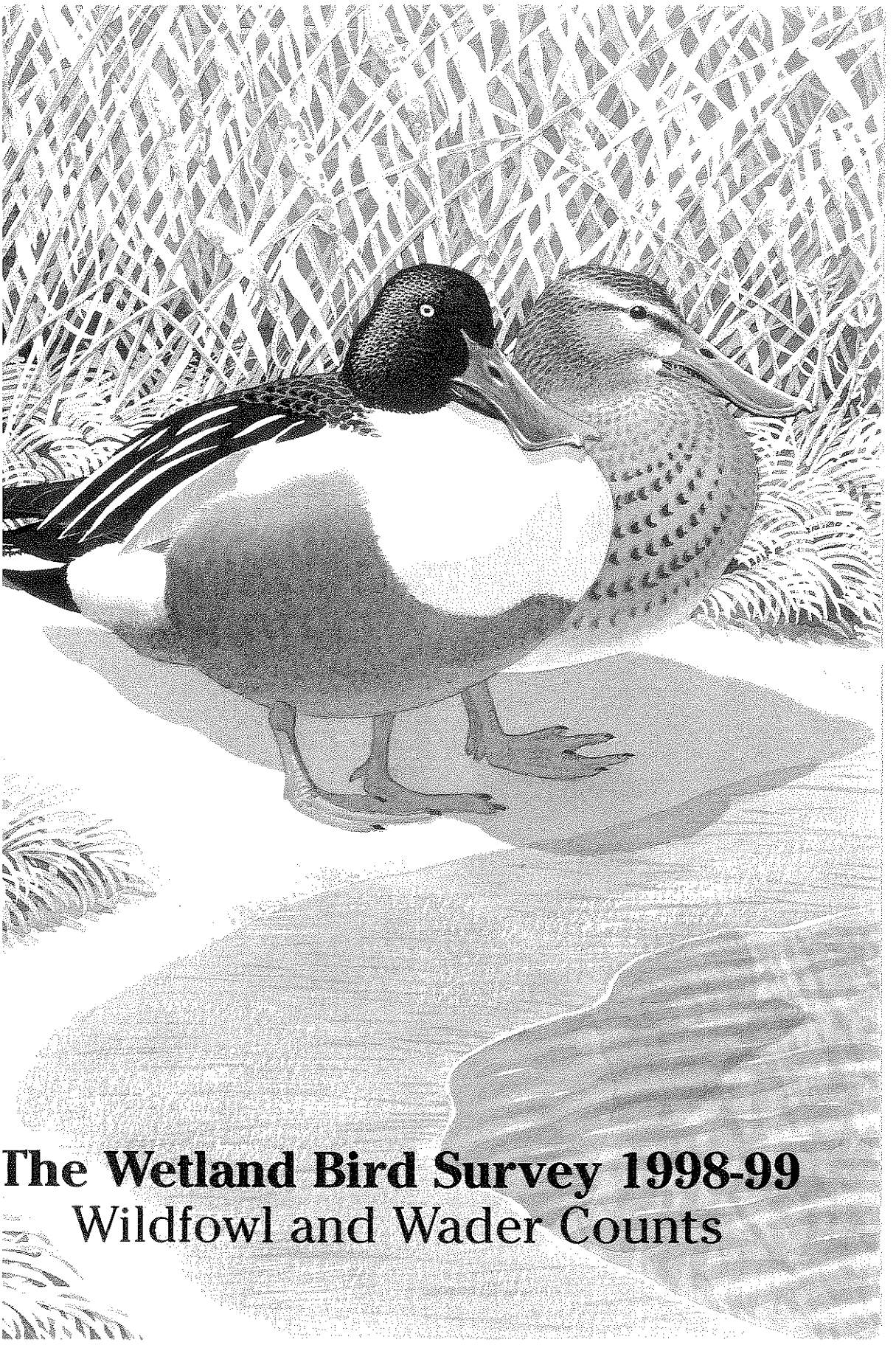
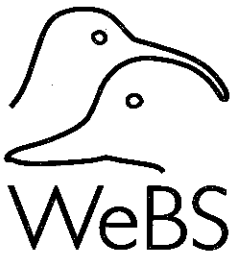


The Wetland Bird Survey 1998-99

Wildfowl and Wader Counts

The Wetland Bird Survey 1998-99 Wildfowl and Wader Counts

Mark Pollitt, Peter Cranswick, Andy Musgrove, Colette Hall, Richard Hearn, James Robinson and Steve Holloway



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This report is provided free to all WeBS counters and those who participate in the other national waterbird surveys, none of whom receive financial reward for their invaluable work. Further feedback is provided to counters through the twice-yearly WeBS Newsletter. For further information please contact the WeBS Secretariat or relevant National Organiser.

ACKNOWLEDGEMENTS

This book represents the twentieth report of the Wetland Bird Survey and comprises information from WeBS and complementary national and local surveys, e.g. goose censuses. It is entirely dependent on the many thousands of dedicated volunteer ornithologists who supply the data and to whom we are extremely grateful. The Local Organisers who co-ordinate these counts deserve special thanks for their contribution.

The WeBS Steering Group members are Peter Cranswick, Richard Gregory, Mel Kershaw, Rowena Langston, Andy Musgrove, Deborah Procter, Mark Rehfisch and David Stroud.

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Grateful thanks to all and apologies to anyone who has inadvertently been missed.

ERRATA TO 1997-98 REPORT

The 1% threshold for international importance for Little Egret was given incorrectly as 800 in Appendix 2 of the 1997-98 report; it should have been 1,250.

WETLAND BIRD SURVEY

Organised and funded by

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For general enquiries, please contact the WeBS Secretariat. More detailed data than published in this report can be obtained from Colette Hall (Core Counts) or Steve Holloway (Low Tide Counts).

NATIONAL GOOSE CENSUSES

Data collated under a WWT/JNCC partnership programme

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CONTENTS

SUMMARY

The Wetland Bird Survey and Wildfowl and Wader Counts

The Wetland Bird Survey (WeBS) is a joint scheme of the British Trust for Ornithology (BTO), The Wildfowl & Wetlands Trust (WWT), Royal Society for the Protection of Birds (RSPB) and Joint Nature Conservation Committee (JNCC) to monitor non-breeding waterbirds in the UK. The principal aims of the scheme are to identify population sizes, determine trends in numbers and distribution, and to identify important sites for waterbirds. WeBS Core Counts are made annually at around 2,000 wetland sites of all habitats; estuaries and large still waters predominate. Monthly co-ordinated counts are made mostly by volunteers, principally from September to March, with fewer observations during summer months. Data from other sources, e.g. roost counts of grey geese, are included in this report where relevant.

This report presents total numbers counted for all species in the most recent year in Great Britain and Northern Ireland. Annual indices, calculated using the 'Underhill' method, are provided for the more numerous species. For certain wildfowl species, monthly indices, showing relative abundance during the winter, are also provided.

Species accounts provide yearly maxima for all sites supporting internationally and nationally important numbers. Sites with changed status are highlighted and significant counts at a national or site level are discussed. Counts are placed in an international context where possible, and relevant research is summarised. Waterbird totals are provided for all sites meeting criteria for international importance and species occurring in internationally important numbers on each are identified. Brief overviews of research initiated by WeBS or using WeBS data, and of conservation issues pertaining to UK waterbirds, are provided.

WeBS Low Tide Counts are made on selected estuaries to determine the distribution of birds during low tide and to identify important feeding areas that may not be recognised during Core Counts which are made mostly at high tide. A summary of results for these estuaries, and distribution maps for selected species, are provided.

Waterbird totals recorded by the Irish Wetland Bird Survey, a similar scheme operating in the Republic of Ireland, are also included.

Appendices list all UK sites designated under the Ramsar Convention and Special Protection Areas classified under the EC Directive on the Conservation of Wild Birds. Also, waterbird count totals for the most recent year are provided separately for England, Scotland, Wales, the Isle of Man and the Channel Islands.

The 1998-99 year

This report summaries counts during 1998-99 and previous years (since 1960 for wildfowl, 1969 for waders and the early 1980s or 1990s for other species groups). Coverage remained at the same relatively high levels, with over 1,600 sites counted each month during the winter. Weather was generally mild and wet during the winter, as has often been the case in recent years, with a short-lived cold spell in November being the only exception. Numbers of many species of wildfowl continued the rise shown in recent years, but notable declines were recorded for Knot and Ringed Plover.

Although numbers of divers recorded by WeBS were not exceptional, dedicated counts of Great Northern Divers in Orkney found internationally important numbers in Scapa Flow; 781 birds in March was probably the biggest ever count at a site in Europe. Counts of all *Podiceps* grebes were below average, and count totals of the three rarer species were the lowest of the last five years.

In Northern Ireland, Cormorant numbers reached their highest ever levels, with 2,071 birds on Loughs Neagh & Beg three times the figure present only five years previously. Little Egret numbers reached a new high with 785 birds in September, and a cold spell in November in continental Europe was perhaps responsible for the highest British WeBS count of Bittern to date in December.

The rise in Mute Swan numbers since the mid 1980s continued with record counts in both Britain and Northern Ireland; indices suggest an increase of around 75% over the period. Both species of migratory swan fared poorly in Northern Ireland with Bewick's rapidly becoming a localised and scarce winter visitor and Whooper Swans having declining markedly over the last 10 years. Numbers in Great Britain were average for a mild winter.

Numbers of European White-fronted Geese were the lowest recorded, with the exception of winter 1991-92, since the mid 1970s. The

Greenland population reached its highest ever level and co-ordinated counts suggested a total of more than 35,500 birds in Britain and Ireland. A small rise in numbers of Icelandic Greylag Geese was the first since 1993-94. The first co-ordinated counts throughout Ireland found just under 2,000 birds. Numbers of most other species of *Anser* geese were normal for recent years.

The Svalbard population of Barnacle Geese increased to record levels, with 26,000 birds counted in December. Continued poor breeding success saw the peak national total and index for Dark-bellied Brent Geese fall to the lowest level since the early 1980s. An increase in Greenland Light-bellied Brent Geese in Northern Ireland was matched by the annual index regaining the high levels of the early 1990s.

The national total of Shelduck in Britain was the lowest for 10 years and the index the lowest for over 20, although the importance of the UK for moulting birds continues to increase, over 10,000 birds present on the Mersey Estuary in August. Numbers of Wigeon were the third highest on record, and the Ribble Estuary held just under 100,000 Wigeon, a figure exceeded only by two counts at the same site in 1994-95. Gadwall numbers in Britain surpassed 15,000 for the first time. After many years of steady decline, the British index for Mallard rose for the first time, albeit only slightly, whilst Pintail numbers increased on both sides of the Irish Sea.

Counts of Scaup in Northern Ireland were the highest yet recorded by WeBS, albeit only marginally higher than in the mid 1990s, but were the lowest for five years in Great Britain. High counts of Common Scoter from Dundrum Bay caused provincial totals to rise considerably. Numbers of Common Scoter wintering in Carmarthen Bay returned to former levels following two years of low counts after the *Sea Empress* oil spill. The cold spell in November caused a significant influx of Smew, with 351 birds in January the second highest total recorded by WeBS.

Peak numbers of Water Rail and Moorhen were the highest on record, albeit both represent only a fraction of the true population.

Numbers of Avocet recorded were low, due to the absence of data from two key sites, but annual indices suggested little change.

In Great Britain, peak Ringed Plover numbers fell by 17% and UK index reached its lowest level for almost 20 years. Numbers of Golden Plover and Lapwing were typical for a mild winter. UK indices for Grey Plover were relatively low compared with the mid 1990s, perhaps suggesting that this population is beginning to plateau.

The British winter peak of Knot was the second smallest in the last ten years and the UK population index fell to at its lowest level for 15 years. Most other *Calidris* species were recorded in average numbers, except for the count of Purple Sandpipers which was the highest since 1993-94. Autumn passage numbers of Little Stint, Curlew Sandpiper and Ruff were all high, and over 1,000 of each species were recorded in September.

The UK index for Black-tailed Godwit remained high following a sustained increased since the early 1990s. British counts of Bar-tailed Godwit, and the UK index, were relatively low, although numbers in Northern Ireland rose sharply. Curlew numbers were high throughout the winter.

Redshank numbers were average, but those for Greenshank were the highest for 10 years in both Great Britain and Northern Ireland. Recorded totals of Turnstone were again low and the annual index has declined steadily over the last 15 years.

Peak counts of Black-headed and Common Gulls were average for recent years. Numbers of Lesser Black-backed and Herring Gulls, which typically peak in late summer following fledging and dispersal from breeding colonies, were high and low, respectively.

Numbers of most terns were average for recent years, although numbers of Arctic Terns dropped sharply following the large increase in the previous year.

The numbers of escaped waterbirds continued to rise, to a new peak of 26 species, although the total number of birds involved fell.

INTRODUCTION

The UK is of outstanding international importance for waterbirds. Lying on some of the major flyways for arctic-nesting species, large numbers of waterbirds are attracted, especially during winter, by the relatively mild climate and extensive areas of wetland, notably estuaries. The UK thus has both moral and legal obligations to conserve both these waterbirds and the wetlands upon which they depend.

The UK is bound by international law by being a signatory to a number of international conservation conventions, as well as being a member of the EU. In particular, the 'Ramsar' Convention on Wetlands of International Importance especially as Waterfowl Habitat, the EC Birds Directive and the EU Habitats and Species Directive, between them, require the UK to identify important examples of wetland and other habitats and sites important for birds and designate them for protection. Implicit in these obligations is the need for regular monitoring to identify and monitor such sites. These instruments also lay particular significance on the need to conserve migratory populations, and consequently most of the waterbird populations in the UK.

The UK has ratified the Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA) of the 'Bonn' Convention on the Conservation of Migratory Species of Wild Animals. AEWA entered into force in 1999. It is a specific Agreement requiring nations to take co-ordinated measures to conserve migratory waterbirds given their particular vulnerability due to their migration over long distances and their dependence on networks that are decreasing in extent and becoming degraded through non-sustainable human activities. Article three of the Agreement requires, among other things, that sites and habitats for migratory waterbirds are identified, protected and managed appropriately, that parties initiate or support research into the ecology of these species, and exchange information and results. Explicit in this Agreement is that adequate monitoring programmes are set in place to fulfil these objectives and the Action Plan to the Agreement specifically requires that nations endeavour to monitor waterbird populations.

Aims and objectives of WeBS

The Wetland Bird Survey (WeBS) aims to monitor all non-breeding waterbirds in the UK to provide the principal data on which the conservation of their populations and wetland habitats is based. To this end, WeBS has three main objectives:

- to assess the size of non-breeding waterbird populations in the UK;
- to assess trends in their numbers and distribution; and
- to assess the importance of individual sites for waterbirds.

A programme of research, to understand the ecology of waterbirds and investigate the effects of habitat change and anthropogenic impact, underpins and enhances these objectives.

These results also form the basis for informed decision-making by conservation bodies, planners and developers and contribute to the sustainable and wise use and management of wetlands and their dependent waterbirds. The data and the WeBS report also fulfil some of the objectives of the Conventions and Directives listed above. WeBS also provides UK data to Wetlands International to assist their function to co-ordinate and report upon waterbird monitoring at an international scale.

Structure and organization of WeBS

WeBS is partnership scheme of the British Trust for Ornithology (BTO), The Wildfowl & Wetlands Trust (WWT), Royal Society for the Protection of Birds (RSPB) and the Joint Nature Conservation Committee (JNCC), the last on behalf of English Nature (EN), Scottish Natural Heritage (SNH) and the Countryside Council for Wales (CCW), and the Environment and Heritage Service in Northern Ireland (EHS).

WeBS continues the traditions of two, long-running count schemes which formed the mainstay of UK waterbird monitoring since 1947 (Cranswick *et al.* 1997). WeBS Core Counts are made at a wide variety of wetlands throughout the UK. Synchronised counts are conducted once per month, primarily from September to March, to fulfil all three main objectives. In addition, WeBS Low Tide Counts are undertaken on selected estuaries with the aim of identifying key areas used during the low tide period, principally by feeding birds; areas not otherwise noted for their importance by Core Counts which are normally conducted at high tide.

The day-to-day running of the Core and Low Tide Count schemes is the responsibility of the National Organisers, with assistance from a

number of other staff.

The success and growth of these count schemes reflects accurately the enthusiasm and dedication of the several thousands of volunteer ornithologists who participate. It is largely due to their efforts that waterbird monitoring in the UK is held in such international high regard.

Aim of this report

This report presents syntheses of data collected in 1998-99 and previous years in line with the WeBS objectives. Data from other national and local waterbird monitoring schemes are included where WeBS data alone are insufficient to fulfil this aim, so that the report provides a single, comprehensive source of information on waterbird status and distribution in the UK. All nationally and internationally important sites for which data exist are listed, as are all sites designated under international law or Conventions (see Appendices 1 & 2).

