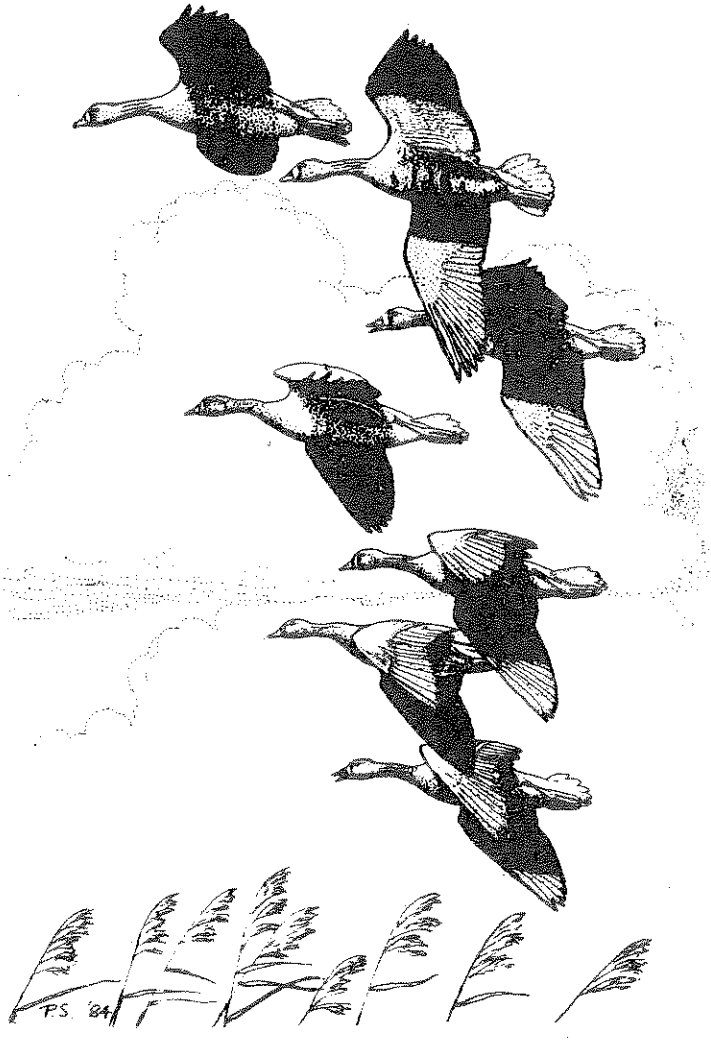

WILDFOWL AND WADER COUNTS 1988-89

Wildfowl and Wader Counts 1988 - 89

The Results of the National Wildfowl Counts and Birds of Estuaries Enquiry in the United Kingdom

By
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The following are also thanked for their help with the analyses and the production of this booklet:

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CONTENTS

WEATHER IN 1988–89

The summer and early autumn were wet, but dry weather then predominated in the south. In the north it continued wet, however. All areas had an exceptionally mild winter, with very little frost, until late February, when a short cold spell affected northern districts in particular. Winds were mainly westerly until mid-October, then easterly until mid-November and thereafter westerly or southerly.

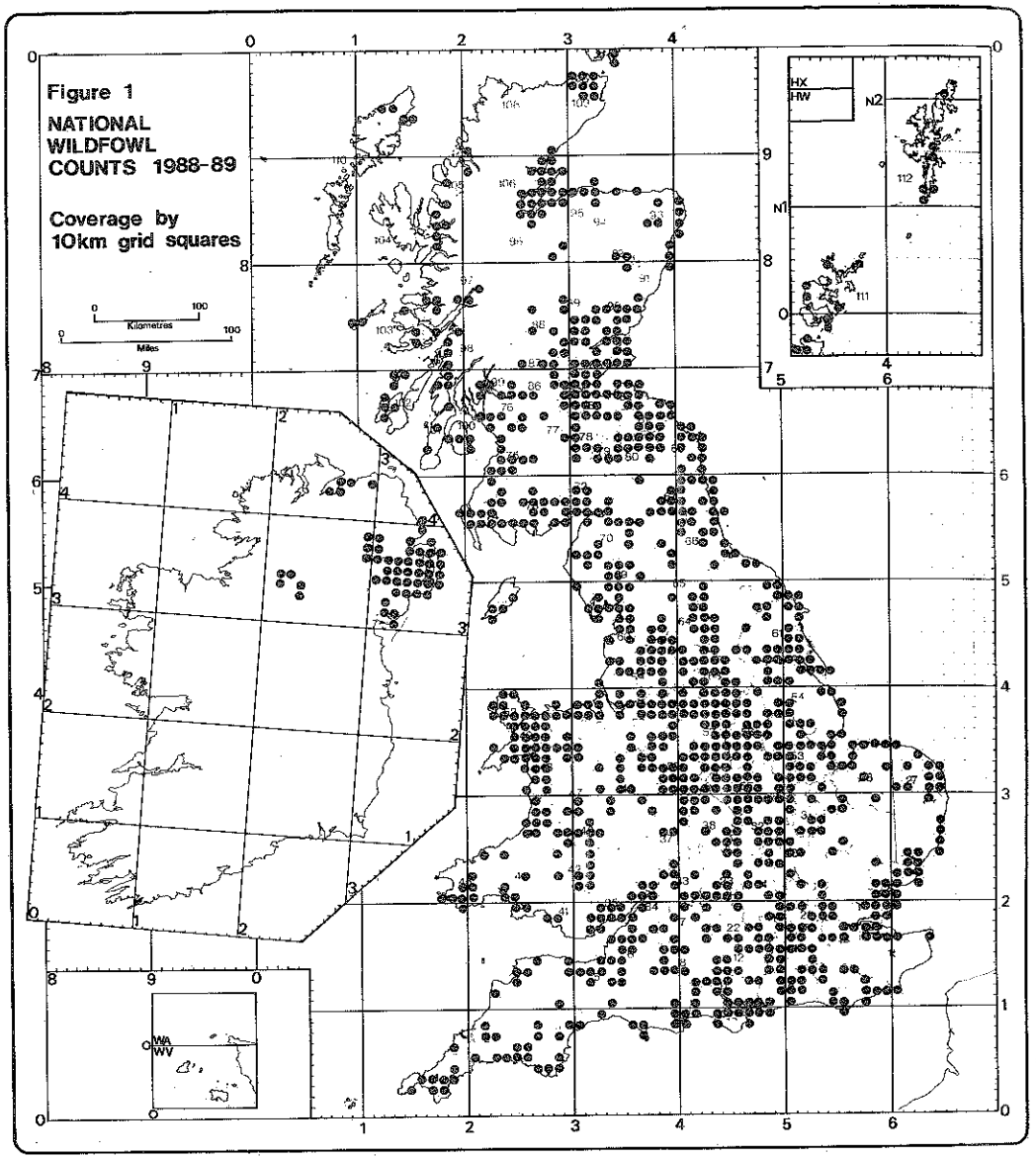
Figure 1
NATIONAL WILDFOWL COUNTS 1988-89
Coverage by 10km grid squares
0 100
Kilometres
0 100
Miles
HX
HW
N2
N1
WA
WV

WILDFOWL

by D.G.Salmon

The National Wildfowl Counts are organised by the Wildfowl and Wetlands Trust under contract to the Nature Conservancy Council and the Department of the Environment for Northern Ireland. Instigated in 1947, they involve monthly counts of swans, geese and ducks, together with certain co-incident wetland species (Cormorant, Great Crested and Little Grebe and Coot), on all wetland habitats from September to March. Supplementary surveys of certain swans and geese, which feed away from water by day, are regularly held, as are counts at major resorts outside the main winter period.

DEVELOPMENTS IN THE NATIONAL WILDFOWL COUNT SCHEME

The uses to which the National Wildfowl Count data are put have increased further over the past year. So far in 1989 requests for data by outside bodies involving several hundred sites have been answered. The Wildfowl & Wetlands Trust has itself done detailed assessments based on the count data for a number of threatened sites. Extra survey-work, supplementing the existing counts, was done by the regular counters and Wildfowl & Wetlands Trust staff in two areas in the south-west: the Severn Estuary and the Cotswold Water Park. The Severn Estuary work, part-funded by the Severn Tidal Power Group, studied the breeding and moulting of Shelducks, in response to the Severn Barrage proposals and as a pilot for a planned national survey (see below). It is hoped that further pilot work around the country will be possible in 1990. The Cotswold Water Park project, part-funded by the Nature Conservancy Council, included weekly surveys of over 100 gravel pits. Breeding, other faunal and habitat surveys have also been undertaken. The project is continuing on a reduced scale in 1989–90. This is probably the most intensive study of a major inland wetland complex ever undertaken in this country.

Subjects of Wildfowl & Wetlands Trust research projects which have made use of the count data or information supplied by the counters over the past year are:–

Colour-marking of wildfowl. (Presently the swans, Bean, Pink-footed, Greenland White-fronted, native Greylag, Canada, Barnacle and Brent Geese, Shelduck, Wigeon and Ruddy Duck.)
National Wetland Register.
Shooting Disturbance.
Night Shooting.
Cold Weather Movements.
Population Dynamics of Pink-footed Geese.
Dispersal of Pink-footed Geese.
Ecology of Bewick's Swans.
Population Dynamics of Whooper Swans.
Breeding and Moulting Shelducks in the Severn Estuary.
Movements and Turnover of Wigeon.
Sex Ratio in Pochard.
Ecological Requirements of Ruddy Ducks.
Conservation Assessment of the Cotswold Water Park.

Several of these studies received funding from the International Waterfowl and Wetlands Research Bureau, NCC or RSPB.

In order to expand the scope of the National Wildfowl Counts to learn more about the status of our wildfowl outside the winter period a series of breeding and moulting surveys of individual species is planned by the Wildfowl & Wetlands Trust. A Special Surveys Officer – Simon Delany – has been appointed to organise these, and the detailed area surveys described earlier, under the supervision of David Salmon. The first breeding survey will cover Mute Swans in 1990, in conjunction with the BTO. The next, covering Shelducks and native Greylags, are planned for 1991.

An independent Wetlands Advisory Service has been set up at Slimbridge to handle the vast number of requests for advice on the conservation and management of wetlands from planners, developers, water authorities and others.

COVERAGE IN 1988–89

The set dates in this 42nd season of the National Wildfowl Counts were September 18th, October 16th, November 13th, December 18th, January 15th, February 12th and March 12th. Coastal areas were counted on different days where necessary to coincide with appropriate tides. The British Trust for Ornithology again kindly supplied data from the Birds of Estuaries Enquiry (see later in this booklet) for certain coastal areas.

A special effort to count extra sites was made as usual in January, the month of the International Waterfowl and Wetland Research Bureau's International Census. The regular supplementary surveys were made of Pink-footed, Greylag and (via the Greenland White-fronted Goose Study and Irish Wildlife Service) Greenland White-fronted Geese in November and April, and of Dark-bellied Brent Geese in January and February. The resident feral population of Greylags in Dumfries & Galloway was censused in June and September 1988.

A total of 1,854 sites in Britain and Northern Ireland were covered at least once, including 1,557 in January and 1,063 in all seven months, September to March. The improvements of recent years were consolidated, additional expansion having been achieved in many areas. Over 50 sites were covered in Hampshire, Leicestershire, Derbyshire, Lancashire, Gwynedd, Dumfries & Galloway, Strathclyde, Borders and Co Down. The main gaps were in north-west Scotland, Herefordshire and some inland areas of Essex, Suffolk and Northern Ireland, while data from most of Dorset, the outer Humber and parts of Strathclyde were not received in time for inclusion in the main analyses.

TOTAL COUNTS

Tables 1 (opposite) and 2 (overleaf) give the total counts of each species in the seven principal months in 1988–89 for Great Britain (England, Scotland and Wales) and Northern Ireland respectively. Certain sea-ducks and geese are excluded as their major resorts are covered irregularly; the numbers found in 1988–89 are given in the species accounts. For the levels of National Importance, based on 1% of the estimated population sizes, see the Appendix.

Table 1. TOTAL NUMBER OF WILDFOWL COUNTED IN GREAT BRITAIN 1988/89

	Monthly totals (no. of sites) Sep (1,114)	Oct (1,195)	Nov (1,256)	Dec (1,239)	Jan (1,451)	Feb (1,242)	Mar (1,239)	Average Max. 1984–85 to 1988–89
	(Figures over 1000 rounded to nearest 100, over 100 to nearest 10.)							
Little Grebe	1,900	2,200	2,100	1,800	1,900	1,600	1,600	1,300**
Great Crested Grebe	7,000	6,700	6,000	5,600	4,900	5,000	5,500	6,600
Cormorant	8,200	9,400	9,000	9,500	9,700	8,900	6,600	7,200**
Mute Swan	9,600	9,300	9,900	9,600	9,600	8,200	8,000	9,200
Bewick's Swan	7	18	2,100	5,600	6,300	4,600	320	6,900
Whooper Swan	110	960	4,500	4,300	3,700	3,000	2,500	3,800
Bean Goose	1	2	0	356	370	60	11	360
Pink-footed Goose	54,800	148,200	176,200*	100,000	85,100	71,700	80,600	140,800
European White-fronted G	2	15	570	4,800	5,600	5,800	2,700	6,500
Greenland Whitefronted G	0	270	13,000	520	520	410	610	13,000
Greylag Goose: Iceland pop	0	60,200	108,700	38,900	31,500	31,700	26,900	98,900
feral	11,300	9,600	8,700	7,800	7,900	8,100	6,100	8,100
Canada Goose	34,700	29,600	29,100	29,700	29,900	24,400	18,100	31,300
Dark-bellied Brent Goose	710	34,900	80,800	100,600	104,200	93,000	54,600	94,300
Light-bellied Brent Goose	22	1,400	3,000	2,000	900	360	140	2,800
Shelduck	17,000	35,600	45,400	6,700	61,700	61,700	45,100	71,000
Wigeon	33,000	170,400	212,000	225,900	240,000	176,100	93,400	275,100
Gadwall	4,600	5,900	6,300	6,600	5,400	5,000	2,700	5,400
Teal	50,100	67,900	80,600	104,000	89,900	69,000	35,000	91,700
Mallard	139,700	144,600	148,700	168,900	170,600	111,000	57,200	177,900
Pintail	8,300	20,700	15,700	25,900	27,300	18,600	2,600	26,300
Shoveler	7,000	6,200	5,500	5,200	4,900	4,900	3,700	7,600
Pochard	12,200	19,900	33,300	33,300	37,100	32,500	11,300	35,000
Tufted Duck	35,800	36,000	45,700	49,500	50,900	42,400	35,000	46,800
Scaup	47	3,000	4,000	6,000	5,000	2,400	3,000	4,100
Goldeneye	160	1,600	6,700	8,900	11,400	11,400	9,300	12,000
Smew	3	2	6	55	80	77	24	205
Redbreasted Merganser	1,800	3,500	2,900	3,200	3,100	2,300	2,600	4,400
Goosander	550	1,100	1,300	3,200	3,800	2,600	1,300	3,600
Ruddy Duck	1,300	1,700	2,200	2,200	2,400	2,300	2,000	2,200
Coot	70,500	77,000	88,900	87,800	84,700	61,900	39,300	86,100

* Complete census attempted. ** 1986/87–88/89 only.

Table 2. TOTAL COUNT OF WILDFOWL IN NORTHERN IRELAND 1988/89

	Monthly totals (no. of sites)			(Figures over 1000 rounded to nearest 100, over 100 to nearest 10)				
	Sep (104)	Oct (105)	Nov (106)	Dec (106)	Jan (106)	Feb (106)	Mar (106)	Av. max 1985/86 to 1988/89
Little Grebe	680	600	560	410	340	260	270	285*
Gt Crested Grebe	2,300	1,600	1,800	1,400	700	520	1,300	1,800
Cormorant	1,500	1,400	1,500	1,500	1,000	880	1,000	1,400*
Mute Swan	1,900	1,900	2,200	2,100	1,800	1,400	1,400	1,600
Bewick's Swan	1	0	95	270	270	270	19	330
Whooper Swan	1	1,700	3,000	1,900	1,800	1,800	1,700	2,100
Gd Whitefront	15	30	8	0	67	67	47	130
Greylag G (incl feral)	170	110	420	270	540	200	360	810
L-b Brent Goose	5,800	1,700	9,400	6,600	3,900	3,000	2,600	15,700
Canada Goose	63	240	190	190	190	190	190	320
Shelduck	160	340	1,400	4,500	3,900	2,900	1,600	3,300
Wigeon	160	24,100	17,600	7,700	6,300	4,700	1,900	17,800
Gadwall	240	160	190	130	190	140	80	180
Teal	980	3,400	5,000	5,600	5,100	4,100	1,600	5,100
Mallard	9,700	7,300	8,900	8,500	6,100	4,300	2,000	8,700
Pintail	31	75	190	190	270	340	70	310
Shoveler	110	250	210	200	180	170	50	280
Pochard	2,100	12,600	40,800	26,000	20,700	7,000	4,000	25,000
Tufted Duck	4,000	13,900	17,300	17,400	18,100	15,200	11,800	13,900
Scaup	0	110	190	2,300	1,300	600	2,100	1,900
Goldeneye	35	1,700	12,800	13,100	8,000	6,600	7,300	10,400
Smew	0	0	0	0	1	1	1	2
R-b Merganser	360	1,100	670	530	400	240	230	720
Goosander	0	0	0	1	2	0	0	4
Ruddy Duck	11	19	22	15	44	12	16	33
Coot	5,900	6,100	6,000	4,700	5,200	3,500	3,500	5,400

* 1987/88–88/89 only.

MONTHLY FLUCTUATIONS

Since the coverage is not uniform in every month, the monthly count totals do not necessarily give a reliable guide to changes in relative numbers during the season. By using data only from sites covered in all seven months from September to March, Tables 3 and 4 overcome this. Each month's total for those sites is expressed as a percentage of those present in the peak month. Non-migratory, scarce and irregularly covered species are omitted.

Table 3. NOS. OF WILDFOWL COUNTED IN BRITAIN IN EACH MONTH OF 1988/89 EXPRESSED AS PERCENTAGES OF THE TOTAL FOR THE PEAK MONTH, based on sites covered in all seven months, September to March (n=963).

(Bracketed figures = average percentages for previous five seasons 1983/84–87/88.)

	Sep		Oct		Nov		Dec		Jan		Feb		Mar	
Little Grebe	99		100		93		83		80		76		76	
G C Grebe	100	(100)	90	(92)	82	(86)	69	(72)	60	(60)	65	(69)	77	(80)
Cormorant	92		100		97		95		99		94		87	
Bewick's Swan	0	(0)	0	(0)	33	(34)	90	(63)	100	(95)	74	(78)	5	(30)
Whooper Swan	1	(1)	24	(44)	97	(88)	100	(95)	94	(84)	86	(78)	66	(63)
E Whitefront	0	(0)	0	(0)	12	(10)	69	(44)	89	(83)	100	(93)	58	(31)
D-b Brent G.	0	(0)	43	(47)	86	(79)	98	(83)	100	(89)	96	(92)	53	(62)
Shelduck	23	(23)	55	(39)	66	(60)	92	(73)	95	(88)	100	(96)	92	(83)
Wigeon	14	(11)	69	(41)	93	(64)	89	(72)	100	(95)	76	(66)	44	(41)
Gadwall	77	(74)	98	(83)	100	(97)	100	(96)	75	(76)	72	(75)	42	(54)
Teal	51	(44)	68	(65)	81	(85)	100	(98)	82	(76)	71	(58)	39	(39)
Mallard	90	(84)	91	(85)	93	(91)	100	(99)	96	(87)	68	(69)	38	(35)
Pintail	46	(26)	80	(77)	57	(87)	99	(94)	100	(75)	77	(51)	13	(23)
Shoveler	100	(84)	84	(97)	68	(87)	66	(72)	61	(52)	63	(52)	51	(49)
Pochard	31	(32)	59	(60)	91	(91)	90	(98)	100	(93)	91	(92)	35	(61)
Tufted Duck	81	(88)	81	(83)	99	(98)	98	(99)	100	(91)	84	(84)	73	(73)
Goldeneye	0	(2)	15	(9)	65	(64)	76	(79)	89	(90)	98	(98)	100	(96)
Goosander	26	(17)	25	(18)	51	(37)	90	(66)	100	(76)	92	(94)	59	(82)
Coot	86	(85)	91	(94)	100	(98)	95	(95)	88	(87)	68	(72)	45	(49)

Table 4. NOS. OF WILDFOWL COUNTED IN N.IRELAND IN EACH MONTH OF 1988/89 (1987/88 IN BRACKETS) EXPRESSED AS PERCENTAGES OF THE TOTAL FOR THE PEAK MONTH, based on sites covered in all seven months, September to March (n = 100).

	Sep		Oct		Nov		Dec		Jan		Feb		Mar	
Little Grebe	100	(84)	89	(90)	77	(72)	55	(70)	41	(100)	30	(91)	33	(70)
G C Grebe	100	(100)	38	(100)	60	(84)	25	(66)	20	(57)	11	(83)	50	(83)
Cormorant	100	(37)	83	(100)	97	(57)	99	(66)	71	(44)	57	(42)	72	(52)
Bewick's Swan	0	(0)	0	(0)	29	(10)	92	(100)	100	(96)	99	(65)	8	(18)
Whooper Swan	0	(0)	24	(100)	63	(95)	73	(74)	86	(65)	100	(86)	87	(85)
Shelduck	2	(4)	5	(5)	28	(11)	100	(51)	85	(81)	65	(100)	39	(75)
Wigeon	3	(20)	47	(100)	68	(81)	69	(43)	100	(26)	81	(31)	31	(13)
Gadwall	100	(67)	64	(59)	82	(84)	56	(100)	82	(80)	62	(83)	36	(89)
Teal	16	(13)	36	(37)	84	(44)	86	(100)	100	(73)	79	(42)	33	(33)
Mallard	100	(89)	60	(75)	67	(81)	65	(100)	50	(73)	34	(42)	21	(24)
Pintail	14	(17)	30	(45)	86	(79)	82	(100)	70	(56)	100	(59)	31	(34)
Shoveler	45	(34)	100	(24)	91	(100)	89	(76)	87	(77)	79	(54)	21	(35)
Pochard	4	(5)	31	(52)	100	(51)	64	(87)	50	(100)	17	(30)	10	(5)
Tufted Duck	23	(7)	25	(79)	98	(25)	97	(40)	100	(100)	84	(38)	64	(19)
Scaup	0	(1)	5	(79)	8	(100)	100	(46)	54	(30)	29	(78)	96	(49)
Goldeneye	0	(1)	13	(5)	99	(78)	100	(85)	62	(100)	51	(99)	57	(83)
Coot	98	(100)	100	(91)	95	(95)	74	(83)	81	(63)	49	(46)	42	(41)

COASTAL PATTERN

During the course of the season several species show a movement from freshwater to the coast. This is especially pronounced, or at any rate influxes of birds are more concentrated on the coast, in cold winters. Table 5 shows the proportions of selected species counted on the coast (i.e. estuaries and open shore) in each month in Britain and Northern Ireland combined during the mild season of 1988–89. For comparison, the results for the hard winter of 1984–85 are given in brackets (Britain only). To allow for variation in coverage, only those sites counted in all seven months, September to March, are included.

