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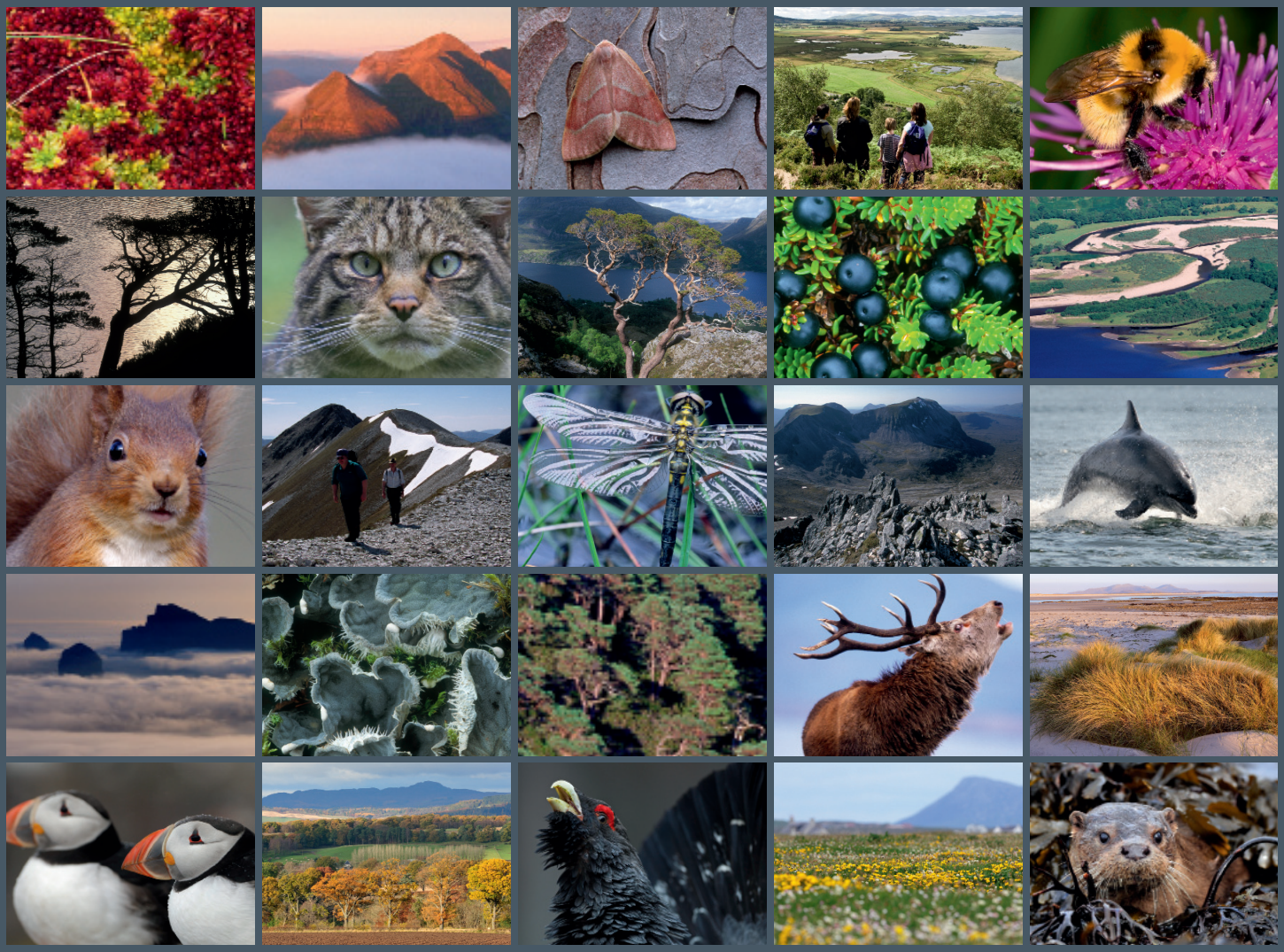
Waders and wildfowl on the Ythan Estuary 2004/2005



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ARCHIVE REPORT

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Waders and wildfowl on the Ythan Estuary 2004/2005

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ARCHIVE REPORT

Summary

Waders and wildfowl on the Ythan Estuary 2004/2005

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Background

Counts of waders and wildfowl on the Ythan estuary were made from 9 July 2004 to 25 June 2005, using similar methods to those used in the past, to enable the data to be comparable; a systematic survey from the estuary mouth to Logie Buchan bridge (Appendix 1). Fortnightly counts and the distribution of birds over the estuary are shown in detail for each species.

Main findings

- The highest monthly mean count of Eiders in spring increased slightly from 3,134 in 2004 to 3,254 in 2005, while the peak monthly mean total of other species also increased, from 9,343 (October 2003) to 9,492 (November 2004).
- The overall mean total of birds other than Eiders over the whole autumn and winter (August to February) decreased from 5,741 in 2003/04 to 5,051 in 2004/05.
- There was a decrease in the numbers of most individual wildfowl species between 2003/04 and 2004/05, shown by both peak counts and winter median numbers. The wader species showed mainly decreases in their peak counts but mainly increases in their winter median counts, as was found in the comparison of 2002/03 and 2003/04.
- A number of species less commonly seen on the Ythan were again recorded systematically in 2004/05; their occurrence and numbers are tabulated.

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1. INTRODUCTION

The wader and wildfowl counts in this report can be compared with data collected since 1989/90, and had 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 9 July 2004 to 25 June 2005, using the same methods as in previous years (Appendix 1). Since the field surveys in 2004/05 were again carried out by a specialist ornithologist, it was possible to include counts of species which occur less commonly on the Ythan.

2. RESULTS

2.1 Individual species which occur commonly on the Ythan

As in the previous report to the Ythan Project, 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 Figure 1, and the total on the whole estuary, on each count date. Information which is not obvious from the data tables is appended 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 2.4.