We recommend that the National Organisers (see *Contacts*) are contacted in the first instance by anyone with queries regarding this report or requiring further information.

PROGRESS AND DEVELOPMENTS

African-Eurasian Waterbird Agreement (AEWA)

The African-Eurasian Waterbird Agreement entered into force on 1 November 1999. This is a profoundly significant date for the conservation of waterbirds as it represents the conclusion of efforts that stretch back many decades to establish this international legal treaty.

The first Meeting of the Parties was held in Cape Town, South Africa, one week later. Although only 16 countries have fully ratified the agreement to date, the meeting was attended by government representatives from around 45 countries, including several outside the range area, demonstrating considerable interest in the agreement and, it is hoped, is an indication that many more countries will sign shortly.

AEWA is the seventh Agreement under the 'Bonn' Convention on the Conservation of Migratory Species of Wild Animals. The agreement has been the result of considerable forethought and planning and includes detailed conservation guidelines, an action plan, and priorities for conservation action. Co-operative action at a flyway level is essential to successful conservation of migratory waterbird species and the aim of AEWA is "to create a legal basis for a concerted conservation and management policy for migratory waterbird species". For more information, visit the AEWA web site at www.wcmc.org.uk/aewa

Waterbird Population Estimates

Two major publications, Wetland International's *Waterbird Population Estimates 3rd edition* and an African-Eurasian Wader Atlas, to complement the Anatidae Atlas (Scott & Rose 1996), currently remain in preparation. When published, both will provide new population estimates for many waterbirds which will be used to identify sites of international importance in future reports.

WEATHER IN 1998-99

This summary of UK weather is drawn from the journals *Weather* and *British Wildlife*. Figures in brackets denote the WeBS priority count date in that month. European weather is summarised from *Weather* and arctic breeding conditions in western and central Russia, one of the main breeding grounds for birds wintering in the UK, are summarised from Soloviev & Tomkovich (1999).

United Kingdom

Winter 1998-99 was generally mild and wet, as has often been the case in recent years. The only significant cold spell of the winter was during November, most months being dominated by southwesterly airflows and Atlantic fronts with no prolonged periods of easterlies in the second half of the winter.

Spring began very wet in most areas. **April** (26th) was the wettest since 1818; averaged over England and Wales it amounted to almost 240% of the long-term average and resulted in widespread flooding in the East Midlands. Temperatures, although only slightly below average, were sufficiently low to make it the coldest April of the decade, suggesting an unfavourable start for breeding birds. High pressure dominated throughout much of **May** (17th), bringing milder conditions to most parts with temperatures typically 1-2°C above the long-term norm. Central and eastern England were particularly warm. Rainfall was below normal over most of the UK, with thundery conditions causing considerable local variations. Low pressure dominated throughout **June** (14th), causing very unsettled conditions for long periods. With the exception of Northern Ireland and northern Scotland, everywhere received above average rainfall, with a handful of local records broken. Mean temperatures were near normal, though this was predominantly due to mild nights and cool days cancelling each other out. **July** (12th) similarly had few periods of settled weather, and though it was widely perceived as being an exceptionally poor month this was largely due to the frequency of the rain rather than the quantity. Many western and northern parts recorded above average precipitation, though many eastern and central areas were drier than usual. Scotland, however, fared less well with rainfall locally approaching twice the typical amount. Westerly driven weather systems saw summer close in **August** (9th) with a split across the country, the north and west being typically wet whilst the south and east was drier than average. Overall temperatures were slightly above normal, particularly so in the south and east.

Autumn commenced with a warm **September** (6th), dominated by southwesterly and southerly winds. It was, however, no 'Indian summer', rain-bearing fronts pushing frequent showers across the country early in the month. High pressure dominated for a short period, though thundery downpours near the end of the month caused localised flooding on the River Lea. The wettest areas were unusually in the south and east, some receiving twice the usual amount of rainfall. Temperatures were typically 1-2°C above average, though notably cooler in most eastern areas.

Cool northeasterly winds dominated during the first week of **October** (11th), eventually giving way to a series of ferocious Atlantic fronts. These brought prolonged and heavy rain, the hills of western Britain being particularly badly affected; over six inches of rain fell in the Rhonda valley in south Wales in just eight days, causing extensive flooding on many river catchments including the Wye and Severn. Many places recorded more than twice their normal rainfall.

Figures for **November** (8th) were, overall, unexceptional though there were widespread regional variations. Early rain caused renewed flooding in south Wales though floods on the Severn and Wye subsided. A short spell of mild southwesterlies followed in the second week, eventually giving way to a developing ridge of high pressure spreading from the east. Changeable and mild conditions returned near the end of the month though high pressure restored cold weather to England and Wales for the last two days. Mean temperatures in southern and eastern England were below average, up to 2°C below normal in East Anglia, the coldest November in that region for 15 years. Rainfall was correspondingly low in these areas though above average figures were recorded for several areas around the Irish Sea.

The high pressure continued in the first week of **December** (6th), bringing cold and relatively dry weather to most of the UK. The period around the priority count date was the coldest part of the month and snow showers pushed in across Scotland and northern England. Milder southwesterly conditions predominated for the remainder of the month broken by a short cold

interlude a few days before Christmas. Overall temperatures were 0.5-1.0°C above average and wetter than normal in most places, though northern England had only half of the usual amount.

January (3rd) was dominated by southwesterly winds and was consequently wet and very mild. Atlantic fronts tracked the country, and flood alerts were regular on many rivers. The West Country, Midlands and again south Wales were the most badly affected areas. Only in the last few days of the month did high pressure assert itself over southern England bringing markedly colder conditions. Overall it was the wettest January since 1988, mild everywhere and up to 2.5°C above average in parts of southern England.

February (21st) was characterised by alternating periods of northwesterly and southwesterly airflows. The most severe spell brought cold conditions and some heavy snow to northern Britain between the 5th and 11th, affecting southern Britain most between the 8th and 14th. Overall the mild spells more than countered the cold conditions, the central England temperature being some 1.7°C above the long-term average, and rainfall across England and Wales was just two-thirds that of normal. Northern Scotland, in contrast, was wetter and colder than average.

The winter closed with a mild **March** (21st), typical for the last decade; 11 of the last 12 Marches have been warmer than average. The lingering wet southwesterlies gave way to northerlies from the 3rd bringing cold conditions to northern Britain. Heavy rain and snow melt caused severe flooding on River Derwent during the first two weeks of the month. Southerly winds and high pressure saw warm and sunny conditions across much of England and Wales, and though more changeable conditions concluded the month, it remained mild.

Northwest Europe

Throughout most of continental Europe, winter 1998-99 was predominantly mild, with just one significant cold spell in November. September began mild and dry in Scandinavian countries with temperatures elsewhere near the long-term average. The Netherlands and much of eastern and central Europe were notably wet. October was unexceptional, temperatures being near normal though drier than average in central and eastern countries. November saw the only prolonged cold period of the winter, most countries recording mean temperatures 1-3°C below the long-term mean though colder still in the far north and east, the coldest conditions occurring between the November and December priority count dates. Temperatures in Iceland, however, were near normal. December was generally mild and dry, whilst the wet conditions that affected the UK in January also brought wet weather to Scandinavia and the near continent. All countries across northern Europe recorded average temperatures 1-2°C above normal in January. Figures for February were typical, with temperatures near normal and rainfall variable. A mild March concluded the winter, with above average temperatures almost everywhere.

Table 1. The proportion of still water count units (lakes, reservoirs and gravel pits) in the UK with any ice and with three-quarters or more of their surface covered by ice during WeBS counts in 1998-99 (England divided by a line drawn roughly between the Humber and the Mersey Estuaries).

Region	Ice	S	O	N	D	J	F	M
Northern Ireland	>0%	0	0	0	0	0	0	0
	>74%	0	0	0	0	0	0	0
Scotland	>0%	0	0	4	28	15	6	<1
	>74%	0	0	1	13	7	2	<1
N England	>0%	0	0	0	30	5	<1	<1
	>74%	0	0	0	14	<1	0	0
S England	>0%	0	<1	<1	25	1	<1	0
	>74%	0	<1	0	10	<1	0	0
Wales	>0%	0	0	0	13	0	0	0
	>74%	0	0	0	4	0	0	0

Arctic breeding conditions in Russian tundras

For the third year in succession, a late spring and cold conditions prevailed over most of the Russian tundra. There was also extensive spring flooding around the western Taimyr. Rains continued on the Taimyr in summer, but elsewhere summer was generally cool and dry.

Lemming abundance was low on the western Taimyr, average or good between the Taimyr and Pechora delta, but poor further west. Predator numbers were generally observed to be low. Overall breeding success, particularly of waders, was observed to be poor in both eastern and western Taimyr, but good at nearly all sites west of here.

WeBS Core Counts

SURVEY METHODS

The main source of data for this report is the WeBS scheme, providing regular monthly counts for most waterbird species at the majority of the UK's important wetlands. In order to fulfil the WeBS objectives, however, data from a number of additional schemes are included in this report. In particular, a number of species groups necessitate different counting methodologies in order to monitor numbers adequately, notably grey geese and sea-ducks, and the results of other national and local schemes for these species are routinely included. Additional, *ad hoc*, data are also sought for important sites not otherwise covered by regular monitoring, particularly open coast sections in Scotland, whilst the results of periodic, co-ordinated surveys, such as the non-estuarine coastal waterfowl survey, are included where the data collected are compatible with the presentation formats used in this report. The methods for these survey types are outlined below and more detail can be found in Gilbert *et al.* (1998). Although the precise methods for some of the additional count data presented within this report are unknown, it is safe to assume that they will follow closely the general methods presented here.

WeBS Core Counts

WeBS Core Counts are made using so-called "look-see" methodology (Bibby *et al.* 1992), whereby the observer, familiar with the species involved, surveys the whole of a predefined area.

Counts are made at all wetland habitats, including lakes, lochs/loughs, ponds, reservoirs, gravel pits, rivers, freshwater marshes, canals, sections of open coast and estuaries.

Numbers of all waterbird species, as defined by Wetlands International (Rose & Scott 1997), are recorded. In the UK, this includes divers, grebes, Cormorant, herons, Spoonbill, swans, geese, ducks, rail, cranes, waders and Kingfisher. Counts of gulls and terns are optional. Vagrants, introductions and escapes are included.

Most waterbirds are readily visible. Secretive species, such as snipes, are generally under-recorded. No allowance is made for these habits by the observer and only birds seen or heard are recorded. The species affected by such biases are well known and the problems of interpretation are highlighted individually in the *Species Accounts*.

Most species and many sub-species are readily identifiable during the counts. Categories may be used, e.g. unidentified scoter species, where it is not possible to be confident of identification, e.g. under poor light conditions.

Species present in relatively small numbers or dispersed widely may be counted singly. The number of birds in large flocks is generally estimated by mentally dividing the birds into groups, which may vary from five to 1,000 depending on the size of the flock, and counting the number of groups. Notebooks and tally counters may be used to aid counts.

Counts are made once per month, ideally on predetermined 'priority dates'. This enables counts across the whole country to be synchronised, thus reducing the likelihood of birds being double-counted or missed. Such synchronisation is imperative at large sites which are divided into sectors, each of which can be practicably counted by a single person in a reasonable amount of time. Local Organisers ensure co-ordination in these cases due to the high possibility of local movements affecting count totals.

The priority dates are pre-selected with a view to optimising tidal conditions for counters covering coastal sites at high tide on a Sunday (see *Coverage*). The dates used for individual sites may vary due to differences in the tidal regime around the country. Co-ordination within a site takes priority over national synchronisation.

The accuracy of each count is recorded. Counts suspected to be gross underestimates of the true number of non-secretive species present are specifically noted, e.g. a large flock of roosting waders only partially counted before being flushed by a predator, or a distant flock of sea-duck in heavy swell. These counts may then be treated differently when calculating site totals (see *Analysis*).

Data are input by a professional data input company. Data are keyed twice by different people and discrepancies identified by computer for correction. Any particularly unusual counts are checked by the National Organisers and are confirmed with the counters if necessary.

Goose roost censuses

Since many 'grey geese' spend daylight hours in agricultural landscapes, most are missed during counts at wetlands by WeBS. These species are usually best counted as they fly to or from their roost sites at dawn or dusk since these are generally discrete wetlands and birds often follow traditional flight lines approaching or leaving the site. Even in half-light, birds can generally be counted with relative ease against the sky, although they may not be specifically identifiable at mixed species roosts.

In order to produce population estimates, counts are synchronised nationally for particular species (see Appendix 3), though normally only one or two such counts are made each year. The priority count dates are determined according to the state of the moon, since large numbers of geese may remain on fields during moonlit nights. Additional counts are made by some observers, particularly during times of high turnover when large numbers may occur for just a few days.

In some areas, where roost sites are poorly known or difficult to access, counts are made during daytime of birds in fields.

As with WeBS Core Counts, the accuracy of the count is noted.

Sea-ducks

The accuracy of counts of waterbirds on the sea is particularly dependent on prevailing weather conditions at the time of or directly preceding the count. Birds are often distant from land, and wind or rain can cause considerable difficulty with identifying and counting birds. Wind not only causes telescope shake, but even moderate swell at all sites except those with high vantage points can hamper counts considerably. Many sites may be best covered using aerial surveys, though these are usually expensive and require experienced, professional counters. In many cases, birds can only be identified to genus, e.g. grebe species or scoter species.

Consequently, the best counts of most divers, grebes and sea-duck at open coast and many estuarine sites are made simply when conditions allow; only rarely will such conditions occur by chance during WeBS counts. Synchronisation between different sites may be difficult or impossible to achieve, and thus co-ordination of most counts to date has occurred at a regional or site level, e.g. within the Moray Firth, within North Cardigan Bay.

Irish Wetland Bird Survey

The Irish Wetland Bird Survey (I-WeBS) monitors non-breeding waterbirds in the Republic of Ireland (Colhoun 2000). I-WeBS was launched in 1994 as a joint partnership between BirdWatch Ireland, National Parks and Wildlife Service of Dúchas The Heritage Service of the Department of Arts, Heritage, Gaeltacht and the Islands (Ireland), and WWT, supported by the Heritage Council and WWF UK (World Wide Fund for Nature). I-WeBS is complementary to and compatible with the UK scheme. The main methodological difference from UK-WeBS is that counts are made only between September and March, inclusive.

Productivity monitoring

Changes in numbers of waterbirds counted in the UK between years are likely to result from a number of factors, including coverage and weather, particularly for European and Russian-breeding species which may winter further east or west within Europe according to the severity of the winter. However, genuine changes in population size will result from differences in recruitment and mortality between years.

For several species of swans and geese, young of the year can be readily identified in the field and a measure of productivity can be obtained by recording the number of young birds in sampled flocks, expressed as a percentage of the total number of birds aged. Experienced fieldworkers, by observing the behaviour of and relationship between individuals in a flock, can record brood sizes as the number of young birds associating with two adults.

ANALYSIS

In fulfilment of the WeBS objectives, results are presented in a number of different sections. An outline of the analyses undertaken for each is given here; further detail is provided in Appendix 3. A number of limitations of the data or these analytical techniques necessitate caution when interpreting the results presented in this report (see *Interpretation of Waterbird Counts*).

National totals

Population estimates are revised once every three years, in keeping with internationally agreed timetables (Rose & Stroud 1994). UK waterbird populations will next be revised in 2000-01, although a number have been revised recently (Appendix 2) for inclusion in the third edition of international *Waterfowl Population Estimates* endorsed by the Seventh Conference of the Contracting Parties to the Ramsar Convention, in Costa Rica in May 1999.

Total numbers of waterbirds recorded by WeBS and other schemes are presented separately for Great Britain (including the Isle of Man but excluding the Channel Islands) and Northern Ireland in recognition of the different legislation that applies to each. Separate totals for England, Scotland, Wales, the Isle of Man and the Channel Islands are provided in Appendices 4-8. Numbers of waterbirds found on coastal (including estuarine) and inland habitats are provided separately in Appendix 9, particularly for comparison of numbers of waders with those in reports prior to 1994 when waders were not counted at inland sites.

Numbers presented in this report are not rounded. National and site totals calculated as the sum of counts from several sectors or sites may imply a false sense of accuracy if different methods for recording numbers have been used, e.g. 1,000 birds estimated on one sector and a count of seven individuals on another is presented as 1,007. It is safe to assume that any large count includes a proportion of estimated birds. However, reproducing the submitted counts in this way is deemed the most appropriate means of presentation and avoids the summation of 'rounding error'.

The count nearest the monthly priority date or, alternatively, the count co-ordinated with nearby sites if there is considered to be significant interchange, is chosen for use in this report if several accurate counts are available for the same month. A count from any date is used if it is the only one available.