Table 5. THE PERCENTAGE OF SELECTED SPECIES OCCURRING ON THE U.K. COAST IN EACH MONTH OF 1987/88 (and 1984/85 – G.B. only). (x = total sample below 1,000).

	Sep		Oct		Nov		Dec		Jan		Feb		Mar	
Little Grebe*	8		14		20		28		29		26		20	
Great Crested Grebe	13	(7)	25	(9)	25	(18)	34	(14)	31	(14)	12	(11)	5	(4)
Cormorant*	69		57		56		50		42		41		38	
Mute Swan	25	(19)	24	(21)	23	(25)	28	(26)	25	(24)	24	(21)	21	(24)
Bewick's Swan	x	(x)	x	(x)	9	(9)	7	(8)	9	(11)	19	(12)	x	(10)
Wigeon	59	(66)	81	(65)	68	(62)	51	(54)	45	(65)	34	(42)	24	(34)
Gadwall	6	(4)	6	(8)	7	(14)	9	(12)	13	(14)	10	(15)	17	(13)
Teal	41	(35)	51	(48)	55	(55)	52	(50)	46	(57)	45	(54)	39	(51)
Mallard	23	(19)	28	(24)	27	(26)	27	(24)	30	(26)	27	(23)	25	(27)
Pintail	74	(85)	72	(95)	79	(98)	92	(97)	93	(98)	86	(91)	56	(73)
Shoveler	13	(6)	18	(13)	27	(18)	31	(27)	26	(22)	19	(20)	18	(22)
Pochard	2	(1)	2	(2)	2	(5)	5	(6)	4	(10)	6	(8)	6	(8)
Tufted Duck	1	(1)	1	(2)	2	(3)	3	(4)	2	(10)	2	(7)	2	(4)
Goldeneye	x	(x)	12	(31)	11	(34)	12	(38)	17	(61)	15	(58)	10	(34)
Coot	2	(2)	2	(2)	3	(2)	3	(2)	3	(6)	3	(7)	4	(5)

* not recorded in 1984/85

TOTAL NUMBERS AT INDIVIDUAL SITES

In addition to the criteria for individual species (see Appendix), any site regularly holding a total of 20,000 or more waterfowl (i.e. wildfowl, waders, grebes, divers, etc.) qualifies as internationally important, as agreed by the contracting parties to the Ramsar Convention. Table 6 lists all U.K. sites holding an average peak total of 10,000 or more wildfowl, Great Crested and Little Grebes, Cormorants and Coots alone over the past five seasons. The first column gives the peak total for 1988–89. The peak total is the sum of the highest count for each species in a season, regardless of month.

Table 6. SITES WITH AVERAGE PEAK TOTALS OF 10,000 OR MORE WILDFOWL, GREBES, ETC., 1984/85–88/89.
Peak totals for 1988/89 are in the first column.

	Peak Total Wildfowl:	
		Av. 1984/85
	1988/89	1988/89
Loughs Neagh/Beg (Cos Down/Antrim/Derry/Tyrone/Armagh)	91,885	67,924*
The Wash (Norfolk/Lincs)	67,691	63,438
Ouse Washes (Norfolk/Cambs)	50,500	56,473
Ribble Estuary (Lancs)	55,160	48,967
Loch of Strathbeg (Grampian)	44,493	40,723
Upper Solway Firth (Cumbria/Dumfries & Galloway)	33,929	34,756
Mersey Estuary (Cheshire/Merseyside)	22,574	31,598
Lindisfarne (Northumberland)	38,542	30,830
Abberton Reservoir (Essex)	32,474	30,159
Thames Estuary (Kent/Gt London/Essex)	29,680	29,953
Inner Moray Firth, Findhorn-Beauly (Highland)	28,563	29,896
Montrose Basin (Tayside)	34,277	29,432
North Norfolk Coast	31,653	27,812
Severn Estuary (Glos/Avon/Somerset/Gwent/S Glam)	20,530	26,227
Lough Foyle (Cos Derry/Donegal)	32,039	25,520
Firth of Forth (Lothian/Central/Fife)	29,003	25,190
Strangford Lough (Co Down)	21,410	25,111
Dee Estuary (Cheshire/Clwyd/Merseyside)	24,972	24,184
Loch Leven (Tayside)	28,152	23,896
Morecambe Bay (Lancs/Cumbria)	24,903	23,725
The Swale (Kent)	20,799	22,907
Southwest Lancashire Pinkfeet (incl. Martin M/Ribble)	30,545	22,822
Martin Mere (Lancs)	32,575	22,440
Westwater Reservoir (Borders)	40,000	22,433
Rutland Water (Leics)	23,874	22,038
Dornoch Firth (Highland)	17,979	21,322
Cromarty Firth (Highland)	20,133	21,201
The Humber (Lincs/Humberside)	17,041	19,774
Blackwater Estuary (Essex)	19,190	18,648
Chichester Harbour (W.Sussex)	17,146	18,006
Slains Lochs (Grampian)	22,555	17,891
Wigtown Bay (Dumfries & Galloway)	17,963	16,933
Hamford Water (Essex)	8,549	16,524
Dinnet Lochs (Grampian)	20,604	16,513
Loch Eye (Highland)	26,370	15,925*
Dupplin Loch (Tayside)	39,190	15,483
Derwent Ings (Humberside/N.Yorks)	14,452	15,437
Medway Estuary (Kent)	28,807	15,033
Burry Inlet (W Glamorgan/Dyfed)	8,542	12,972
Langstone Harbour (Hants)	13,628	12,952
Beauly Firth (Highland)	12,551	12,888
Chesil Fleet (Dorset)	(7,083)	12,644*
Carsebreck/Rhynd Lochs (Tayside)	17,575	12,448
Crouch Estuary (Essex)	9,337	11,642
Moray Firth (seaducks) (Grampian/Highland)**	12,291	11,598

* based on four season's data only; ** Eider, Long-tailed Duck, Common & Velvet Scoter.

INDICES

Table 7 shows the trends in numbers of individual species in Britain for the period 1985–86 to 1988–89, with earlier years expressed as five-year means for comparison. The indices are obtained by comparing counts from sites covered in consecutive years and relating the resultant ratios to a running figure based arbitrarily on 1970–71 = 100. The months chosen for each species are those in which the greatest numbers are usually counted. For species which may peak in either of two months, the average indices for these months are given; for those with significant populations at different times of year (usually autumn and mid-winter), separate sets of indices are given. Species for which full censuses are attempted each year (e.g. Pink-footed and Greylag Geese) and those with erratic coverage (e.g. the sea ducks) are omitted.

Similar analyses will be undertaken for Nortern Ireland when a long enough run of data is available from the present degree of coverage.

Table 7. INDICES OF ABUNDANCE OF WILDFOWL IN BRITAIN, based on 1970–71 = 100. (Five year means 1960–61 to 84–85; seasonal figures thereafter)

		Mean 1960/61 –64/65	Mean 1965/66 –69/70	Mean 1970/71 –74/75	Mean 1975/76 –79/80	Mean 1980/81 –84/85	85/86	86/87	87/88	88/89
Mute Swan	–Sep	105	96	103	93	119	125	132	140	158
	Jan	88	106	90	85	89	89	90	101	102
Bewick's S.	–Jan	15	50	72	153	215	298	360	227	233
Whooper S.	–Nov	69	77	104	148	164	164	152	166	235
	Jan	202	146	118	114	116	144	130	174	180
E.Whitefront	–Jan	62	85	56	39	40	51	45	89	68
Canada Goose	–Sep/Jan	47	72	127	175	275	366	351	425	444
D.b.Brent	–Jan	61	87	134	305	455	520	455	469	523
Shelduck	–Jan	92	106	102	132	133	148	121	120	125
Wigeon	–Oct	111	112	138	149	183	148	185	185	235
	Jan	83	91	84	85	97	122	127	107	113
Gadwall	–Oct	42	50	146	149	259	351	462	425	553
	Dec	86	81	164	336	781	1112	1017	1292	1464
Teal	–Dec/Jan	94	76	115	150	193	174	132	178	199
Mallard	–Sep	73	83	92	82	92	89	91	89	94
	Dec	78	89	86	80	90	102	91	101	91
Pintail	–Dec	27	54	151	177	147	144	75	167	134
Shoveler	–Oct/Nov	91	97	144	193	201	215	219	197	180
	Jan	50	63	113	139	127	108	70	88	107
Pochard	–Jan	64	105	124	122	101	87	78	86	102
Tufted Duck	–Sep	44	64	110	122	134	126	115	113	135
	Dec	73	91	119	123	123	138	132	140	170
Scaup	–Jan	64	110	114	33	11	10	13	29	24
Goldeneye	–Jan	115	92	126	109	98	99	108	110	114
R.b.Merganser	–Jan	49	101	115	245	222	228	295	204	195
Goosander	–Jan	92	80	121	285	213	271	283	325	311
	Feb	171	115	153	123	171	143	272	177	191

SPECIES ACCOUNTS

NB: Updated population estimates have recently been published for all wildfowl in north-west Europe (Pirot *et al.* 1989; Monval & Pirot 1989). Some figures are unaltered, but significant changes are referred to in the following species accounts, along with a few slight adjustments to the national population estimates. The current qualifying levels for international and national importance, taking account of these changes, are given in the Appendix, along with those for the waders (q.v.).

The tables which follow show sites exceeding the G.B. qualifying levels for national importance for each species, ranked according to the average maxima for the five seasons 1984–85 to 1988–89. Where this would involve an unmanageably long list a convenient higher "cut-off" point has been used. A cross indicates no counts made, brackets incomplete data. The "month" column shows when the peak occurred in 1988–89. In addition to the main September to March counts, "off-date" and July/August data are received for some resorts. These are included where applicable.

Little Grebe *Tachybaptus ruficollis*

These were included in the National Wildfowl Counts in virtually all areas in 1988–89 for the first time. They are undoubtedly very under-recorded, however, due to their secretive habits and liking for streams, rivers and, in winter, small bays not necessarily included in the counts. The autumn totals of 2,200 found in Britain (Table 1) and 680 in Northern Ireland (Table 2) compare with an estimate in the range of 11–50,000 wintering in Britain and all-Ireland based on the *Atlas* results (Vinicombe 1986).

The species disperses widely in winter, and some 1,500–2,500 are believed to move onto the coast (Prater 1981; Vinicombe 1986). Table 5 shows the increasing proportion counted on the coast as the season progresses, while the apparent overall reduction during the winter suggested by Tables 3 and 4 probably reflects birds moving onto unrecorded small bays and similar sheltered areas.

It is not possible to split the estimated total wintering population above between Britain and Ireland. In any case the species is so scattered that very few large concentrations occur, and it is doubtful if any amount to national importance. Maxima of 50 or more were recorded at only eleven sites in 1988–89: Loughs Neagh/Beg (412, September); Thames Estuary (124, October); Hanningfield Reservoir, Essex (85, September); Southampton Water (81, December); Rutland Water (73, November); Cliffe Pits, Kent (70, October); Milford Haven/Cleddau Estuary, Dyfed (69, January); R Soar/Grand Union Canal, Leicester (62, December); Upper Lough Erne, Fermanagh (62, January); Yantlet Creek, Medway Estuary (57, September); Pitsford Reservoir, Northants (50, September).

Great Crested Grebe *Podiceps cristatus*

The influx onto estuaries in February noted last season was not repeated in 1988–89, indeed there was a marked reduction in the proportion on the coast in that month (see Table 5). Over the country as a whole, coastal and inland, however, the usual pattern is for the numbers counted to increase from a low point in mid-winter to a March level not far below the autumn peak (see Tables 3 and 4). This may confirm the earlier impression (Salmon *et al.* 1987) that there is an exodus from the U.K. even in a mild season. On the other hand it should be remembered that winter flocks of Great Crested Grebes occur off-shore in many areas, often outside the regular estuarine or open coast count areas. Some of these are included in Table 8, but there must be others. Records of sizeable flocks elsewhere would be gratefully received!

The September count in Loughs Neagh and Beg was the highest on record and comprised 17% of the entire U.K. total. Table 8 shows sites holding average maxima of at least 150 over the past five seasons. Two sites not qualifying for the table exceeded that number in September 1988: Church Wilne Reservoir, Derbyshire (178) and Loch Leven, Tayside (168).

Table 8. GREAT CRESTED GREBE: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Loughs Neagh/Beg	x	1,105	1,104	1,356	1,605	(Sep)	1,293
Rutland Water	966	705	472	382	605	(Oct)	626
Firth of Forth	326	542	759	795	311	(Sep)	547
Belfast Lough, Antrim/Down	x	282	279	703	776	(Oct)	510
Chew Valley Lake	465	530	445	430	560	(Sep)	486
Grafham Water, Cambs	950	411	524	288	179	(Jan)	470
Upper Lough Erne, Fermanagh	x	263	374	446	404	(Mar)	372
Swale	120	556	418	(68)	346	(Dec)	360
Queen Mary Reservoir, Surrey	348	310	410	413	251	(Dec)	346
Tremadog Bay, Gwynedd	x	x	x	x	305	(Oct)	305
Medway Estuary	272	226	194	143	357	(Dec)	238
Borth/Ynyslas, Dyfed	138	310	177	(103)	190	(Jan)	204
Conwy Bay, Gwynedd	x	260	x	189	164	(Oct)	204
Morecambe Bay	133	111	202	128	276	(Dec)	170
Pitsford Reservoir	139	151	169	189	202	(Dec)	170
Carlingford Lough, Down	x	199	186	164	106	(Jan)	164

Cormorant *Phalacrocorax carbo*

The National Wildfowl Counts database has included Cormorants since 1986–87, although they were unrecorded at many sites until later than that. The wintering population almost certainly comprises mainly native birds, although our breeding birds travel large distances outside the breeding season (Dunnet 1986). Note the remarkably stable number counted during the autumn and winter, particularly in Britain (Table 3). Although a substantial proportion are probably missed by the counts through being on unrecorded parts of the open coast, large numbers move inland for the winter (see Table 5). In January 1989 4,800 Cormorants were counted on freshwater habitats, including over 2,000 on reservoirs.

The maximum totals counted in 1988–89 were 9,500 in Great Britain (Table 1) and 1,500 in Northern Ireland (Table 2). The British and Irish wintering population has been estimated at 20–25,000, based on a breeding stock of 8,000 pairs (Dunnet 1986). However, Macdonald (1987) found 4,455 pairs in Ireland alone in 1985–86. He also estimated an Irish wintering population of 10,500, which would leave only 1,590 non-breeding birds if applied to the 1985–86 figure. Both the British and Irish wintering populations are probably well in excess of 10,000, and the combined population may well be above the top end of Dunnet's (1986) range. A figure of 150 is provisionally suggested for the 1% level of national importance in Britain, but 200 is used as the baseline for Table 9. In addition, Wigtown Bay held 218 in September.

Table 9. CORMORANT: MAXIMA AT MAIN RESORTS

	1986/87	87/88	88/89	(Mth)	Average
Inner Moray F (Findhorn-Beauly)	685	940	641	(Dec)	755
Loughs Neagh/Beg	x	x	591	(Dec)	591
Morecambe Bay	303	544	729	(Sep)	525
Poole Harbour, Dorset	436	426	615	(Nov)	492
Firth of Forth	(145)	419	482	(Jan)	451
Upper Solway Firth	527	341	483	(Sep)	450
Strangford Lough	504	397	365	(Sep)	422
Queen Mary Reservoir	x	278	438	(Jan)	358
Ranworth/Cockshoot Broad, N'k	267	354	368	(Nov)	330
Medway Estuary	(12)	237	415	(Nov)	326
Blackwater Estuary	x	252	345	(Nov)	299
Rutland Water	x	x	280	(Mar)	280
Outer Ards Coast, Down	61	374	379	(Sep)	271
Dee Estuary, Cheshire	x	210	290	(Oct)	250
Grafham Water, Cambs	158	200	325	(Jan)	228
Elmley, Swale	118	204	358	(Aug)	227
The Wash	188	198	294	(Sep)	227
Stour Estuary, Essex/Suffolk	x	209	244	(Sep)	227
Ouse Washes	286	169	182	(Jan)	212
Ribble Estuary	x	170	242	(Mar)	206
Clwyd Estuary, Clwyd	x	x	200	(Aug)	200

Mute Swan *Cygnus olor*

The signs of increase noted in last year's report have continued, indeed the September index for Britain is the highest on record. Two of the largest increases were at the Loch of Harray, Orkney, where a proliferation of Canadian Pondweed attracted a huge gathering of Mute and Whooper Swans, and Upper Lough Erne, where the count has risen steadily over the last four years.

The monthly counts only locate about half the actual numbers of Mute Swans, and a special survey is being organised by the Wildfowl & Wetlands Trust and the BTO in the spring of 1990, the first since 1983. It will be very interesting to see if the numbers have indeed improved nationally following the banning of use of most sizes of lead weights in 1987.

In addition to the sites in Table 10 two further areas held over 180 Mute Swans in 1988–89: Breydon Water, Norfolk (213, February) and Montrose Basin, Tayside (191, October).

Table 10. MUTE SWAN: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Lough Neagh/Beg	x	314	1,069	1,269	1,120	(Sep)	943
Chesil Fleet, Dorset	681	635	812	774	(571)	(Jan)	726
Ouse Washes	570	477	500	586	399	(Dec)	506
Abberton Resevoir	432	450	547	481	440	(Nov)	470
Tweed Estuary, Northumberland	674	602	309	268	240	(Mar)	419
Colne Estuary, Essex	350	341	435	618	306	(Feb)	410
Christchurch Harbour, Dorset	345	370	392	341	402	(Aug)	370
Loch of Harray, Orkney	177	216	293	456	655	(Oct)	359
Somerset Levels	(29)	(74)	(55)	286	271	(Mar)	279
Stour Estuary	165	212	349	290	357	(Aug)	275
Rutland Water	181	171	462	229	258	(Oct)	260
R Welland: Spalding to Borough Fen, Lincs	316	305	254	164	241	(Oct)	256
Strangford Lough	242	300	193	176	212	(Oct)	225
Upper Lough Erne	x	134	197	229	336	(Dec)	224
Thames Estuary	243	153	210	230	240	(Mar)	215
Loch of Strathbeg	242	263	163	187	50	(Sep)	181

Bewick's Swan *Cygnus columbianus bewickii*

After high counts in the cold winters of the mid-1980s both the index and the total count were at a relatively low level for the second season running. In the Netherlands, however, record numbers were reported (Rees *et al.* 1989).

The 1988 breeding season had been a good one: Slimbridge held 20% young in its population (although the mean brood size was only 1.9 per family), the Ouse Washes (where there are always relatively fewer juveniles) 13% and Martin Mere 12%. The total numbers roosting at Martin Mere (feeding mainly on the Ribble Estuary) reached another record level in 1988–89. The 1987–88 peak of 691 at Breydon Water was inadvertently omitted from last year's report. The unprecedented concentration there that winter was maintained last season, and represented the third largest in the U.K. Two sites not qualifying for Table 11 held over 160 Bewick's Swans in 1988–89, a level which if attained regularly would render them of national importance: Earith Gravel Pits, (400, January – birds from the nearby Ouse Washes, presumably) and How Hill, Ludham, Norfolk (185, January).

As part of the Wildfowl and Wetlands Trust's long-term study of this species a further 45 Bewick's Swans were fitted with plastic leg-rings in 1988–89, mostly at Slimbridge. Forty birds were X-rayed, of which no fewer than 17 were found to have lead pellets in their tissues. Of 100 Whooper Swans X-rayed at Caerlaverock on the Solway Firth, 15 also contained shot, including a yearling with five pellets (Rees *et al.* 1989). These are worrying results, albeit from small samples, and the Wildfowl & Wetlands Trust is discussing with the IWRB the possibility of a more detailed, international study of the shooting pressure on protected waterfowl.

A Dutch research group fitted nine Bewick's Swans with neck-collars (codes 002M-010M) near Groningen in March 1989.

In view of increases during the 1980s the north-west European population is now estimated at 17,000 (Monval & Pirot 1989; Pirot *et al.* 1989). Of these, a peak of 7,000 nowadays reaches Britain on average, compared with the previous estimate of 5,000 (Owen *et al.* 1986).

Table 11. BEWICK'S SWAN: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Ouse Washes	5,227	4,743	6,164	3,787	3,834	(Dec)	4,751
Nene Washes, Cambs	211	937	x	1,400	1,137	(Jan)	921
Martin Mere/Ribble Estuary	330	410	415	552	639	(Jan)	469
Breydon Water, Norfolk	178	98	184	691	698	(Feb)	370
Slimbridge, Severn Estuary	421	475	414	240	245	(Jan)	359
Loughs Neagh/Beg	x	338	234	264	246	(Jan)	271
Walland Marsh, Kent	300	227	220	225	x		243
Hants Avon:							
Ringwood/Harbridge	219	236	311	136	167	(Feb)	214
Walmore Common, Glos	167	154	211	200	112	(Mar)	169

Whooper Swan *Cygnus cygnus*

Despite a poor 1988 breeding season, only 10% young subsequently occurring on the Ouse Washes, 9% at Martin Mere and 5% at Caerlaverock, the autumn numbers were high, and the November index was at a record level. That for January was the highest for 22 years.

In addition to the sites in Table 12 there were 263 along the Tweed between Kelso and Coldstream, Borders, and 191 at the Lake of Menteith, Central, in November.