CORMORANT *Phalacrocorax carbo*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
9 7 2004	0	0	0	0	0	0	6	0	1	7
9 8 2004	0	0	0	0	32	34	3	0	0	69
26 8 2004	1	0	1	0	36	13	6	2	3	62
10 9 2004	2	22	1	0	24	15	15	0	4	83
22 9 2004	17	10	3	0	13	0	15	0	2	60
8 10 2004	0	0	8	0	10	0	1	0	0	19
18 10 2004	1	1	5	0	2	6	0	0	0	15
2 11 2004	1	1	6	0	6	1	0	5	1	21
17 11 2004	1	3	7	0	3	0	2	1	0	17
1 12 2004	2	2	0	0	4	0	1	0	0	9
15 12 2004	4	5	1	0	0	0	0	0	0	10
13 1 2005	0	4	2	0	3	0	0	0	0	9
27 1 2005	1	1	0	0	1	0	0	0	0	3
11 2 2005	1	1	0	0	2	2	0	1	0	7
22 2 2005	0	1	0	0	3	0	0	1	0	5
3 3 2005	0	1	0	0	0	0	0	0	0	1
26 3 2005	1	0	2	0	1	0	1	1	0	6
7 4 2005	0	2	4	0	2	0	0	1	0	9
19 4 2005	0	1	2	0	6	0	1	2	1	13
5 5 2005	3	1	0	0	2	0	0	0	0	6
18 5 2005	0	0	1	0	3	0	0	0	0	4
14 6 2005	5	6	0	0	4	3	0	0	0	18
25 6 2005	0	1	0	0	1	0	0	0	0	2

Peak; 83: (2003/04 peak; 47)

HERON *Ardea cinerea*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
9 7 2004	1	4	2	0	13	2	0	0	1	23
9 8 2004	0	0	5	4	7	0	2	0	0	18
26 8 2004		2	3	2	4	2	0	0	1	14
10 9 2004	4	4	2	1	11	2	3	0	0	27
22 9 2004	0	4	0	0	4	0	1	1	0	10
8 10 2004	0	3	2	0	0	0	4	0	2	11
18 10 2004	1	7	0	1	3	0	1	0	0	13
2 11 2004	3	2	3	2	5	0	0	0	0	15
17 11 2004	3	3	0	0	2	0	0	0	0	8
1 12 2004	4	5	2	0	6	0	0	0	0	17
15 12 2004	3	4	2	0	2	1	0	0	0	12
13 1 2005	0	3	1	0	5	0	0	0	0	9
27 1 2005	0	2	1	0	0	0	0	0	0	3
11 2 2005	1	4	1	0	4	0	0	0	1	11
22 2 2005	1	4	0	0	5	0	0	0	0	10
3 3 2005	0	1	0	0	0	0	0	0	0	1
26 3 2005	0	1	1	0	1	0	0	0	1	4
7 4 2005	1	0	1	0	2	0	0	0	0	4
19 4 2005	0	1	0	0	1	0	0	0	0	2
5 5 2005	0	2	1	1	7	0	2	0	0	13
18 5 2005	0	1	2	0	0	0	0	0	0	3
14 6 2005	1	7	3	0	5	0	0	0	1	17
25 6 2005	4	7	7	4	4	2	0	1	0	29

Peak; 29: (2003/04 peak; 66)

MUTE SWAN *Cygnus olor*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
9 7 2004	0	0	0	0	5	0	2	0	0	7
21 7 2004	0	0	0	0	8	0	1	0	0	9
9 8 2004	0	0	0	0	0	4	5	0	0	9
26 8 2004	0	0	0	0	0	7	3	0	0	10
10 9 2004	0	0	3	0	6	0	0	0	0	9
22 9 2004	0	0	0	0	7	0	0	0	0	7
8 10 2004	0	3	5	0	9	0	0	0	4	21
18 10 2004	0	5	0	0	2	9	0	0	0	16
2 11 2004	0	0	0	0	11	3	1	0	0	15
17 11 2004	0	0	0	0	4	11	0	0	0	15
1 12 2004	0	0	2	0	10	9	0	0	0	21
15 12 2004	0	0	0	0	6	3	0	0	0	9
13 1 2005	0	1	4	1	5	8	0	0	0	19
27 1 2005	0	2	0	0	3	5	8	0	0	18
11 2 2005	0	2	0	0	1	0	0	0	0	3
22 2 2005	0	0	0	0	5	0	0	0	0	5
26 3 2005	0	0	0	0	1	0	0	0	2	3
7 4 2005	0	0	0	0	0	0	0	0	2	2
19 4 2005	0	1	1	0	3	0	0	1	0	6
5 5 2005	0	4	0	0	11	0	0	0	1	16
18 5 2005	0	3	2	0	14	7	2	0	0	28
14 6 2005	0	0	2	0	21	1	9	0	2	35
25 6 2005	0	0	0	0	7	4	0	0	0	11

Peak; 35: (2003/04 peak; 81)

SHELDUCK *Tadorna tadorna*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
9 7 2004	0	0	2	4	76	23	2	0	1	108
9 8 2004	0	0	0	0	41	0	7	0	0	48
21 7 2004	0	0	0	0	30	0	2	2	0	34
26 8 2004	0	1	0	0	21	0	0	0	0	22
10 9 2004	0	1	0	1	9	4	0	0	0	15
22 9 2004	0	0	0	0	3	2	1	2	0	8
8 10 2004	0	0	0	0	2	3	0	0	0	5
18 10 2004	0	0	0	0	0	2	0	0	0	2
2 11 2004	0	0	0	0	5	7	0	0	0	12
17 11 2004	0	0	0	0	0	12	0	0	0	12
1 12 2004	0	5	0	0	0	17	0	0	0	22
15 12 2004	0	2	0	0	0	28	0	0	0	30
13 1 2005	1	4	1	60	1	0	0	0	0	67
27 1 2005	0	22	3	0	70	1	0	0	0	96
11 2 2005	0	20	1	0	38	22	0	2	2	85
22 2 2005	1	20	4	0	90	19	2	2	4	142
3 3 2005	0	15	8	5	77	10	16	0	0	131
26 3 2005	2	2	13	6	76	15	11	5	2	132
7 4 2005	2	9	7	4	26	2	2	23	2	77
19 4 2005	5	10	17	4	51	31	5	17	4	144
5 5 2005	1	8	15	5	44	31	5	23	2	134
18 5 2005	3	13	18	8	23	35	23	30	20	173
14 6 2005	1	12	9	22	47	43	14	2	2	152
25 6 2005	1	4	9	5	83	49	19	4	2	176