Data from other national surveys are used instead of WeBS Core Counts where the census total provides a better estimate of the total numbers, e.g. the national census of Pink-footed and Greylag Geese in October and November. Totals from different censuses are not combined to produce national totals due to lack of synchronisation (birds counted at roost by one method may be effectively double-counted during the WeBS count at a different site in that month), with the exception of a few goose populations where the risk of double-counting is minimal (see Appendix 2). Consequently, counts from site or regional-based surveys of sea-ducks, for example, are not included in national totals. Data from NEWS are not included in national totals.

For some scarcer species, including many escaped or introduced species, an estimate of the total number recorded by WeBS throughout the country has been provided using summed site maxima, calculated by summing the highest count at each site, irrespective of the month in which it occurred. For some species, this is likely to result in double-counting where birds move between sites.

Annual indices

Because the same WeBS sites are not necessarily covered each year, changes in waterbird population sizes cannot be determined simply by comparing the total number of birds counted in each year. Consequently, indexing techniques have been developed which allow between-year comparisons of numbers, even if the true population size is unknown.

The 'Underhill index' (Underhill 1989) was specifically developed for waterbird populations and is used in this report for most species. A full explanation of this indexing process is given in Prŷs-Jones *et al.* (1994), Underhill & Prŷs-Jones (1994) and Kirby *et al.* (1995), with additional information on its use in this report in Appendix 3.

In summary, where sites have not been visited, a count for each species is calculated based on counts in other months and years and at other sites. This effectively means that data are available for the same set of sites in each year and counts are thus directly comparable from one year to the next. Changes in the population can be calculated and the relative difference expressed as an index.

Not all species are included in the indexing process. Notably, many of the goose populations are excluded, partly because their reliance on non-wetland sites requires different count methodologies, but also because regular censusing of substantially the whole of the British populations negates the need for an index to be calculated using the Underhill technique. Thus, change indices for Pink-footed, Icelandic Greylag, Greenland White-fronted and Svalbard Barnacle Geese have been derived from the highest total count obtained during censuses of the population in each year (see Appendix 3). Many sea-duck are also excluded from the indexing process because of the extreme counting difficulties involved. Waders excluded from the index include those for which large numbers occur away from wetlands, e.g. Lapwing and Golden Plover, and those that are difficult to count accurately using WeBS methods, e.g. Snipe and Jack Snipe. Waterbird species which only occur in small numbers in Britain and Ireland have also been excluded.

Index values for wildfowl species have been provided separately for Britain and Northern Ireland. However, values calculated for waders in Northern Ireland were found to be statistically unreliable due to the small number of estuaries contributing to each index value, and consequently indices have been calculated for the UK as a whole for these species.

For all species, the index value has been constrained to equal 100 in the most recent year. In particular, this enables direct comparison of values for wildfowl in Great Britain with Northern Ireland despite the different availability of data as a consequence of the later start of the scheme in the province (see Appendix 3 for availability of data for different species groups and countries).

Monthly indices

The abundance of different wildfowl species varies during the winter due to a number factors, most notably the timing of their movements along the flyway, whilst severe weather, particularly on the continent, may also affect numbers in the UK. However, due to differences in site coverage between months, such patterns cannot be reliably detected using count totals. Consequently, an index is calculated for each month to reflect changes in relative abundance during the season.

The index uses only counts from sites covered in all seven months (September to March). Totals calculated for each month from these sites only can then be compared directly (expressed as a percentage of the maximum numbers), thus revealing patterns of seasonality for the species considered. These are presented as graphs in the species accounts, giving both the value for the 1998-99 winter, and the average value from the five preceding winters, 1993-94 to 1997-98. Non-migratory, scarce and irregularly counted species are omitted and only WeBS Core Counts have been used in the index.

Broad differences in the monthly values between species reflect their status in the UK. Resident species, or those with large UK breeding populations, e.g. some grebes and Mallard, are present in large numbers early in the winter. Declines through the winter result in part from mortality of first year birds, but also birds returning to remote or small breeding sites that are not covered by WeBS. The majority of UK wildfowl either occur solely as winter visitors, or have small breeding populations that are swelled by winter immigrants, with peak abundance generally occurring in mid winter.

The vast majority of the wintering populations of many wader species are found on estuaries, and, since coverage of this habitat is relatively complete and more or less constant throughout winter, meaningful comparisons of total monthly counts can be made for many species. Consequently, monthly indices are not calculated for waders. As counting of gulls and terns is optional, indices are not calculated for these species either.

Site importance

Tables in the *Species Accounts* rank the principal sites for each species according to average seasonal maxima for the last five seasons in line with recommendations of the Ramsar Convention (see Appendix 2 and *Presentation and notation*).

The count nearest the priority date or, alternatively, the count co-ordinated with nearby sites if there is considered to be significant interchange, is chosen for use in this report if several accurate counts are available for the same month. A count from any date is used if it is the only one available.

In accounts for most divers, grebes, Cormorant, herons, wildfowl and Kingfisher, annual maxima are derived from any month, with the season running from July to June inclusive. Average maxima for sites listed in the wader accounts are calculated using data from only the winter period, November to March. For species

which occur primarily as summer visitors, e.g. Garganey, Little Ringed Plover, annual statistics are calculated using the calendar year.

Data from other sources, often involving different methods, e.g. goose roost censuses, are used where these provide better, i.e. larger, counts for individual sites. NEWS data have only been presented for selected species (Ringed Plover, Sanderling, Purple Sandpiper, Bar-tailed Godwit and Turnstone) and only for sites previously noted as being of national importance.

In the first instance, average maxima were calculated using only complete counts but, if any incomplete counts exceeded this initial average, they were also incorporated and the averages recalculated. Averages enclosed by brackets are based solely on incomplete counts.

Counts at any site are considered to be incomplete whenever significant under-recording is thought to have occurred, due to part of the site not being counted or adverse counting conditions. This information is provided by the observer on the accuracy of the overall count (either 'OK' or 'Low', the latter indicating that a significant proportion of birds present were thought to have been missed, e.g. due to poor visibility) or for individual species.

For sites comprising just one count unit, completeness is assessed on a species-by-species basis using the accuracy information provided by the observer.

For complex sites (i.e. those comprising more than one count unit), counts from individual count sectors might have been made under very different conditions, particularly at very large sites, and consequently may have quite different qualities assigned to accuracy of the count. Additionally a variable amount of the overall site may have been uncounted.

For wildfowl and their allies, completeness assessments for the major complex sites (most estuaries, gravel pit complexes etc) have been made according to the number of sectors covered. If a significant proportion of the total number of sectors were not counted, and the total number of wildfowl was correspondingly lower than normal, all counts of those species at that site in that month are deemed incomplete.

For waders, gulls, terns and herons, more sophisticated species-by-species completeness qualities are assigned. In this case, the importance of the contribution of each count sector to the site total is based on its average contribution to the total at the time of year in question and on recent years (to allow for seasonal and long-term trends). Further, consideration is given to the fact that a count sector which normally holds a significant proportion of a site total for species A may hold only a small proportion of the site total for species B. Consequently, if such a count sector is not completely counted, the site total will now be treated as complete for species B but incomplete for species A.

In addition to the assessment of sites in *Species Accounts*, sites are identified for their importance in terms of overall waterbird numbers in *Principal Sites*. The peak count at each site is calculated by summing the individual species maxima during the season, irrespective of the month in which they occurred. Only WeBS Core Counts and national goose censuses (see Appendix 3) are included in totals. Note that non-native introduced or escaped species (i.e. those not in BOURC category A; see *Introduced and Escaped Waterbirds* under *Total Numbers*) are not included in these totals. Additional counts made using different methodologies, such as those of sea-ducks on the Moray Firth, are not incorporated.

The locations of all sites named in this report are given in Appendix 10.

PRESENTATION AND NOTATION

Detail is provided here on the format of presentation and the notation used in *Species Accounts* in particular. The information provided in *Analysis* and *Interpretation of Waterbird Counts* should mean that results presented in other sections are self-explanatory.

The main purpose of the *Species Accounts* is to list important sites for each species, sub-species or populations, as relevant. This is done using certain numerical criteria adopted widely for use in conservation legislation and guidelines for site designation (see Appendix 2), although a number of exceptions have been made in some cases. Where available, the international and national importance thresholds are listed at the start of each account, although, for some numerous species, no population estimates, and therefore no thresholds, are available. Less numerous species, for which thresholds are not likely to be produced, are classified as "scarce" whilst species are classified as a "vagrant" where the UK does not fall within its normal range of

distribution. In line with the recommendations of Vinicombe *et al.* (1993), records of all species recorded by WeBS, including escapes, have been published to contribute to the proper assessment of naturalised populations and escaped birds. Following Holmes & Stroud (1995), non-native species which have become established are termed "naturalised". These species are categorised according to the process by which they became established: naturalised feral (domesticated species gone wild); naturalised introduction (introduced by man); naturalised re-establishment (species re-established in an area of former occurrence); or naturalised establishment (a species which occurs, but does not breed naturally, e.g. potentially Barnacle Goose in southern England). With the exception of vagrants, all other non-native species have been classed as "escapes". The native range is given in the species account for naturalised species, escapes and vagrants.

The maximum count in any month of 1998-99, and the month of occurrence, is given for Great Britain and Northern Ireland in each account except for species occurring in very small numbers. Where productivity data have been collected, the proportion of young and mean brood size, where available, are also listed at the start of the account for ease of reference.

Index values, where calculated, are graphed within each account. Annual indices are presented on a log scale, as is the scientific norm for population growth. Where separate British and Northern Ireland values have been calculated (for certain wildfowl species), these are presented on the same graph to allow direct comparison but with different y-axes (vertical axes) for clarity. British indices are denoted using circles and the left-hand axis, and Northern Ireland values using squares and the right hand axis. Where only one index series is presented, circles and the left-hand axis have been used regardless of country.

Monthly indices, where calculated, are graphed within each account. Mean values for the previous five years (1992-93 to 1996-97) are shown using black columns and values for the most recent year using white columns.

Text in each account highlights significant points, e.g. coverage, changes in numbers or indices and at individual sites, and provides an overview of any recently published relevant research or surveys. The terms "recent average" and "previous average" refer to averages based on the winters 1992-93 to 1996-97, i.e. those presented in the previous WeBS report.

Tables provide data for all internationally important sites and all nationally important sites (either in a Great Britain context or, for sites in Northern Ireland, in an all-Ireland context) monitored by WeBS or other appropriate surveys. For each site, the maximum count in each of the five most recent years, the month of occurrence of the 1998-99 peak and the mean of the maxima is given. Incomplete counts are bracketed and missing counts are denoted using a dash "-".

Sites are selected for presentation using a strict interpretation of the 1% threshold (for convenience, sites in the Channel Islands and Isle of Man are identified using 1% thresholds for Great Britain and included under the Great Britain section of the tables). For some species with very small national populations, and consequently very low 1% thresholds, an arbitrary, higher level has been chosen for the inclusion of sites and is highlighted in the text. Where no thresholds are given, e.g. for introduced species, and where no or very few sites in the UK reach the relevant national qualifying levels, an arbitrary threshold has been chosen to select a list of sites for this report. These thresholds are highlighted in the text, whilst a blank line has been inserted in the table to separate sites that qualify as nationally important from those selected for the purposes of this report using lower thresholds, including 1% thresholds of less than 50 birds.

Where the importance of a site has changed as a result of the 1998-99 count, i.e. it has become nationally or internationally important but was not following the previous year, or it has changed from international to national importance or vice versa, this is indicated in the table. Sites with elevated status have a black triangle pointing up (▲) to the right of the average, whilst those with lowered status are indicated using a triangle pointing down (▼). Sites for which the average fell below the threshold for national importance following 1998-99 are listed under the heading "Sites no longer meeting table qualifying levels".

A few sites that have not been counted in recent years, in most cases due to their isolated location, but were of national or international importance for one or more species when last counted (and thus retain that status in the absence of data to the contrary), are listed in the accounts under the section "Internationally or nationally important sites not counted in last five years". This also serves to highlight the need for counting to be resumed.

All sites which, in 1998-99, held numbers exceeding the relevant national threshold (or

adopted qualifying level), but with five year means below this value are listed under "Other sites surpassing table qualifying levels in 1998-99". This serves to highlight important sites worthy of continued close attention. For waders, this includes counts from any month of the year.

It should be noted that a site may appear to have been flagged erroneously as having elevated status if the most recent count was below the relevant threshold. However, a particularly low count six years previously will have depressed the mean in the previous report. The converse may be true for sites with lowered status and thus, in exceptional circumstances, a site may be listed in the relevant sections of the table as both no longer being of national importance and with a peak count in the most recent year exceeding the national threshold.

For a number of wader species, different thresholds exist for passage periods. The list of "sites surpassing passage thresholds in 1998-99" includes all those with counts above the relevant number, even if already listed in the main part of the table by virtue of the winter mean surpassing the national threshold.

See page 36 for symbols and notation used.

INTERPRETATION OF WATERBIRD COUNTS

Caution is always necessary in the interpretation and application of waterbird counts given the limitations of these data. This is especially true of the summary form which, by necessity, is used in this report. A primary aim here remains the rapid feedback of key results to the many participants in the WeBS scheme. More detailed information on how to make use of the data for research or site assessment purposes can be obtained from the appropriate National Organisers.

Information collated by WeBS and other surveys can be held or used in a variety of ways. Data may also be summarised and analysed differently depending on the requirements of the user. Consequently, calculations used to interpret data and their presentation may vary between this and other publications, and indeed between organisations or individual users. The terminology used by different organisations may not always highlight these differences. This particularly applies to summary data. Such variations do not detract from the value of each different method, but offer greater choice to users according to the different questions being addressed. This should always be borne in mind when using data presented here.

For ease of reference, the caveats provided below are broadly categorised according to the presentation of results for each of the key objectives of WeBS. Several points, however, are general in nature and apply to a broad range of uses of the data.

National totals

The majority of count data are collected between September and March, when most species of waterbird are present in the UK in highest numbers. Data are collected during other months and have been presented where relevant. However, caution is urged regarding their interpretation both due to the relative sparsity of counts from this period and the different count effort for different sites.

A number of systematic biases of WeBS or other count methodology must be borne in mind when considering the data. Coverage of estuarine habitats and large, standing waters by WeBS is good or excellent. Consequently, counted totals of those species which occur wholly or primarily on this habitat during winter will approximate the true number. However, those species dispersed widely over rivers, non-estuarine coast or small inland waters are likely to be considerably under-represented, as will secretive or cryptic species, such as snipes, or those which occur on non-wetlands, e.g. grassland plovers. Species which occur in large numbers during passage are also likely to be under-represented, not only because of poorer coverage at this time, but due to the high turnover of birds in a short period. Further, since counts of gulls and terns are optional, national totals are likely to be considerable underestimates of the number using the WeBS network of sites. Only for a handful of species, primarily geese, do count totals approach the true number in the UK.

One instance of possible over-estimation is the use of summed site maxima to determine the total number of scarcer species. For species with mobile flocks in an area well covered by WeBS, e.g. Snow Goose in south-east England, it is likely that a degree of double-counting will occur, particularly if birds move between sites at different times of the year. These cases are highlighted in the *Species Accounts*.

The publication of records of vagrants in this

report does not imply acceptance by the *British Birds* Rarities Committee (e.g. Rogers and the Rarities Committee 1998).

Annual indices

For all species, the long-term trends in index values can be used with confidence to assess changes in overall wintering populations. Because short-term fluctuations provide a less rigorous indication of population changes, care should be taken in their interpretation.

Caution should be used in interpreting figures for species which only occur in small numbers. Thus, numbers tend to fluctuate more widely for many species in Northern Ireland, largely as a result of the smaller numbers of birds involved but also, being at the westernmost limit of their range, due to variable use being made of Ireland by wintering wildfowl.

It should be borne in mind that the missing values used in the Underhill index are calculated anew each year. Because the index formula uses data from all years, each new year's counts will slightly alter the site, month and year factors. In turn, the missing counts may differ slightly and, as a result, the index values produced each year are likely to differ from those published in the previous *Wildfowl and Wader Counts*. The indices published here represent an improvement on previous figures as the additional year's data allow calculation of the site, month and year factors with greater confidence.

The use of a log scale to present indices means that the graph describes the rate of change, irrespective of the population size. Thus, a line showing a change from 10 to 100 has the same slope as from 100 to 1,000 since both represent a 10-fold increase in numbers. This has the effect of reducing the apparent magnitude of changes in numbers at the top end of the scale since a straight line increase over time represents a logarithmic, rather than linear, growth in numbers. Index values are given in Appendix 3.

Monthly indices

As for annual indices, the reduced numbers of both sites and birds in Northern Ireland result in a greater degree of fluctuation in numbers used in the analyses of data from the province.