Of the 365 Whooper Swans ringed by the Wildfowl & Wetlands Trust in Iceland in 1988, 105 were sighted during the winter – one in Denmark! An additional 37 were newly ringed in Britain in 1988–89, mostly at Caerlaverock. Of nine ringed Whoopers seen on the Ouse Washes last winter, 5 had been ringed elsewhere: one at Caerlaverock and four in Iceland. In the summer of 1989 in Iceland a further 185 (including 47 cygnets) were ringed by Wildfowl and Wetlands Trust and Icelandic scientists. They were fitted with yellow plastic leg-rings, and 43 were dyed with yellow on the tail. A bird previously ringed at Caerlaverock was also caught along with 28 from the 1988 expedition.

Table 12. WHOOPER SWAN: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Lough Foyle	1,162	2,597	1,030	1,288	1,960	(Nov)	1,607
Loughs Neagh/Beg	x	723	1,266	1,105	1,192	(Feb)	1,072
Upper Lough Erne	x	876	821	669	582	(Jan)	737
Ouse Washes	230	330	520	582	603	(Jan)	453
Loch Eye/Cromarty Firth	60	405	461	500	275	(Dec)	340
Loch of Harray	20	26	108	485	1,010	(Dec)	330
Loch of Strathbeg	234	508	406	202	225	(Nov)	315
Martin Mere/Ribble Estuary	127	238	243	429	406	(Dec)	289
Loch Leven	162	210	199	222	222	(Nov)	203
Caerlaverock, Upr Solway Firth	104	218	220	225	209	(Nov)	195
Wigtown Bay	211	281	120	212	75	(Feb)	180

Bean Goose *Anser fabalis*

The Yare Valley population reached a peak of 370 (the third highest on record) in early January, with 300 or more present from mid-December to late January. Thereafter the flock decreased rapidly, probably due to the mildness of the winter. The five-year mean maximum for this site is 363.

It was wrongly stated in last year's report that several hundred Bean Geese had been neck-collared in Sweden; in fact, out of a moulting flock about 300 (all non- or failed breeders) at Vasterbotten in July 1987 only 36 were caught. Of these, 22 were seen in the Yare Valley in 1987–88 and 21 (i.e. all but one of the previous winter's birds) in 1988–89. It seems likely that most of the Yare Valley Bean Geese over the last two seasons came from this moulting flock, although not all, as the winter numbers were higher and included families (Parslow-Otsu 1989).

The only record from the regular Carron Valley wintering area was of 20 in mid-October. There were no other reports of 10 or more Bean Geese outside Norfolk, although 10–12 different individuals were found during the monthly Pinkfoot counts in Lancashire.

The Yare Valley birds prefer unimproved pasture, where they will selectively graze rough and smooth meadow-grasses. Bean Geese apparently cannot digest rye-grass (Allport 1989).

Pink-footed Goose *Anser brachyrhynchus*

The 1988 breeding season was very successful, with 23.5% juveniles in the autumn flocks and a mean brood size of 3.19, but the November census total showed only a slight increase from 172,000 to 176,000. Again, over half were in Fife and Tayside Districts. Overall the birds were further south than usual by then. Phenomenal concentrations had occurred early in the autumn at Dupplin Loch, Tayside (39,000 on 30th September) and Westwater Reservoir, Borders (40,000 on 8th October). Dupplin therefore held the record for the highest count ever made of Pinkfeet in Britain for just eight days! The likely destination of many of these birds was Lancashire, which held record numbers of 27,400 in November and 30,500 in December.

This year's spring count of Pinkfeet and Greylags was carried out on 1st/2nd April, two weeks earlier than the main census last year. Roughly the same number was found, 114,000, of which 61,000 were north of Aberdeen.

In addition to the sites in Table 13, the following held over 2,000 in 1988–89: Dinnet Lochs, Grampian (4,500, March); Loch Tullybelton, Tayside (3,050, November); Cowgill Resevoir, Strathclyde (3,000, October); Balgavies Loch, Tayside (2,000, November).

Recent analyses have revealed a correlation between breeding success in Iceland and spring weather conditions in Britain and Iceland for both Pink-footed and Greylag Geese. Mild springs mean better feeding in Scotland and earlier egg-laying in Iceland, both of which improve breeding success. This correlation is, however, less marked in Pinkfeet, due partly to an element of the population breeding in Greenland. Density dependent factors do not seem to be affecting either population, and both are expected to continue to increase (Fox *et al.* in press a).

A further 233 Pinkfeet were ringed in Britain by the Wildfowl & Wetlands Trust in 1988–89, bringing to 604 the total marked in the present project. Most have been caught at Martin Mere and have white plastic rings, but 43 have been ringed in Iceland (white rings) and 21 in Greenland (orange). Perhaps the most remarkable resighting has been of a bird ringed at Martin Mere in April 1987, spotted on the nearby Ribble Estuary next winter, and found in Denmark (whose Pinkfeet generally come from Svalbard) in April 1989. This is the first confirmed sighting of a Martin Mere Pinkfoot on the Continent (Fox *et al.* 1989).

Table 13. PINK-FOOTED GOOSE: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Loch of Strathbeg	20,200	27,900	29,800	20,900	30,200	(Oct)	25,800
South-west Lancashire	20,660	19,990	16,220	26,695	30,545	(Dec)	22,822
Westwater Reservoir	8,700	13,780	24,610	22,400	40,000	(Oct)	21,898
Montrose Basin	9,425	12,000	12,600	35,000	22,000	(Nov)	18,205
Slains Lochs/Ythan Estuary	19,000	15,300	9,590	21,700	21,000	(Apr)	17,318
Dupplin Loch	6,690	6,075	8,448	11,300	39,000	(Sep)	14,303
Upper Solway Firth	27,000	6,895	14,125	11,467	9,006	(Mar)	13,699
Loch Leven	12,670	10,000	10,500	9,700	12,200	(Oct)	11,014
Wigtown Bay	12,000	17,000	3,910	7,000	14,000	(Mar)	10,782
Fylde/Morecambe Bay	8,950	4,000	12,795	8,700	7,900	(Dec)	8,469
Carsebreck/Rhynd Lochs	500	7,200	5,840	11,100	15,090	(Oct)	7,946
Aberlady Bay, F of Forth	4,610	12,500	3,000	11,000	7,300	(Nov)	7,682
Scolt Head, N. Norfolk	x	9,800	12,000	4,000	3,800	(Jan)	7,400
The Wash	9,500	8,288	2,712	6,621	9,382	(Jan)	7,300
Loch Eye/Cromarty Firth	x	x	(2,700)	6,306	7,000	(Apr)	6,653
Cameron Reservoir, Fife	4,000	8,000	7,500	6,000	7,000	(Nov)	6,500
Findhorn Bay, Grampian	x	x	x	2,211	9,800	(Mar)	6,005
Castle L, Lochmaben, D & G	6,950	13,400	5,000	950	2,000	(Mar)	5,660
Hule Moss, Borders	5,500	4,400	5,500	5,000	5,100	(Oct)	5,100
Fala Flow, Lothian	3,240	1,352	6,500	6,800	3,000	(Mar)	4,178
Lour, Tayside	380	5,000	3,850	7,660	3,410	(Nov)	4,060
Crombie Loch, Tayside	1,500	1,250	5,000	6,000	6,244	(Mar)	3,999
Beauly F/Munlochy, Inr Moray	x	x	(28)	5,050	2,560	(Apr)	3,805
Lake of Menteith, Central	6,010	3,145	1,040	2,056	6,000	(Mar)	3,650
Loch of Kinnordy, Tayside	(250)	x	(10)	4,550	2,000	(Nov)	3,275
Gladhouse Reservoir, Lothian	2,300	3,800	3,500	2,500	3,400	(Oct)	3,100
Loch Mahaick, Central	480	725	1,000	x	6,531	(Nov)	2,184

European White-fronted Goose *Anser albifrons albifrons*

As last year more crossed the North Sea than would normally be expected in such a mild winter. The January index was the highest for 16 years. It may well be that the population as a whole showed a major increase, since the flocks at Slimbridge contained a very high proportion of young – 45%. The north-west European population, wintering mainly in the Netherlands, has in any case been increasing substantially for many years. It reached 350,000 by the mid-1980s, with a five-year mean of 300,000 (Pirot *et al.* 1989; Madsen in press), compared with 200,000 in the mid-1970s (Scott 1980). Although this increase is thought to be caused chiefly by the banning of spring shooting in the USSR, it is possible that some birds have moved their wintering grounds from central Europe, where numbers have reportedly declined in recent decades (Ebbinge *et al.* 1986; Pirot *et al.* 1989; Madsen in press).

Table 14. EUROPEAN WHITE-FRONTED GOOSE: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Slimbridge, Severn Est	4,200	4,300	3,500	4,600	3,770	(Feb)	4,074
Swale	1,300	2,570	2,070	1,400	2,050	(Jan)	1,878
South Thames Marshes	360	730	224	640	300	(Feb)	451
Hampshire Avon	530	510	520	205	245	(Jan)	402
Holkham, N.Norfolk	247	326	232	290	376	(Jan)	294
R Tywi: Dryslwyn, Dyfed	290	298	175	175	x		234
Alde Estuary, Suffolk	x	350	140	11	x		167
Minsmere, Suffolk	72	23	119	142	180	(Feb)	107

Greenland White-fronted Goose *Anser albifrons flavirostris*

The annual censuses organised by the Greenland White-fronted Goose Study (GWGS) and Wildlife Service of the Office of Public Works in the Irish Republic found totals of 13,036 in Scotland and 12,954 in Ireland in November, and 12,178 and 12,316 respectively in March/April. The grand totals were therefore 25,990 in November and 24,494 and March/April, compared to 24,300 and 25,000 respectively in 1987–88.

Islay held 7,588 in November and 6,816 in late March. The proportion of young there was high for the second year running, at 23.2% (mean brood size 3.4) (Ogilvie 1988), compared with 21.9% (3.3) in autumn 1987. Wexford held 10,454 in November and 9,765 in April, with 22.1% young. The rest of Ireland, where the proportion of juveniles is generally smaller, had 15.4% young (GWGS/Wildlife Service). Away from the main resorts the highest counts reported were at Machrihanish, Kintyre (862, December), Rhunahaorine, Kintyre (800, December), and Loch Ken, Dumfries & Galloway (342, November).

Duich Moss on Islay, where plans for peat extraction for the whisky industry were dropped after a long campaign, has been declared a National Nature Reserve, an important addition to its SSSI, Ramsar site and Special Protection Area status. The impact of habitat loss on the population has been vividly demonstrated by recent analyses. Individual birds show extreme site loyalty, some even using the same fields year after year (Wilson *et al.* in press).

A Wildfowl & Wetlands Trust/GWGS expedition to West Greenland in summer 1989 ringed 32 geese and carried out further surveys of the Ramsar-listed breeding areas.

Greylag Goose *Anser anser*

Like the Pinkfoot this species had a good breeding season in Iceland, with 22.5% young in the autumn flocks, but, again, there was only a slight increase in the November count total, to 109,000. Also as with Pinkfeet, large numbers moved south earlier than usual. The 19,300 at Loch Eye on October 28th had declined to 3,700 in mid-November, for example.

This is the second year running that migrant Greylags have apparently been under-counted and serious consideration is being given to overcoming this problem. The total population is actually estimated to have reached 130,000 by 1987–88 (Fox *et al.* in press a). (The figure of 100,000 used to produce the 1% level of international importance in the Appendix is, as with other species, based on the average for the last five years.)

By holding the spring census two weeks earlier this year more Greylags were found – 43,800 compared to 19,500 in mid-April 1988. Of these, 34,000 were north of Aberdeen.

Meteorological conditions have been found to be particularly significant in affecting the breeding success of Greylags, with 70% of the variation in productivity accountable for by precipitation, temperature and wind speed in Scotland and Iceland in the middle two weeks of April (Fox *et al.* in press a).

The entry for feral Greylags in Table 1 comprises the total British count for September, when few Icelandic birds have returned. For other months an estimate of 1,500 for the Dumfries & Galloway feral population (Shimmings *et al.* in press) is added to the totals south of Cumbria and Northumberland – the southern limit of the Icelandic birds. The small feral populations further north are not readily separable from the migrant and, in the case of the far north, native stocks, and the totals given for the Icelandic population contain an element of these. No separation is attempted for Northern Ireland, where 416 migratory and 618 feral birds were found in the March 1986 census (Merne 1986) but there has been a recent decline at Strangford Lough. The total number of feral birds in the U.K. was estimated at 13–14,000 in 1986 (Owen & Salmon 1988). If their estimate of a 13% annual increase has been maintained there are now (1989) 18,750–20,200, compared to 11,300 actually counted in September 1988.

Apart from the sites in Table 15, the following held over 2,000 in 1988–89: Loch of Lintrathen, Tayside (3,050, November); Corby Loch, Grampian (2,000, March); Loch Ashie, Highland (2,000, November).

Table 15. GREYLAG GOOSE: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Dinnet Lochs/River Dee	7,000	19,900	8,200	10,800	18,000	(Nov)	12,600
Inner Moray Firth	(2,400)	5,550	12,556	17,450	12,311	(Nov)	11,967
Loch Eye/Cromarty Firth	(550)	10,000	4,774	4,042	19,259	(Oct)	9,519
Loch Spynie, Grampian	3,170	6,000	7,750	9,000	12,300	(Oct)	7,644
Tay/Isla Valley, Tayside	2,351	18,295	3,685	3,663	6,331	(Nov)	6,865
Loch of Strathbeg	1,750	4,600	6,250	9,700	6,900	(Feb)	5,840
Loch of Skene, Grampian	5,060	8,500	4,200	10,000	x		5,552
Drummond Pond, Tayside	4,810	7,500	4,000	5,000	4,160	(Nov)	5,094
Lindisfarne	3,000	3,500	4,500	4,000	4,000	(Nov)	3,800
Caithness Lochs, Highland	1,950	3,334	5,879	4,995	2,787	(Apr)	3,789
Haddo House Loch, Grampian	4,200	1,100	4,320	3,500	5,000	(Dec)	3,624
Dornoch Firth	(280)	3,450	4,389	3,406	1,517	(Apr)	3,191
Carsebreck & Rhynd Lochs	4,000	1,688	4,450	3,150	2,470	(Nov)	3,152
Hoselaw Loch	2,900	5,700	3,000	220	3,600	(Nov)	3,084
Stranraer Lochs, Dumf & Gall	2,400	2,900	3,500	2,800	(1,000)	(Dec)	2,900
Fedderate Reservoir, Grampian	2,400	2,700	2,500	2,750	3,300	(Nov)	2,730
Holborn Moss, Northumberland	1,790	2,200	3,000	3,000	2,500	(Nov)	2,498
Loch Leven	500	3,000	2,100	2,250	2,400	(Feb)	2,050

Canada Goose *Branta canadensis*

Table 16 shows the trend of increase in different regions of Britain over the last twenty years, based on the combined September and January indices. The number of birds contributing to the index in the higher month of 1988–89 is shown in the final column, to illustrate the relative sizes of the current populations in each region. The increase has been most marked in the south, to which birds are still spreading. In central districts, where most of the original introductions were made, the rise has been much slower; control measures have presumably been most prevalent in this region, and some areas may in any case be nearing their capacity. In the north there has been a small population for some time, which has only just started to increase rapidly, presumably aided by birds spreading from the core area to the south. These results have recently been presented at a symposium on Canada Geese organised by the British Association for Shooting and Conservation.

Table 16. CANADA GOOSE: REGIONAL TREND INDICES, September/January, based on 1970/71=100. (For method see introduction to Table 7)

	1964/65–68/69	69/70–73/74	74/75–78/79	79/80–83/84	84/85–88/89	Total no. 1988/89
S.W.England/S.Wales	97	99	138	329	708	3,000
S.E.England	57	147	207	428	720	18,100
Central England/N.Wales	66	113	151	218	298	17,300
N.England/Scotland	111	88	96	98	163	4,800

KEY:
S.W.England/S.Wales = Cornwall/Devon/Somerset/Avon/Glos/Hereford & Worcs/Gwent/Glam/Dyfed/S.Powys
S.E.England = Dorset/Wilts/Hants/IOW/Sussex/Kent/Surrey/Gt London/Essex/Herts/Berks/Bucks/Oxon
C.England/N.Wales = Beds/Northants/Cambs/Suffolk/Norfolk/Lincs/Leics/Notts/Humberside/Warwicks/W.Midlands/Staffs/Shropshire/Cheshire/N.Powys/Gwynedd/Clwyd
N.England/Scotland = remainder of England and Scotland

Table 17 shows the recent numbers at the major resorts. As well as these sites, the following held over 600 Canada Geese in 1988–89: Rostherne Mere, Cheshire (814, September) and the gravel pit groups at Twyford, Berks (792, September); Dorchester, Oxon (758, September); Drakelow, Derbys (650, October) and Radwell, Beds (623, December).

Table 17. CANADA GOOSE: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Stratfield Saye, Hants	1,900	1,750	1,850	1,400	400	(Oct)	1,464
Kedleston Park, Derbyshire	650	1,350	1,600	2,000	1,000	(Jan)	1,320
Bewl Water, Kent/East Sussex	1,158	1,150	1,500	1,150	1,100	(Sep)	1,212
Livermere, Suffolk	800	1,102	874	x	x		925
Rutland Water	694	691	856	1,181	1,102	(Aug)	905
Abberton Reservoir	543	821	539	1,122	1,156	(Sep)	836
Lackford Gravel Pits, Suffolk	797	856	834	x	x		829
Shavington Park, Staffs	1,150	847	676	800	638	(Oct)	822
Amberley Wildbrooks, W Sussex	1,037	780	670	540	600	(Oct)	725
Ellesmere, Shropshire	924	813	568	570	526	(Nov)	680
Fairlop Gravel Pits, Gt London	x	x	x	x	650	(Sep)	650
Blithfield Reservoir, Staffs	669	585	624	830	365	(Nov)	615
Harewood Lake, W Yorkshire	470	655	607	651	625	(Jan)	602

Barnacle Goose *Branta leucopsis*

Islay, the main wintering area for the Greenland breeding population, held 20,650 in October, 20,380 in December and 20,843 in March. The proportion of young was 11.8%, similar to 1987–88, and mean brood size 2.19 (Ogilvie 1988). Elsewhere in the range of Greenland birds the Monach Isles held 1,700, Tiree 384, Danna 325 and Colonsay 230 (all November). The Skomer/Marloes Mere (Dyfed) flock, probably from this population, reached 130 in January.

In the Upper Solway, winter quarters for the Svalbard population, based at Caerlaverock, there were a record 12,100, containing 12% juveniles. During a Wildfowl & Wetlands Trust expedition to Svalbard in summer 1989, 700 Barnacle Geese were newly ringed. Breeding success in 1989 was below average due to severe weather, and no further increase is expected. It also appears that, although the breeding range continues to expand, density dependent factors are operating on the output of the population. The controlling feature is thought to be availability of food (Black & Owen 1989). STOP PRESS: the first geese returned to Caerlaverock in 1989 on the earliest ever date: September 16th. By October 9th, 12,000 had arrived, probably virtually the full complement.

Flocks of over 100 of probable feral origin were reported in 1988–89 from Hornsea Mere, Humberside (121, December) and Bittel Reservoirs, Worcester (140, December).

Table 18. BARNACLE GEESE: MAXIMA AT MAIN RESORTS

	1979/80	80/81	81/82	82/83	83/84	84/85	85/86	86/87	87/88	88/89	Average 84/85–88/89
Islay	17,300	20,500	17,000	14,000	16,600	21,000	19,200	23,900	21,900	20,800	21,400
Solway	7,700	9,050	8,300	8,500	8,400	10,500	10,400	10,500	11,400	12,100	11,000

Dark-bellied Brent Goose *Branta bernicla bernicla*

After a successful breeding season, with 34.4% young in the autumn flocks, the winter peak in Britain reached a new record level of 104,000, compared with a previous highest 97,000 in February 1987. The total for Europe as a whole was 235,000 (per A.St.Joseph, IWRB), the previous record being 205,000 in 1982–83.

The British peak has amounted to 40–48% of the European total in most years since the mid-1970s, but exceptionally up to 59% (Salmon & Fox in press). The proportion in 1988–89 was above the normal range at 51%, which may seem surprising in such a mild season. The severity of the winter is only part of the story, however, as the timing and duration of cold spells are also important, while in particularly severe conditions birds may move out of Britain to France. This could explain why the proportion counted at peak in Britain is not higher in some cold winters. To complicate matters further, different age classes (whose contribution to the total stock varies widely from year to year) probably have different migratory habits, while the steadily increasing use of agricultural land for feeding may have caused slight distributional changes within north-west Europe.

The qualifying level for international importance has been raised to 1,700 (see Appendix). Table 19 lists all sites exceeding that number on average over the past five seasons. Dengie, Essex (2,455, January) and the Stour Estuary, Essex/Suffolk (1,784, December) also held over 1,700 in 1988–89.

Table 19. DARK-BELLIED BRENT GOOSE: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
The Wash	14,219	23,071	17,619	23,166	27,612	(Dec)	21,137
Foulness/Leigh, Thames	23,810	16,307	19,844	18,539	16,954	(Oct)	19,091
Blackwater Estuary	13,410	10,300	12,387	7,709	8,363	(Dec)	10,434
North Norfolk Coast	7,147	12,592	9,800	9,450	12,711	(Jan)	10,340
Chichester Harbour	8,859	11,764	9,998	9,721	10,473	(Jan)	10,163
Langstone Harbour	7,000	8,646	8,567	6,800	8,050	(Nov)	7,813
Hamford Water	9,500	6,000	8,000	3,750	3,942	(Jan)	6,238
Colne Estuary, Essex	4,690	5,265	7,748	5,487	5,494	(Jan)	5,737
Crouch Estuary, Essex	8,990	5,185	5,600	2,853	5,333	(Feb)	5,592
Medway Estuary, Kent	1,158	2,659	2,888	2,910	6,868	(Dec)	3,297
Pagham Harbour, W Sussex	4,219	3,188	2,251	2,551	2,965	(Feb)	3,035
Exe Estuary, Devon	2,493	3,729	2,500	1,724	2,795	(Nov)	2,648
Swale, Kent	2,808	2,000	1,966	2,789	3,032	(Dec)	2,519
The Humber	2,765	2,559	2,229	1,263	(2,000)		2,204
N.W.Solent, Hants	1,690	2,600	2,170	1,750	2,400	(Feb)	2,122
Portsmouth Harbour	1,855	1,610	2,347	2,129	2,062	(Jan)	2,001
Dengie, Essex	1,350	(1,350)	900	2,598	2,445	(Jan)	1,826

Light-bellied Brent Goose *Branta bernicla hrota*

Table 20 plots the seasonal maxima over the last five years at the three main resorts in Britain and Ireland: Strangford Lough and Lough Foyle in Northern Ireland, visited by the bulk of the Canada/Greenland population in autumn, and Lindisfarne, England, reached by many of the small Svalbard population, totalling c.4,000, in mid-winter. Two other places in Co Down held over 200 in 1988–89: Carlingford Lough (309, January) and Killough Harbour (222, March).