Peak; 176: (2003/04 peak; 192)

WIGEON *Anas penelope*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
9 7 2004	0	0	0	0	0	8	0	0	0	8
26 8 2004	0	0	0	0	0	42	0	0	0	42
10 9 2004	2	22	0	0	4	0	0	0	0	28
22 9 2004	5	0	0	0	24	0	0	2	0	31
8 10 2004	0	14	42	0	45	0	0	0	0	101
18 10 2004	19	6	132	0	301	0	0	0	0	458
2 11 2004	80	130	420	0	75	0	0	0	0	705
17 11 2004	47	101	247	0	237	0	0	0	0	632
1 12 2004	68	99	100	0	62	10	0	0	0	339
15 12 2004	26	76	130	0	50	0	0	0	0	282
13 1 2005	35	85	71	0	7	0	0	0	0	198
27 1 2005	50	72	71	0	0	0	0	0	0	193
11 2 2005	4	42	11	11	232	0	35	7	0	342
22 2 2005	55	105	28	0	101	12	0	0	0	301
3 3 2005	63	74	28	0	350	0	0	0	0	515
26 3 2005	12	27	26	0	175	0	35	0	0	275
7 4 2005	0	4	0	0	50	0	0	0	0	54
19 4 2005	0	4	0	0	61	0	0	0	0	65
25 6 2005	0	0	0	0	3	0	0	0	0	3

Peak; 705: (2003/04 peak; 946)

TEAL *Anas crecca*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
26 8 2004	0	3	0	0	0	0	7	3	1	14
10 9 2004	0	0	0	0	0	0	0	2	0	2
22 9 2004	0	2	0	0	0	0	0	0	0	2
8 10 2004	0	16	0	0	0	0	0	0	0	16
18 10 2004	0	0	2	0	4	0	0	0	0	6
11 2 2005	0	0	0	0	0	0	0	0	10	10
22 2 2005	0	0	0	0	0	0	0	0	23	23
26 3 2005	0	0	0	0	0	0	0	0	37	37
7 4 2005	0	0	0	0	0	0	0	0	22	22
19 4 2005	0	0	0	0	0	0	0	20	22	42

Peak; 42: (2001/2002 peak; 76)

MALLARD *Anas platyrhynchos*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
9 7 2004	0	2	0	0	0	8	4	4	0	18
9 8 2004	0	0	0	0	8	0	8	0	0	16
26 8 2004	0	2	0	0	25	5	38	0	0	70
10 9 2004	0	14	0	0	0	28	14	3	0	59
22 9 2004	0	7	0	0	0	0	0	0	0	7
8 10 2004	0	26	0	0	0	0	0	0	0	26
18 10 2004	1	0	0	0	0	0	0	0	0	1
2 11 2004	0	19	4	0	0	0	0	0	0	23
17 11 2004	0	10	0	0	0	0	0	0	0	10
1 12 2004	0	17	8	0	8	32	0	0	0	65
15 12 2004	0	13	2	0	0	0	0	0	0	15
13 1 2005	0	22	2	0	0	0	0	0	0	24
27 1 2005	0	21	0	0	0	0	0	0	0	21
11 2 2005	0	11	12	1	0	0	4	0	0	28
22 2 2005	0	11	4	0	0	0	0	0	0	15
3 3 2005	0	2	3	0	0	0	0	0	0	5
26 3 2005	0	2	2	0	7	0	0	2	0	13
7 4 2005	0	2	0	0	0	0	0	0	0	2
19 4 2005	0	7	5	0	2	0	2	0	0	16
5 5 2005	2	0	1	0	0	0	1	0	0	4
18 5 2005	0	8	2	0	5	0	0	0	0	15
14 6 2005	0	0	0	0	1	3	0	0	0	4
25 6 2005	0	0	0	0	0	0	2	0	0	2

Peak; 70: (2003/04 peak; 57)

EIDER *Somateria mollissima*

Date			Mo	In	Qu	Ta	Sl	Ha	Sn	Total
7	7	2004	1495	298	139	0	5	0	0	1937
21	7	2004	2031	1	66	0	0	0	0	2098
3	8	2004	775	9	0	0	0	0	0	784
25	8	2004	1535	0	0	0	0	0	0	1535
7	9	2004	262	2	0	0	0	0	0	264
23	9	2004	2332	97	363	0	3	0	0	2795
18	10	2004	66	63	1042	0	0	0	0	1171
26	10	2004	38	1	1263	0	0	0	0	1302
10	11	2004	17	28	956	0	0	0	0	1001
24	11	2004	32	1224	16	0	0	0	0	1272
7	12	2004	300	300	0	0	0	0	0	600
21	12	2004	82	24	902	0	0	0	0	1008
10	1	2005	0	0	1093	0	0	0	0	1093
21	1	2005	5	461	561	0	0	0	0	1027
8	2	2005	28	1096	0	0	0	0	0	1124
24	2	2005	18	3	1002	0	78	0	0	1101
7	3	2005	8	271	494	0	118	0	0	891
7	3	2005	1221	475	58	0	54	0	0	1808
11	4	2005	794	0	615	0	77	0	0	1486
22	4	2005	1825	752	434	0	84	0	0	3095
28	4	2005	2027	2450	352	0	43	0	0	4872
6	5	2005	1082	1638	243	0	29	0	0	2992
12	5	2005	1446	1417	225	0	30	0	0	3118
20	5	2005	1792	1181	146	0	23	0	0	3142
28	5	2005	2571	924	233	0	36	0	0	3764
7	6	2005	2244	430	76	0	29	0	0	2779
15	6	2005	2559	258	29	0	23	0	0	2869

Peak; 3,926: (2003/04 peak; 3,470)

No Eiders were seen at Machar and Logie

The total number of ducklings reared in 2005 was 96, including 25 on the sea coast between Collieston and the mouth of the estuary.

