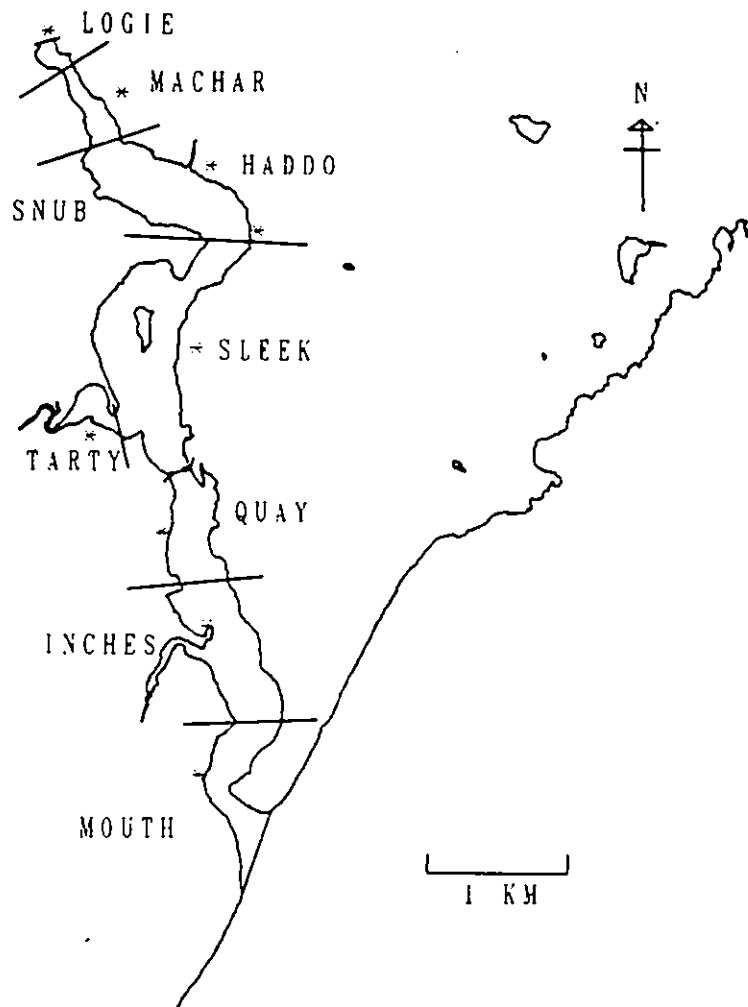


Figure 1. The Ythan estuary, showing the counting sections and count points (asterisks). The division between the Snub and Haddo areas is the centre of the low-tide river channel.

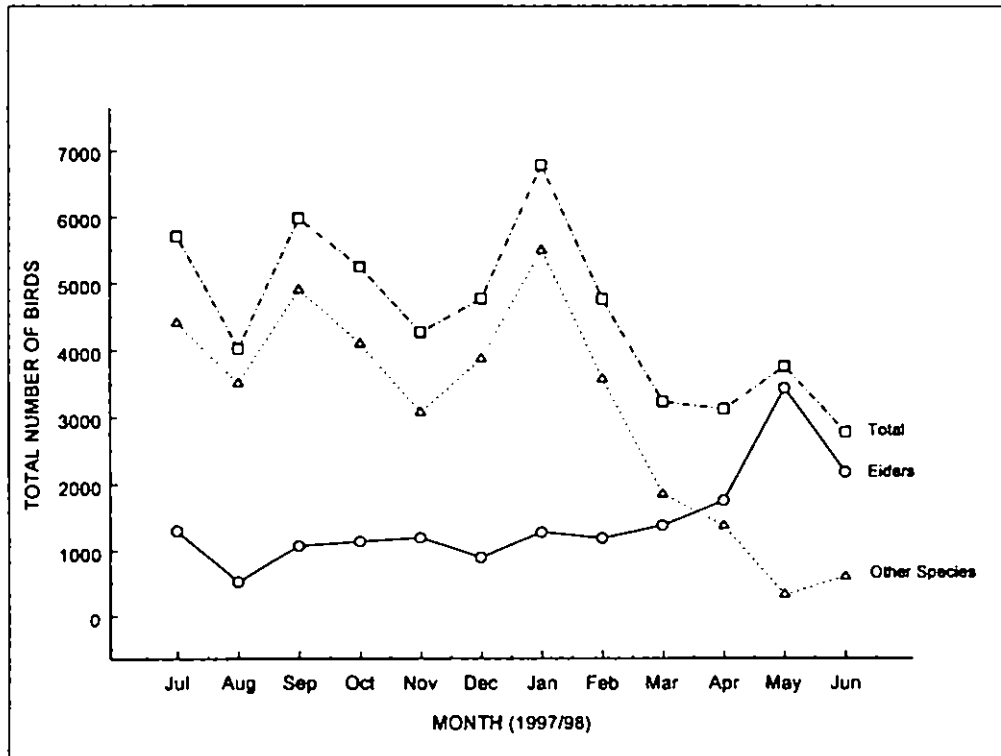


Figure 2. The mean number of Eiders (circles), birds of other species (squares) and the total of all species (triangles) on the Yhtan estuary in 1997/98.

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