The numbers at Strangford Lough have been fairly stable over recent years, but were the lowest for seven years in 1988–89. At Lough Foyle the autumn peak has increased lately and the birds have stayed for a longer period.

An increasing proportion of the Svalbard population, whose principal wintering area is in Denmark, have been crossing to Lindisfarne in recent years, probably because of the succession of cold winters in the 1980s. Unlike the Dark-bellied Brents from Siberia, this population has remained stable overall for many years. Reproductive output is consistently low, due mainly to high predator pressure in Svalbard – particularly from Polar Bears, skuas and gulls. It is also possible that competition with the expanding Barnacle Goose population will arise (Madsen *et al.* 1989).

Table 20. LIGHT-BELLIED BRENT GOOSE: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Strangford Lough	13,737	15,872	14,516	15,031	8,478	(Oct)	13,527
Lindisfarne	3,000	3,100	3,000	2,000	3,000	(N/D)	2,820
Lough Foyle	1,117	1,562	1,693	2,495	3,700	(Nov)	2,113

Egyptian Goose *Alopochen aegyptiacus*

The National Wildfowl Counts find only those present by water-bodies during the day. The majority of records are still from the main area of introductions in Norfolk (70 out of 89 counted in November). The furthest north record in 1988–89 was from the Isle of Man.

Shelduck *Tadorna tadorna*

The numbers in Britain were remarkably constant from December to March, suggesting that the normal slight influx in January/February did not materialise in this very mild winter (see Table 3). The equivalent figures for Northern Ireland (Table 4) are dominated by the pattern at Strangford Lough, where there was a record December peak in 1988–89. Monval and Pirot (1989) document clear shifts from the Wadden Sea to Britain and France in cold winters and suggest that Ireland may play a similar role.

The qualifying level for international importance is now 2,500 (see Appendix). Table 20 lists sites with average maxima of at least 2,000. The July 1988 count of 2,819 in the Severn Estuary included 2,340 at the Bridgwater Bay moulting ground, of which just under 2,000 were flightless (Fox & Salmon in press). Studies of the estuary continued in the summer of 1989, and a peak of 2,600 Shelduck was found at Bridgwater Bay in mid-August (Jones 1989).

Table 20. SHELDUCK: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
The Wash	12,011	21,309	23,755	16,332	15,613	(Jan)	17,804
Dee Estuary	6,540	5,670	6,130	4,600	4,896	(Oct)	5,567
The Humber	3,784	4,492	4,727	2,944	4,186	(Oct)	4,027
Ribble Estuary	2,243	3,078	5,055	6,037	3,534	(Mar)	3,989
Medway Estuary	1,415	2,984	5,305	3,300	5,805	(Feb)	3,762
Mersey Estuary	7,605	4,000	2,355	2,225	2,602	(Dec)	3,757
Morecambe Bay	4,236	2,476	3,865	4,433	3,345	(Mar)	3,671
Chichester Harbour	3,126	2,556	3,772	2,451	2,514	(Jan)	2,884
Severn Estuary	2,802	1,611	2,459	2,707	2,819	(Jul)	2,480
Poole Harbour, Dorset	2,891	2,223	3,588	1,439	2,230	(Mar)	2,474
Thames Estuary	2,376	2,304	3,570	1,679	2,255	(Feb)	2,437
Firth of Forth	(474)	2,086	2,404	2,468	2,301	(Sep)	2,315
Blackwater Estuary	2,580	3,288	2,263	1,168	2,000	(Jan)	2,260
Strangford Lough	1,391	2,221	1,335	1,579	3,973	(Dec)	2,100

Mandarin *Aix galericulata*

As usual the largest counts were in south-east England: 92 at Cutmill Ponds, Surrey (December); 37 at Shillinglee Lake, W Sussex (January) and 32 at Woburn Park Lakes, Beds (November).

Wigeon *Anas penelope*

The peak winter count and January index were fairly low compared to most recent years, as befits such a mild winter, when an extra influx of birds from the Scandinavian/ Siberian breeding population would not be expected. The autumn counts, on the other hand, were by far the highest on record in Britain and the highest for some years in Northern Ireland, suggesting either that the Icelandic stock, which reaches the U.K. sooner than the continental birds, was particularly large, or that the latter contingent arrived in strength earlier than usual – or both.

For the first time the Ribble Estuary held the largest concentration of Wigeon in the country, with a November peak of over 40,000. Table 5 shows that, in this very mild winter, the relative numbers on the coast declined as the season progressed, whereas in the cold weather of 1984/85 the extra influx of migrants to the eastern estuaries kept the proportion on the coast at a high level for longer.

The north-west European population is currently considered stable, at approximately 750,000 birds (Monval & Pirot 1989). For Britain, Owen *et al.* (1986) estimated a winter peak of 200,000, but recent increases in the number counted suggest that this figure should now be 250,000, and the level for national importance in the Appendix has been adjusted accordingly.

Table 21 lists all sites exceeding the revised level of 7,500 for international importance on average over the last five seasons. Two further places held that many in 1988–89: Martin Mere (18,000, February – by far the highest ever) and the Yare Valley (8,950, January)

Table 21. WIGEON MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Ouse Washes	23,755	34,495	42,175	38,672	30,968	(Mar)	34,013
Ribble Estuary	17,600	24,150	24,462	35,000	41,809	(Nov)	28,604
Lindisfarne	10,000	12,495	18,000	22,000	28,000	(Oct)	18,099
Lough Foyle	26,310	12,262	12,220	11,997	22,000	(Oct)	16,959
Abberton Resevoir	35,000	10,180	10,000	2,453	5,704	(Jan)	12,667
Dornoch Firth	8,310	14,925	15,029	14,194	10,299	(Oct)	12,551
Elmley, Swale	19,500	5,610	10,714	9,125	5,931	(Feb)	10,176
Cromarty Firth	9,705	12,364	8,871	8,392	8,158	(Oct)	9,498
Mersey Estuary	9,300	11,650	12,000	6,000	4,630	(Dec)	8,710
Severn Estuary	14,072	9,264	9,256	5,359	4,557	(Jan)	8,501

Gadwall *Anas strepera*

The January International Counts show that the north-west European winter population (estimated at 12,000) has increased markedly since the late 1960s, in concert with that in Britain but interrupted in cold winters (Monval & Pirot 1989). Ringing recoveries suggest that 33–50% of wintering Gadwall in Britain and Ireland come from eastern Europe. Ireland also receives the bulk of the Icelandic and Scottish breeding populations, while 25–50% of the "introduced" English stock appears to move south (Fox & Mitchell 1988). There is a slight movement onto the coast in Britain during the course of the winter (Table 5).

In 1988–89 the indices for both September and December reached yet another record level. The count of 1,800 at Rutland Water in October (Table 22) represented over a third of the entire British total in that month. Note also the record count at Abberton Reservoir in December. In addition to the sites qualifying for Table 22, the following held over 150 in 1988–89: Narford Lake, Norfolk (525, September); Hampshire Avon/GPs, Ringwood-Bickton (333, December); Chew Valley Lake (160, August) and Tophill Low Reservoirs, Humberside (155, September).

Table 22. GADWALL: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Rutland Water	1,109	1,577	1,031	1,387	1,805	(Oct)	1,382
Abberton Reservoir	325	169	410	160	784	(Dec)	370
Gunton Park, Norfolk	144	327	266	389	461	(Sep)	317
Ouse Washes	284	255	356	277	229	(Feb)	280
Slimbridge	237	321	200	322	290	(Dec)	274
Loch Leven	210	195	250	140	154	(Sep)	190
Cheshunt GPs, Herts	145	215	105	185	200	(Dec)	170
Thrapston GPs, N'hants	145	215	105	185	181	(Oct)	167
Stanford Meres, N'k	77	245	316	67	110	(Sep)	163
Hornsea Mere, Humb.	105	235	70	281	77	(Sep)	154

Teal *Anas crecca*

This is one of the most dispersed and hardest to census species of wildfowl. In north-west Europe Teal were found at 3,000 different sites in the January International Counts between 1982 and 1986, yet 60% of these held less than 25 birds. There was a steady increase from 1967 to 1983, followed by a sharp decline to 1986. The average population level in the mid-1980s was an estimated 400,000 (Monval & Pirot 1989). The decline was not mirrored in Britain, where a varying proportion of the north-west European stock spends mid-winter depending on its severity. In mild winters the numbers here are much greater, and the 1988–89 indices were the highest since 1983–84.

The estuaries of the Dee, Mersey and Ribble, together with the nearby freshwater resorts of Woolston Eyes and Martin Mere, held a total of 24,400 Teal in December. In addition to the sites in Table 23 the following held over 2,000 in 1988–89: the Medway Estuary (4,113, December, the highest count there for 12 years); Blackwater Estuary, Essex (a record 3,897, December); Dornoch Firth (2,307, October) and Firth of Forth (2,014, January).

Table 23. TEAL: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Mersey Estuary	8,580	4,300	8,350	12,730	9,670	(Dec)	8,726
Ribble Estuary	4,800	3,076	6,177	3,435	6,417	(Nov)	4,781
Dee Estuary	3,865	5,720	2,940	3,640	4,670	(Nov)	4,167
Martin Mere	3,000	3,400	2,600	4,700	4,300	(Sep)	3,600
Ouse Washes	1,934	3,177	3,551	2,753	3,870	(Feb)	3,057
Derwent Ings	1,966	2,573	3,620	3,750	3,300	(Feb)	3,042
Milford Haven/Cleddau Est	2,867	2,450	2,241	2,728	3,024	(Jan)	2,662
Woolston Eyes, Cheshire	1,600	1,530	3,000	3,500	3,500	(Dec)	2,626
Hamford Water	3,500	5,000	366	1,700	1,975	(Nov)	2,508
Loughs Neagh/Beg	x	2,290	2,173	2,619	2,155	(Feb)	2,309
Severn Estuary	1,915	3,383	2,515	2,451	1,253	(Dec)	2,303
Thames Estuary	2,818	2,040	2,044	2,393	1,879	(Dec)	2,235
The Humber	1,397	2,904	1,675	1,183	2,875	(Sep)	2,007

Mallard *Anas platyrhynchos*

An estimated 5 million Mallard were present in north-west Europe in the mid-1980s (Monval & Pirot 1989), but since anywhere regularly holding 20,000 or more waterfowl is automatically regarded as internationally important, that amount is used as the qualifying level for Mallard (see Appendix). However, so dispersed is the population that no site in the U.K. comes anywhere near to that level. Table 24 shows all sites with an average maximum of over 2,000; only two of these even exceed the qualifying level for national importance of 5,000. However, by safeguarding important sites for other species the habitat of many Mallard is also protected, of course.

Apart from those in Table 24 only one site held more than 2,000 Mallard in 1988–89: Montrose Basin, with 2,622 in January.

TABLE 24: MALLARD: MAXIMA AT MAIN RESORTS.

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
The Humber	4,838	6,311	5,992	10,040	4,940	(Dec)	6,424
Ouse Washes	3,781	7,815	4,216	5,553	4,905	(Mar)	5,254
Loughs Neagh/Beg	x	3,778	5,282	4,054	5,560	(Sep)	4,669
The Wash	2,502	5,949	5,852	5,448	2,975	(Jan)	4,545
Dee Estuary	4,480	4,450	5,325	3,880	4,105	(Sep)	4,448
Morecambe Bay	4,037	4,463	3,625	3,344	4,670	(Sep)	4,028
Martin Mere	3,200	4,600	3,600	3,200	3,900	(Dec)	3,700
Severn Estuary	2,800	3,183	3,520	4,263	3,916	(Nov)	3,536
Derwent Ings	2,500	5,240	3,000	3,420	3,000	(Feb)	3,432
Loch of Strathbeg	3,800	3,450	2,650	3,450	3,300	(Dec)	3,330
Lough Foyle	3,006	2,965	3,300	2,274	2,000	(Nov)	2,709
Thames Estuary	2,298	2,593	2,543	1,711	2,480	(Oct)	2,325
Firth of Forth	(1,352)	2,165	2,082	2,609	2,434	(Dec)	2,323
Upper Solway Firth	1,583	1,821	2,629	2,694	2,665	(Oct)	2,278
Loch Leven	3,288	1,737	2,300	1,060	2,710	(Nov)	2,219
Livermere	2,000	2,300	x	x	x		2,150
Rutland Water	2,781	2,832	1,816	1,635	1,535	(Aug)	2,120

Pintail *Anas acuta*

As well as the usual December/January peak there was a separate one in October, suggesting a marked early passage. Strangford Lough again held most of the Northern Irish total, with 215 in February.

The December index was down to a more normal level after last year's high figure. The peak on the Mersey Estuary was the lowest since 1970–71. Table 25 charts the last ten seasons' maxima on the adjacent Mersey and Dee Estuaries. The combined figures are the largest total for a single month.

Table 25. PINTAIL: MERSEY AND DEE ESTUARIES' MAXIMA OVER THE LAST TEN SEASONS

	1979/80	80/81	81/82	82/83	83/84	84/85	85/86	86/87	87/88	88/89
Mersey	10,030	18,450	11,440	13,750	8,000	16,000	9,000	6,000	8,050	4,288
Dee	6,700	5,510	5,395	7,360	11,265	6,280	6,800	4,620	9,550	8,435
Combined	16,450	19,095	15,025	17,325	15,970	21,470	14,400	10,620	17,600	10,498

Table 26 lists sites reaching, on average, the qualifying level for international importance, revised slightly downwards to 700 (see Appendix). Narford Lake (866, September) and the Ribble Estuary (830, February) also exceeded that amount in 1988–89.

In north-west Europe 50% of the Pintail found in the January International Counts are on only 13 sites, each of which supports over 1,000. The trend has been stable overall over the last ten years, though with an underlying increase from 1978–1983 followed by a decrease (Monval & Pirot 1989).

Table 26. PINTAIL: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Mersey Estuary	16,000	9,000	6,000	8,050	4,288	(Dec)	8,668
Dee Estuary	6,280	6,800	4,620	9,550	8,435	(Jan)	7,137
The Wash	4,397	2,866	4,562	7,715	6,541	(Jan)	5,216
Morecambe Bay	2,869	2,889	2,072	1,979	1,662	(Jan)	2,294
Burry Inlet	2,290	1,180	2,085	2,005	1,780	(Dec)	1,868
Martin Mere	720	1,500	1,200	1,370	2,600	(Oct)	1,478
Ouse Washes	802	1,300	1,803	1,080	1,228	(Feb)	1,243
Duddon Estuary	722	820	1,102	1,289	2,200	(Oct)	1,227
Medway Estuary	453	251	1,000	1,011	927	(Jan)	728

Garganey *Anas querquedula*

Records of this species came from 15 sites, mainly in September when a total of 15 birds was found. The largest groups were of 3 at Chew Valley Lake (August), the Ouse Washes (September) and Margam Park Ponds, West Glamorgan (March). The furthest north record was from Teesmouth.

Shoveler *Anas clypeata*

Monval & Pirot (1989) recognise a north-west European population on the basis of the quality of information available from that region rather than biogeographical distinction. Their estimate for the mid-winter numbers is 40,000, with a stable trend broken by massive exoduses (apparently to southern Spain) in cold winters.

In the U.K. the proportion found on the coast usually increases slightly in mid-winter (see Table 5).

In addition to the sites in Table 27 the following held over 250 in 1988–89: Stain Hill Resevoir, Gt London (266, September) and Thrapston Gravel Pits, Northants (252, October).

Table 27. SHOVELER: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Ouse Washes	403	505	445	1,443	523	(Mar)	664
Rutland Water	612	655	525	285	729	(Sep)	561
Loch Leven	595	177	780	391	540	(Sep)	497
Elmley, Swale	428	397	253	532	303	(Nov)	383
Abberton Resevoir	313	379	522	240	418	(Aug)	374
Woolston Eyes	427	510	475	230	167	(Sep)	362
Chew Valley Lake	275	190	390	440	475	(Sep)	354
Thames Estuary	404	631	178	207	258	(Nov)	336
K George VI Resr, Surrey	219	365	270	361	333	(Sep)	310
Staines Resr, Surrey	564	275	252	187	212	(Oct)	298

Pochard *Aythya ferina*

This is one of the few species of wildfowl to have shown a significant decline in north-west Europe in recent years. However, this followed a major increase in the 1970s. The population was still at a higher level in the mid-1980s (c.350,000) than the previous estimate of 250,000 for the early 1970s. A similar decline has occurred in the Black Sea/ Mediterranean and, probably, eastern Mediterranean wintering regions (Monval & Pirot 1989).

Table 27 lists U.K. sites with average maxima of at least 1,000 over the last five seasons. The count of nearly 40,000 in the Lough Neagh/Beg basin in November 1988 compares with a highest ever of 41,000 in January 1980 and, previously, 38,000 in 1965–66, and represented 11% of the estimated north-west European population. The exceptional numbers of diving ducks at Chew Valley Lake in the autumn were apparently attracted by higher than normal water levels. Two sites not qualifying for Table 27 held over 2,000 in 1988–89: Loch Gelly, Fife (1,009, September) and the Old Manchester Docks, where 2,000 came in at dusk to feed in mid-winter, presumably from nearby daytime roosts such as Rostherne Mere and Chorlton Water Park. That recent discovery highlights the lack of knowledge of night-time feeding resorts of this and other species of duck.

Table 27. POCHARD: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Loughs Neagh/Beg	x	17,436	16,348	24,072	39,811	(Nov)	24,417
Abberton Reservoir	2,700	2,024	3,000	2,102	2,739	(Aug)	2,513
Ouse Washes	2,355	1,975	1,511	3,750	1,129	(Feb)	2,144
L of Boardhouse, Orkney	2,358	627	2,402	3,755	723	(Oct)	1,973
Rostherne Mere, Cheshire	1,273	1,900	2,850	2,395	1,151	(Nov)	1,914
Cotswold Water Pk E, Glos	886	1,806	1,578	3,291	1,352	(Nov)	1,783
Kingsbury/Coton Warwicks	1,700	1,500	2,000	1,775	1,408	(Nov)	1,677
Loch of Harray	1,401	1,549	1,569	1,043	1,372	(Dec)	1,387
Cotswold Water Pk W, Glos	1,475	1,138	1,176	1,119	1,538	(Feb)	1,289
Slimbridge	900	1,172	1,230	1,484	1,100	(Dec)	1,177
Chew Valley Lake	580	410	1,080	650	2,450	(Nov)	1,034

Tufted Duck *Aythya fuligula*

In this exceptionally mild winter the total count in Britain exceeded 50,000 for the first time. The September index was the third highest on record, the January one the highest. Presumably few of the breeding birds of southern Britain bothered to move further south. In Northern Ireland the total was also the largest in recent years, althoug the concentration around Lough Neagh did not approach the dimensions of the mid-1960s, unlike Pochard. Among sites with complete monthly coverage the numbers were at an almost constant level from November to January in both Britain and Northern Ireland (Tables 3 and 4), while virtually no movement onto the coast was recorded (Table 5).

Six sites not qualifying for Table 28 held over 600 in 1988–89: Farmoor Reservoirs, Oxon (780, November); King George VI Reservoir, Surrey (765, July); R Avon/GPs, Blashford-Hucklesbrook, Hants (705, November); Forfar Loch, Tayside (680, November); Upper Lough Erne (637, January); Little Paxton Gravel Pits, Cambs (627, February).

In north-west Europe as a whole there have been considerable fluctuations but the January trend overall showed no significant change over the ten years to 1986. The total population is now estimated at 750,000, of which the majority are around the Baltic (Monval & Pirot 1989).

Table 28. TUFTED DUCK: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Loughs Neagh/Beg	x	6,442	8,943	19,603	16,642	(Jan)	12,900
Rutland Water	3,379	3,000	3,301	3,237	5,582	(Sep)	3,700
Abberton Reservoir	2,700	2,200	3,375	3,463	3,987	(Dec)	3,145
Loch Leven	1,463	3,310	1,800	2,580	3,180	(Sep)	2,467
Kingsbury Water Pk/Coton	1,417	1,620	1,300	2,271	1,405	(Nov)	1,600
Severn Estuary	2,139	1,757	1,490	1,101	990	(Dec)	1,495
Loch of Harray	1,267	1,447	987	1,142	1,920	(Dec)	1,353
Wraysbury GPs, Berkshire	(741)	630	1,101	(456)	1,447	(Jan)	1,059
Staines Reservoir	442	807	3,313	303	387	(Sep)	1,050
Walthamstow Res, Gt London	1,031	894	1,347	760	721	(Jan)	951
Ouse Washes	617	675	1,078	1,847	470	(Mar)	937
Cotswold Water Park West	686	1,011	413	524	1,322	(Feb)	791
Hanningfield Resr, Essex	1,010	460	790	870	655	(Dec)	757
Queen Mother Resr, Berks	1,036	1,029	824	231	635	(Dec)	751
Kilconquhar Loch, Fife	(330)	407	288	477	1,570	(Oct)	686

Scaup *Aythya marila*

Carse Bay in the upper Solway Firth again held the largest assembly in the U.K., although slightly below the level of 1987–88. The improvement in the January index from its low level of the early 1980s was not continued. In Lough Neagh the peak, also in December, was the highest ever, but elsewhere in Northern Ireland the decline noted in last year's report was repeated.

In addition to the sites in Table 29, the Clwyd Estuary held 372 in February 1989.