Site importance

Criteria for assessing the international importance of wetlands have been agreed by the Contracting Parties to the Ramsar Convention on Wetlands of International Importance (Ramsar Convention Bureau 1998). Under criterion 3c, a wetland is considered internationally important if it regularly holds at least 1% of the individuals in a population of one species or subspecies of waterbird, whilst any site regularly holding a total of 20,000 or more waterbirds also qualifies under criterion 3a. Similar criteria have been adopted for identification of SPAs under the EC Birds Directive in the UK legislation. A wetland in Britain is considered nationally important if it regularly holds 1% or more of the estimated British population of one species or subspecies of waterbird, and in Northern Ireland, important in an all-Ireland context if it holds 1% or more of the estimated all-Ireland population. The relevant 1% thresholds are given in Appendix 2.

Sites are selected for presentation in this report using a strict interpretation of the 1% threshold. However, it should be noted that, where 1% of the national population is less than 50 birds, 50 is normally used as a minimum qualifying threshold for the designation of sites of national importance. It should also be noted that the 'qualifying levels' used for introduced species are used purely as a guide for presentation of sites in this report and do not infer any conservation importance for the species or the sites concerned since protected sites would not be identified for these non-native birds.

It is necessary to bear in mind the distinction between sites that *regularly* hold wintering populations of national or international importance and those which may happen to exceed the appropriate qualifying levels only in occasional winters. This follows the Ramsar Convention, which states that key sites must be identified on the basis of demonstrated regular use (calculated as the mean winter maxima from the last five seasons for most species in this report), otherwise a large number of sites might qualify as a consequence of irregular visitation by one-off large numbers of waterbirds. However, the Convention also indicates that provisional assessments may be made on the basis of a minimum of three years' data. These rules of thumb are applied to SPAs and national assessments also. Sites with just one or two years' data are also included in the tables if the mean exceeds the relevant threshold for completeness but this does not, as such, imply qualification.

Nevertheless, sites which irregularly support nationally or internationally important numbers may be extremely important at certain times, e.g.

when the UK population is high, during the main migratory periods, or during cold weather, when they may act as refuges for birds away from traditionally used sites. For this reason also, the ranking of sites according to the total numbers of birds they support (particularly in *Principal Sites*) should not be taken as a rank order of the conservation importance of these sites, since certain sites, perhaps low down in terms of their total 'average' numbers, may nevertheless be of critical importance to certain species or populations at particular times.

Peak counts derived from a number of visits to a particular site in a given season will reflect more accurately the relative importance of the site for the species than do single visits. It is important to bear this in mind since, despite considerable improvements in coverage, data for a few sites presented in this report derive from single counts in some years. Similarly, in assessing the importance of a site, peak counts from several winters should ideally be used, as the peak count made in any one year may be unreliable due to gaps in coverage and disturbance- or weather-induced effects. The short-term movement of birds between closely adjacent sites may lead to altered assessments of a site's apparent importance for a particular species. More frequent counts than the once-monthly WeBS visits are necessary to assess more accurately the rapid turnover of waterbird populations that occurs during migration or cold weather movements.

This list of potential sources of error in counting wetland birds, though not exhaustive, suggests that the net effect tends towards under- rather than over-estimation of numbers and provides justification for the use of maximum counts for the assessment of site importance or the size of a populations. Factors causing under-estimation are normally constant at a given site in a given month, so that while under-estimates may occur, comparisons between sites and years remain valid.

It should be recognised that, in presenting only sites of national importance, this report provides just one means of identifying important sites and does not provide a definitive statement on the conservation value of individual sites for waterbirds, let alone other conservation interests. The national thresholds have been chosen to provide a reasonable amount of information in the context of this report only. Thus, for example, many sites of regional importance or those of importance because of the assemblage of species present are not included here. European Directives and conservation Conventions stress the need for a holistic approach to effect successful conservation, and lay great importance on maintaining the distribution and range of species, in addition to the conservation of networks of individual key sites.

For the above reasons of poor coverage, geographically or temporally, outlined above, it should be recognised that lists of internationally and nationally important sites are limited by the availability of WeBS and other survey data. Whilst the counter network is likely to cover the vast majority of important sites, others may be missed and therefore will not be listed in the tables due to lack of appropriate data.

Some counts in this report differ from those presented previously. This results from the submission of late data and corrections, and in some cases, the use of different count seasons or changes to site structures. Additionally, some sites may have been omitted from tables previously due to oversight. It is likely that small changes will continue as part of the current site mapping project and as the database, developed initially for waders, is brought on line for wildfowl. Most changes are minor, but comment is made in the text where they are significant. Where a site has apparently changed status as a result of recalculations or omissions, comment is made in the text but it is not flagged in the tables in the *Species Accounts*.

Note that sites listed under "Sites no longer of national/all-Ireland importance" represent those that were listed in the 1996-97 report as of national importance but which, following the 1998-99 counts, no longer meet the relevant threshold. It is not an exhaustive list of sites which, at any time in the past, have been of national or all-Ireland importance.

Counts made using non-WeBS methodologies, such as those of sea-ducks on the Moray Firth, are not incorporated into the site totals presented in *Principal Sites*, with the exception of goose roost counts. Thus, it should be borne in mind that other sites that are important for certain waterbird species are not included in the table, whilst the sites listed may be of 'greater importance' for the species listed if additional data were included.

Lastly, owing to possible boundary differences, totals given for WeBS sites in this report are not necessarily the same as totals for designated statutory sites (ASSIs/SSSIs, SPAs or Ramsar Sites) having the same or similar names.

COVERAGE

WeBS Core Counts

Co-ordinated, synchronous counts are advocated to prevent double-counting or birds being missed. Consequently, priority dates are recommended nationally. Due to differences in tidal regimes around the country, counts at a few estuaries were made on other dates to match the most suitable conditions. Weather and counter availability also result in some counts being made on alternative dates.

Table ii. WeBS Core Count priority count dates in 1998-99

26 April	11 October
17 May	8 November
14 June	6 December
12 July	3 January
9 August	21 February
6 September	21 March

Counts were received from 1,996 sites of all habitats for the period April 1998 to March 1999, comprising 3,546 count units (the sub-divisions of large sites for which separate counts are provided). The number of sites remains at the high level of recent years, whilst the increased number of count units continues the trend of greater detail being provided. The coverage of the NW Scottish mainland coast is particularly noteworthy. Just one or two sites have been counted in this area in previous years, but extensive coverage was undertaken in late winter by the Royal Air Force Ornithological Society. Of the key waterbird sites, 1998-99 counts for the Alde Complex, Loch Leven and Blyth Estuary (Suffolk) were not received in time for inclusion in this report.

WeBS and I-WeBS coverage in 1998-99 is shown by 10 km squares in Figure 1. The location of each count unit is shown using only its central grid reference. Thus, for example, the 19 count sectors of the North Norfolk Coast fall in four 10 km squares, broadly indicating the extent of the whole site. In all, WeBS count units were visited in 1,117 different 10 km squares during 1998-99, typical of coverage in recent years. As ever, areas with few wetlands or small human populations are apparent on the map as areas with little coverage. The location of many of the key sites mentioned in the report and all estuaries is shown in Appendix 10. The county and grid reference of all sites mentioned by name in this report are given in Appendix 10.

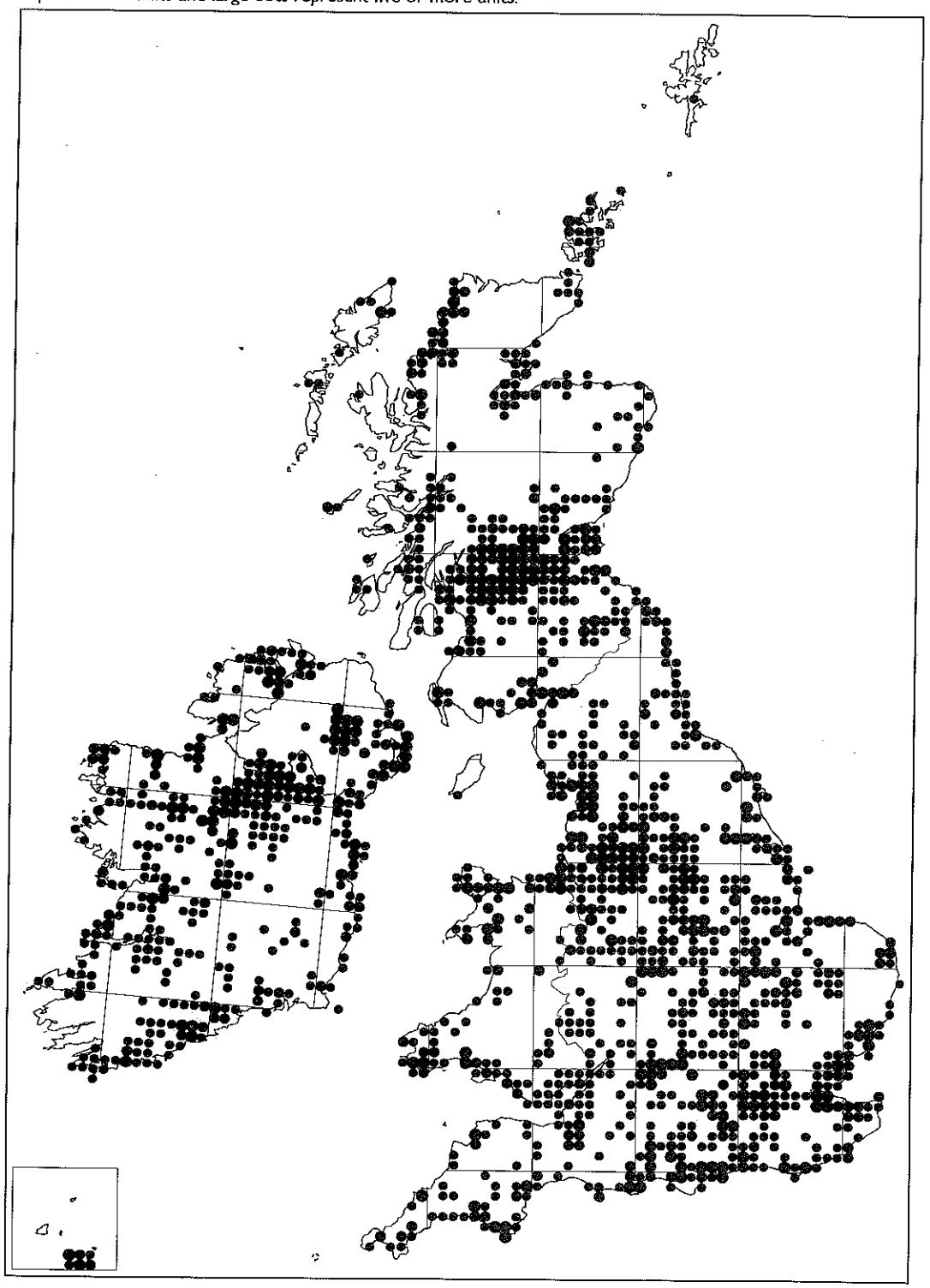
Goose censuses

In 1998-99, as in previous years, Bean Geese were censused regularly on the Slamannan Plateau (Simpson & MacIver 1999). National surveys of Pink-footed and Icelandic Greylag Geese were undertaken in October and November (Hearn 1999a), involving counts of birds arriving at or leaving roosts. Censuses of the native Scottish Greylag population on the Uists were made in August and February (R. MacDonald *in litt.*). Full censuses of Greenland White-fronted Geese, including birds in Ireland, were undertaken in autumn 1997 and spring 1998 by the Greenland White-fronted Goose Study and Irish National Parks and Wildlife Service (Fox & Francis 1999). Greenland Barnacle Geese were counted regularly by SNH and others on Islay and main islands in Argyll (M. McKay *in litt.*), and an international census covered all known sites in March (WWT/SNH/NPW unpubl. data). The Svalbard Barnacle Goose population was counted frequently on the Solway Firth by WWT staff (WWT unpubl. data). Dark-bellied Brent Geese were censused in January and February by the WeBS network, with counters at key sites making special effort to locate birds using adjacent areas, particularly fields, which would ordinarily be missed during normal Core Counts.

Sea-duck surveys

Data were received from the following regional or site-based surveys for counts of sea-duck, divers and grebes at coastal sites, many continuing studies from previous years: counts in the Moray Firth between November and January (Stenning 1999); at least once monthly aerial and/or land-based counts of Common Scoter in Carmarthen Bay Between April and March (Hayward *et al.* 1999); regular counts of grebes and Red-breasted Merganser off Lavan Sands (M. Howe *in litt.*); regular counts of key sites around the Isles of Shetland by SOTEAG (Heubeck 1999); and a land- and boat-based surveys of Scapa Flow, Orkney, the first since 1988-99, were made during most winter months (Williams 1999). However, no data were received for Cardigan Bay or parts of SE Scotland where dedicated counts have been made in recent years.

Figure 1. Coverage by 10-km grid squares for WeBS Core Counts in the UK, Isle of Man and the Channel Islands and for I-WeBS in the Republic of Ireland in 1998-99. Small dots represent 1-2 count units per 10-km square, medium dots represent 3-4 units and large dots represent five or more units.



TOTAL NUMBERS

The total numbers of waterbirds recorded by WeBS in 1998-99 are given in Tables 1 & 2 for Great Britain (including the Isle of Man, but excluding the Channel Islands) and Northern Ireland, respectively. Brief comment on these figures are provided below. In addition, counts of waterbirds in the Republic of Ireland by I-WeBS are provided in Table 3.

Site coverage for gulls and terns is given separately since counts of these species were optional.

As in 1997-98, winter 1998-99 was generally mild, although with a cold spell in much of northwest Europe in November. There were no obvious overall patterns in waterbird totals for Great Britain and Northern Ireland, some species showing continued increases, many were around average, but a number showed rather large and unexpected drops.

Throughout the text below, differences in annual index values between 1997-98 and 1998-99 are given in brackets for all species where the change was 20% or more. Values for wildfowl and their allies are for Great Britain unless otherwise specified; those for waders are for the UK (note that annual indices are not calculated for all waterbirds).

Divers, grebes, herons and Cormorant

Although numbers of divers were not markedly different to those in recent years, totals for both Black-throated and Great Northern Diver were the highest recorded by WeBS. Little Grebe numbers were also normal, but counts of all *Podiceps* grebes were below average, the annual index for Great Crested Grebes in Northern Ireland dropping by 36%, and count totals of the three rarer species were the lowest of the last five years.

Cormorant numbers remained around average in Great Britain, annual indices continuing the small decline of recent years, although record numbers were recorded in Northern Ireland, with the index value jumping accordingly (+29%). Little Egret numbers rose to new heights, whilst Grey Heron counts suggested continued stability.

Wildfowl

Continuing the steady rise since the mid 1980s, numbers and indices for Mute Swans reached record highs in Great Britain and Northern Ireland in 1998-99. Numbers and annual index values for migrant swans were around average for a mild winter, a sharp rise (+51%) in the British annual index for Bewick's Swans simply representing a recovery after the previous year's low; in Northern Ireland, values dropped markedly both for this species (-67%) and Whooper Swan (-25%).

Bean Goose numbers registered slight increases. Pink-footed Goose numbers fell slightly despite reasonable breeding success, but European White-fronts declined markedly (-27%), the peak count being the lowest but one since the mid 1970s. The spring national census of Greenland White-fronts showed a significant increase, the index reaching the highest level since co-ordinated monitoring began in the early 1980s. Icelandic Greylag Geese increased for the first time since 1993-94, whilst record numbers at key resorts were responsible for continued increases in the northwest Scottish population. The naturalised population also continued to grow, the annual index fractionally higher than the previous record.

Canada Goose numbers rose sharply to near record levels after the previous year's fall (+23%). Greenland Barnacle Goose numbers surpassed the previous record count whilst the Svalbard population census showed the large increases of recent years continued in 1998-99. The peak count of Dark-bellied Brent Geese dropped dramatically, with numbers and the annual index (-23%) being the lowest since 1981-82, poor breeding success (as suspected for other Taimyr-nesting waterbirds) a contributory factor. Light-bellied Brent Geese in Northern Ireland showed continuing increases over recent years, the annual index regaining the high levels of the early 1990s, whilst numbers of the Svalbard population were around average for a mild winter.

Numbers of Wigeon in Britain were the third highest on record. The inexorable rise in Gadwall numbers continued, passing 15,000 for the first time, and Teal numbers were also high, although British annual indices for both species dropped slightly. Numbers and annual indices for Mallard rose slightly for the first time in 10 years, but both remained at very low levels. Pintail numbers and indices rose sharply (+25% and +39% in Great Britain and Northern Ireland, respectively) to match early 1990s levels. The peak count of Shoveler was low for recent years, following high counts in the previous three years, and the annual index value dropped accordingly (-20%).

Numbers of Pochard and Tufted Duck were average for recent years. Scaup numbers reached a record high in Northern Ireland, although only just exceeding previous levels, but were the lowest for five years in Great Britain.