GOLDENEYE *Bucephala clangula*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
10 9 2004	0	0	0	0	0	0	0	0	3	3
22 9 2004	0	0	0	0	1	0	0	0	6	7
8 10 2004	1	0	0	0	4	0	0	0	0	5
2 11 2004	0	0	0	0	27	0	0	0	0	27
17 11 2004	1	6	1	0	15	0	0	0	10	33
1 12 2004	8	7	3	0	10	0	6	1	5	40
15 12 2004	31	7	0	0	1	0	0	0	1	40
13 1 2005	14	0	7	0	2	0	1	2	0	26
27 1 2005	5	0	8	0	4	0	1	2	0	20
11 2 2005	3	0	4	0	6	0	0	1	2	16
22 2 2005	4	3	4	0	11	0	6	0	1	29
3 3 2005	4	4	6	0	0	1	1	0	0	16
26 3 2005	0	1	2	0	9	0	4	0	0	16
7 4 2005	0	2	0	0	15	10	1	0	0	28
19 4 2005	0	0	6	0	3	0	0	0	0	9
5 5 2005	0	0	2	0	2	0	0	0	0	4
14 6 2005	0	0	0	0	0	0	0	0	3	3
25 6 2005	0	0	0	0	0	0	0	0	3	3

Peak; 40: (2003/04 peak; 62)

RED-BREASTED MERGANSER *Mergus serrator*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
9 7 2004	0	0	0	0	0	0	1	0	0	1
26 8 2004	0	0	0	0	0	0	3	0	0	3
22 9 2004	5	4	2	0	4	0	0	0	0	15
8 10 2004	7	1	8	0	1	0	0	0	0	17
18 10 2004	5	7	5	0	2	0	1	0	0	20
2 11 2004	5	4	6	0	14	1	0	0	0	30
17 11 2004	5	9	1	0	3	0	2	0	0	20
1 12 2004	5	11	3	0	3	0	0	0	0	22
15 12 2004	4	4	1	0	4	0	0	0	0	13
13 1 2005	1	5	2	0	3	0	0	0	0	11
27 1 2005	0	3	3	0	8	0	0	0	0	14
11 2 2005	2	3	0	0	1	0	0	0	0	6
22 2 2005	5	5	1	0	0	0	0	0	0	11
3 3 2005	3	4	4	0	1	0	0	0	0	12
26 3 2005	1	1	3	0	15	0	0	0	0	20
7 4 2005	2	2	0	1	4	0	0	0	0	9
19 4 2005	3	7	5	0	2	0	0	0	0	17
5 5 2005	1	0	1	0	0	0	0	0	0	2

Peak; 30: (2003/04 peak; 25)

OYSTERCATCHER *Haematopus ostralegus*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
9 7 2004	55	147	10	0	17	7	0	2	1	239
21 7 2004	67	210	16	1	45	6	0	0	0	345
9 8 2004	341	342	7	1	15	0	4	0	0	710
26 8 2004	274	435	19	0	15	3	0	0	0	746
10 9 2004	324	269	40	0	3	1	0	0	0	637
22 9 2004	304	264	41	0	6	0	0	0	0	615
8 10 2004	287	237	25	0	4	1	0	0	0	554
18 10 2004	237	168	25	1	12	6	0	0	0	449
2 11 2004	205	138	11	0	17	1	0	0	0	372
17 11 2004	201	135	29	1	1	0	1	0	0	368
1 12 2004	218	125	48	0	25	0	0	0	0	416
15 12 2004	152	123	31	0	27	0	0	1	0	334
13 1 2005	147	104	50	0	28	1	6	0	0	336
27 1 2005	110	102	57	0	4	1	6	0	0	280
11 2 2005	149	118	46	0	38	0	2	0	0	353
22 2 2005	228	130	53	0	72	6	0	2	0	491
3 3 2005	145	143	51	0	48	5	6	0	0	398
26 3 2005	62	63	26	17	48	9	7	0	2	234
7 4 2005	36	85	18	2	10	4	4	0	0	159
19 4 2005	63	102	0	2	37	9	3	0	0	216
5 5 2005	32	56	9	3	32	6	1	0	0	139
18 5 2005	12	78	7	3	15	1	0	0	0	116
14 6 2005	78	48	12	4	17	9	3	4	0	175
25 6 2005	11	81	22	8	10	5	8	0	1	146

Peak; 746: (2003/04 peak; 651)

RINGED PLOVER *Charadrius hiaticula*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
21 7 2004	1	0	1	0	0	0	0	0	0	2
9 8 2004	10	4	6	0	0	0	2	0	0	22
26 8 2004	10	16	0	0	0	0	0	0	0	26
10 9 2004	6	0	0	0	4	0	0	0	0	10
22 9 2004	0	13	0	0	0	1	0	0	0	14
8 10 2004	8	0	0	0	0	0	0	0	0	8
18 10 2004	0	0	0	0	0	19	0	0	0	19
2 11 2004	0	0	0	0	0	7	6	0	0	13
17 11 2004	0	0	0	0	0	15	0	0	0	15
1 12 2004	0	0	0	0	0	5	0	0	0	5
15 12 2004	0	0	0	0	0	6	0	0	0	6
11 2 2005	0	0	0	0	0	13	0	0	0	13
22 2 2005	0	0	0	0	0	10	0	0	0	10
3 3 2005	0	0	0	0	0	12	0	0	0	12
26 3 2005	0	0	0	0	0	3	0	0	0	3
7 4 2005	4	0	0	0	0	0	0	0	0	4
19 4 2005	0	19	0	0	0	0	0	0	0	19
18 5 2005	0	56	0	0	0	0	0	0	0	56
14 6 2005	7	0	0	0	0	0	0	0	0	7

Peak; 56: (2003/04 peak; 42)

GOLDEN PLOVER *Pluvialis apricaria*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
21 7 2004	0	610	0	0	400	0	0	0	0	1010
9 8 2004	0	520	60	0	90	0	0	0	0	670
26 8 2004	0	440	910	0	120	3	0	0	0	1473
10 9 2004	0	60	130	0	0	140	0	0	0	330
22 9 2004	0	0	2	0	0	2	0	0	0	4
8 10 2004	0	0	1000	2	3000	0	0	0	0	4002
18 10 2004	0	0	3000	0	0	0	0	0	0	3000
2 11 2004	0	415	0	0	4700	0	0	0	0	5115
17 11 2004	0	330	340	0	2000	0	0	0	0	2670
1 12 2004	0	0	0	0	0	60	0	0	0	60
15 12 2004	0	0	0	0	0	0	21	0	0	21
22 2 2005	0	0	0	0	160	0	0	0	0	160