Table 29. SCAUP: MAXIMA AT MAIN RESORTS

	1984/85	85/85	86/87	87/88	88/89	(Mth)	Average
Upper Solway Firth	1,709	1,400	1,438	4,000	3,092	(Dec)	2,328
Loughs Neagh/Beg	x	1,712	1,586	1,432	2,150	(Dec)	1,720
Loch Indaal, Islay	1,189	1,505	817	1,198	1,230	(Dec)	1,188
Largo Bay, Firth of Forth	1,100	1,650	950	850	762	(Jan)	1,062
Carlingford Lough, Co Down	1,050	720	435	178	140	(Jan)	505
Dornoch Firth	495	311	194	107	266	(Feb)	275
Belfast Lough	x	344	422	44	19	(Dec)	207
Loch Ryan, Dumf & Galloway	160	x	340	120	200	(Dec)	205
Loch of Harray	144	163	218	137	219	(Jan)	176
Dee Estuary	135	128	240	171	174	(Mar)	170
Cromarty Firth	x	120	193	155	151	(Dec)	155
St Andrews Bay, Fife	390	54	140	31	54	(Dec)	134
Inner Firth of Clyde	166	99	x	80	174	(Mar)	130

Eider *Somateria mollissima*

Coverage of the main areas is irregular, the principal site – the outer Firth of Tay – rarely being counted, for instance. The highest monthly total in Britain last winter, 15,800, must have been well below the true number. In Northern Ireland there are far fewer, and the total count of 440 in December is probably not a great underestimate. The vast majority occur along the outer Ards peninsula, Co Down, 40km from the Scottish mainland.

Reviewing the 1987 breeding season in Scotland, Hogg (1989) stated that only 25 chicks were fledged by 1,200 breeding pairs in the main colony at Forvie on the Ythan Estuary "due to disturbance from windsurfers and predation from foxes." A count of 3,000 Eiders at Troon in July 1987 was also reported (see Table 28).

The numbers in the Baltic have increased by 8–12% per annum over the last decade, and the estimate for the north-west European population has consequently been raised to 3,000,000 (Pirot *et al.* 1989).

Table 28. EIDER: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Outer Firth of Tay	x	12,000	6,000	20,000	x		12,667
Murcar, Grampian	9,000	5,300	x	(1,000)	(1,000)	(Sep)	7,150
Walney/Foulney, Morecambe Bay	6,122	4,346	4,000	4,200	5,563	(Jul)	4,846
Inner Firth of Clyde	3,501	2,560	x	4,325	4,384	(Oct)	3,693
Lindisfarne	3,000	3,020	5,300	2,505	2,300	(Nov)	3,225
Troon, Strathclyde	(302)	(450)	(461)	3,000	(402)	(Dec)	3,000
Montrose Basin	1,679	1,840	2,772	2,230	2,000	(Mar)	2,104
Loch Fleet/Dornoch Firth	3,000	1,608	2,200	902	1,122	(Oct)	1,766
Sumburgh, Shetland	1,484	1,800	x	x	x		1,642
Ythan Estuary, Grampian	1,316	1,689	1,661	1,831	1,315	(Oct)	1,562
N Bressay/Noss, Shetland	1,415	x	x	x	x		1,415
Westerwick/Skelda Ness, Shet.	1,400	x	x	x	x		1,400
Fraserburgh, Grampian	650	1,480	x	x	x		1,065

Long-tailed Duck *Clangula hyemalis*

The Western Palearctic population (confined to north-west Europe) is now estimated at 2,000,000, of which about 1,000,000 winter in the Baltic and Danish waters (Laursen 1989; Pirot *et al.* 1989).

The figures for the Moray Firth in Table 31 are estimates by RSPB/BP based on land-based surveys combined with roost flight counts. The most important part of the firth in 1988–89 was Burghead Bay, where over 3,500 spent the day in November and December, and 3,100 roosted in November. The mean maximum of 10,375 for the period 1984–85 to 88–89 compares with over 15,000 for 1981–82 to 83–84. Note the recent increases at two resorts further south, the Firth of Forth and Lindisfarne.

There was a notable influx of Long-tailed Ducks to southern Britain in the autumn of 1988, presumably comprising birds pushed further south than usual on migration by the northerly gales. A total of 166 were counted over a wide area south of Lindisfarne in November, many of them inland, compared with only 9 in 1987. A further influx to Norfolk took place in the new year, with 316 along the east shore of the Wash in February, compared to the usual 50–100.

Table 31. LONG-TAILED DUCK: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Moray Firth **	15,000	6,000	10,000	(3,900)	10,500	(Nov)	10,375
Wide Firth-Rousay, Ork	x	1,200	874*	x	x		1,037
Firth of Forth	323	312	700	898	1,045	(Jan)	656
Bluemull Sound, Shetld	632	712	519*	x	x		621
Sth Yell Sound, Shetld	x	573	x	x	x		573
New Aberdour, Grampian	520	x	x	x	x		520
Eynhallow Sound, Orkney	450	x	530	x	x		490
Broad Bay, Lewis	153	1,000	200	210	x		391
Dunnet Bay, Caithness	350	x	x	x	x		350
Lindisfarne	54	72	305	386	800	(Mar)	323
Water Sound, Orkney	400	212	240	240	147	(Feb)	248

* From Hogg (1989); ** From RSPB/BP

Common Scoter *Melanitta nigra* and Velvet Scoter *M. fusca*

The peak number found by the RSPB/BP surveys of the Moray Firth (where the two species are hard to separate) was 2,968 in February. Burghead Bay and Culbin Bar were the main sites. Common Scoter comprised 83% on average of those specifically identified. Velvet Scoter tended to occur further off-shore and so were more likely to be amongst those unidentified. The mean maximum number of scoters in the Moray Firth over the past five seasons is 2,869, compared with over 10,000 in the early 1980s.

Apart from Carmarthen Bay, where the latest counts were of 10,600 in November 1985 and 800 in December 1986, the largest concentration of Common Scoters in the U.K. is probably now at Dundrum Bay, Co Down, with a mean maximum of 2,800 between 1984–85 and 88–89. The 1988–89 peak there was 2,580 in December. Elsewhere the highest counts of Common Scoters in 1988–89 were in the Firth of Forth (2,113, March), between Towyn and Llandulas, Clwyd (1,735, March) and in Tremadog Bay, Gwynedd (1,500, October).

Only two counts of over 50 Velvet Scoters were made away from the Moray Firth, at St Andrews Bay, Fife (500, November) and between Blackdog and the Ythan Estuary, Grampian (133, October).

Laursen (1989) has revised the estimates of the north-west European population to 800,000 Common and 250,000 Velvet Scoters, thanks to improved coverage in several countries. These comprise virtually the entire Western Palearctic stocks.

Analysis of the breeding data from the 1988 survey of Caithness and Sutherland has shown that, although mainly nesting on acidic peatland lochs, the Common Scoters prefer to feed on base-rich waters; broods will move to these as soon as they are able. Many such lochs have been surrounded by forestry in recent years, and any consequent increase in acidity may affect these and other nationally rare species (Fox *et al.* in press b).

Goldeneye *Bucephala clangula*

This is one of the most widely dispersed wildfowl of north-west Europe. Three per-cent of the estimated north-west European population of 300,000 (Monval & Pirot 1989) winter in the Lough Neagh area, but no other site in the U.K. approaches international importance. The relatively low proportion on the coast in 1988–89 compared to 1984–85 indicated by Table 5 is explained by the absence of Northern Ireland, and therefore Lough Neagh, from the 1984–85 sample. In Great Britain in January 1989, 30% of Goldeneye at sites counted in all seven months were on the coast. The overall index for that month was at its highest level for 11 years.

Note the record numbers at the main inland site in G.B., Abberton Reservoir, in 1988–89 (Table 23). The majority of the Inner Moray birds feed at the Longman outfall, just east of Inverness. In addition to the sites in Table 32 the following held over 300 in 1988–89: Loch Leven (330, March) and the River Tweed: Kelso-Coldstream (315, March).

Table 32. GOLDENEYE: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Loughs Neagh/Beg	x	4,851	9,906	10,463	12,239	(Dec)	9,365
Firth of Forth	881	996	1,855	1,425	1,608	(Jan)	1,353
Abberton Reservoir	575	364	677	389	1,002	(Mar)	601
Inner Moray Firth	598	512	510	559	682	(Feb)	572
Firth of Clyde	359	706	x	580	607	(Mar)	563
Belfast Lough	x	372	692	580	320	(Nov)	491
Strangford Lough	429	553	280	725	289	(Nov)	455
Blackwater Estuary	639	329	490	228	172	(Dec)	372
Morecambe Bay	315	349	411	288	430	(Feb)	359
Tweed Estuary	x	287	340	290	408	(Nov)	331
Windermere	287	329	345	246	256	(Jan)	293
Rutland Water	303	190	243	272	385	(Mar)	279
Cromarty Firth	352	445	275	192	133	(Feb)	279

Smew *Mergus albellus*

In January, Dungeness, Kent held 15 and Rutland Water 9. Such figures contrast with a mean of 4,900 in the IJseelmeer over the period 1977 to 1986. The numbers in the IJsselmeer actually fluctuate hugely between years, without any apparent linkage with the severity of the winter (Monval & Pirot 1989).

Red-breasted Merganser *Mergus serrator*

The Inner Moray Firth is the only area of the U.K. with internationally important numbers of Mergansers, the estimate of the north-west European population having been revised to 100,000. The IJsselmeer is the single most important resort, with over 10,000 at times, but as with other saw-bills the numbers there vary enormously (Monval & Pirot 1989).

The Inner Moray Firth birds are mainly in the Beauly/Inverness Firths (peaking in November/December) and the Riff Bank (peak October), although the Culbin-Lossiemouth stretch held 186 in March 1989 (RSPB/BP). Moulting flocks occur around the Moray Firth in July and August, comprising mostly males, and totalling 653 birds in 1987. Increases in the numbers of both Mergansers and Goosanders in the firth have coincided with a ban on fishing in the areas which began in 1979 (Aspinall & Dennis 1988).

In addition to the sites in Table 33, Loch Fleet (222, October) and the Exe Estuary (154, January) carried over 150 in 1988–89.

Table 33. RED-BREASTED MERGANSER: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Inner Moray Firth	485	2,450	3,063	1,374	1,076	(Oct)	1,690
Tenstmuir	465	1,050	600	1,102	420	(Nov)	727
Cromarty Firth	401	588	615	584	332	(Nov)	504
Firth of Forth	454	383	547	317	439	(Oct)	428
Poole Harbour	270	528	302	309	387	(Jan)	359
Montrose Bay, Tayside	x	x	x	350*	x		350
Strangford Lough	381	305	183	213	371	(Oct)	291
Sound of Gigha, Argyll	x	x	x	251	x		251
Dundrum Bay	203	540	104	93	255	(Oct)	239
Morecambe Bay	309	210	177	140	250	(Jan)	217
Lindisfarne	81	229	217	310	198	(Aug)	207
Machrihanish, Argyll	x	x	200*	x	x		200
Loch Ryan	246	280	210	460*	50	(Dec)	187
Hodbarrow Lagoon/ Duddon Estuary	59	112	178	267	262	(Nov)	176
Langstone Harbour	128	152	131	214	234	(Mar)	172
Turnberry/Girvan, Ayr	171	102	207	x	x		160
Inner Firth of Clyde	102	156	x	253	118	(Nov)	157

* From Hogg (1988; 1989)

Goosander *Mergus merganser*

Several hundred, mostly females, moult in the Moray Firth, mainly at the mouth of the Ness. The numbers are boosted from late October by the arrival of adult males from their Norwegian moulting grounds. In winter the area's Goosanders are nearly all in the Beauly Firth, apart from occasional visits to feed in the adjacent Inverness Firth (Aspinall & Dennis 1988). On average this population just exceeds the 1% level for international importance of 1,500, but that is based on a very rough estimate of the north-west European numbers. Over 30,000 have been counted at times in the IJsselmeer (Monval & Pirot 1989).

Table 34 lists all sites exceeding the level of 50 for national importance over the last five years. A higher cut-off point for the table has not been used, in order to illustrate the variations that can occur on the wintering grounds from year to year. This is a particularly significant point in a species with such a low qualifying level. The stretch of the Tweed included in the table emphasises the importance of the riparian habitat. The Borders branch of the Scottish Ornithologists' Club and the Northumberland Ringing Group conducted six spring/summer counts of the Tweed between 1984 and 1987, finding 458–561 birds in 1987. In spring 1988, 256 Goosanders (5% of the estimated British wintering population) were shot under licence along the Tweed. In 1989, however, the cull was restricted to 30 birds (Murray 1989).

In addition to the sites in Table 34 the following held over 50 Goosanders in 1988–89: Hay-a-Park Gravel Pits, N.Yorks (148, February); Hirsel Lake, Borders (124, November); S.Muskham/N.Newark GPs, Notts (108, January); Whitton Loch, Borders (73, September); Morecambe Bay (57, November).

Table 34. GOOSANDER: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Beauly Firth, Inner Moray	1,280	1,700	1,241	1,900	1,490	(Jan)	1,522
Glenlatterach Resr, Grampian	x	x	180	x	x		180
R Tweed: Kelso/Coldstream	152	86	145	102	91	(Nov)	115
Loch of Skene	197	57	61	92	x		102
Tentsmuir	x	(0)	70	225	8		101
Castle Howard Lake, N.Yorks	70	154	120	57	95	(Dec)	99
Castle Loch, Lochmaben, Dumf/G	138	71	120	81	82	(Jan)	98
Cromarty Firth	136	238	73	35	10	(Oct)	98
Thrapston GPs	63	75	174	66	101	(Dec)	96
Eccup Resevoir, W.Yorks	134	68	108	62	105	(Jan)	95
Besthorpe/Girton, Notts	160	60	67	97	55	(Feb)	88
Queen Mary Resr, Surrey	98	92	171	49	26	(Feb)	87
Chew Valley Lake	96	60	105	55	107	(Jan)	85
Hamilton Low Parks, Lanark	67	59	94	97	65	(Nov)	76
Blithfield Resevoir	105	66	80	48	73	(Feb)	74
Rutland Water	69	89	55	44	56	(Dec)	63
Leighton/Roundhill R, N Yorks	45	27	90	65	82	(Nov)	62
King George VI Reservoir	51	59	68	28	97	(Dec)	61
Abberton Reservoir	74	54	74	29	47	(Mar)	56
Loch Leven	148	15	12	16	73	(Dec)	53
Clyde: Lamington/Hyndford, L'rk	37	54	67	x	x		53
Eden: Carlisle/Rockcliffe, Cumb	x	x	56	65	35	(Apr)	52
Pitsford Reservoir	93	25	71	46	27	(Dec)	52
Hoselaw Loch	20	35	164	6	23	(Oct)	50

Ruddy Duck *Oxyura jamaicensis*

The U.K. count total reached a new record level of 2,700. Table 35 lists sites with an average maximum of over 100 Ruddy Ducks. All, except for Woolston Eyes, are reservoirs. Counts of over 50 came from a further nine localities in 1988–89 – including two in south-east England, a relatively recent expansion of the range.

Attempts to fit birds with white plastic wing-tags proved unsuccessful last season, but efforts will again be made this winter, so please let us know if you see any! Please also inform Barry Hughes at Slimbridge if you notice any aggression between Ruddy Ducks and other species.

Table 35. RUDDY DUCK: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Chew Valley Lake	611	680	1,064	610	785	(Jan)	750
Blithfield Resevoir	680	581	570	909	640	(Nov)	676
Rutland Water	229	188	287	305	468	(Feb)	295
Blagdon Lake, Avon	320	197	603	121	173	(Dec)	283
Belvide Reservoir	248	320	212	156	340	(Oct)	255
Eyebrook Reservoir	318	221	125	230	218	(Jan)	222
Woolston Eyes	138	179	162	116	137	(Sep)	146

Coot *Fulica atra*

As usual the peak numbers were counted in early autumn in Northern Ireland and in late autumn in Great Britain. Analysis of the January international counts has uncovered evidence of major cold weather movements by Coot (Monval & Pirot 1989), but, surprisingly, there is no indication that the U.K. receives extra migrants at such times. Our Coot do, however, apparently undergo small-scale movements to the coast in hard winters (see Table 5). No U.K. site qualifies as internationally important (see Appendix).

Five sites not qualifying for Table 36 carried over 1,000 Coot in 1988–89: Stanford Reservoir, Leics (1,750, December); Hampshire Avon: Blashford-Hucklesbrook (1,250, December); Dungeness (1,198, November); Langtoft/Baston Common Gravel Pits, Lincs (1,029, December).

Table 36. COOT: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Abberton Reservoir	10,000	9,540	8,703	10,274	12,510	(Nov)	10,205
Rutland Water	7,453	5,660	4,623	3,062	4,160	(Dec)	4,992
Loughs Neagh/Beg	x	2,307	5,687	5,008	4,821	(Sep)	4,456
Cotswold Water Pk West	3,677	2,521	2,606	2,731	3,033	(Dec)	2,914
Hanningfield Resr, Essex	2,557	x	4,930	1,450	1,983	(Sep)	2,730
Ouse Washes	1,757	2,970	2,388	3,005	1,537	(Feb)	2,331
Chesil Fleet	2,281	2,080	2,673	2,000	1,750	(Nov)	2,157
Cotswold Water Pk East	1,716	2,217	1,888	2,112	1,680	(Jan)	1,923
Cheddar Reservoir, Som.	2,100	1,900	2,050	1,300	1,000	(Jan)	1,670
Loch Leven	1,361	1,370	1,150	1,150	2,270	(Aug)	1,460
Brogborough GP, Beds	1,600	1,820	1,300	720	979	(Dec)	1,284
Fairburn Ings, N Yorks	1,086	1,289	1,284	1,053	1,511	(Sep)	1,245
Kingsbury Water Pk/Coton	683	822	839	1,747	1,936	(Dec)	1,205
Chew Valley Lake	1,625	1,625	460	1,180	1,051	(Aug)	1,188
Chichester GPs, W Sussex	938	1,543	1,227	1,210	1,011	(Nov)	1,186
Bewl Water, Kent/E Sussex	610	1,068	2,013	1,500	398	(Sep)	1,118
Fen Drayton GPs, Cambs	1,300	960	1,150	1,021	1,112	(Nov)	1,109
Hornsea Mere, Humberside	2,000	1,100	600	995	830	(Sep)	1,105
Windermere	1,663	1,287	1,320	324	698	(Jan)	1,058

WADERS

by R.P. Prys-Jones & J.S. Kirby

The Birds of Estuaries Enquiry (BoEE) is co-sponsored by the British Trust for Ornithology (BTO), Nature Conservancy Council (NCC), Royal Society for the Protection of Birds (RSPB) and Department of the Environment for Northern Ireland (DoENI), and is organised by staff of the BTO Estuaries Unit based at Tring, Hertfordshire. Including the 1969–70 Pilot Study, the twentieth consecutive season of co-ordinated counts for the BoEE took place between July 1988 and June 1989. Counts are made on selected dates near the middle of each month, timed to coincide with the best tidal conditions for censusing estuarine birds. Records of wildfowl from both the BoEE and the National Wildfowl Counts are analysed by the Wildfowl and Wetlands Trust and are presented in the first section of this booklet.

DATA PRESENTATION

Data presentation in this report follows that for the 1987–88 season with only minor alterations. The period of year covered comprehensively comprises the entire winter (November-March), although additional information relating to the spring (April-June) and autumn (July-October) is provided for species with notable passage populations. In the light of information from the ongoing BoEE Sites Review, limited modifications have been made to the areas of a few British estuarine sites in order better to encompass known movements of local bird populations. These include: an expanded site 19 (Figure 2), renamed The Fleet/Wey; merger of Ore/Butley/Havergate and Alde, both parts of the same estuarine system, into the Ore complex (site 49/50); expansion of the Tees (site 56) to include the part of Hartlepool Bay formerly treated as a separate, non-estuarine site; merger of Findhorn/Culbin/Nairn into an expanded Inner Moray Firth (site 70/71); merger of Outer S Solway, formerly treated as a non-estuarine site, into an expanded Solway (site 84). As a result, the 112 British estuarine sites designated by Moser (1987) are reduced to 110 which, together with seven additional ones in Northern Ireland (Moser & Prys-Jones 1988), are treated in this report (Figure 2). As usual, where information is available on non-estuarine sites this is also incorporated, but such sites are clearly indicated by an asterisk (*).

The qualifying levels adopted in this report as signifying international importance for populations of wader species have been revised in accordance with the recommendations of Smit & Piersma (1989), who have produced an up-to-date appraisal of wader populations using the East Atlantic flyway. Explanation of the basis for the qualifying levels used for defining both the international and national importance of sites for waders is provided in the Appendix. In the "Species Accounts" and "Principal Sites" sections, it is necessary to bear in mind the distinction between sites *regularly* (i.e. based on five-year averages) holding wintering populations of national/international importance and those which may merely happen to exceed the appropriate qualifying levels in occasional winters. Use of the term "national importance" results in one anomaly which will require rectification when appropriate information becomes available, namely that the sites in Northern Ireland are considered in terms of what are strictly British qualifying levels.

COVERAGE

Of the 117 estuarine sites shown in Figure 2, no winter counts for seven were received in time for incorporation here: Gannel, Luce Bay, Kirkcudbright Bay, Rough Firth, Dulas Bay, Nyfer and Carmarthen Bay. For a further five sites, only incomplete counts were carried out during the winter: The Fleet/Wey, Swale, Medway, Humber and Lavan Sands. For all other sites, at least one, and normally four or five, complete counts were made during the winter.