Counts of seaducks, prone to considerable variation due to count conditions, were average for Long-tailed Duck, Eider and Goldeneye, all having shown a fair degree of stability in recent years, although annual indices for the last species in Northern Ireland rose sharply (+43%). British totals of Common Scoter were the lowest for five years, but the largest count for many years was made in Northern Ireland. Velvet Scoter numbers were the highest of the 1990s.

Counts of Smew reached the second highest ever levels, surprising in view of the relatively mild winter. Numbers of Red-breasted Merganser were average, although annual indices (-21%) were the lowest of the last five years. Goosander numbers and index values in 1998-99 fell roughly in the middle of the wide range of fluctuating values of recent years. Ruddy Duck total counts and index values were the second highest on record.

Water Rail and Moorhen counts were the highest to date, although both represent only a very small proportion of the total populations. Coot numbers and annual indices were close to record high levels.

Waders

Numbers of Oystercatchers were around average in 1998-99. Counted numbers of Avocet were low due to the absence of data from key sites, but annual indices suggested little change and remained high following the recent increase.

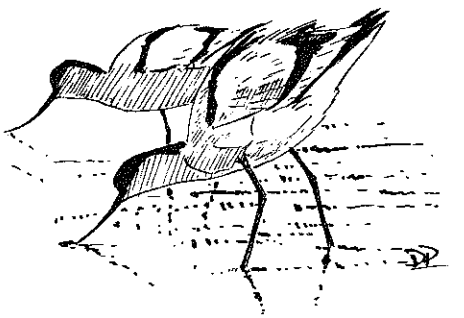
The recorded peak of Ringed Plover was the lowest for 10 years, and the annual index the lowest since the early 1980s. Golden and Grey Plover and Lapwing numbers were average for the last decade.

Numbers of Knot were small, and the annual index the lowest for 15 years, presumably the combined effect of poor breeding conditions across much of the Taimyr and the relatively mild winter enabling birds to winter further east. Sanderling numbers were around average, whilst those of Purple Sandpipers were the highest since 1993-94. Dunlin numbers were around average, but the index was low for the last decade.

Numbers of Snipe rose again in 1998-99. Numbers of Black-tailed Godwit were also high, the annual index remaining steady for third winter following a sustained increase since the early 1980s. British counts of Bar-tailed Godwit fell, whilst those in Northern Ireland rose 57% from the previous year, although the UK annual index value was average to low. Curlew numbers were high throughout the winter, although the index returned to more normal levels after the high in 1997-98.

Redshank numbers were around average, but those for Greenshank were the highest for the last 10 years in both Great Britain and Northern Ireland. Low totals of Turnstone were recorded, the annual index having declined steadily over the last 15 years.

Numbers of species which occur primarily during autumn passage, e.g. stints, Curlew and Wood Sandpipers, were in many cases record highs in 1998-99, thought likely to be mostly due to conditions during migration which favoured large numbers arriving in the UK.



Gulls and terns

The peak counts of both Black-headed and Common Gulls were around average for recent years. Peak numbers of Lesser-black Backed and Herring Gulls recorded by WeBS tend to occur in late summer, as birds disperse from breeding colonies; counted numbers of the former continued to increase, but those of the latter were slightly low. Numbers of Sandwich, Common, Arctic and Little Tern were around average for recent years, those of Arctic Tern were only half of the 1997-98 total.

Introduced and escaped waterbirds

Many species of waterbird occur in the UK as a result of introductions, particularly through escape from collections. Several have become

established, such as Canada Goose and Ruddy Duck. The British Ornithologists' Union Records Committee recently established a category 'E' for "Species that have been recorded as introductions, transportees or escapees from captivity, and whose breeding populations (if any) are not thought to be self-sustaining" (BOURC 1999).

WeBS records of these species are included in this report both for the sake of completeness and in order to assess their status and monitor any changes in numbers, a key requirement given the need, under the African-Eurasian Waterbird Agreement of the Bonn Convention ". . . to prevent the unintentional release of such species . . ." and, once introduced, the need ". . . to prevent these species becoming a potential threat to indigenous species" (Holmes *et al.* 1998). Numbers of established populations (e.g. Canada Goose and Ruddy Duck, which are placed in category 'C') are excluded from the statistics below since the large numbers involved would swamp numbers of other species.

Figure 2 shows data for species in category E, although these data exclude species which occur in both category A and E, e.g. Pink-footed Geese, since separation of escaped from wild birds is not readily possible using WeBS methods. The total number of species recorded by WeBS rose again in 1998-99, reaching a new peak of 26. The total of 186 sites, though slightly less than the 189 of the previous year, still suggests an overall upwards trend, particularly given that data not yet submitted may elevate this total. However, there was a marked drop in the summed site maxima, with the lowest figure for any of the most recent five years. It is unlikely that late data will add greatly to the total and there seems no obvious explanation for the large fall from the increasing trend in recent years.

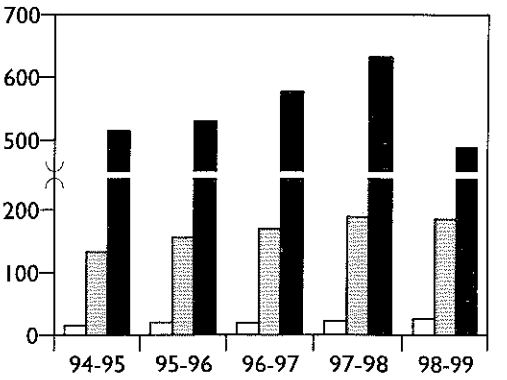


Figure 2. Number of species (white bars), number of sites at which birds were recorded (grey bars) and summed site maxima (black bars) for waterbird species in the BOURC's category E.

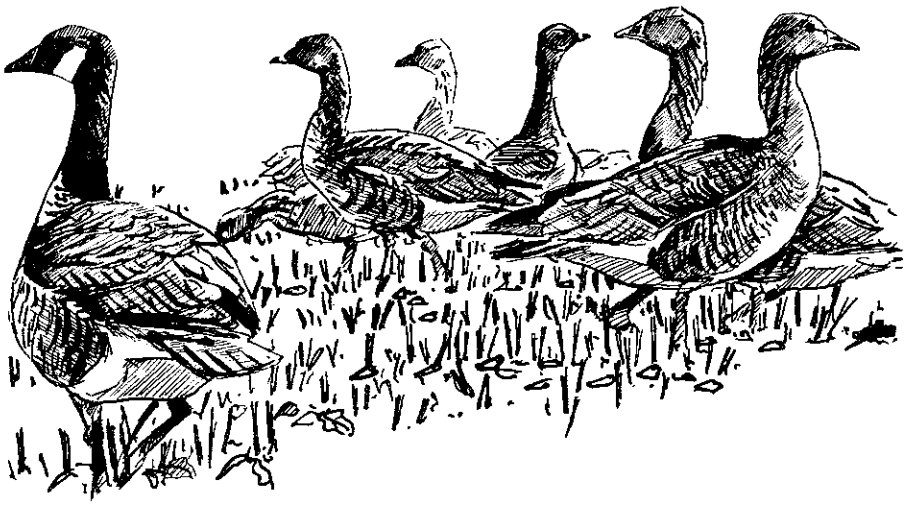


Table 1. Total numbers of waterbirds counted by WeBS in Great Britain, 1998-99†.

		Apr	May	Jun	Jul	Aug
	Number of sites visited	*861*	*836*	*806*	*805*	*825*
	Number of count units visited	*1,391*	*1,273*	*1,176*	*1,218*	*1,333*
RH	Red-throated Diver	230	63	6	54	44
BV	Black-throated Diver	6	1	1	1	0
ND	Great Northern Diver	43	12	3	2	0
UL	Unidentifed diver	0	0	0	0	0
PJ	Pied-billed Grebe	0	0	0	0	0
LG	Little Grebe	915	767	657	947	1,754
GG	Great Crested Grebe	3,583	3,038	2,884	3,596	5,623
RX	Red-necked Grebe	16	3	1	11	43
SZ	Slavonian Grebe	61	6	0	0	2
BN	Black-necked Grebe	13	25	11	22	20
UV	Unidentified grebe	0	0	0	0	0
CA	Cormorant	5,203	3,864	3,805	4,644	8,068
YP	Great White Pelican	0	0	0	0	0
BI	Bittern	5	8	1	4	2
QH	Squacco Heron	0	0	1	0	1
EC	Cattle Egret	1	0	0	0	0
ET	Little Egret	40	10	21	89	506
H.	Grey Heron	1,993	1,842	1,789	1,974	2,848
OR	White Stork	1	2	2	1	1
IS	Sacred Ibis	0	0	0	0	0
NB	Spoonbill	5	12	9	9	8
FK	Lesser Flamingo	0	0	0	0	0
FL	Greater Flamingo	1	1	0	0	0
YV	Fulvous Whistling Duck	0	1	1	0	0
MS	Mute Swan	8,333	8,118	8,099	9,538	11,276
AS	Black Swan	12	11	23	22	34
BS	Bewick's Swan	2	1	0	0	0
WS	Whooper Swan	44	26	20	16	22
ZS	hybrid Cygnus	0	0	0	1	0
HN	Swan Goose	0	0	0	0	0
BE	Bean Goose	1	0	0	0	0
PG	Pink-footed Goose	11,712	75	29	16	35
WG	White-fronted Goose	0	0	0	0	0
EW	European White-fronted Goose	3	1	1	1	2
NW	Greenland White-fronted Goose	1	0	1	0	1
LC	Lesser White-fronted Goose	0	0	0	1	0
JI	Greylag Goose (Iceland)	777	310	911	1,185	440
JH	Greylag Goose (NW Scotland)	189	179	357	559	5,962
JE	Greylag Goose (naturalised)	4,517	5,097	6,526	8,504	12,680
HD	Bar-headed Goose	8	6	17	10	11
SJ	Snow Goose	25	17	19	21	12
RJ	Ross's Goose	0	0	1	0	0
EM	Emperor Goose	0	0	0	0	2
CG	Canada Goose	10,773	10,868	17,516	21,577	28,968
YN	Barnacle Goose (Greenland)	30	20	19	18	19
YS	Barnacle Goose (Svalbard)	16,426	3,012	28	11	2
YE	Barnacle Goose (naturalised)	79	39	19	150	224
BG	Brent Goose	0	0	0	0	0
DB	Dark-bellied Brent Goose	14,996	13,010	33	39	28
BB	Black Brant	0	0	0	0	0
QS	Light-bellied Brent Goose (Svalbard)	3	0	2	1	1
QN	Light-bellied Brent Goose (Canada)	4	0	0	0	0
EB	Red-breasted Goose	0	1	0	1	1
EG	Egyptian Goose	72	142	261	305	304
ZL	feral/hybrid goose	70	63	47	65	73
UO	unidentified goose	2	0	0	0	0

Table 1. continued

	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Sites	*1,333*	*1,617*	*1,673*	*1,649*	*1,603*	*1,623*	*1,572*
Count units	*2,104*	*2,617*	*2,748*	*2,731*	*2,650*	*2,701*	*2,577*
RH	131	175	280	416	960	438	262
BV	1	3	10	35	19	12	89
ND	0	17	53	89	95	39	93
UL	0	0	1	11	2	1	13
PJ	0	0	0	0	0	2	2
LG	3,240	3,771	3,292	3,498	2,922	2,621	2,271
GG	7,937	8,483	8,570	7,828	6,749	6,641	6,239
RX	28	14	40	38	27	27	25
SZ	23	69	119	201	168	85	95
BN	21	26	31	15	17	27	22
UV	0	0	0	0	0	0	1
CA	12,343	14,475	13,146	13,330	12,310	11,249	10,017
YP	0	1	0	1	1	0	0
BI	4	8	9	29	24	15	16
QH	0	0	0	0	0	0	0
EC	0	0	0	0	0	0	0
ET	785	655	521	491	373	449	479
H.	3,659	3,683	3,224	3,272	2,741	2,899	2,641
OR	1	4	2	4	4	3	3
IS	0	0	0	1	1	0	1
NB	8	9	6	8	6	4	4
FK	0	1	1	1	1	0	0
FL	0	0	0	0	0	0	0
YV	0	0	2	0	0	0	0
MS	15,285	18,797	18,764	18,847	16,355	15,558	13,907
AS	43	33	18	23	25	15	21
BS	4	37	182	866	1,452	1,742	48
WS	24	645	2,492	2,530	2,788	2,673	1,801
ZS	0	0	1	0	0	0	0
HN	2	0	2	1	1	1	0
BE	0	20	234	185	334	53	2
PG	115	123,144	56,058	93,821	48,979	66,867	52,793
WG	0	3	0	46	6	11	0
EW	14	57	170	1,846	4,139	3,217	253
NW	63	506	20,302	476	1,038	700	22,117
LC	3	4	1	1	1	0	1
JI	850	23,779	23,657	26,639	25,841	17,162	12,739
JH	299	386	213	562	258	5,190	193
JE	16,799	18,553	18,663	18,296	16,221	11,542	9,598
HD	13	7	16	18	9	12	14
SJ	21	43	28	36	34	37	40
RJ	3	2	2	0	1	0	1
EM	0	3	4	3	5	5	5
CG	39,382	42,542	42,128	42,349	40,534	29,507	23,526
YN	1	36,798	274	3,517	1,028	1,779	39,430
YS	42	26,843	†20,722	†26,143	18,516	†22,522	†22,233
YE	190	232	788	982	535	788	373
BG	6	1	0	2	0	1	0
DB	77	55,683	68,008	71,079	74,409	67,259	27,735
BB	0	0	0	1	1	1	1
QS	286	1,680	2,819	2,487	1,976	267	18
QN	110	15	26	29	59	41	18
EB	1	0	1	1	0	6	1
EG	315	197	157	138	145	109	89
ZL	121	540	505	581	491	352	337
UO	0	0	0	0	0	1,120	0

Table 1. Great Britain, continued

		Apr	May	Jun	Jul	Aug
UD	Ruddy Shelduck	4	4	3	5	3
UA	Australian Shelduck	0	0	0	0	0
UB	Paradise Shelduck	0	1	0	0	0
SU	Shelduck	22,662	16,384	16,170	13,635	20,050
ZT	hybrid shelduck	0	0	0	0	0
QF	Magellan Goose	0	0	0	0	0
MY	Muscovy Duck	37	16	24	24	18
DC	Wood Duck	0	0	0	0	0
MN	Mandarin	81	95	112	132	67
QD	Crested Duck	0	0	0	0	0
WN	Wigeon	2,258	387	264	212	310
AW	American Wigeon	1	1	1	0	1
HL	Chiloe Wigeon	2	2	3	2	2
GA	Gadwall	1,850	1,427	2,078	1,358	2,613
IK	Baikal Teal	0	0	0	0	0
T.	Teal	3,282	386	664	761	4,027
TA	American Green-winged Teal	1	0	0	0	0
KQ	Speckled Teal	0	0	0	0	2
MA	Mallard	22,475	24,237	31,174	38,183	60,548
QB	Chestnut Teal	0	0	0	0	0
PT	Pintail	260	20	10	15	29
YL	Yellow-billed Pintail	0	0	0	1	0
PN	Bahama Pintail	0	0	1	0	0
YR	Red-billed Teal	0	0	0	0	0
QC	Cape Teal	0	0	0	0	0
AG	Silver Teal	0	0	0	1	0
GY	Garganey	23	68	17	13	46
TB	Blue-winged Teal	0	1	1	0	0
QA	Cinnamon Teal	0	0	0	0	0
SV	Shoveler	1,159	960	567	688	2,330
IE	Ringed Teal	0	0	4	0	0
MQ	Maned Duck	1	1	1	1	1
RQ	Red-crested Pochard	5	5	1	8	16
PO	Pochard	903	754	667	1,324	4,471
NG	Ring-necked Duck	1	1	1	0	0
FD	Ferruginous Duck	0	0	0	0	0
TU	Tufted Duck	14,766	7,907	7,331	15,208	27,631
SP	Scaup	1,328	24	1	94	4
AY	Lesser Scaup	0	0	0	0	0
E.	Eider	16,605	15,889	15,665	23,017	19,413
KE	King Eider	0	0	0	1	0
LN	Long-tailed Duck	282	66	0	0	0
CX	Common Scoter	2,074	569	785	818	691
FS	Surf Scoter	1	0	0	0	0
VS	Velvet Scoter	418	33	48	19	9
UX	Unidentified scoter sp.	0	0	0	0	0
VH	Bufflehead	0	0	0	0	0
GN	Goldeneye	1,453	87	54	106	70
HO	Hooded Merganser	1	0	0	0	0
SY	Smew	2	0	0	0	0
RM	Red-breasted Merganser	1,329	620	648	913	1,018
GD	Goosander	491	455	319	703	795
RY	Ruddy Duck	880	675	520	582	916
ZF	feral/hybrid Mallard type	88	81	87	114	98
ZR	hybrid Anas	0	0	0	0	0
ZD	hybrid Aythya	1	0	1	0	1
UM	unidentified duck	0	0	0	0	0
WA	Water Rail	65	24	26	85	37
AK	Spotted Crake	0	3	0	0	0
MH	Moorhen	4,192	3,668	3,090	3,849	6,344
CO	Coot	15,532	12,455	14,724	25,073	42,647
AN	Crane	0	0	0	0	0
	TOTAL WILDFOWL[2]	192,662	136,082	136,360	178,263	269,859

Table 1. continued.