Peak; 5,115: (2003/04 peak; 6,700)

LAPWING *Vanellus vanellus*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
9 7 2004	0	0	38	21	1800	140	110	14	4	2127
21 7 2004	0	3	26	70	880	48	680	2	21	1730
9 8 2004	0	140	330	560	1800	380	450	0	2	3662
26 8 2004	0	460	460	30	610	570	190	0	0	2320
10 9 2004	0	200	640	2	460	555	180	600	20	2657
22 9 2004	0	2	22	0	0	12	0	29	0	65
8 10 2004	0	0	470	40	900	300	0	0	24	1734
18 10 2004	0	270	360	45	760	320	100	0	0	1855
2 11 2004	0	310	800	0	750	70	300	0	0	2230
17 11 2004	0	500	170	0	1850	350	120	0	0	2990
1 12 2004	0	110	12	5	720	190	300	2	0	1339
15 12 2004	0	2	11	0	765	300	620	3	0	1701
13 1 2005	0	4	25	0	8	18	11	0	0	66
27 1 2005	0	23	16	0	288	18	11	0	0	356
11 2 2005	0	2	31	0	78	130	190	0	0	431
22 2 2005	0	0	31	0	15	390	0	60	0	496
26 3 2005	0	0	0	0	4	2	0	6	0	12
7 4 2005	0	0	0	0	6	0	7	0	0	13
19 4 2005	0	0	0	0	0	0	8	0	0	8
5 5 2005	0	0	0	0	3	1	0	2	0	6
18 5 2005	0	0	1	0	0	0	0	2	0	3
14 6 2005	0	0	0	0	0	0	45	1	2	48
25 6 2005	0	2	0	6	19	130	100	82	1	340

Peak; 3,662: (2003/04 peak; 3,160)

KNOT *Calidris canutus*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
21 7 2004	0	0	0	0	43	0	0	0	0	43
9 8 2004	44	0	0	0	0	52	0	0	0	96
26 8 2004	193	51	34	0	53	0	0	0	0	331
10 9 2004	55	9	0	0	1	0	0	0	0	65
22 9 2004	125	0	0	0	0	150	0	0	0	275
8 10 2004	10	73	0	0	0	0	0	0	0	83
18 10 2004	20	21	0	0	7	240	0	0	0	288
2 11 2004	0	78	0	0	230	0	0	0	0	308
17 11 2004	0	15	15	0	0	170	0	0	0	200
1 12 2004	0	12	0	0	0	235	0	0	0	247
15 12 2004	6	85	48	0	0	0	0	0	0	139
13 1 2005	0	21	5	0	0	370	0	0	0	396
27 1 2005	0	0	0	0	0	370	0	0	0	370
11 2 2005	0	8	0	0	140	117	0	0	0	265
22 2 2005	0	45	0	0	0	0	0	0	0	45
3 3 2005	0	0	0	0	220	0	0	0	0	220
26 3 2005	6	0	0	0	0	0	0	0	0	6

Peak; 396: (2003/04 peak; 420)

DUNLIN *Calidris alpina*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
21 7 2004	0	0	10	0	0	6	17	161	0	194
9 8 2004	2	20	0	0	1	44	70	197	11	345
26 8 2004	0	58	15	2	0	61	2	0	0	138
10 9 2004	0	6	1	0	0	90	87	0	2	186
22 9 2004	0	23	2	0	0	330	0	0	0	355
8 10 2004	0	1	8	0	0	0	390	0	0	399
18 10 2004	0	16	0	0	1	310	330	0	0	657
2 11 2004	0	2	0	0	0	0	470	0	0	472
17 11 2004	0	6	4	0	0	60	130	0	0	200
1 12 2004	0	0	0	0	1	200	190	0	0	391
15 12 2004	0	0	0	0	0	0	295	0	0	295
13 1 2005	0	73	10	0	0	530	30	0	0	643
27 1 2005	0	0	5	0	220	530	30	0	0	785
11 2 2005	0	0	0	0	0	40	170	45	0	255
22 2 2005	0	0	0	0	0	120	1	0	0	121
3 3 2005	0	0	0	0	0	190	280	0	0	470
26 3 2005	0	0	0	0	0	41	22	0	0	63
19 4 2005	0	1	0	0	0	0	0	0	0	1
18 5 2005	0	9	0	0	0	0	0	0	0	9
25 6 2005	0	0	0	0	0	0	0	12	0	12

Peak; 785: (2003/04 peak; 638)

BAR-TAILED GODWIT *Limosa lapponica*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
9 7 2004	0	4	0	0	0	1	0	0	0	5
21 7 2004	0	5	1	0	0	0	0	0	0	6
9 8 2004	0	4	0	0	1	1	0	0	0	6
26 8 2004	0	2	12	0	0	0	0	0	0	14
10 9 2004	0	3	0	0	1	0	0	0	0	4
22 9 2004	0	2	5	0	0	1	0	0	0	8
8 10 2004	0	4	7	0	0	0	0	0	0	11
18 10 2004	0	6	4	0	5	0	0	0	0	15
2 11 2004	1	0	2	0	2	0	0	0	0	5
17 11 2004	0	6	2	0	0	0	0	0	0	8
1 12 2004	0	2	13	0	2	0	0	0	0	17
15 12 2004	0	16	15	0	2	0	0	0	0	33
13 1 2005	0	9	20	0	3	0	0	0	0	32
27 1 2005	0	1	14	0	0	0	0	0	0	15
11 2 2005	0	2	4	0	22	0	0	0	0	28
22 2 2005	0	2	7	0	7	0	0	0	0	16
3 3 2005	0	11	11	0	12	0	0	0	0	34
26 3 2005	0	0	1	0	6	2	0	0	0	9
7 4 2005	0	0	0	0	6	0	0	0	0	6
19 4 2005	0	0	2	0	3	0	0	0	0	5
18 5 2005	0	0	0	0	0	0	9	0	0	9
14 6 2005	0	0	3	0	0	0	0	0	0	3
25 6 2005	0	0	0	0	0	3	0	0	0	3