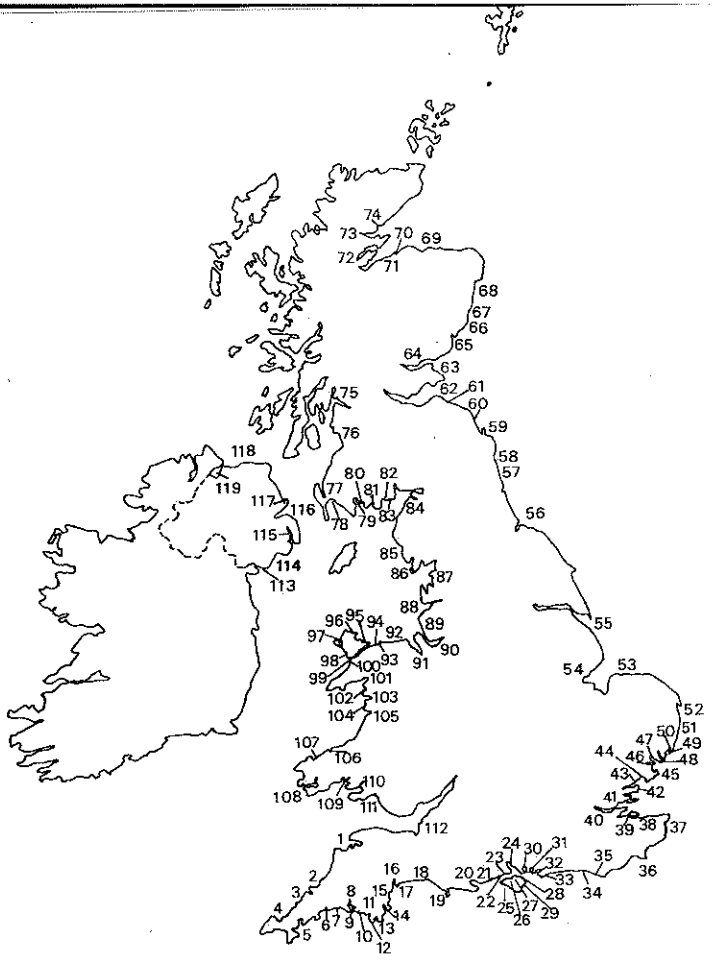

Figure 2. Map of the British Isles showing the locations of all estuaries considered in this report. Site numbers are as follows: 1 Taw/Torridge; 2 Camel; 3 Gannel; 4 Hayle; 5 Fal complex; 6 Fowey; 7 Looe; 8 Tamar complex; 9 Plym; 10 Yealm; 11 Erme; 12 Avon; 13 Kingsbridge; 14 Dart; 15 Teign; 16 Exe; 17 Otter; 18 Axe; 19 The Fleet/Wey; 20 Poole Harbour; 21 Christchurch Harbour; 22 NW Solent; 23 Beaulieu; 24 Southampton Water; 25 Yar; 26 Newtown; 27 Medina; 28 Wootton; 29 Brading Harbour; 30 Portsmouth Harbour; 31 Langstone Harbour; 32 Chichester Harbour; 33 Pagham Harbour; 34 Adur; 35 Newhaven; 36 Rye Harbour/Pett Levels; 37 Pegwell Bay; 38 Swale; 39 Medway; 40 Thames; 41 Crouch/Roach; 42 Dengie; 43 Blackwater; 44 Colne; 45 Hamford Water; 46 Stour; 47 Orwell; 48 Deben; 49/50 Ore complex; 51 Blyth; 52 Breydon Water; 53 N Norfolk Marshes; 54 Wash; 55 Humber; 56 Tees; 57 Blyth; 58 Coquet; 59 Lindisfarne; 60 Tweed; 61 Tyninghame; 62 Forth; 63 Eden; 64 Tay; 65 Montrose Basin; 66 Dee; 67 Don; 68 Ythan; 69 Spey; 70/71 Inner Moray Firth; 72 Cromarty Firth; 73 Dornoch Firth; 74 Loch Fleet; 75 Inner Clyde; 76 Irvine; 77 Loch Ryan; 78 Luce Bay; 79 Wigtown Sands; 80 Fleet Bay; 81 Kirkcudbright Bay; 82 Auchencairn Bay; 83 Rough Firth; 84 Solway; 85 Irt/Mite/Esk; 86 Duddon; 87 Morecambe Bay; 88 Ribble; 89 Alt; 90 Mersey; 91 Dee; 92 Clwyd; 93 Conwy; 94 Lavan Sands; 95 Red Wharf Bay; 96 Dulas Bay; 97 Inland Sea; 98 Cefni; 99 Braint; 100 Foryd Bay; 101 Traeth Bach; 102 Artro; 103 Mawddach; 104 Dysynni; 105 Dyfi; 106 Teifi; 107 Nyfer; 108 Cleddau; 109 Carmarthen Bay; 110 Burry; 111 Swansea Bay; 112 Severn; 113 Carlingford Lough; 114 Dundrum Bay; 115 Strangford Lough; 116 Belfast Lough; 117 Lough Larne; 118 Bann; 119 Lough Foyle.

DEVELOPMENTS IN THE ESTUARIES UNIT

The scope of studies drawing on Estuaries Unit data continues to diversify. Based in major part on BoEE data, Robert Prys-Jones and Jeff Kirby produced comprehensive reports for the NCC outlining the status of wader and wildfowl populations on the Burry (Prys-Jones *et al.* 1989) and Cleddau (Prys-Jones 1989) estuaries. The former site is notable in that the major part of it has been covered largely by a single stalwart counter, Bob Howells, since the inception of the BoEE in 1969! Kirby *et al.* (1988) reviewed the background to the enormous increase in the importance of the small Alt estuary to waders in recent years. A number of other studies, relating particularly to Scottish sites, further illustrated the value of BoEE and Winter Shorebird Count data. Notable among these were reviews of wader populations on Tiree and Coll (Madders & Moser 1989), the Shetland Islands (Summers *et al.* 1988b), Moray Basin (Swann & Mudge 1989) and the Aberdeen coastline (Bell 1989). Results from fieldwork on the late spring passage of Nearctic-breeding waders in the Uists, Western Isles, carried out in 1988 as a follow-up to the West Coast Spring Passage Project, were presented by Prys-Jones *et al.* (1988); in addition, some further work was carried out on Sanday, Orkney Islands, in spring 1989. The autumn of 1988 was notable in Britain and Ireland for the influx of Curlew Sandpipers that occurred, and the overview of the event by Kirby *et al.* (1989) drew heavily on the increasingly comprehensive BoEE counts now being carried out during passage periods.

In March 1989, Robin Ward completed the 15-month contract, funded by Dorset County Council, aimed at assessing the implications for intertidal birds of development proposals in Poole Harbour. Nigel Clark meanwhile had completed a major report (Clark 1989) from the first 18 months of studies in relation to the proposed Severn tidal barrage, funded by the Energy Technology Support Unit (ETSU) of the Department of Energy. This work, which incorporated comprehensive winter low-tide censuses by a group of about 40 counters, was successful to the extent that ETSU extended it to cover a further winter of fieldwork in 1988–89. In addition, ETSU awarded a further 24-month contract to the BTO under which Nigel Clark and a new Estuaries Unit staff member, Tom Mawdsley, have been carrying out similar studies on the Mersey spanning winter, spring and autumn in relation to a proposed tidal barrage there. This work, which began in winter 1988–89 and will continue in expanded form through winter 1989–90, has since assumed an added conservation significance as a result of the major oil spill which occurred in the Mersey in August 1989. Concern for the impact of tidal barrages on estuarine bird populations is not confined to the U.K., as studies such as that of Lambeck *et al.* (1989) in The Netherlands demonstrate.

A total of 46 requests for data was received during the 1988–89 season. As usual, the majority of these requests concerned the evaluation of the importance of particular sites or the provision of information in response to development proposals, and the most frequent user was the NCC. In addition, the Estuaries Unit provided both the NCC and RSPB with comprehensive summaries of BoEE results for use for conservation purposes. The Estuaries Unit's "Shorelines" feature in *BTO News* continued as a regular feature throughout the 1988–89 season, carrying major items on wader studies both in Britain (the Hebrides and the Severn estuary) and abroad (Australia, west Africa, the Soviet Union and the Baltic).

UNITED KINGDOM POPULATION TOTALS

Table 37 shows the total populations of each wader species counted in each winter month of 1988–89 in both Britain and Northern Ireland, along with the numbers of BoEE sites covered in each month. Recorded totals of the highly cryptic Jack Snipe and Snipe are likely to be far smaller than the populations of those species actually present on the BoEE sites covered, but for other species the figures should provide reliable population estimates.

The mid-winter (December-February) U.K. population averaged 17% higher than for the equivalent period in 1987–88, with both a high productivity in 1988 by species breeding in arctic Siberia and the outstandingly mild winter weather no doubt being major factors in this. The almost 1,500,000 waders counted in January 1989 appears to be a BoEE record, exceeding that of December 1985 (Salmon *et al.* 1987). Black-tailed Godwit numbers were well up on recent years, and Golden Plover and Lapwing numbers were both high overall and in Britain peaked unusually late (in January). Grey Plover numbers reaching over 40,000 in January were unprecedented, continuing the spectacular increase in the U.K. wintering population of this species.

Table 37. TOTAL NUMBERS OF WADERS RECORDED BY BOEE COUNTS IN THE UNITED KINGDOM DURING WINTER 1988/89

	November	December	January	February	March
BRITAIN					
Oystercatcher	234,779	244,565	269,563	227,722	106,919
Avocet	778	894	866	658	556
Ringed Plover	11,472	10,955	11,320	10,979	4,033
Golden Plover	28,220	37,267	44,907	24,884	17,240
Grey Plover	34,302	33,239	40,403	38,685	33,824
Lapwing	76,843	122,231	146,192	95,492	8,985
Knot	186,447	300,090	247,689	208,708	120,040
Sanderling	5,671	6,706	5,202	5,006	4,506
Little Stint	9	5	1	3	1
Curlew Sandpiper	6	0	0	0	0
Purple Sandpiper	1,165	1,513	2,165	2,116	1,605
Dunlin	367,877	396,855	423,683	466,231	179,272
Ruff	77	92	60	119	74
Jack Snipe	15	28	39	20	10
Snipe	3,083	2,880	2,857	2,066	1,428
Woodcock	0	0	1	1	0
Black-tailed Godwit	6,497	7,564	7,468	5,398	5,725
Bar-tailed Godwit	37,448	42,352	45,560	40,657	12,181
Whimbrel	9	4	5	4	50
Curlew	48,144	51,825	66,028	68,885	40,543
Spotted Redshank	67	50	102	92	49
Redshank	69,997	73,375	80,156	73,130	49,281
Greenshank	206	157	171	156	136
Green Sandpiper	29	26	31	26	17
Common Sandpiper	16	14	15	14	9
Turnstone	14,734	15,588	17,199	15,341	11,719
Total	1,127,891	1,348,275	1,411,683	1,286,393	598,203
No.of sites counted	167	193	197	197	151
NORTHERN IRELAND					
Oystercatcher	13,832	13,873	15,600	9,645	5,320
Ringed Plover	943	1,357	1,029	663	315
Golden Plover	9,812	12,458	3,033	1,413	3,654
Grey Plover	147	257	169	122	26
Lapwing	12,628	25,884	21,791	6,398	730
Knot	985	482	1,243	1,917	837
Sanderling	0	0	1	0	0
Little Stint	0	1	0	0	0
Purple Sandpiper	147	117	180	68	104
Dunlin	8,696	11,448	14,108	11,398	5,106
Ruff	6	4	1	3	1
Jack Snipe	16	3	0	0	0
Snipe	136	276	128	79	98
Long-billed Dowitcher	1	0	1	0	0
Black-tailed Godwit	237	173	310	133	179
Bar-tailed Godwit	1,727	1,674	3,060	3,912	457
Whimbrel	1	0	0	0	0
Curlew	6,787	7,018	8,021	7,166	1,826
Spotted Redshank	0	1	0	0	0
Redshank	6,306	7,043	6,663	4,371	3,601
Greenshank	99	89	95	46	40
Turnstone	2,741	2,607	3,059	1,994	2,168
Total	65,247	84,765	78,492	49,328	24,462
No. of sites counted	7	8	8	6	6
U.K. Total	1,193,138	1,433,040	1,490,175	1,335,721	622,665

INDICES OF WINTERING NUMBERS

The geographical coverage achieved by the BoEE varies from year to year; it is not therefore possible to derive satisfactory data on population changes between winter seasons simply by examining totals of birds counted. To overcome this problem, an index of wintering numbers has been devised, based on the January counts. The indices have been calculated by the same method as for wildfowl (see Table 7), except that 1973 is used as the arbitrary "anchor" year. Species which occur in small total numbers only are excluded. Lapwing and Golden Plover are also excluded because such a high proportion of the population occurs on inland fields; as a result, the indices are highly sensitive to cold weather movements rather than reflecting true changes in population levels from year to year.

Table 38 shows the five-year mean indices for the period 1971–85, followed by the indices for 1986, 1987, 1988 and 1989. Population increases in January 1989 of 10% or more over the preceding year occurred for Oystercatcher (+10%), Ringed Plover (+31%), Grey Plover (+29%) and Dunlin (+21%), whereas Sanderling (–21%) and Bar-tailed Godwit (–12%) populations declined by over 10%. The increases in Grey Plover and Dunlin appear particularly significant, with the former continuing its inexorable rise and the latter showing signs of climbing from the low levels it reached in the mid 1980s. However, for all species it should be borne in mind that whereas long-term trends in index values almost certainly indicate real changes in overall wintering populations, the same cannot necessarily be concluded from short-term fluctuations.

Table 38. JANUARY INDICES FOR WADER POPULATIONS IN THE UNITED KINGDOM, 1971–89

	Mean 1971 to 75	Mean 1976 to 80	Mean 1981 to 85	1986	1987	1988	1989
Oystercatcher	116	158	173	203	171	215	238
Ringed Plover	107	129	141	162	105	129	169
Grey Plover	115	157	173	221	199	299	386
Knot	112	84	83	92	82	88	92
Sanderling	129	120	107	104	85	103	81
Dunlin	101	93	71	68	55	64	77
Bar-t.Godwit	101	137	184	166	190	161	142
Curlew	119	103	93	75	69	108	101
Redshank	100	97	77	78	69	100	109
Turnstone	118	143	130	192	144	173	181

SPECIES ACCOUNTS

The tables presented in this section rank the principal sites, including all internationally important ones, for each species in the United Kingdom on the basis of the average winter maxima recorded over the last five seasons. Incomplete counts presented for individual years are bracketed. The five-year averages for each site were in the first instance calculated using only complete counts, but if any incomplete counts exceeded this initial average they were then also incorporated in order to give the best possible estimate of the average winter peak count.

Oystercatcher *Haematopus ostralegus*

The January population index for Oystercatchers again increased to a new record level in 1989, being 10% higher than in January 1988. A continuing increase in wintering populations has also occurred elsewhere in western Europe (Smit & Piersma 1989), resulting in the qualifying level for international importance being raised to 9,000. On this basis, seven sites in the U.K. certainly rank as internationally important, and the Forth might well be found to do so if more complete data were available for it (Table 39). As in the previous winter, the Wash and Ribble again held notably large numbers of Oystercatchers, the Wash count being much the highest ever at this site.

Goss-Custard (1988) has summarized recent work, much of it his own, on how foraging efficiency and competitive success of Oystercatchers feeding on mussels vary between individuals and with age. The available data indicate a complex web of interactions, with aggressiveness and foraging technique (stabbing or hammering) both playing important roles. One interesting implication of the results is that "stabbers", a category into which most juveniles fall, are more likely to be at risk than "hammerers" during cold weather. Branson (1989) has also considered Oystercatcher mortality, in this case of the population which winters on the Wash and breeds in Norway. Using a simple model incorporating age-independent mortality, he suggests that their mortality rate is c. 14% per year, giving an average life expectancy of c. 7 years to an Oystercatcher which reaches adulthood.

Table 39. OYSTERCATCHER: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Morecambe Bay	54,366	49,700	(45,395)	61,664	50,776	(Nov)	54,126
Solway	40,396	27,235	(21,897)	(32,916)	28,536	(Jan)	32,270
Wash	25,820	29,159	23,202	35,421	46,912	(Jan)	32,102
Dee (Eng/Wales)	29,000	38,000	24,600	28,890	27,397	(Jan)	29,577
Burry	16,550	19,420	21,390	19,334	14,980	(Dec)	18,334
Thames	(10,832)	19,258	13,703	(9,438)	8,295	(Mar)	13,752
Ribble	7,417	9,332	10,963	15,062	19,271	(Jan)	12,409
Forth	(6,575)	(8,121)	(8,807)	(7,574)	(7,600)	(Nov)	(8,807)
Inner Moray Firth	6,075	6,429	8,376	5,423	4,901	(Jan)	6,240
Duddon	4,488	6,627	6,933	6,650	6,401	(Nov)	6,219

Avocet *Recurvirostra avosetta*

The peak monthly U.K. total of 894 Avocets recorded during the exceptionally mild 1988–89 winter was well up on any previous BoEE count. However, although there are no indications of a more general recent increase in western European wintering populations (Smit & Piersma 1989), more complete surveys of Avocets present have resulted in the raising of the qualifying level for international importance to 700, which no U.K. site as yet attains. The Ore complex continues to hold the main concentration, but small numbers of birds are becoming increasingly widely distributed. In addition to those shown in Table 40, sites holding 10 or more birds in winter 1988/89 were the Wash (46 in March), Medway (38 in December) and Swale (18 in November).

Table 40. AVOCET: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Ore complex	(308)	334	(411)	285	514	(Nov)	386
Exe	141	135	121	152	229	(Jan)	156
Tamar complex	95	96	172	132	90	(Feb)	117
Hamford Water	16	38	26	(64)	85	(Nov)	45
Poole Harbour	12	0	59	48	65	(Feb)	37
Thames	(27)	22	36	22	40	(Nov)	30

Ringed Plover *Charadrius hiaticula*

Ringed Plovers wintering in western Europe comprise that proportion of the race *hiaticula* which breeds in western Europe, including southern Scandinavia. Birds breeding further north, both *tundrae* and *hiaticula* (including those from Iceland), winter mainly in west Africa (Smit & Piersma 1989). More complete surveys in recent years of the European wintering population have resulted in the qualifying level for international importance being raised to 500. The nine U.K. sites which currently qualify are shown in Table 41, along with the top nationally important site, the Colne. In addition, in winter 1988–89 the Solway held 580 birds in February and the Blackwater 564 in January. The overall January index for Ringed Plovers was up by 31% in 1989 relative to a year earlier, reaching its highest level on record.

A substantial passage through the U.K. of the much larger numbers of Ringed Plovers wintering south of Europe occurs during autumn and spring. Site coverage at these times is less complete, especially during the spring, but during 1988–89 over 1,000 birds were recorded during autumn at the Wash (2,686 in August), Lindisfarne (1,340 in October), Medway (1,168 in September), Solway (1,130 in August) and Severn (1,051 in August) and during spring at the Ribble (1,485 in May). These totals of course take no account of population turnover and can provide only a minimum impression of site importance during passage periods.

Herrmann & Holz (1988) have recently used three independent methods in order to estimate the annual mortality of Ringed Plovers in north-central Europe. For adult birds, ringing recoveries gave the highest apparent mortality (40% annually) whereas capture-recapture (resighting) data provided the lowest value (17% annually). The authors conclude that the latter estimate is closest to the true situation, with ring loss being a major problem in ringing recovery analysis.

Table 41. RINGED PLOVER: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Medway	1,285	(539)	(571)	(1,003)	(971)	(Dec)	1,285
Tiree *	987	555	872	x	x		805
Thames	(463)	821	(955)	(505)	540	(Feb)	772
Outer Ards *	571	693	630	710	(753)	(Dec)	671
Chichester Hbr.	(572)	341	624	x	924	(Nov)	629
Morecambe Bay	(1,083)	322	(348)	514	497	(Feb)	604
Langstone Hbr.	391	640	460	615	542	(Nov)	529
Lindisfarne	483	716	216	480	720	(Nov)	523
Orwell	620	782	292	243	625	(Feb)	512
Colne	(550)	(401)	382	469	403	(Dec)	451

Golden Plover *Pluvialis apricaria*

Golden Plover numbers on BoEE sites in winter 1988–89 reached almost 50,000 in December, 12% up on the peak count of the preceding winter. The mild prevailing weather no doubt contributed both to this and to the fact that good numbers remained on BoEE sites well into the New Year. The Humber is the only BoEE site of international importance for wintering Golden Plovers, but six further sites currently rank as nationally important (Table 42). In addition to these, Lindisfarne (4,000 in January), the Wash (3,568 in January) and Dengie (2,646 in March) all had peak counts exceeding 2,000 in winter 1988–89.

Table 42. GOLDEN PLOVER: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Humber	(7,414)	(6,846)	(10,233)	(14,219)	(10,346)	(Jan)	(14,219)
Strangford Lough	13,510	7,277	6,454	7,333	9,972	(Dec)	8,909
Ribble	3,630	4,333	4,291	3,660	5,111	(Jan)	4,205
Solway	3,190	3,021	(2,323)	2,762	(4,360)	(Nov)	3,333
Taw/Torridge	3,350	2,178	1,458	1,050	1,652	(Dec)	2,457
Crouch/Roach	1,169	2,420	(800)	(825)	2,860	(Nov)	2,150
Chichester Hbr.	(1,386)	2,441	1,971	x	1,850	(Jan)	2,087

Grey Plover *Pluvialis squatarola*

Grey Plover numbers recorded on BoEE sites in a single winter month exceeded 30,000 for the first time in winter 1987–88; in winter 1988–89, however, they exceeded 40,000! A further major rise of 29% brought the January index in 1989 to approaching four times its 1973 level. A continuing increase in Grey Plover wintering numbers has also been occurring elsewhere in Europe, notably in the Wadden Sea and the Dutch delta, with the result that the qualifying level for international importance has had to be revised upwards to 1,500 (Smit & Piersma 1989). Eight U.K. sites currently attain this level and are listed in Table 43 along with the top two nationally important sites; more complete coverage of the Humber would probably reveal that it is in fact internationally important for Grey Plover. Other sites having peak counts exceeding 1,500 birds in winter 1988–89 were Langstone Harbour (1,870 in February) and Lindisfarne (1,825 in November). In addition to its prime position during the winter months (Table 43), the Wash is also enormously important to Grey Plovers during passage periods, with peak counts of about 10,000 birds present in both autumn 1988 and spring 1989.

Studying Grey Plovers at Teesmouth, Evans & Townshend (1988) found that among juveniles they marked in autumn 1984, individuals that apparently emigrated shortly after capture were significantly smaller but heavier than those which subsequently overwintered. They interpret this as showing that these early emigrants were "pre-programmed" to migrate and had therefore stored premigratory fat. They further found that birds which emigrated later in autumn/early winter consisted of two groups: one with high masses and of similar size to the early emigrants, and a second group of significantly larger birds but with lower body masses. They suggest that these later emigrants contained both smaller individuals pre-programmed to migrate farther and larger birds that were displaced by competition.