	Sep	Oct	Nov	Dec	Jan	Feb	Mar
UD	3	6	0	3	1	5	1
UA	0	2	1	0	0	0	0
UB	0	0	0	0	0	0	0
SU	32,653	44,324	58,488	55,931	63,106	50,259	39,439
ZT	0	0	0	0	0	1	0
QF	0	1	1	1	1	1	1
MY	29	52	71	63	46	46	45
DC	0	1	2	1	2	1	1
MN	211	288	261	189	175	90	115
QD	0	0	1	1	1	1	0
WN	18,088	164,995	203,642	369,798	347,191	248,381	98,498
AW	3	3	4	3	3	3	1
HL	3	14	13	10	1	12	8
GA	6,374	10,286	11,493	15,211	12,347	10,392	4,929
IK	0	0	0	1	0	0	0
T.	40,180	90,300	104,025	135,065	138,162	78,314	37,027
TA	0	1	2	3	5	2	3
KQ	3	5	2	2	0	1	1
MA	109,990	130,578	140,105	151,114	128,916	85,482	49,470
QB	1	1	0	0	1	0	0
PT	4,999	16,613	22,474	20,871	26,783	13,724	3,912
YL	0	0	0	0	0	0	0
PN	0	0	0	0	0	0	0
YR	0	0	0	0	0	0	1
QC	0	0	0	0	0	1	0
AG	0	0	0	0	0	0	0
GY	32	10	3	1	1	0	5
TB	0	0	0	0	1	0	1
QA	0	0	1	0	0	0	0
SV	6,055	8,496	7,501	7,617	8,171	7,653	5,558
IE	1	0	3	1	4	1	1
MQ	1	1	1	0	1	1	0
RQ	29	74	85	66	28	51	55
PO	8,285	13,413	25,904	40,401	37,824	29,753	5,165
NG	1	2	2	3	3	4	6
FD	1	1	0	4	3	1	0
TU	38,563	40,799	48,280	54,278	50,842	46,055	36,896
SP	46	1,397	3,615	2,252	2,637	2,875	1,752
AY	0	0	1	1	2	3	2
E.	24,880	23,883	24,662	16,713	16,831	17,801	15,763
KE	0	0	0	0	0	0	0
LN	1	293	688	2,185	930	1,924	1,013
CX	706	1,733	5,467	4,257	3,856	3,398	3,820
FS	0	2	2	4	6	4	5
VS	70	701	508	1,290	398	479	384
UX	0	0	0	200	300	77	0
VH	0	0	0	1	1	1	0
GN	173	853	8,485	14,367	12,871	16,580	11,804
HO	0	0	0	0	0	0	0
SY	0	1	7	294	351	341	57
RM	1,609	2,051	2,913	4,322	3,269	2,798	3,829
GD	766	1,003	1,600	3,254	3,244	3,552	1,489
RY	1,846	2,862	2,946	3,641	3,051	3,538	2,158
ZF	128	148	191	205	191	171	151
ZR	1	1	0	0	0	0	0
ZD	1	5	1	2	4	5	5
UM	0	0	5	6	1	50	0
WA	102	230	364	521	338	306	311
AK	3	0	0	0	0	0	0
MH	10,309	11,592	12,241	11,915	11,050	11,150	10,241
CO	74,613	96,207	105,586	110,226	93,312	69,249	42,579
AN	0	0	0	0	0	0	2
WILDFOWL	478,552	1,007,396	1,093,426	1,363,260	1,244,712	974,729	583,846

Table 1. Great Britain, continued

		Apr	May	Jun	Jul	Aug
OC	Oystercatcher	59,999	35,605	31,884	45,435	135,569
IT	Black-winged Stilt	1	1	1	1	1
AV	Avocet	1,260	956	916	1,326	811
TN	Stone-curlew	0	0	0	0	1
LP	Little Ringed Plover	199	265	229	237	110
RP	Ringed Plover	8,479	12,761	1,767	1,835	12,123
TV	Semipalmated Plover	1	0	0	0	0
KP	Kentish Plover	0	0	0	0	2
DO	Dotterel	0	12	0	0	0
GP	Golden Plover	4,720	37	20	3,259	13,988
GV	Grey Plover	29,277	26,011	1,440	2,149	10,695
IP	Sociable Plover	0	0	0	0	0
L.	Lapwing	5,939	5,480	7,614	18,963	50,039
KN	Knot	86,541	22,184	6,514	26,127	57,279
SS	Sanderling	6,385	10,804	1,010	3,862	15,945
LX	Little Stint	5	6	3	5	12
TK	Temminck's Stint	0	1	0	0	0
PP	Pectoral Sandpiper	0	0	0	0	1
CV	Curlew Sandpiper	1	22	4	5	59
PS	Purple Sandpiper	551	9	1	3	41
DN	Dunlin	123,838	87,486	1,813	46,446	89,500
RU	Ruff	92	25	10	93	277
JS	Jack Snipe	8	0	0	1	0
SN	Snipe	404	135	77	137	790
LD	Long-billed Dowitcher	0	0	0	0	1
WK	Woodcock	1	1	0	0	1
BW	Black-tailed Godwit	8,041	2,246	2,006	4,102	18,337
BA	Bar-tailed Godwit	2,695	1,805	1,499	3,977	13,525
WM	Whimbrel	2,722	941	68	870	1,150
CU	Curlew	11,974	3,691	8,112	36,396	61,903
DR	Spotted Redshank	144	20	24	91	139
RK	Redshank	24,676	4,981	4,387	17,095	48,110
GK	Greenshank	357	102	24	734	1,453
LY	Lesser Yellowlegs	1	1	0	0	0
GE	Green Sandpiper	21	2	22	223	574
OD	Wood Sandpiper	1	18	0	3	17
CS	Common Sandpiper	525	521	359	864	1,235
TT	Turnstone	7,307	1,703	431	1,647	5,899
NK	Red-necked Phalarope	0	0	0	0	0
	TOTAL WADERS	386,165	217,832	70,235	215,886	539,587
	TOTAL WATERFOWL [3]	580,873	355,789	208,418	396,226	812,812

Table 1. continued

	Sep	Oct	Nov	Dec	Jan	Feb	Mar
OC	257,093	219,392	228,940	241,218	224,842	191,274	124,225
IT	0	1	1	1	1	1	1
AV	883	1,834	2,517	2,316	2,118	2,107	1,738
TN	0	0	0	0	0	0	0
LP	37	0	0	6	0	0	26
RP	20,911	12,223	8,881	7,922	7,890	6,587	3,759
TV	0	0	0	0	0	0	0
KP	0	0	0	0	0	0	0
DO	0	0	0	0	0	0	0
GP	25,221	67,818	118,588	112,777	152,831	77,693	21,469
GV	31,247	35,346	31,815	40,001	46,439	33,516	41,377
IP	0	1	0	0	0	0	0
L.	85,059	123,400	191,372	258,054	419,258	182,181	19,591
KN	106,981	179,789	188,268	234,978	213,542	196,535	125,022
SS	8,801	6,712	6,030	7,472	7,418	6,993	7,773
LX	1,063	176	39	26	14	16	8
TK	1	1	0	0	0	0	0
PP	0	1	0	0	0	0	0
CV	1,120	43	0	2	0	0	17
PS	276	476	1,266	940	1,335	1,129	871
DN	79,150	196,240	354,380	507,169	446,629	338,685	125,616
RU	1,280	799	372	386	361	756	521
JS	1	57	94	105	84	136	70
SN	2,119	3,510	5,273	7,768	6,536	5,488	3,574
LD	1	3	2	1	2	1	1
WK	0	5	30	49	28	19	34
BW	11,916	17,031	14,445	13,493	11,577	12,717	13,161
BA	20,337	23,312	17,393	45,134	42,268	38,547	10,949
WM	333	54	28	2	5	4	3
CU	85,746	75,687	78,205	69,593	73,817	72,845	53,596
DR	238	177	50	64	55	171	49
RK	75,823	84,500	81,479	80,203	72,037	66,332	60,402
GK	2,385	704	279	262	193	215	186
LY	0	3	0	0	1	1	1
GE	402	157	126	131	95	107	83
OD	30	1	0	0	0	0	0
CS	826	91	34	38	21	27	24
TT	10,057	12,319	12,346	13,045	12,406	10,456	9,932
NK	1	0	0	0	0	0	0
WADERS	829,338	1,061,863	1,342,253	1,643,156	1,741,803	1,244,539	624,079
WATERFOWL	1,312,347	2,073,620	2,439,442	3,010,223	2,989,666	2,222,638	1,211,071

Table 1. Great Britain, continued

		Apr	May	Jun	Jul	Aug
	Number of sites where gulls were counted [4]	*705*	*702*	*672*	*675*	*680*
MU	Mediterranean Gull	18	18	9	31	32
LF	Laughing Gull	0	1	0	0	0
LU	Little Gull	145	36	35	65	150
AB	Sabine's Gull	0	0	0	0	1
BH	Black-headed Gull	41,313	31,878	26,654	51,202	134,812
IN	Ring-billed Gull	1	0	1	0	0
CM	Common Gull	6,045	3,404	2,160	2,903	11,939
LB	Lesser Black-backed Gull	41,326	47,799	38,022	44,603	60,138
HG	Herring Gull	35,634	32,008	35,910	37,408	51,782
YG	Yellow-legged Gull	0	0	5	24	163
YM	Western Yellow-legged Gull	0	0	0	0	0
IG	Iceland Gull	3	0	0	0	0
GZ	Glaucous Gull	2	1	1	1	2
GB	Great Black-backed Gull	1,627	1,302	1,646	2,217	4,708
KI	Kittiwake	61	144	86	134	693
UU	Unidentified gull	40	0	6	56	229
	TOTAL GULLS	126,215	116,591	104,535	138,644	264,649
	Number of sites where terns were counted[4]	*701*	*706*	*675*	*674*	*688*
CJ	Caspian Tern	0	0	0	0	1
TE	Sandwich Tern	1,130	1,946	2,430	4,802	6,930
RS	Roseate Tern	0	2	1	1	3
CN	Common Tern	582	2,433	2,697	3,938	5,134
AE	Arctic Tern	46	592	301	529	219
FO	Forster's Tern	0	0	0	0	0
AF	Little Tern	149	636	565	623	634
BJ	Black Tern	0	10	0	0	1
WJ	White-winged Black Tern	0	0	0	0	0
UT	Unidentified tern	52	4	9	9	6
	TOTAL TERNS	1,959	5,623	6,003	9,902	12,928
KF	Kingfisher	73	86	95	137	180

† *See Appendix 3 for calculation of national totals for goose populations*
1 *Indicates White-fronted and Brent Geese not identified to race*
2 *Total wildfowl and allies represents numbers of all divers, grebes, Cormorant, swans, geese, ducks and rails*
3 *Total waterfowl represents numbers of all species except gulls and terns*
4 *Counting gulls and terns was optional, thus totals are incomplete at a national level*

Table 1. continued

	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Sites	*1,137*	*1,350*	*1,412*	*1,362*	*1,325*	*1,345*	*1,265*
MU	33	66	25	24	25	50	81
LF	0	0	0	0	0	0	0
LU	52	9	2	0	10	6	1
AB	1	0	0	0	0	0	0
BH	179,024	176,692	211,041	211,977	230,483	196,153	98,194
IN	1	1	2	1	2	5	1
CM	25,223	43,838	84,246	69,715	63,239	74,907	37,022
LB	27,105	16,055	18,848	7,254	7,661	12,003	39,582
HG	45,302	45,197	46,365	59,905	50,981	60,066	49,205
YG	105	111	50	31	6	16	9
YM	1	0	0	1	1	3	0
IG	0	0	0	3	2	6	8
GZ	1	1	2	8	6	9	3
GB	7,189	9,369	10,231	9,306	8,727	6,923	2,981
KI	1,455	1	2	6	54	75	195
UU	10,775	14,293	2,566	3,820	3,522	14,617	5,815
GULLS	296,267	305,633	373,380	362,051	364,719	364,839	233,097
Sites	*992*	*1,191*	*1,184*	*1,161*	*1,156*	*1,164*	*1,073*
CJ	0	0	0	0	0	0	0
TE	4,891	35	2	0	0	17	35
RS	1	0	0	0	0	0	0
CN	3,230	19	11	0	0	0	0
AE	123	3	1	0	0	0	19
FO	0	0	0	1	0	1	0
AF	338	0	0	0	0	0	0
BJ	340	0	0	0	0	0	0
WJ	1	0	0	0	0	0	0
UT	0	0	0	0	0	0	0
TERNS	8,924	57	14	1	0	18	54
KF	329	337	326	305	195	172	173

Table 2. Total numbers of waterbirds counted by WeBS in Northern Ireland, 1998-99[†].

		Apr	May	Jun	Jul	Aug
	Number of sites visited	*3*	*2*	*2*	*2*	*4*
	Number of count units visited	*11*	*10*	*6*	*10*	*101*
RH	Red-throated Diver	0	0	0	0	0
ND	Great Northern Diver	0	0	0	0	0
UL	Unidentified diver	0	0	0	0	0
LG	Little Grebe	0	0	0	0	171
GG	Great Crested Grebe	0	0	0	0	1,599
RX	Red-necked Grebe	0	0	0	0	0
SZ	Slavonian Grebe	0	0	0	0	0
CA	Cormorant	44	20	15	18	1,051
H.	Grey Heron	4	3	3	8	368
NB	Spoonbill	0	0	0	0	0
MS	Mute Swan	52	83	67	41	2,459
BS	Bewick's Swan	0	0	0	0	0
WS	Whooper Swan	0	0	0	0	7
PG	Pink-footed Goose	0	0	0	0	0
NW	Greenland Whitefront	0	0	0	0	0
GJ	Greylag Goose	0	0	0	0	0
CG	Canada Goose	0	0	0	0	0
YN	Barnacle Goose (Greenland)	0	0	0	0	0
YE	Barnacle Goose (naturalised)	0	0	0	0	0
DB	Dark-bellied Brent	0	0	0	0	0
BB	Black Brant	0	0	0	0	0
PB	Light-bellied Brent	74	0	0	0	0
SU	Shelduck	81	63	50	6	40
MN	Mandarin	4	3	0	0	1
WN	Wigeon	10	0	0	0	4
GA	Gadwall	4	0	0	0	59
T.	Teal	10	0	2	0	27
TA	American Green-winged Teal	0	0	0	0	0
MA	Mallard	48	52	75	103	5,211
PT	Pintail	0	0	0	0	2
SV	Shoveler	0	0	0	0	2
PO	Pochard	0	0	0	0	163
TU	Tufted Duck	0	0	0	0	3,078
SP	Scaup	0	0	0	0	0
E.	Eider	10	6	0	1	1
LN	Long-tailed Duck	0	0	0	0	0
CX	Common Scoter	0	0	0	0	0
GN	Goldeneye	4	0	0	0	34
SY	Smew	0	0	0	0	0
RM	Red-breasted Merganser	32	3	3	3	42
GD	Goosander	0	0	0	0	0
RY	Ruddy Duck	0	0	0	0	5
WA	Water Rail	0	0	0	0	0
MH	Moorhen	0	0	0	0	174
CO	Coot	0	0	0	0	3,463
	TOTAL WILDFOWL [1]	373	230	212	172	17,593