Peak; 34: (2003/04 peak; 39)

CURLEW *Numenius arquata*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
9 7 2004	0	49	6	2	870	23	0	1	1	952
21 7 2004	0	117	10	0	520	18	63	12	1	741
9 8 2004	2	182	10	19	192	60	60	1	1	527
26 8 2004	5	124	30	5	0	47	15	0	1	227
10 9 2004	11	122	4	8	30	114	11	42	2	344
22 9 2004	7	116	25	16	40	334	43	2	0	583
8 10 2004	5	118	18	6	410	260	0	0	0	817
18 10 2004	6	101	18	2	132	350	35	2	1	647
2 11 2004	6	95	9	230	260	74	4	1	1	680
17 11 2004	11	40	4	4	4	255	2	0	1	321
1 12 2004	4	151	12	9	436	46	15	1	1	675
15 12 2004	5	82	8	150	32	48	12	2	0	339
13 1 2005	114	84	10	2	20	26	24	1	0	281
27 1 2005	1	48	9	0	616	26	24	1	0	725
11 2 2005	49	74	15	5	75	210	60	0	2	490
22 2 2005	3	118	21	1	655	100	6	0	0	904
3 3 2005	5	69	7	3	85	54	5	8	0	236
26 3 2005	0	42	10	22	417	28	9	0	0	528
7 4 2005	3	41	3	1	1	1	4	0	0	54
19 4 2005	0	45	5	1	270	23	4	0	0	348
5 5 2005	0	3	1	1	0	1	0	0	0	6
18 5 2005	0	54	1	0	8	4	28	0	0	95
14 6 2005	0	41	27	3	25	20	0	0	0	116
25 6 2005	0	34	49	1	350	60	40	0	0	534

Peak; 952: (2003/04 peak; 1,060)

REDSHANK *Tringa totanus*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
9 7 2004	0	2	9	0	85	151	13	5	3	268
21 7 2004	0	16	175	0	292	309	87	59	2	940
9 8 2004	12	221	61	12	307	236	268	42	10	1169
26 8 2004	22	346	57	26	207	352	325	14	6	1355
10 9 2004	21	151	22	18	216	352	579	43	10	1412
22 9 2004	10	151	44	20	110	323	201	15	1	875
8 10 2004	21	232	79	16	68	182	133	6	10	747
18 10 2004	31	113	25	27	147	379	243	4	1	970
2 11 2004	7	63	6	8	84	237	178	3	3	589
17 11 2004	12	93	47	4	309	163	41	56	1	726
1 12 2004	11	41	13	44	125	291	162	9	2	698
15 12 2004	13	93	28	27	114	339	71	2	3	690
13 1 2005	15	95	21	35	192	294	72	3	1	728
27 1 2005	7	33	33	2	74	294	72	3	1	519
11 2 2005	5	31	11	19	71	219	88	2	1	447
22 2 2005	3	71	6	1	102	233	196	4	1	617
3 3 2005	2	26	17	46	57	260	148	4	0	560
26 3 2005	2	36	53	21	56	366	218	9	2	763
7 4 2005	3	51	7	35	106	161	280	3	0	646
19 4 2005	1	35	40	11	241	197	111	3	3	642
5 5 2005	0	0	0	0	1	4	0	2	0	7
18 5 2005	0	0	0	0	0	0	0	0	2	2
14 6 2005	0	0	0	2	0	0	0	0	0	2
25 6 2005	0	0	0	0	1	0	0	6	0	7

Peak; 1,412: (2003/04 peak; 2,008)

TURNSTONE *Arenaria interpres*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
21 7 2004	0	1	0	0	0	0	0	0	0	1
9 8 2004	3	9	0	0	1	3	0	0	0	16
26 8 2004	0	8	3	0	2	0	0	0	0	13
10 9 2004	0	15	4	0	1	0	0	0	0	20
22 9 2004	7	12	0	0	2	0	0	0	0	21
8 10 2004	11	26	0	0	0	0	0	0	0	37
18 10 2004	13	11	4	0	0	4	0	0	0	32
2 11 2004	12	14	0	0	0	3	0	0	0	29
17 11 2004	4	13	8	0	0	0	0	0	0	25
1 12 2004	3	5	2	0	2	5	0	0	0	17
15 12 2004	4	12	2	0	8	0	0	0	0	26
13 1 2005	4	5	2	0	9	0	0	0	0	20
27 1 2005	11	5	0	0	0	0	0	0	0	16
11 2 2005	0	8	2	0	0	2	0	0	0	12
22 2 2005	0	21	0	0	3	0	0	0	0	24
3 3 2005	2	22	3	0	0	0	0	0	0	27
26 3 2005	3	17	1	0	0	0	0	0	0	21
7 4 2005	4	5	0	0	0	0	0	0	0	9
19 4 2005	2	1	0	0	0	0	0	0	0	3

Peak; 37: (2003/04 peak; 68)

2.2 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.

Month	Eiders	Other species	Total
2004			
July	2018	4418	6436
August	1160	7174	8334
September	1530	4438	5968
October	1237	8571	9808
November	1137	9492	10629
December	804	4426	5230
2005			
January	1060	3170	4230
February	1113	3133	4246
March	1350	2425	3775
April	3151	1382	4533
May	3254	443	3697
June	2824	947	3771

The total number of birds of all species on the estuary was highest in August, October and November (Figure 2), due mainly to large numbers of Golden Plovers and Lapwings. From January to June, total bird numbers remained fairly constant, with an increase in the number of Eiders being offset by a decrease in the total number of birds of other species.

2.3 Comparison between 2003/04 and 2004/05

2.3.1 Total number of birds

There was little overall change between 2003/04 and 2004/05 in the monthly mean numbers of birds of all species (including Eiders); numbers were higher in 2004/05 in six of the 12 months and lower in six. The peak of 10,629 birds in November 2004 was, however, lower than the peaks in 2003/04 (11,269) and 2002/03 (12,788), which were earlier in the autumn.