Table 43. GREY PLOVER: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Wash	5,343	4,600	5,512	8,385	9,054	(Mar)	6,578
Thames	(2,998)	1,947	(4,411)	4,884	8,486	(Feb)	5,105
Ribble	2,177	1,963	2,048	3,872	3,539	(Dec)	2,719
Medway	1,813	(1,134)	(1,121)	(2,534)	(3,209)	(Nov)	2,518
Swale	2,971	(1,748)	(420)	1,409	(1,362)	(Jan)	2,190
Morecambe Bay	(1,055)	1,846	(1,167)	1,146	3,062	(Jan)	2,018
Chichester Hbr.	2,048	1,243	1,631	x	2,791	(Feb)	1,928
Dee (Eng/Wales)	2,070	1,975	1,607	1,800	1,270	(Jan)	1,744
Humber	(1,031)	(952)	(891)	(365)	(1,425)	(Nov)	(1,425)
Stour	783	1,122	1,430	1,629	1,761	(Nov)	1,345

Lapwing *Vanellus vanellus*

Peak numbers of Lapwing recorded in winter 1988–89 were 10% up on those of the preceding year, the exceptionally mild weather being almost certainly the major contributory factor. No BoEE site in the U.K. is internationally important for this predominantly inland species, but four regularly hold over 10,000 wintering individuals and are thus nationally important. Table 44 lists all sites regularly holding over 7,500 birds; in addition, the Thames held 7,988 Lapwing in February 1989. The totals of over 20,000 individuals recorded on each of the neighbouring Morecambe Bay and Ribble estuaries in January 1989 are probably the highest counts of this species ever recorded on any BoEE site.

Table 44. LAPWING: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Morecambe Bay	(13,077)	10,635	(9,520)	6,672	26,327	(Jan)	14,544
Strangford Lough	15,729	14,839	6,740	18,057	13,592	(Dec)	13,791
Humber	(10,418)	(6,421)	(6,306)	13,165	(12,644)	(Dec)	13,165
Ribble	13,562	9,445	8,917	10,883	21,174	(Jan)	12,796
Swale	5,037	(4,036)	(2,968)	11,184	(3,445)	(Dec)	8,110
Solway	9,096	4,810	(8,456)	(7,959)	(6,883)	(Nov)	7,580

Knot *Calidris canutus*

Knot wintering in Europe belong to the subspecies *islandica*, which breeds in the Nearctic, whereas the Siberian-breeding *canutus* winter in Africa. The January 1989 index for the U.K. wintering population was 5% up relative to that of a year earlier. The qualifying level for wintering populations of Knot in Europe has remained unchanged at 3,500, which is exceeded at 16 U.K. sites; these are listed in Table 45 together with the top nationally important site. Particularly striking features are the continuing increase in Knot wintering on the Ribble and the collapse of the population on Strangford Lough. No BoEE site additional to those listed held over 3,500 birds in winter 1988–89.

The world-wide migrations of Knot continue to attract numerous studies by wader enthusiasts, and these recently culminated in a one-day workshop on "Recent advances in understanding Knot migrations" held in conjunction with the 8th International Waterfowl Feeding Symposium and the Wader Study Group Annual Meeting at Ribe, Denmark, in September 1989. A suite of papers arising from this should appear in the *Wader Study Group Bulletin* in 1990. Publications appearing during the past year include two on weight variations among birds present in the far north of Britain, on the Western Isles (Buxton 1989) and the Moray Basin (Swann & Etheridge 1989) respectively, which make for interesting comparisons with results obtained from further south. Further afield, Underhill *et al.* (1989) report significant associations between the proportions of juvenile Knot wintering in different years in southern Africa and lemming abundance on the Taimyr peninsula. In the absence of any relevant breeding season ringing recoveries, they suggest that this points to a north-central Siberian provenance for the southern African wintering population. Over in the Americas, Knot of the subspecies *rufa* winter principally in two discrete areas, the Atlantic coast of Patagonia and the Gulf coast of Florida. Harrington *et al.* (1988) report work indicating both that there is no apparent interchange between these groups and that the annual survival rate of Knots marked in Florida is twice that of marked Knots that winter in Patagonia.

Table 45. KNOT: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Wash	77,050	117,886	83,340	93,666	75,921	(Nov)	89,572
Alt	40,303	42,000	46,000	40,000	45,000	(Jan)	42,660
Ribble	9,963	22,098	27,007	52,400	60,030	(Dec)	34,299
Humber	25,317	(23,647)	(29,247)	22,438	(38,465)	(Dec)	28,866
Morecambe Bay	18,146	27,954	(28,081)	23,968	25,229	(Feb)	24,675
Thames	(21,546)	16,147	(25,826)	(20,794)	30,160	(Jan)	24,044
Dee (Eng/Wales)	19,500	22,230	12,170	18,860	13,132	(Mar)	17,178
Strangford Lough	18,977	21,450	8,700	2,918	1,745	(Feb)	10,758
Forth	(7,718)	(4,478)	(8,145)	9,803	10,810	(Jan)	10,306
Dengie	(120)	5,000	10,280	5,200	6,390	(Feb)	6,717
Solway	7,191	4,654	(3,070)	(6,668)	(7,311)	(Feb)	6,456
N Norfolk Marshes	(6,121)	5,240	4,930	(4,200)	6,260	(Dec)	5,637
Tees	5,410	6,462	4,640	5,030	4,484	(Dec)	5,205
Burry	3,550	4,900	7,100	5,740	1,920	(Jan)	4,642
Duddon	140	750	12,000	5,500	600	(Feb)	3,798
Montrose Basin	4,000	10,000	2,000	450	2,000	(Jan)	3,690
Swale	1,753	(4,612)	(1,750)	1,904	(3,503)	(Nov)	2,943

Sanderling *Calidris alba*

The January 1989 population index for Sanderling was 21% down relative to that of a year earlier. Sanderling breeding in both Siberia and the Nearctic move down into Europe in early autumn, with most subsequently spreading out for the winter along the Atlantic coast of Africa. Information linking breeding and wintering areas is both limited and somewhat confusing, but apparently the two breeding populations mix to at least some extent in winter. Discrete wintering populations therefore cannot presently be differentiated: in conjunction with the discovery of new concentrations of birds in the more complete surveys of recent years, this means that the qualifying level for international importance for the species has been substantially raised to 1,000 (Smit & Piersma 1989). In the U.K. only the Ribble exceeds this, with the remaining sites in Table 46 comprising the main nationally important wintering populations.

Numerous Sanderling pass through the U.K. in autumn and spring en route to and from wintering sites further south. BoEE counts provide only minimum estimates of site usage at such times because population turnover is rapid and site coverage relatively poor, especially during the spring. Sites with peak counts exceeding 1,000 birds in autumn 1988 were the Ribble (3,300 in August), the Wash (1,652 in July) and the Alt (1,252 in August). In spring 1989, the only BoEE counts exceeding 1,000 were on the Ribble which recorded 2,236 birds in April and 5,051 in May.

Myers *et al.* (1988) have studied both intra- and inter-year dispersal of colour-marked Sanderling during the non-breeding season in California and Peru. Site-faithfulness at both sites was strong, but the South American birds both moved more widely within a given season and showed greater dispersal between years.

Table 46. SANDERLING: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Ribble	1,431	2,038	1,193	2,801	3,574	(Dec)	2,207
Thanet *	x	x	659	722	572	(Feb)	651
Wash	802	427	768	572	435	(Mar)	600
Alt	555	326	727	625	429	(Jan)	532
Tay	(232)	750	560	362	336	(Mar)	502
Humber	(412)	(270)	(408)	461	(472)	(Nov)	466
Tees	490	476	800	200	252	(Dec)	443
Duddon	606	238	291	447	388	(Feb)	394
Tiree *	402	305	353	x	x		353
Chichester Hbr.	600	291	206	x	300	(Mar)	349

Little Stint *Calidris minuta*

The only BoEE counts of more than two Little Stints made in winter 1988–89 were on the Swale (4 in November and December). A better than average autumn passage occurred in 1988, with sites having peak counts of 20 or more birds comprising the Wash (87 in August and 135 in October), the Humber (35 in September), Severn (32 in September) and Forth (31 in September). In addition to problems of population turnover, the species is probably substantially undercounted because of its small size and tendency to associate with commoner small waders.

Curlew Sandpiper *Calidris ferruginea*

The only BoEE site recording more than a single Curlew Sandpiper in winter 1988–89 was the Dee (Eng/Wales) which had 3 in November. There was a notably good autumn passage in 1988 which has been summarized in detail by Kirby *et al.* (1989). BoEE counts of 50 or more birds (all in September except as indicated) were recorded on the Wash (253 in August and 68 in September), Humber (169), Severn (100), Forth (83), Colne (82), Swale (68), Tyninghame (50) and Montrose Basin (50).

Purple Sandpiper *Calidris maritima*

Purple Sandpipers are not monitored adequately by BoEE counts because most birds are spread out along open rocky coasts, with under 5% of the British wintering population occurring on estuaries (Moser 1987). Considering all sites counted during the 1988–89 winter, none held internationally important numbers and only five exceeded 160, the qualifying level for national importance. In rank order, these latter comprised the Tees, Rosehearty-Fraserburgh* (Grampian), Budle Pt.-Seahouses* (Northumberland), Port Gordon-Buckie* (Grampian) and Ayre-Deerness* (Orkney), all sites in the north-east of Britain.

Following up the work of Nicoll *et al.* (1988) on the population structure of Purple Sandpipers wintering in Britain, Summers *et al.* (1988a) have investigated further the possibility that the "long-billed" birds found to winter in the north and west of Britain may breed in Iceland. Biometrical data from Icelandic breeding birds are significantly different from those of the British wintering population, implying little or no interchange between the two. Instead, winter sightings of colour-marked Icelandic Purple Sandpipers near their breeding sites suggest most or all are resident in Iceland, where a large wintering population is known to occur. The authors conclude by speculating that the provenance of the British "long-billed" birds is Greenland and/or Canada.

Dunlin *Calidris alpina*

Almost all Dunlin wintering in Europe are of the race *alpina*, for which Smit & Piersma (1989) have fixed a revised qualifying level for international importance of 14,000. Unlike in Britain and Ireland, these authors find that numbers in continental Europe appear to have changed little in recent years, and the species remains the most abundant coastal wader. Following a good breeding season, the January 1989 BoEE population index for Dunlin showed a welcome 21% increase over that of the preceding year, continuing its rise from the low levels of 1987. Thirteen sites in the U.K. currently rank as internationally important for wintering Dunlin, and these are listed in Table 47 along with the top nationally important site. The 1988–89 winter peak counts for the Wash and Medway were the largest ever for these sites. In addition, the Ribble held 16,684 Dunlin in March and the Burry had an unprecedented 15,436 in February. Although Prys-Jones *et al.* (1989) summarized evidence from low tide surveys that BoEE counts may underestimate wintering Dunlin present on the Burry, this count was three times normal levels and must have resulted from a short-term influx.

Gromadzka (1989) has reviewed the breeding and wintering areas of Dunlin migrating through the Baltic. Most autumn passage birds winter in western Europe, including the U.K., but some migrate south-east to winter in the eastern Mediterranean. Ruiz *et al.* (1989) have studied a wintering Dunlin population in Bodega Bay, California, finding structure on two different scales. In early winter, significantly smaller individuals and a higher proportion of juveniles were found on the periphery of a night roost relative to its centre. In late winter, the entire population separated into "resident" and "mobile" groups, the latter roosting elsewhere; the resident birds weighed less, had lower amounts of body fat, and were delayed in moult schedule relative to the mobile birds. Raptor predation on Dunlin has also come under the spotlight, with studies reported from both eastern Britain (Whitfield *et al.* 1988) and the north-western U.S.A. (Buchanan *et al.* 1988).

Table 47. DUNLIN: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Wash	38,139	41,105	37,257	46,239	65,679	(Nov)	45,683
Severn	(34,746)	(34,193)	(25,410)	44,580	44,311	(Feb)	44,446
Morecambe Bay	(50,211)	33,912	(36,404)	40,409	42,987	(Feb)	41,879
Langstone Hbr.	30,250	27,700	25,800	32,900	31,700	(Feb)	29,670
Humber	21,635	(32,026)	(28,089)	(16,090)	(21,899)	(Jan)	25,912
Thames	(13,296)	18,893	(34,987)	(23,892)	19,279	(Nov)	24,262
Mersey	34,700	25,000	12,000	16,040	22,000	(Jan)	21,948
Chichester Hbr.	(27,028)	26,997	19,361	x	12,915	(Nov)	21,575
Medway	18,366	(8,412)	14,777	(19,663)	(28,569)	(Dec)	20,343
Blackwater	(21,800)	16,700	16,400	11,265	19,785	(Dec)	17,190
Stour	20,854	15,466	11,852	16,134	16,154	(Nov)	16,092
Swale	18,014	(15,470)	(4,520)	13,276	(13,610)	(Nov)	15,645
Dee (Eng/Wales)	12,000	12,230	12,300	19,490	16,772	(Jan)	14,558
Solway	15,157	12,253	(5,498)	(10,160)	(12,443)	(Feb)	13,705

Ruff *Philomachus pugnax*

BoEE counts of Ruff in winter 1988–89 peaked at 122 birds in February, very similar to that of winter 1987–88 despite the fact that the important site of Bracklesham Bay* (West Sussex) was not covered. Numbers recorded at Pagham Harbour, the only nationally important coastal site, continue to decline: a peak of only 15 in winter 1988–89 means that its five-year average peak count is now 65. Five estuaries, all in eastern or southern England, held 20 or more birds during winter 1988–89: Breydon Water (45 in December), Swale (36 in February), Wash (31 in November), Chichester Harbour (25 in November) and Southampton Water (21 in February). The Humber (243 in September) and Forth (51 in September) were the only BoEE sites with recorded passage totals exceeding 50.

Castelijns *et al.* (1988) provide an interesting review of the status of wintering Ruff in western Europe. A considerable increase in numbers has occurred in the south-west Netherlands and north-west Belgium since the mid 1970s, with an average of 2,000 birds (almost all adult males) recorded during the early 1980s. Combined data from wintering areas in France, the U.K., The Netherlands and Belgium suggest that the western European population now totals at least 4,000.

Jack Snipe *Lymnocryptes minimus*

Jack Snipe are so difficult to census that BoEE counts can provide no more than evidence of occurrence. Not only do they resemble the much commoner Snipe, but they are also exceptionally difficult to flush from cover. Working in Denmark, Pedersen (1988) found that of 44 Jack Snipe flushed in front of a moving observer, none flew at more than six metres and almost all (42) not until they were within two metres. Among BoEE sites, only Morecambe Bay (12 in November) and the Orwell (10 in January) had peak counts of 10 or more individuals in winter 1988–89.

Snipe *Gallinago gallinago*

Snipe numbers counted on BoEE sites in winter 1988–89 peaked at just over 3,200 in November, slightly less than the peak count of the preceding winter. Five sites held 200 or more individuals: Morecambe Bay (402 in November), Southampton Water (328 in January), Colne (307 in March), Thames (209 in January) and Rye Harbour/Pett Levels (208 in November).

Black-tailed Godwit *Limosa limosa*

The total of over 7,750 Black-tailed Godwit recorded on the January 1989 BoEE count is a winter record, being 36% up on the peak count of winter 1987–88. The U.K. wintering population belongs to the race *islandica*, which breeds mainly in Iceland and winters along the Atlantic coast of Europe. Based on recent population information, Smit & Piersma (1989) have revised the qualifying level for international importance for this subspecies to 700 birds. Six U.K. sites exceed this (Table 48), with the other sites listed being the top nationally important ones. During passage periods in 1988/89, particularly notable concentrations of Black-tailed Godwit were recorded on the Ribble (peaks of 3,714 in August and 1,759 in April), Medway (1,560 in September and 838 in April), Langstone Harbour (892 in September) and the Wash (719 in July).

Table 48. BLACK-TAILED GODWIT: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Ribble	1,280	2,110	560	1,497	2,490	(Jan)	1,587
Stour	945	1,660	906	1,067	1,080	(Jan)	1,131
Colne	(220)	(300)	(445)	500	1,400	(Dec)	950
Langstone Hbr.	1,037	906	1,019	869	761	(Nov)	918
Hamford Water	240	580	1,477	(250)	1,010	(Nov)	826
Poole Hbr.	791	682	569	874	1,099	(Mar)	803
Chichester Hbr.	395	467	521	x	1,125	(Nov)	627
Exe	756	617	582	520	542	(Jan)	603
Dee (Eng/Wales)	371	430	773	400	552	(Feb)	505
Southampton Water	319	407	306	(750)	427	(Dec)	441

Bar-tailed Godwit *Limosa lapponica*

The January 1989 BoEE index for Bar-tailed Godwit was 12% lower than in 1988. Reviewing information on the species along the East Atlantic flyway, Smit & Piersma (1989) consider there is a clear segregation of birds into two wintering areas: one group, which probably breeds from northern Scandinavia eastwards to the White Sea, winters mainly around the North Sea; the other group, which probably breeds further east in Siberia, winters mainly along the west African coast. In the light of this, they fix a qualifying level for international importance for the European wintering population of 1,000, substantially lower than the previous level. Populations of Bar-tailed Godwits on thirteen U.K. sites regularly exceed this level, and these are listed in Table 49 along with the top nationally important site. The only additional site to hold over 1,000 birds in winter 1988–89 was Strangford Lough (1,074 in February).

Table 49. BAR-TAILED GODWIT: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Ribble	7,461	13,880	10,836	16,756	7,898	(Feb)	11,366
Wash	7,846	8,204	12,809	10,691	8,403	(Nov)	9,590
Alt	4,503	4,956	11,310	9,001	7,902	(Feb)	7,534
Lindisfarne	4,765	9,600	8,900	7,000	6,010	(Jan)	7,255
Thames	(16,217)	3,277	(5,066)	2,076	3,304	(Feb)	5,988
Solway	4,185	4,557	(5,761)	(2,310)	7,315	(Jan)	5,454
Forth	(3,396)	(4,509)	(2,663)	(3,621)	3,372	(Jan)	3,724
Morecambe Bay	5,301	4,105	2,877	3,570	1,844	(Nov)	3,539
Lough Foyle	3,300	3,842	3,210	651	2,520	(Feb)	2,704
Inner Moray Firth	2,910	2,326	3,418	2,308	1,465	(Dec)	2,485
Tay	(230)	1,540	1,615	1,200	1,835	(Dec)	1,548
Humber	1,558	(1,603)	(1,681)	659	(1,054)	(Jan)	1,375
Eden	970	1,664	1,800	900	892	(Jan)	1,245
Chichester Hbr.	913	1,064	985	x	890	(Nov)	963

Whimbrel *Numenius phaeopus*

Only minute numbers of Whimbrel winter in the U.K. In 1988–89, the only site holding more than two wintering birds was the Wash (45 in March), and these were presumably early passage birds following the mild prevailing weather. Passage populations are considerably larger. Sites recording peak counts of 50 or more birds in either autumn 1988 or spring 1989 were the Wash (572 in July and 192 in May), Medway (116 in July and 62 in May), Burry (54 in July and 346 in May), Cleddau (105 in August), Severn (66 in July), Lindisfarne (62 in August), Langstone Harbour (57 in August) and Morecambe Bay (50 in August).

Curlew *Numenius arquata*

The January 1989 BoEE index for Curlew was 7% lower than that of 1988. Reassessment of the overall population size of Curlew along the East Atlantic flyway has led to a new qualifying level for international importance of 3,500 birds (Smit & Piersma 1989). Six BoEE sites currently achieve this status, with the Dee (Eng/Wales) falling only just short. Table 50 includes all sites regularly supporting wintering populations of 2,000 or more birds.

Table 50. CURLEW: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Morecambe Bay	10,979	7,715	(9,897)	12,888	9,849	(Jan)	10,357
Solway	6,663	6,041	(4,455)	(8,248)	(3,757)	(Mar)	6,984
Humber	(2,065)	(3,095)	(2,370)	4,107	(2,704)	(Feb)	4,107
Wash	3,500	5,149	2,265	4,814	3,796	(Feb)	3,904
Thames	(2,719)	2,808	(4,864)	(3,698)	3,492	(Feb)	3,715
Severn	(3,301)	(2,777)	(3,416)	4,576	2,706	(Dec)	3,641
Dee (Eng/Wales)	2,526	4,680	3,510	3,840	2,474	(Feb)	3,406
Lough Foyle	2,800	4,323	1,670	2,370	3,000	(Nov)	2,832
Forth	(1,452)	(1,540)	(2,141)	(2,161)	(2,709)	(Feb)	(2,709)

Spotted Redshank *Tringa erythropus*

A peak monthly BoEE count for winter 1988–89 of 102 Spotted Redshank in January was almost twice that for 1987–88. Sites holding 10 or more wintering birds were Tamar complex (23 in January), Medway (22 in January), Thames (22 in February), Dee (Eng/Wales) (20 in January), Severn (13 in February), Fal complex (13 in February), Beaulieu (10 in November) and Cleddau (10 in December). During autumn passage in 1988, three sites recorded over 50 individuals: Swale (150 in August), Medway (147 in September) and Wash (111 in September).

Redshank *Tringa totanus*

The January 1989 BoEE index for Redshank was 8% up on that of 1988. Smit & Piersma (1989) have concluded that two populations of Redshank can be distinguished within the area of the East Atlantic flyway: a north-west European wintering population, composed primarily of Icelandic, Faeroese, British and Irish breeding birds, and a western European/west African wintering population comprising primarily continental European breeding birds. For each of these they suggest a qualifying level for international importance of 1,500 birds. Twenty-three BoEE sites regularly exceed this, and these are listed in Table 51 along with the top nationally important site. Sites additional to those listed which held 1,500 birds or more in winter 1988–89 were Poole Harbour (1,997 in February), Montrose Basin (1,983 in January) and Cleddau (1,603 in November).