Table 2. continued

	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Sites	*14*	*24*	*26*	*30*	*28*	*24*	*25*
Count units	*146*	*154*	*199*	*317*	*280*	*200*	*163*
RH	0	0	36	16	12	22	57
ND	0	0	25	1	8	2	1
UL	0	0	0	0	0	1	0
LG	458	593	283	603	568	242	125
GG	1,689	475	1,801	1,535	759	2,247	1,252
RX	0	0	0	0	0	1	0
SZ	0	0	0	1	0	0	0
CA	2,449	2,605	1,660	2,402	1,323	1,378	905
H.	335	390	182	294	224	258	130
NB	0	1	0	0	0	0	0
MS	2,169	2,461	1,910	2,378	2,239	1,675	1,613
BS	0	1	1	22	66	35	4
WS	11	244	1,339	1,881	1,877	1,490	1,237
PG	5	5	0	1	0	0	0
NW	0	8	2	12	99	0	9
GJ	147	154	107	694	485	967	411
CG	40	12	32	493	476	90	117
YN	0	0	0	1	0	0	0
YE	105	121	120	123	121	121	81
DB	0	0	0	0	0	1	1
BB	0	0	0	0	1	0	0
PB	13,217	15,976	13,282	4,303	2,713	3,681	2,743
SU	274	1,261	2,483	4,796	3,809	3,483	2,013
MN	2	0	0	0	0	0	0
WN	2,622	12,596	5,029	6,155	4,976	4,799	2,319
GA	229	173	99	128	137	166	223
T.	1,594	2,861	1,999	6,730	3,548	4,779	1,799
TA	0	0	0	0	1	1	1
MA	9,805	8,126	5,724	6,465	4,821	3,182	1,946
PT	97	178	304	379	238	208	24
SV	45	93	172	188	111	149	65
PO	231	2,106	7,467	13,458	29,928	4,854	810
TU	4,005	6,126	11,730	20,888	19,714	9,412	7,645
SP	9	211	905	2,645	4,120	5,177	2,352
E.	666	40	893	657	201	847	375
LN	0	0	2	14	0	1	14
CX	0	1	756	1	0	5	271
GN	40	391	3,849	7,585	8,384	6,376	6,597
SY	0	0	0	0	1	1	0
RM	547	378	571	492	355	441	370
GD	1	0	1	1	0	1	1
RY	44	90	12	31	9	6	17
WA	0	0	1	4	1	2	0
MH	183	368	164	315	315	185	177
CO	4,941	6,033	4,804	6,850	5,212	2,826	1,632
WILDFOWL	45,625	63,687	67,563	92,247	96,628	58,854	37,207

Table 2. Northern Ireland, continued

		Apr	May	Jun	Jul	Aug
OC	Oystercatcher	672	255	167	254	1,466
RP	Ringed Plover	40	104	19	21	136
GP	Golden Plover	0	0	0	0	0
GV	Grey Plover	6	4	0	0	3
L.	Lapwing	0	0	16	125	1,310
KN	Knot	16	0	0	0	2
SS	Sanderling	10	37	0	0	3
LX	Little Stint	0	0	0	0	0
CV	Curlew Sandpiper	0	0	0	0	0
PS	Purple Sandpiper	0	0	0	0	0
DN	Dunlin	45	65	7	10	117
RU	Ruff	0	0	0	0	0
JS	Jack Snipe	0	0	0	0	0
SN	Snipe	0	0	0	0	8
BW	Black-tailed Godwit	7	0	0	1	4
BA	Bar-tailed Godwit	3	1	3	0	1
WM	Whimbrel	16	6	1	1	3
CU	Curlew	62	19	40	535	798
DR	Spotted Redshank	0	0	0	0	0
RK	Redshank	509	7	23	402	607
GK	Greenshank	1	0	0	6	5
CS	Common Sandpiper	1	0	0	2	2
TT	Turnstone	12	1	0	0	12
	TOTAL WADERS	1,400	499	276	1,357	4,477
	TOTAL WATERFOWL [2]	1,777	732	491	1,537	22,438
	Number of sites where gulls were counted	*2*	*2*	*2*	*2*	*3*
BH	Black-headed Gull	63	81	100	259	5,227
IN	Ring-billed Gull	0	0	0	0	0
CM	Common Gull	45	31	53	50	453
LB	Lesser Black-backed Gull	9	0	0	2	751
HG	Herring Gull	105	114	39	112	329
IG	Iceland Gull	0	0	0	0	0
GZ	Glaucous Gull	0	0	0	0	0
GB	Great Black-backed Gull	53	58	20	87	226
KI	Kittiwake	3	0	0	323	37
	TOTAL GULLS	278	284	212	833	7,023
	Number of sites where terns were counted	*2*	*2*	*2*	*2*	*3*
TE	Sandwich Tern	123	37	24	425	356
CN	Common Tern	0	0	0	17	58
AE	Arctic Tern	0	39	3	0	0
AF	Little Tern	1	0	0	0	0
	TOTAL TERNS	124	76	27	442	415
KF	Kingfisher	0	0	0	0	1

† *See Table 1 for footnotes*

Table 2. continued.

	Sep	Oct	Nov	Dec	Jan	Feb	Mar
OC	14,423	11,616	21,105	20,290	15,201	17,641	11,110
RP	287	429	794	932	379	660	63
GP	225	9,371	19,038	14,885	9,862	19,597	4,858
GV	39	119	153	486	227	266	145
L.	1,487	4,614	13,715	23,951	11,239	16,794	262
KN	467	526	647	7,640	7,666	4,378	680
SS	9	2	54	0	72	22	0
LX	11	0	0	0	0	1	0
CV	41	7	0	0	0	0	0
PS	7	0	112	79	44	176	38
DN	1,353	2,353	10,864	18,753	13,506	18,883	2,880
RU	17	6	1	0	0	0	0
JS	0	0	3	3	1	4	4
SN	25	65	187	199	155	235	208
BW	532	284	345	370	166	237	316
BA	58	286	795	1,531	5,336	506	96
WM	18	0	0	0	0	0	0
CU	5,088	4,257	5,375	7,587	5,374	6,620	3,353
DR	1	1	0	0	0	0	1
RK	7,489	6,960	9,744	8,391	5,977	7,478	5,683
GK	119	181	79	135	59	88	72
CS	4	0	0	0	0	0	0
TT	1,005	329	1,802	1,873	806	1,857	594
WADERS	32,705	41,406	84,813	107,105	76,070	95,443	30,363
WATERFOWL	78,665	105,484	152,558	199,646	172,922	154,555	67,700
Sites	*8*	*11*	*16*	*18*	*17*	*15*	*14*
BH	5,955	6,030	15,152	13,746	7,102	14,828	8,026
IN	0	0	1	0	0	1	0
CM	1,269	3,164	4,449	1,797	2,987	3,914	849
LB	1,195	992	540	94	230	174	345
HG	1,710	654	3,370	3,855	4,234	8,435	3,051
IG	0	0	0	0	0	4	1
GZ	0	0	0	0	0	4	0
GB	432	249	771	708	1,254	522	264
KI	0	0	0	0	0	0	0
GULLS	10,561	11,089	24,283	20,200	15,807	27,882	12,536
Sites	*10*	*18*	*22*	*24*	*23*	*22*	*21*
TE	366	24	0	0	0	0	0
CN	7	0	0	0	0	0	0
AE	0	0	0	0	0	0	0
AF	0	0	0	0	0	0	0
TERNS	373	25	0	0	1	0	0
KF	0	1	0	0	1	0	0

Table 3. Total numbers of waterbirds counted by I-WeBS in the Republic of Ireland, 1998-99†.

	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Number of sites visited	*119*	*168*	*219*	*200*	*289*	*217*	*192*
Number of count units visited	*202*	*272*	*359*	*352*	*637*	*369*	*361*
Red-throated Diver	27	38	105	77	126	111	110
Black-throated Diver	0	0	61	7	64	0	31
Great Northern Diver	7	33	247	181	433	95	167
Pied-billed Grebe	1	0	1	0	1	0	1
Little Grebe	813	764	678	444	636	348	273
Great Crested Grebe	260	384	782	515	1,509	659	394
Red-necked Grebe	0	0	0	1	1	1	1
Slavonian Grebe	0	0	5	5	23	8	3
Black-necked Grebe	0	2	3	2	5	2	0
Cormorant	3,041	2,070	2,206	1,691	2,719	2,332	1,657
Bittern	0	0	0	0	1	0	0
Little Egret	94	37	34	47	42	45	37
Grey Heron	454	518	524	436	685	338	384
Spoonbill	0	1	0	0	0	0	1
Mute Swan	2,145	2,877	3,565	3,010	4,155	3,156	2,175
Bewick's Swan	0	16	77	99	62	120	10
Whooper Swan	4	685	1,973	2,726	4,589	2,195	2,649
Pink-footed Goose	0	4	13	13	20	13	16
Greenland W-fronted Goose	9	6,207	9,685	8,944	11,547	11,252	10,221
Greylag Goose	519	304	3,818	2,391	4,302	3,490	3,371
Canada Goose	120	37	299	14	213	78	13
Barnacle Goose	1	60	562	580	2,009	626	845
Light-bellied Brent Goose	701	3,867	5,257	9,983	9,281	8,128	6,962
feral/hybrid Goose	7	7	104	63	116	101	48
Shelduck	711	977	3,686	5,869	9,579	5,794	4,097
Wigeon	6,763	23,209	27,287	41,623	55,667	31,083	10,224
American Wigeon	0	1	4	1	1	0	0
Gadwall	130	247	249	430	538	168	90
Teal	3,191	6,824	14,385	20,662	31,183	14,918	7,058
Am. Green-winged Teal	0	2	1	3	3	0	0
Mallard	12,023	10,643	11,190	11,050	12,816	5,745	3,278
Pintail	19	94	991	1,043	1,080	268	222
Garganey	0	0	0	0	1	0	0
Shoveler	176	683	1,197	1,312	1,716	1,083	435
Red-crested Pochard	1	0	0	0	0	0	0
Pochard	142	302	14,491	3,068	8,493	2,083	441
Ring-necked Duck	0	0	2	0	2	1	1
Ferruginous Duck	0	0	0	0	0	1	0
Tufted Duck	763	860	9,723	2,711	7,696	5,489	2,027
Scaup	6	84	1,225	487	328	171	155
Lesser Scaup	0	0	1	0	0	0	0
Eider	0	24	133	17	20	0	0
Long-tailed Duck	0	1	44	35	51	11	19
Common Scoter	5,576	2,573	4,948	6,573	5,897	5,143	1,674
Surf Scoter	0	2	4	1	1	0	0
Velvet Scoter	0	0	1	4	4	0	0
Goldeneye	2	21	820	699	2,271	1,182	543
Smew	0	1	2	1	5	3	1
Red-breasted Merganser	144	347	769	600	1,146	495	644
Goosander	0	0	1	0	5	0	1
Ruddy Duck	3	0	2	0	1	2	6
feral/hybrid Mallard type	9	9	9	11	17	9	2
Water Rail	12	28	19	27	30	22	18
Moorhen	457	604	516	430	647	528	411
Coot	4,051	4,857	25,230	5,255	7,692	3,440	994
TOTAL WILDFOWL [1]	41,834	69,748	146,371	132,658	188,701	110,354	61,288

Table 3. continued

	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Oystercatcher	13,525	24,330	22,611	20,369	24,824	16,761	13,512
Ringed Plover	2,134	2,152	2,889	2,177	3,594	1,932	355
American Golden Plover	0	1	0	0	0	0	0
Golden Plover	580	27,388	60,103	93,225	83,984	62,226	21,018
Grey Plover	318	2,185	1,557	2,197	2,409	1,895	631
Lapwing	1,795	9,005	40,483	94,663	121,820	51,415	2,685
Knot	575	3,935	15,530	6,840	16,204	7,401	6,262
Sanderling	690	887	929	1,033	1,457	691	1,230
Little Stint	107	5	3	1	1	0	0
Baird's Sandpiper	2	0	0	0	0	0	0
Pectoral Sandpiper	4	0	0	0	0	0	0
Curlew Sandpiper	82	13	1	0	0	0	0
Purple Sandpiper	25	2	170	341	225	425	164
Dunlin	4,677	16,019	39,151	49,584	66,420	36,257	7,773
Buff-breasted Sandpiper	6	0	0	0	0	0	0
Ruff	21	12	5	5	4	7	6
Jack Snipe	0	4	12	22	24	20	20
Snipe	173	365	883	841	1,434	721	278
Woodcock	0	0	1	2	9	2	0
Black-tailed Godwit	6,971	6,779	6,992	8,246	10,459	7,720	7,740
Bar-tailed Godwit	720	3,332	4,884	7,458	10,470	6,056	2,266
Whimbrel	33	7	3	1	10	2	1
Curlew	14,832	15,545	15,312	20,305	35,028	17,545	6,909
Spotted Redshank	5	14	10	20	21	13	12
Redshank	7,896	13,281	11,572	9,654	13,984	8,250	8,156
Greenshank	384	362	408	299	430	263	245
Lesser Yellowlegs	2	1	0	1	0	0	0
Green Sandpiper	7	5	5	2	12	3	5
Common Sandpiper	12	5	3	3	3	2	4
Turnstone	1,033	2,128	2,171	2,380	2,976	2,369	1,666
Grey Phalarope	0	0	0	0	1	0	0
TOTAL WADERS	56,609	127,762	225,688	319,669	395,803	221,976	80,938
TOTAL WATERFOWL [2]	98,991	198,066	372,617	452,810	585,231	332,713	142,648
Mediterranean Gull	5	10	4	6	10	7	2
Little Gull	0	0	1	0	1	0	0
Black-headed Gull	16,962	23,760	17,255	24,593	39,715	25,286	10,515
Ring-billed Gull	2	3	2	3	7	4	4
Common Gull	2,177	2,610	4,759	8,541	15,011	2,364	4,949
Lesser Black-backed Gull	11,940	2,815	3,271	5,969	4,736	1,867	524
Herring Gull	2,711	4,259	2,561	1,802	4,505	5,552	1,101
Iceland Gull	0	0	0	0	3	0	1
Glaucous Gull	0	2	1	1	10	1	0
Great Black-backed Gull	2,523	990	919	1,183	1,610	827	313
Kittiwake	6,207	18	97	1,649	8,031	135	53
Unidentified Gull	0	0	0	0	670	0	0
TOTAL GULLS	42,527	34,467	28,870	43,747	74,309	36,043	17,462
Sandwich Tern	462	4	1	0	0	0	32
Roseate Tern	31	0	0	0	0	0	0
Common Tern	320	1	0	0	0	0	0
Black Tern	1	0	0	0	0	0	0
TOTAL TERNS	814	5	1	0	0	0	32
Kingfisher	10	10	11	15	18	5	7

† *See Table 1 for footnotes*

SPECIES ACCOUNTS

Key to symbols commonly used in the species accounts (see Presentation and notation*)*

As footnotes to thresholds (see Appendix 2)

? population size not accurately known

\+ population too small for meaningful threshold

* where 1% of the national population is less than 50 birds, 50 is normally used as a minimum threshold for national importance

** a site regularly holding more than 20,000 waterfowl (excluding non-native species) qualifies as internationally important by virtue of absolute numbers

† denotes that a qualifying level different to the national threshold has been used for the purposes of presenting sites in this report

In tables of important sites:

\- no data available

( ) incomplete count

† same meaning as when used for thresholds

▲ site was of a lower importance status in the previous year

▼ site was of a higher importance status in the previous year

1, 2 count obtained using different survey methodology (see table below for sources and references)

A blank line within a section of a table is used to separate sites holding 50 or more birds where the relevant threshold is below this figure (e.g. Little Grebe, p40) or to separate those meeting the national or all-Ireland threshold from additional sites selected for presentation in this report (e.g. Long-tailed Duck, p99).

Sources of additional survey information used in compiling tables of important sites. Non-WeBS counts are identified in the table by the relevant number or letter below given in superscipt preceding the count, e.g. [8] *231 represents a count derived from Greenland White-fronted Goose Study surveys.*

1 A. Webb (*in litt.*)
2 Argyll Bird report & SNH
3 B. Martin (*in litt.*)
4 Bean Goose Working Group, e.g. Smith et *al.* (1994), Simpson & Maciver (1997)
5 D. Walker (*in litt.*)
6 Delany & Ogilvie (1994), SNH data and Mitchell et *al.* (1997)
7 Friends of Cardigan Bay, e.g. Green & Elliott (1993)
8 Greenland White-fronted Goose Study, e.g. Fox & Francis (1998)
9 Hayward et *al.* (1999)
10 M. Howe (*in litt.*)
11 M. Tickner (*in litt.*)
12 Mitchell et al. (1995), R. MacDonald (*in litt.*) & SNH
13 NEWS data
14 Orkney Bird Report & J. Plowman (*in litt.*)
15 P. Collin (*in litt.*)
16 Roost counts
17 RSPB pers comm.
18 RSPB Report One: Orkney Winter Shorebird Counts
19 RSPB/BP studies, e.g. Stenning (1994)
20 RSPB/Talisman Energy studies, e.g. Stenning (1998)
21 SNH 'adopted' counts
22 SNH (*in litt.*)
23 SOTEAG reports, e.g. Heubeck (1999)
24 Stewart et *al.* (1996)
25 Supplementary daytime counts
26 unpubl. data
27 WeBS Low Tide Counts
28 Williams (1999)
29 WWT annual swan reports, e.g. Bowler et *al.* (1994) or WWT unpubl. data
30 WWT data
31 WWT studies, e.g. Rees et *al.* (1999)
32 WWT/JNCC National Grey Goose Census
33 WWT/SNH surveys, WWT unpubl. data

RED-THROATED DIVER

Gavia stellata

GB max: **960** **Jan**
NI max: **57** **Mar**

International threshold: **750**
Great Britain threshold: **50**
All-Ireland threshold: **10***
* 50 is normally used as a minimum threshold

This is by far the most numerous of the divers in British waters, found along almost the entire east coast from the Moray Firth to Kent, but patchily distributed elsewhere, with concentrations in southwest England, the extremities of Wales and amongst the inner Hebrides and northern isles of Scotland (Parrack 1986). This is reflected in the table below, although Cardigan Bay, the most important site and holding around 10% of British numbers, is somewhat isolated from other key areas.