Eiders showed little change, with numbers higher in 2004/05 in seven of the 12 months. Species other than Eiders had higher mean numbers in 2004/05 in six months of the 12 months and lower numbers in six. 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 a decrease from 5,741 in 2003/04 to 5,051 in 2004/05.

2.3.2 Individual species

For each of the commonly-recorded species, the mean of the three highest counts in 2004/05 was compared with the same measure for the previous year (Patterson and Thorpe 2004).

Species	2003/04	2004/05	Change
Cormorant	40	71	+
Heron	40	26	-
Mute Swan	63	28	-
Shelduck	188	167	-
Wigeon	856	617	-
Teal	47	34	-
Mallard	49	65	+
Eider	3385	3926	+
Goldeneye	53	38	-
Red-breasted Merganser	23	24	+
Oystercatcher	590	698	+
Ringed Plover	35	35	=
Golden Plover	4599	4039	-
Lapwing	2745	2107	-
Knot	377	366	-
Dunlin	581	695	+
Bar-tailed Godwit	37	33	-
Curlew	922	891	-
Redshank	1784	1312	-
Turnstone	60	33	-

Of the eight wildfowl species, three showed increases and five showed decreases. Of the 10 wader species, two increased, seven decreased and one stayed the same. The data are of course subject to the difficulty that some species (eg Golden Plover and Lapwing) occurred in unusually large numbers in only a few counts out of the whole year, so that peak counts can be misleading. Peak counts were, however, appropriate for Eiders and Shelduck, which reached predictable seasonal peak numbers in the nesting season (usually in May).

An alternative measure, the median of the winter counts (1 September to 31 March) is not subject to this problem (Patterson and Cosgrove, 1998).

Species	Median 2003/04	2004/05	Change
Cormorant	15	10	-
Heron	10	11	+
Mute Swan	8	12	+
Wigeon	366	292	-
Teal	3	1	-
Mallard	18	18	=
Goldeneye	37	18	-
Merganser	14	15	+
Wildfowl total	471	356	-
Oystercatcher	379	385	+
Ringed Plover	6	10	+
Golden Plover	582	41	-
Lapwing	865	918	+
Knot	220	234	+
Dunlin	348	373	+
Bar-tailed Godwit	17	15	-
Curlew	357	556	+
Redshank	684	712	+
Turnstone	26	23	-
Wader total	3484	3267	-
Overall total	3955	3623	-

Of the six species of wildfowl which normally have their highest numbers in winter (ie excluding Eider and Shelduck), two showed an increase in their median counts, while three decreased and one stayed the same. Of the 10 wader species, seven increased and three decreased. The totals of the median values decreased for both wildfowl and waders, with an decrease overall.

2.4 Species which occur less commonly on the Ythan, which were 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
17 11 2004	0	0	1	0	0	0	0	0	0	1
8 10 2004	0	1	0	0	0	0	0	0	0	1
19 4 2005	0	1	0	0	0	0	0	0	0	1

GREAT CRESTED GREBE *Podiceps cristatus*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
10 9 2004	0	0	0	0	0	0	0	0	1	1
22 9 2004	0	0	0	0	0	0	0	0	1	1

WHOOPER SWAN *Cygnus cygnus*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
13 1 2005	0	0	0	0	0	0	4	0	0	4
27 1 2005	0	0	0	0	0	0	4	0	0	4
3 3 2005	1	0	0	0	0	0	0	0	0	1

PINK-FOOTED GOOSE *Anser brachyrhychus*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
26 3 2005	0	0	0	0	16	0	0	0	0	16
19 4 2005	0	0	0	0	70	0	0	0	0	70
5 5 2005	0	0	0	0	0	0	23	0	0	23
27 1 2005	0	1	0	0	0	0	0	0	0	1
22 2 2005	0	0	0	1	5	0	0	1	0	7
9 8 2004	0	0	0	0	0	0	2	0	0	2

GREYLAG GOOSE *Anser anser*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
26 3 2005	0	1	0	0	0	0	0	0	0	1
26 8 2004	0	0	0	0	2	0	0	0	0	2
2 11 2004	0	0	0	0	0	0	0	6	0	6
1 12 2004	0	0	0	0	0	129	0	0	0	129
15 12 2004	0	0	0	0	0	255	0	0	0	255
5 5 2005	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
9 7 2004	0	0	0	0	1	0	0	0	0	1
9 8 2004	0	0	0	0	1	0	0	0	0	1
26 8 2004	0	0	0	0	0	2	0	0	0	2
15 12 2004	0	0	0	0	0	12	0	0	0	12
22 2 2005	0	1	0	0	0	0	0	0	0	1
26 3 2005	0	7	0	0	0	0	0	0	0	7

BARNACLE GOOSE *Branta leucopsis*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
9 8 2004	0	0	0	0	0	5	0	0	0	5
10 9 2004	0	0	0	0	0	5	0	0	0	5
8 10 2004	0	1	0	0	0	0	0	0	0	1

BRENT GOOSE *Branta bernicla*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
8 10 2004	0	2	0	0	0	0	0	0	0	2

GADWALL *Anas strepera*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
18 5 2005	0	0	0	0	0	0	0	0	2	2

PINTAIL *Anas acuta*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
26 3 2005	0	0	0	0	0	0	4	0	0	4
19 4 2005	0	0	0	0	0	0	12	0	0	12

SHOVELER *Spatula clypeata*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
7 4 2005	0	0	0	0	0	0	0	0	1	1
19 4 2005	0	0	2	0	0	0	0	0	0	2

TUFTED DUCK *Aythya fuligula*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
22 2 2005	2	0	0	0	0	0	0	0	0	2
5 5 2005	0	0	0	0	0	0	0	2	0	2
18 5 2005	3	0	0	0	0	0	0	0	0	3