Summers *et al.* (1988c) have discussed methods for estimating the proportions of Icelandic and British Redshanks in mixed populations wintering on British coasts. They are visually indistinguishable, but differ in average wing, bill and foot measurements. Two methods, discriminant analysis and maximum likelihood analysis, both resulted in similar estimates of the proportions of Icelandic Redshanks when used on mixed samples. Estimates from captured samples in eastern Scotland indicated that there is an equal mix of Icelandic and British Redshanks in autumn, but that almost the entire winter population is Icelandic. On the Western Isles of Scotland, Buxton (1988) suggests that the winter population of about 1,000 birds comprises about one quarter local breeders and three quarters Icelandic birds. Working in south-east Scotland, Whitfield *et al.* (1988) found Redshank to be the wader species most vulnerable to raptor predation, with 15–20% of the wintering population, including a disproportionately large number of juveniles, being taken annually at two study sites over five site years.

Table 51. REDSHANK: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Dee (Eng/Wales)	3,000	4,510	9,220	9,930	8,035	(Mar)	6,939
Morecambe Bay	5,995	(7,802)	(5,806)	6,575	7,151	(Jan)	6,880
Wash	5,124	5,566	3,346	7,501	4,619	(Mar)	5,231
Humber	(2,896)	(3,588)	(3,145)	(4,295)	(2,671)	(Dec)	(4,295)
Thames	(5,105)	3,866	(3,872)	3,563	3,280	(Dec)	3,937
Medway	2,844	(2,424)	(2,926)	(3,557)	(5,087)	(Jan)	3,603
Forth	(1,925)	2,475	(3,067)	(4,952)	3,464	(Jan)	3,489
Lindisfarne	2,400	4,041	3,500	3,800	3,100	(Jan)	3,368
Swale	2,500	(3,730)	(910)	2,492	(3,714)	(Nov)	3,109
Severn	(2,150)	(1,803)	(1,908)	3,286	2,627	(Dec)	2,956
Mersey	1,855	1,620	3,300	4,100	2,930	(Dec)	2,761
Inner Clyde	3,169	3,051	2,423	2,798	2,243	(Mar)	2,736
Strangford Lough	2,573	2,366	2,645	3,079	2,809	(Nov)	2,694
Inner Moray Firth	2,141	2,515	2,032	2,635	2,962	(Jan)	2,457
Solway	2,573	2,224	(964)	2,075	(1,851)	(Feb)	2,290
Chichester Hbr.	2,437	1,871	1,522	x	1,770	(Nov)	1,900
Cromarty Firth	1,520	2,450	1,557	1,817	1,829	(Dec)	1,835
Deben	840	2,399	1,779	1,760	1,903	(Feb)	1,736
Stour	3,221	2,033	936	1,158	905	(Jan)	1,650
Orwell	2,972	1,070	1,170	1,600	1,373	(Dec)	1,637
Belfast Lough	(530)	1,387	1,341	1,999	1,646	(Dec)	1,593
Ribble	1,166	2,194	1,211	1,863	1,449	(Dec)	1,576
Tay	(1,570)	1,569	1,055	2,506	1,051	(Jan)	1,550
Duddon	778	1,232	1,463	1,829	1,878	(Nov)	1,436

Greenshank *Tringa nebularia*

The peak monthly BoEE count in 1988–89 of this uncommon wintering species was just over 300 birds, about 20% up on 1987–88. Sites recording peak counts of 20 or more individuals are all in south-west Britain or northern Ireland, i.e. Kingsbridge (34 in November), Strangford Lough (34 in January), Dundrum Bay (26 in November), Taw/Torridge (25 in March), Tamar complex (23 in March), Cleddau (21 in November) and Lough Larne (20 in November). Larger numbers occur during autumn passage, at which time the following sites recorded peak counts of 50 or more birds in 1988: Wash (241 in July), Thames (230 in September), Medway (120 in September), Langstone Harbour (119 in August), Dee (Eng/Wales) (66 in September), Exe (53 in September), Swale (52 in August) and Stour (50 in September).

Green Sandpiper *Tringa ochropus*

According to the Winter Atlas, only 500–1,000 Green Sandpipers winter in Britain and Ireland (Smith 1986), and of these only a small proportion occur on U.K. coastal sites. The only BoEE sites recording peak counts exceeding two birds in winter 1988–89 were the Tamar complex (4 in December), Colne (4 in January), Ore complex (4 in January), Burry (4 in December), Severn (3 in November/December), Camel (3 in January/February), Southampton Water (3 in January) and Deben (3 in November and February). During the autumn passage period totals are larger, and the Swale (21 in August), Colne (16 in August), Humber (14 in September) and Burry (13 in October) recorded peak counts of 10 or more birds in 1988.

The Netherlands also have a small wintering population of Green Sandpipers. Heg (1988) estimated it totals 300–400 birds and summarises information on the ecology of the birds present, in particular their reaction to varying weather conditions.

Common Sandpiper *Actitis hypoleucos*

Probably only 100 or so Common Sandpipers winter in Britain and Ireland, with perhaps half of these on the coast (Preston 1986). Only three BoEE sites had peak counts exceeding two individuals in winter 1988–89, all in southern Britain: Southampton Water (4 in January), Taw/Torridge (3 in November/December) and Tamar complex (3 in November/December). Larger numbers occur during autumn passage, with both Morecambe Bay (170 in July and 57 in August) and the Wash (80 in July) recording counts of 50 or more birds in 1988.

Turnstone *Arenaria interpres*

Smit & Piersma (1989) distinguish two wintering populations of Turnstone within the area of the East Atlantic flyway, one in Europe and the other in Africa. Their review of the size of the European population results in a qualifying level for international importance increased to 700, almost entirely as a result of the incorporation of recent surveys on non-estuarine shores. The nine U.K. sites which currently qualify are shown in Table 52, along with the top nationally important site, Guernsey* (Channel Islands). In addition, in winter 1988–89 the Stour held 840 birds in November. The overall January BoEE index for Turnstones was up 4% on the 1988 level.

BoEE data provide only minimum estimates of site usage during passage periods because population turnover may be rapid and site coverage relatively poor, especially during the spring. Six sites had peak counts exceeding 700 birds in autumn 1988, all except the Wash in October. These were the Wash (2,596 in July), Outer Ards* (1,708), Morecambe Bay (1,638), Medway (1,150), Burry (855) and Dee (Eng/Wales) (830). In spring 1989, Morecambe Bay (1,790), Wash (1,643), Rosehearty-Fraserburgh* (1,023) and Thanet* (880) exceeded this level, all in April.

Table 52. TURNSTONE: MAXIMA AT MAIN RESORTS

	1984/85	85/86	86/87	87/88	88/89	(Mth)	Average
Morecambe Bay	(755)	1,703	2,269	2,189	1,647	(Jan)	1,952
Outer Ards *	987	1,949	1,803	1,990	1,775	(Nov)	1,701
Thanet *	x	x	1,010	1,674	1,284	(Mar)	1,322
Forth	(842)	937	(959)	1,642	1,184	(Jan)	1,254
Wash	1,216	764	754	1,995	1,282	(Mar)	1,202
Tiree *	966	861	1,196	x	x		1,008
Belfast Lough	(192)	1,183	929	322	575	(Jan)	752
Solway	654	824	(209)	759	(507)	(Feb)	745
Thames	(537)	630	(888)	(640)	681	(Dec)	733
Dee (Eng/Wales)	50	890	721	909	960	(Nov)	706
Guernsey *	717	708	582	752	602	(Feb)	672

PRINCIPAL SITES

All estuarine sites in the United Kingdom covered by BoEE counts are listed in Table 53, ranked in order of their average peak winter counts over the five-year period 1984–85 to 1988–89. Included with them are non-estuarine sites ranking as of at least national importance in terms of the total numbers of waders they support. Information on peak counts in winter 1988–89 at all these sites is also presented.

For each of the included five winters, the peak count for each site was first calculated by listing the highest count for each species between November and March, irrespective of the month in which it was made, and then totalling these counts. The results for the 1988–89 winter are shown in the first column. The numbers in brackets following these indicate the numbers of complete and incomplete counts (before and after the slash respectively) available for each included site in winter 1988–89. Where no complete counts were performed, the peak count is itself placed in brackets to indicate that it is no more than a minimum estimate.

The average peak winter count for each site was initially calculated using only the totals from winters in which at least one complete count was conducted. However, in the few cases where totals from other winters exceeded this initial average, they were then also incorporated in order to give the best possible estimate of the average peak count. In the brackets following, the numbers of winters with at least one complete count are given before the slash and the number without after it. Sites averaging at least 20,000 and 10,000 waders are definitely internationally and nationally important respectively in terms of total numbers.

Table 53. OVERALL WADER COUNTS AT BOEE SITES IN WINTER

Site No.†	Site	Peak winter count, 1988/89		Average peak winter count, 1984/85 to 1988/89	
54	Wash	225,180	(5/0)	199,947	(5/0)
87	Morecambe Bay	171,516	(4/0)	157,051	(5/0)
88	Ribble	142,399	(5/0)	97,778	(5/0)
40	Thames	87,650	(5/0)	85,408	(4/1)
55	Humber	(97,536)	(0/5)	84,984	(2/3)
91	Dee (Eng/Wales)	76,691	(5/0)	82,068	(5/0)
84	Solway	74,899	(2/3)	76,683	(4/1)
89	Alt	62,987	(5/0)	57,758	(5/0)
112	Severn	57,970	(3/2)	51,216	(3/2)
115	Strangford Lough	41,452	(5/0)	49,028	(5/0)
31	Langstone Harbour	41,605	(5/0)	39,978	(5/0)
38	Swale	(32,424)	(0/4)	39,015	(2/3)
62	Forth	40,675	(2/3)	38,262	(3/2)
110	Burry	38,619	(5/0)	36,194	(5/0)
32	Chichester Harbour	28,408	(5/0)	35,961	(4/0)
39	Medway	(45,211)	(0/5)	33,226	(2/3)
90	Mersey	29,563	(5/0)	30,866	(5/0)
59	Lindisfarne	31,539	(3/0)	30,248	(5/0)
46	Stour	27,285	(5/0)	26,133	(5/0)
43	Blackwater	27,446	(5/0)	24,773	(4/1)
44	Colne	23,577	(5/0)	22,459	(3/2)
86	Duddon	21,505	(5/0)	21,880	(5/0)
70/71	Inner Moray Firth	21,531	(3/0)	19,152	(5/0)
42	Dengie	23,734	(5/0)	17,599	(4/1)
47	Orwell	15,127	(5/0)	16,760	(5/0)
56	Tees	15,355	(5/0)	16,085	(5/0)
119	Lough Foyle	12,418	(4/0)	15,375	(5/0)
53	N Norfolk Marshes	15,471	(4/1)	15,347	(5/0)
*	Outer Ards	17,914	(4/1)	14,600	(4/0)
16	Exe	13,905	(5/0)	14,530	(5/0)
94	Lavan Sands	(5,802)	(0/4)	14,335	(3/2)
1	Taw/Torridge	9,845	(5/0)	12,959	(5/0)
75	Inner Clyde	11,412	(5/0)	12,755	(5/0)
116	Belfast Lough	14,948	(5/0)	12,687	(4/1)
65	Montrose Basin	12,913	(5/0)	11,965	(5/0)
108	Cleddau	11,511	(4/0)	11,544	(5/0)
64	Tay	11,047	(5/0)	11,489	(4/1)
49/50	Ore complex	11,010	(4/1)	11,317	(4/1)
63	Eden	9,119	(3/0)	11,223	(5/0)
20	Poole Harbour	13,845	(5/0)	10,804	(5/0)
24	Southampton Water	10,374	(5/0)	10,550	(5/0)
72	Cromarty Firth	12,594	(3/0)	10,512	(5/0)
41	Crouch/Roach	9,353	(5/0)	10,223	(3/2)

Table 53 contd.

45	Hamford Water	8,393	(3/2)	8,904	(4/1)
30	Portsmouth Harbour	9,910	(5/0)	8,872	(5/0)
33	Pagham Harbour	7,279	(5/0)	8,839	(5/0)
48	Deben	11,826	(5/0)	8,756	(5/0)
8	Tamar complex	8,164	(3/2)	8,164	(1/4)
73	Dornoch Firth	9,330	(3/0)	7,533	(5/0)
79	Wigtown Sands	6,708	(5/0)	6,875	(4/1)
109	Carmarthen Bay	x		6,711	(2/2)
111	Swansea Bay	6,073	(4/1)	6,554	(2/3)
22	NW Solent	6,757	(5/0)	6,358	(4/1)
2	Camel	4,799	(3/0)	6,248	(4/0)
114	Dundrum Bay	5,914	(3/0)	6,226	(5/0)
36	Rye Hbr/Pett Levels	4,040	(5/0)	5,593	(5/0)
113	Carlingford Lough	6,476	(2/0)	5,158	(5/0)
37	Pegwell Bay	3,793	(4/0)	4,899	(5/0)
74	Loch Fleet	8,112	(3/0)	4,831	(5/0)
61	Tyninghame	4,039	(5/0)	4,527	(5/0)
97	Inland Sea	3,853	(5/0)	4,521	(5/0)
34	Adur	1,473	(1/0)	4,375	(5/0)
52	Breydon Water	4,861	(5/0)	4,306	(5/0)
23	Beaulieu	3,776	(5/0)	4,158	(4/0)
93	Conwy	2,565	(5/0)	3,859	(4/0)
5	Fal complex	3,095	(5/0)	3,802	(2/3)
68	Ythan	3,701	(4/0)	3,512	(3/0)
117	Lough Larne	2,470	(5/0)	3,342	(5/0)
118	Bann	2,607	(5/0)	3,331	(5/0)
4	Hayle	2,467	(5/0)	3,258	(5/0)
105	Dyfi	3,922	(5/0)	3,165	(5/0)
51	Blyth (Suffolk)	4,994	(5/0)	3,053	(5/0)
76	Irvine	5,037	(3/0)	2,681	(5/0)
77	Loch Ryan	2,239	(5/0)	2,555	(5/0)
85	Irt/Mite/Esk	2,565	(2/3)	2,551	(5/0)
26	Newtown	3,679	(5/0)	2,413	(5/0)
82	Auchencairn Bay	2,723	(5/0)	2,185	(3/0)
13	Kingsbridge	1,883	(5/0)	2,177	(5/0)
19	The Fleet/Wey	(1,247)	(0/5)	1,913	(4/1)
21	Christchurch Harbour	1,551	(5/0)	1,867	(5/0)
92	Clwyd	1,962	(5/0)	1,845	(5/0)
95	Red Wharf Bay	2,356	(5/0)	1,772	(5/0)
101	Traeth Bach	1,517	(5/0)	1,768	(5/0)
100	Foryd Bay	2,093	(5/0)	1,715	(5/0)
98	Cefni	2,334	(4/0)	1,668	(5/0)
35	Newhaven	1,300	(5/0)	1,445	(5/0)
99	Braint	1,500	(4/0)	1,284	(5/0)
60	Tweed	967	(3/0)	1,064	(5/0)
104	Dysynni	593	(5/0)	1,022	(5/0)

Table 53 contd.

96	Dulas Bay	x		984	(2/0)
29	Brading Harbour	660	(5/0)	982	(5/0)
58	Coquet	863	(5/0)	969	(5/0)
83	Rough Firth	x		858	(1/0)
9	Plym	798	(5/0)	843	(5/0)
81	Kirkcudbright	x		831	(1/0)
57	Blyth (Northumberland)	1,179	(4/0)	774	(5/0)
27	Medina	739	(5/0)	757	(5/0)
78	Luce Bay	x		726	(1/0)
103	Mawddach	870	(5/0)	718	(4/0)
66	Dee (Scotland)	558	(5/0)	630	(4/0)
3	Gannel	x		627	(1/1)
18	Axe	600	(5/0)	610	(5/0)
106	Teifi	556	(5/0)	559	(5/0)
107	Nyfer	x		487	(4/0)
67	Don	385	(5/0)	448	(4/0)
12	Avon	367	(5/0)	447	(5/0)
15	Teign	361	(5/0)	394	(5/0)
28	Wootton	33	(1/0)	378	(3/0)
102	Artro	240	(5/0)	366	(5/0)
25	Yar	330	(3/0)	360	(3/0)
7	Looe	128	(4/0)	203	(5/0)
17	Otter	153	(5/0)	195	(5/0)
10	Yealm	159	(5/0)	181	(5/0)
14	Dart	121	(5/0)	181	(5/0)
6	Fowey	166	(3/0)	164	(2/0)
11	Erme	94	(5/0)	159	(5/0)
80	Fleet Bay	29	(1/0)	139	(3/0)
69	Spey	x		134	(2/0)

† see Figure 2
* non-estuarine site
x no count

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APPENDIX

INTERNATIONAL AND NATIONAL IMPORTANCE

Criteria for International Importance have been agreed by the Contracting Parties to the Ramsar Convention on Wetlands of International Importance (Ramsar Convention Bureau 1988). Under one criterion a wetland is considered Internationally important if it regularly holds 1% of the individuals in a population of one species or subspecies of waterfowl, while any site regularly holding a total of 20,000 waterfowl also qualifies. Britain and Ireland's wildfowl belong to the north-west European population (Pirot *et al.* 1989), and the waders to the east Atlantic flyway population (Smit & Piersma 1989). A wetland in Britain is considered Nationally Important if it regularly holds 1% of the estimated British population of one species or subspecies of waterfowl. Table 54 gives the current qualifying levels among wildfowl and waders for both these categories of importance (the international levels having been substantially revised since last year's report, in the light of recent published reviews). NB: The category of National Importance applies to Great Britain only; equivalent criteria and figures have not yet been produced for Ireland.

With the addition of Vietnam, Malta and Venezuela since last year's booklet went to press, 52 countries are now Contracting Parties to the Ramsar Convention; they have listed a total of 435 sites covering 30,000,000 ha. No new sites have been designated in the United Kingdom since the publication of last year's booklet, but the North Norfolk Coast site has been extended, and that area has also been made a Special Protection Area (SPA) under the EC Directive on the Conservation of Wild Birds. A total of 40 Ramsar sites and 33 SPAs have now been designated in the U.K., as follows:–

(R) = Ramsar site only; (S) = SPA only; other sites both.

Abberton Reservoir (R)
Alt Estuary
Bridgend Flats
Bridgwater Bay (R)
Bure Marshes (R)
Cairngorm Lochs (R)
Chesil Beach/Fleet
Chew Valley Lake (S)
Claish Moss (R)
Coquet Island (S)
Cors Fochno/Dyfi (R)
Dee Estuary
Derwent Ings
Din Moss/Hoselaw Loch
Eilean na Muice Duibhe (Duich Moss)
Farne Islands (S)
Gladhouse Reservoir
Grassholm (S)
Gruinart Flats
Hickling Broad/Horsey Mere (R)
Holburn Moss
Irthinghead Mires (R)
Laggan Peninsula (S)
Langstone/Chichester Harbours
Leighton Moss
Lindisfarne (R)
Lochs Druidibeg/a'Machair/Stilligary
Loch Eye
Loch Leven (R)
Loch of Lintrathen (R)
Loch Lomond (R)
Loch of Skene
Lough Neagh/Beg (R)
Martin Mere
Minsmere/Walberswick (R)
Moor House (S)
North Norfolk Coast
Orfordness/Havergate (S)
Ouse Washes (R)
Pagham Harbour
Priest Island (S)
Rannoch Moor (R)
Ribble Estuary (part) (S)
Rhum (S)
Rockcliffe Marsh (pt of Solway F)
Rostherne Mere (R)
Silver Flowe (R)
Skomer (S)
The Swale
The Wash
Upper Severn Estuary

Table 54. QUALIFYING LEVELS FOR NATIONAL AND INTERNATIONL IMPORTANCE

	National (G.B.)	International
Great Crested Grebe	100	?
Mute Swan	180	1,800
Bewick's Swan	70	170
Whooper Swan	60	170
Bean Goose	†*	800
Pink-footed Goose:		
Iceland/Greenland pop.	1,100	1,100
European White-fronted Goose	60	3,000
Greenland White-fronted Goose	100	220
Greylag Goose	1,000	1,000
Barnacle Goose: Greenland pop.	200	300
Svalbard pop.	100	100
Dark-bellied Brent Goose	900	1,700
Light-bellied Brent Goose:		
Canada/Greenland pop.	†*	200
Svalbard	30	40
Shelduck	750	2,500
Wigeon	2,500	7,500
Gadwall	50	120
Teal	1,000	4,000
Mallard	5,000	20,000**
Pintail	250	700
Shoveler	90	400
Pochard	500	3,500
Tufted Duck	600	7,500
Scaup	40*	1,500
Eider	700	20,000**
Long-tailed Duck	200	20,000
Common Scoter	350	8,000
Velvet Scoter	30*	2,500
Goldeneye	150	3,000
Smew	†*	150
Red-breasted Merganser	100	1,000
Goosander	50	1,250
Coot	1,000	15,000

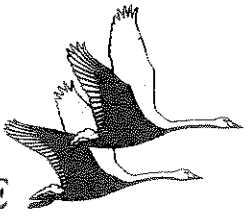
Table 54 contd.

Oystercatcher	2,800	9,000
Avocet	5*	700
Ringed Plover	230 (passage: 300)	500
Golden Plover	2,000	10,000
Grey Plover	210	1,500
Lapwing	10,000	20,000**
Knot	2,200	3,500
Sanderling	140 (passage: 300)	1,000
Purple Sandpiper	160	500
Dunlin	4,300 (passage: 2,000)	14,000
Ruff	15*	10,000
Snipe	?	10,000
Black-tailed Godwit	50	700
Bar-tailed Godwit	610	1,000
Whimbrel	† (passage: 50)	700
Curlew	910	3,500
Spotted Redshank	2*	?
Redshank	750 (passage: 1,200)	1,500
Greenshank	4*	?
Turnstone	450	700

† British population too small for meaningful figure to be obtained.
* Where 1% of the British wintering population is less than 50 birds, 50 is normally used as a minimum qualifying level for national importance.
** A site regularly holding more than 20,000 waterfowl qualifies as internationally important by virtue of the absolute numbers.

Sources for qualifying levels for International Importance: wildfowl – Pirot *et al.* 1989; waders – Smit & Piersma (1989) or, for species they do not cover, Scott (1982).

Sources for qualifying levels for National Importance: wildfowl – Owen *et al.* (1986), updated where necessary from NWC data; waders – Moser (1987) or, for species he does not cover, Prater (1981).



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