SCAUP *Aythya marila*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
18 10 2004	4	0	0	0	0	0	0	0	0	4
1 12 2004	7	0	0	0	0	0	0	0	0	7
15 12 2004	4	0	0	0	0	0	0	0	0	4
27 1 2005	8	0	0	0	0	0	0	0	0	8
11 2 2005	8	0	0	0	0	0	0	0	0	8
22 2 2005	3	0	0	0	0	0	0	0	0	3
3 3 2005	2	0	0	0	0	0	0	0	0	2
26 3 2005	1	0	0	0	0	0	0	0	0	1

LONG-TAILED DUCK *Clangula hyemalis*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
11 2 2005	2	0	0	0	0	0	0	0	0	2
22 2 2005	4	1	0	0	0	0	0	0	0	5
2 11 2004	2	0	0	0	0	0	0	0	0	2
8 10 2004	1	0	0	0	0	0	0	0	0	1
1 12 2004	2	0	0	0	0	0	0	0	0	2
15 12 2004	5	0	0	0	0	0	0	0	0	5
13 1 2005	1	0	0	0	0	0	0	0	0	1
27 1 2005	3	0	0	0	0	0	0	0	0	3
3 3 2005	3	1	0	0	0	0	0	0	0	4
26 3 2005	3	1	0	0	2	0	0	0	0	6
7 4 2005	0	0	1	0	2	0	0	0	0	3
19 4 2005	0	2	0	0	0	0	0	0	0	2
5 5 2005	2	1	0	0	0	0	0	0	0	3

GOOSANDER Mergus merganser

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
3 3 2005	0	0	0	0	0	0	0	0	3	3
26 8 2004	0	0	0	0	2	0	0	0	0	2
14 6 2005	0	0	0	0	13	1	0	0	0	14
25 6 2005	0	0	0	0	0	2	0	0	0	2

GREY PLOVER *Pluvialis squatarola*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
22 9 2004	0	1	0	0	0	3	0	0	0	4
8 10 2004	2	12	1	0	3	0	0	0	0	18
18 10 2004	3	15	0	0	6	1	0	0	0	25
2 11 2004	2	14	1	0	2	0	0	0	0	19
17 11 2004	2	17	1	0	0	0	0	0	0	20
1 12 2004	1	27	0	0	0	1	0	0	0	29
15 12 2004	1	13	0	0	0	0	0	0	0	14
13 1 2005	0	19	0	0	0	0	0	0	0	19
22 2 2005	0	11	0	0	0	0	0	0	0	11
3 3 2005	2	11	0	0	0	0	0	0	0	13
7 4 2005	0	1	0	0	0	0	0	0	0	1
5 5 2005	0	1	0	0	0	0	0	0	0	1
18 5 2005	0	1	0	0	0	0	0	0	0	1

CURLEW SANDPIPER *Calidris testacea*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
9 8 2004	0	0	0	0	0	0	0	5	0	5
22 9 2004	0	0	0	0	0	2	0	0	0	2

RUFF *Philomachus pugnax*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
9 8 2004	0	0	0	0	1	0	0	0	0	1
26 8 2004	2	0	0	0	0	3	0	0	0	5
22 9 2004	0	0	0	0	0	1	0	0	0	1

SNIPE *Gallinago gallinago*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
26 8 2004	0	0	1	0	0	0	0	2	0	3
2 11 2004	0	2	0	0	0	0	0	2	0	4

BLACK-TAILED GODWIT *Limosa limosa*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
9 7 2004	0	0	0	0	0	1	0	0	0	1
21 7 2004	0	2	0	4	1	0	0	0	0	7
26 8 2004	0	4	0	35	0	0	0	0	0	39
22 9 2004	0	0	0	0	1	0	0	0	0	1
8 10 2004	0	13	0	0	0	0	0	0	0	13
26 3 2005	0	0	8	0	0	0	0	0	0	8
7 4 2005	0	0	0	0	7	0	0	0	0	7
19 4 2005	0	0	0	0	9	0	0	0	0	9
14 6 2005	0	0	0	0	0	5	0	10	0	15
25 6 2005	0	0	0	0	0	13	0	0	0	13

WHIMBREL *Numenius phaeopus*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
9 7 2004	0	0	0	1	0	0	0	0	0	1
21 7 2004	0	2	0	0	0	1	0	0	0	3

SPOTTED REDSHANK *Tringa erythropus*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
19 4 2005	0	0	0	0	0	0	0	1	0	1

GREENSHANK *Tringa nebularia*

Date	Mo	In	Qu	Ta	Sl	Ha	Sn	Ma	Lo	Total
9 7 2004	0	0	0	0	0	0	1	0	0	1
21 7 2004	0	0	0	0	3	0	0	0	1	4
9 8 2004	0	0	0	0	3	2	0	0	0	5
26 8 2004	0	0	0	1	4	1	0	1	0	7
10 9 2004	0	0	0	1	2	2	0	1	0	6
22 9 2004	0	0	0	0	0	2	0	0	0	2
8 10 2004	0	0	0	1	0	0	0	0	0	1
14 6 2005	0	0	0	0	1	0	0	0	0	1

3. 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 2003/04 and 2004/05, 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.

There was little overall change in total bird numbers between the two years, with numbers higher in 2004/05 than in 2003/04 in half of the 12 months and lower in the other months. However, the mean total number of birds (of species other than Eiders) between August and February was lower than in the previous year. A majority of the individual wildfowl species showed a decrease in both their peak and their winter median numbers. Among the two main breeding duck species, Eiders showed an increase in their peak count, while Shelduck showed a decrease. Evidence from the common wader species was ambiguous, with a difference between peak numbers (which tended to decrease between the two years) and winter median numbers (which tended to increase). The same difference between peak and median numbers was found when comparing 2002/03 and 2003/04 (Patterson and Thorpe 2004) and suggests that while overall wintering numbers of individual species generally increased, there were fewer large peaks in numbers.

4. REFERENCES

Patterson, I.J. and Cosgrove, P.J. 1998. Waders and waterfowl on the Ythan estuary, 1997/1998. *Scottish Natural Heritage Archive Report No. 007.*

Patterson, I.J. and Thorpe A.W. 2004. Waders and waterfowl on the Ythan estuary, 2003/2004. *Scottish Natural Heritage Archive Report No. 013.*

APPENDIX 1. SURVEY METHODS

1.1 Field survey

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 nine 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.

1.2 Data analysis

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.

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