Counts in Cardigan Bay were rather lower than normal in 1998-99, although no dedicated counts of seaducks were made in that winter. The large national total in January resulted largely from the considerable numbers off the Wash in January, elevating the site to national importance. However, birds were markedly concentrated off Gibraltar Point, and only a very few were noted on adjacent sectors or sites. In February, 175 remained in the Wash, but 413 birds were recorded flying north from the nearby Theddlethorpe to Saltfleetby sector of the outer Humber. With large numbers regularly recorded along several parts of the East Anglian coastline by WeBS as well as *ad hoc* counts, a dedicated survey from the Thames to the Humber would prove valuable in assessing national and local numbers.

Large numbers are regularly recorded along the east coast during passage periods, and Parrack (1986) suggested as many as 20,000 birds in waters around Britain and Ireland during October, far higher than the mid winter total. This included large concentrations in Scottish estuaries, e.g. 1,500 in the Moray Firth in October 1982 (Barrett & Barrett 1985). WeBS national totals, although detecting only around one fifth of British birds, showed no indication of larger numbers during passage periods in the 1990s. Similarly, dedicated surveys of the Moray have not recorded notably larger numbers in early winter in recent years, although midwinter counts are similar to those in the early 1980s.

	94-95	95-96	96-97	97-98	98-99	Mon	Mean	
Sites of national importance in Great Britain								
Cardigan Bay	[7]252	900	528	[7]536	270	Jan	497	
Moray Firth	[19]385	(72)	(52)	[20]284	[20]179	Dec	283	
Clyde Estuary	50	126	195	136	21	Dec	106	
Forth Estuary	72	(98)	124	75	121	Nov	98	
Dengie Flats	143	41	96	100	45	Jan	85	
Don Mouth to Ythan Mouth	58	11	35	166	81	Sep	70	
Wash	11	56	15	26	224	Jan	66	▲
Scapa Flow	-	-	-	-	[28]59	Nov	59	▲
Durham Coast	63	81	103	25	20	Jan	58	
Sites of all-Ireland importance in Northern Ireland								
Lough Foyle	[26]40	83	18	4	[25]50	Nov	39	
Belfast Lough	28	10	11	41	57	Mar	29	
Craigalea to Newcastle	-	13	-	-	-		13	
Sites no longer meeting table qualifying levels								
North Norfolk Coast								
Other sites surpassing table qualifying levels in 1998-99								
Solway Estuary	78	Jan		Alt Estuary		57	Dec	
Loch Ryan	66	Apr						

BLACK-THROATED DIVER

Gavia arctica

GB max: 89 Mar
NI max: 0

International threshold: 1,200
Great Britain threshold: 7*
All-Ireland threshold: 1*
* 50 is normally used as a minimum threshold

The British peak exceeded all previous WeBS totals although, as is often the case for this species, it was a spring count comprising a large proportion of birds on passage to breeding sites; midwinter totals were average to low, with a peak of just 35 in December. None were recorded in Northern Ireland for the second year in succession.

Sea-duck surveys of Scapa Flow, Orkney resulted in the first count in the country to exceed national importance in the 1990s (and perhaps the first on record). Consistently high numbers were maintained throughout the winter, with a monthly average, between October and March, of 43 birds. This compares with a figure of less than 10 for surveys in 1988-89. The 1998-99 surveys noted that Black-throated Divers tended to form mobile flocks. WeBS counts at most sites were generally low, and only at Lochs Ewe and Coalisport did they reach double figures.

	94-95	95-96	96-97	97-98	98-99	Mon	Mean	
Sites of national importance in Great Britain								
Scapa Flow	-	-	-	-	[28]57	Dec	57	▲
Moray Firth	[19]35	(5)	(5)	[20]22	[20]5	Nov	21	
Loch Ewe	14	-	-	-	26	Mar	20	
Loch Coalisport	-	-	-	-	12	Mar	12	▲
Loch Indaal	(31)	11	1	2	3	Mar	10	
Polbain	-	-	-	-	9	Mar	9	▲
Forth Estuary	9	19	7	8	1	Jun	9	
Girvan to Turnberry	3	6	8	23	3	Nov	9	
Sites of all-Ireland importance in Northern Ireland								
Belfast Lough	1	2	2	0	0		1	

GREAT NORTHERN DIVER

Gavia immer

GB max: 95 Jan
NI max: 25 Nov

International threshold: 50
Great Britain threshold: 30*†
All-Ireland threshold: ?†
* 50 is normally used as a minimum threshold

The British total was the largest to date and although only around 20 higher than the previous figure, it was one of three monthly totals in 1998-99 which exceeded the previous maximum. Whilst the steady rise since the early 1990s may reflect a genuine increase, it is difficult to be confident of such trends when small numbers and a low proportion of the true total are involved. The peak count in Northern Ireland was reasonably high although monthly and year on year figures fluctuate considerably.

The count of Great Northern Divers was one of the most remarkable results from the seaduck survey of Scapa Flow (Williams 1999). It accounted for almost 16% of the international population and over 25% of British numbers and probably surpassed all previous individual site counts of this species in the UK and perhaps also Europe. The site qualifies as internationally important under the Ramsar criteria, and it will be important to assess the use of this area regularly in building a case for designation. The peak was during March, when birds on passage may be present for only a short period (albeit that this brief period may be crucial for birds on migration), but all three counts from November to December recorded in excess of 500 birds, indicating the sustained importance of this area.

The survey comprised both land- and boat-based counts, showing a large proportion to be in the centre of the Flow, not visible from land. Although inclement weather hindered several of the boat-based counts during the previous survey in 1988-89, the 1998-99 peak is many-fold larger

than the 172 and 200 birds recorded in 1988-89 and land-based 1974-78 surveys, respectively. Regular counts of 50 birds from the north side of the Orkney mainland in 1997-98, not counted in 1998-99, further emphasizes the importance of this archipelago for wintering waterbirds.

Counts at other sites were generally average or low. A larger than normal total at Lough Foyle demonstrates the benefit of additional counts to those made under the WeBS regime for seaducks. Presumably fortuitous conditions at Dundrum Bay resulted in the unusually high count in 1998-99 and hints at greater importance if dedicated counts of seaducks were made at this site.

	94-95	95-96	96-97	97-98	98-99	Mon	Mean	
Sites of international importance in the UK								
Scapa Flow	-	-	-	-	[28]781	Mar	781	▲
Tankerness	-	-	393	330	-		362	
Sites of national importance in Great Britain †								
Whiteness to Scarvister	-	-	-	-	[23]44	Jan	44	▲
Moray Firth	[19]14	(1)	(8)	[20]54	[20]17	Dec	28	
Loch Indaal	16	14	11	33	12	Mar	17	
Traigh Luskentyre	3	12	39	8	5	Nov	13	
Southern Yell Sound	-	[23]6	[23]10	[23]10	[23]11	Jan	9	
Red Point to Port Henderson	-	-	-	-	9	Mar	9	▲
Lochs Beg & Scridain	4	6	(6)	6	6	Jan/Mar	6	
Sullom Voe	-	-	-	[23]7	[23]5	Feb	6	
Loch Coalisport	-	-	-	-	5	Mar	5	▲
Sites of all-Ireland importance in Northern Ireland †								
Lough Foyle	[26]20	15	9	3	[25]22	Feb	14	
Tyrella Shore	-	12	-	-	-		12	
Carlingford Lough	12	26	1	2	6	Jan	9	
Kilkeel to Lee Stone Point	-	8	-	-	-		8	
Dundrum Bay	2	2	0	0	23	Nov	5	▲
Craigalea to Newcastle	-	5	-	-	-		5	

Internationally or nationally important sites not counted in last five years

Sound of Taransay

Other sites surpassing table qualifying levels in 1998-99

Aignish Bay (Lewis)	8	Mar	Bluemull/Colgrave Sands	5	Feb
North Norfolk Coast	8	Dec	Fleet/Wey	[23]5	Jan
Par Sands Pools	8	Dec	Gruinard Bay	5	Mar
Grutness to Quendale	[23]6	Jan	Loch Gairloch	5	Mar

† *as few sites in Great Britain and Northern Ireland exceed the respective thresholds, a qualifying level of five has been chosen to select sites for presentation in this report*

PIED-BILLED GREBE

Podilymbus podiceps

Vagrant

Native range: North America

Singles were seen at Cosmeston Lakes and Singleton Lake in both February and March.

LITTLE GREBE

Tachybaptus ruficollis

GB max: 3,771 Oct
NI max: 603 Dec

International threshold: ?
Great Britain threshold: 30*
All-Ireland threshold: ?†

* 50 is normally used as a minimum threshold

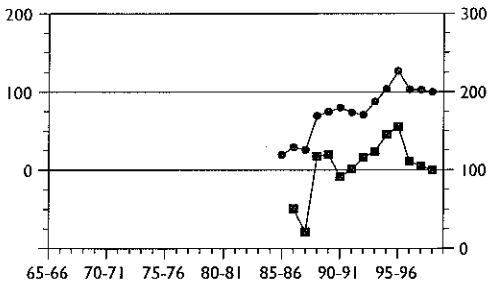


Figure 3. Annual indices for Little Grebe in GB (circles, left axis) and NI (squares, right axis)

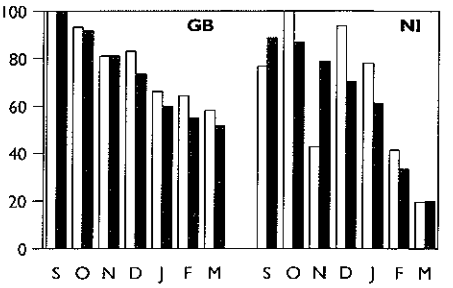


Figure 4. Monthly indices for Little Grebe in GB and NI (white bars 1998-99; black bars 1993-94 to 1997-98)

In both Britain and Northern Ireland, peak totals rallied after relatively low counts in the previous two winters, and were around average for the last five years. Monthly index values peak in late autumn and suggest that higher totals would have resulted had full coverage been achieved in those months. Curiously, there was a large drop in November in Northern Ireland, both in counted numbers and monthly index values, although the pattern in other months remained normal. However, despite the higher counted totals, annual index values for both areas exhibit a continuing though small decline following the large peak in 1994-95.

Individual site maxima generally show a reasonable degree of consistency between years. Notable exceptions are low counts on the Thames Estuary and the Wash in both of the last two winters, representing only one quarter of the totals there in the mid 1990s; a similar pattern is also found on the Medway. However, the idea that this is an estuarine or east coast phenomenon can be dismissed in view of large counts on the North Norfolk Coast, Deben Estuary and Langstone Harbour. At inland sites, the count at Wraysbury Gravel Pits was notably higher than normal, whilst numbers at Lee Valley Gravel Pits continued to increase steadily. The large count on the River Avon between Ringwood and Christchurch is all the more impressive in view of the limited access to this river for counting, with counts of secretive species such as Little Grebes probably suffering most as a result.

	94-95	95-96	96-97	97-98	98-99	Mon	Mean	
Sites of national importance in Great Britain								
Thames Estuary	328	477	255	124	130	Dec	263	
Swale Estuary	202	195	213	244	201	Dec	211	
Chew Valley Lake	106	122	152	105	80	Aug	113	
Holme Pierrepont Gravel Pits	105	162	80	100	109	Sep	111	
North Norfolk Coast	56	93	51	87	105	Sep	78	
Wash	120	146	53	29	32	Nov	76	
Cleddau Estuary	49	75	91	72	56	Dec	69	
Deben Estuary	66	49	63	78	[27]84	Jan	68	
Chichester Harbour	50	100	52	72	50	Nov	65	
Rutland Water	60	83	35	62	78	Sep	64	
Eyebrook Reservoir	43	70	76	56	49	Oct	59	
R. Test: Fullerton to Stockbridge	55	62	52	52	63	Dec	57	
R. Avon: F'bridge to Ringwood	47	86	39	49	46	Oct	53	
Cameron Reservoir	63	70	33	56	44	Oct	53	
Tees Estuary	53	42	47	52	67	Oct	52	▲
Sutton/Lound Gravel Pits	17	72	39	72	-		50	
Lee Valley Gravel Pits	27	45	39	56	77	Sep	49	
Blackwater Estuary	52	59	44	47	41	Oct	49	
Somerset Levels	34	37	55	47	62	Oct	47	

	94-95	95-96	96-97	97-98	98-99	Mon	Mean	
Middle Tame Valley Gravel Pits	25	52	53	68	36	Feb	47	
Bewl Water	47	57	44	36	43	Oct	45	
Alde Complex	37	51	38	44	-		43	
Kirkby-on-Bain Gravel Pits	-	-	(6)	40	43	Oct	42	
Hamford Water	28	72	18	26	61	Dec	41	
Kilconquhar Loch	36	52	42	49	25	Aug	41	
Pitsford Reservoir	53	64	32	10	(27)	Oct	40	
Southampton Water	[27]37	37	[27]46	34	[27]43	Jan	39	
Medway Estuary	54	60	42	18	16	Dec	38	
Hogganfield Lough	22	31	45	56	35	Sep	38	
Rye Harbour & Pett Level	26	46	28	37	51	Oct	38	
King's Dyke Pits	-	48	18	31	52	Oct	37	▲
Blagdon Lake	39	59	23	31	29	Aug	36	
Langstone Harbour	29	30	24	37	60	Dec	36	▲
Portsmouth Harbour	36	36	30	35	43	Feb	36	
R Avon: Salisbury to F'bridge	36	42	38	33	25	Nov	35	▲
Orwell Estuary	37	36	45	34	21	Jan	35	
Hampton & Kempton Reservoirs	43	54	28	16	30	Sep	34	
Hickling Broad	29	-	-	-	(38)	Jan	34	▲
Wraysbury Gravel Pits	32	27	32	27	47	Dec	33	
Fleet/Wey	37	37	30	34	27	Nov	33	
Cemlyn Bay & Lagoon	33	40	33	32	25	Dec	33	
Barton Pits	7	19	43	44	47	Sep	32	▲
Pirton Pool	29	37	41	32	18	Sep	31	
King's Mill Reservoir	40	23	29	(14)	-		31	
Hilfield Park Reservoir	22	28	35	(34)	32	Sep	30	▲

Sites of all-Ireland importance in Northern Ireland †

Loughs Neagh & Beg	535	626	376	330	380	Oct	449	
Strangford Lough	102	169	140	101	99	Dec	122	
Upper Lough Erne	84	62	73	50	86	Jan	71	
Lough Money	21	33	35	51	46	Oct	37	

Sites no longer meeting table qualifying levels

Barleycroft Gravel Pits
Morecambe Bay

Internationally or nationally important sites not counted in last five years

R. Soar: Leicester

Other sites surpassing table qualifying levels in 1998-99

R Avon: Ringwood to Christchurch	58	Jan	Poole Harbour	33	Jan
Nosterfield GPs	53	Sep	Cotswold Water Park (West)	32	Oct
Swanpool (Falmouth)	41	Dec	Loch Etive: Connel To Taynuilt	31	Dec
Dungeness Gravel Pits	39	Sep	Cefni Reservoir	30	Oct
River Irwell	36	Dec	Humber Estuary	30	Mar
North West Solent	34	Nov	R Hull: Riverhead-Whinhill	30	Jan

† *as no all-Ireland threshold has been set for Little Grebe, a qualifying level of 30 has been chosen to select sites for presentation in this report*

GREAT CRESTED GREBE

Podiceps cristatus

GB max: 8,570 **Nov**
NI max: 2,247 **Feb**

International threshold: 1,500
Great Britain threshold: 100
All-Ireland threshold: *30
* 50 is normally used as a minimum threshold

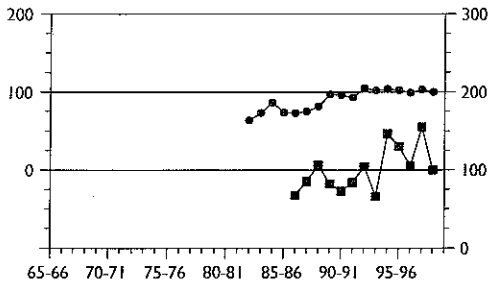


Figure 5. Annual indices for Great Crested Grebe in GB (circles, right axis) and NI (squares, right axis)

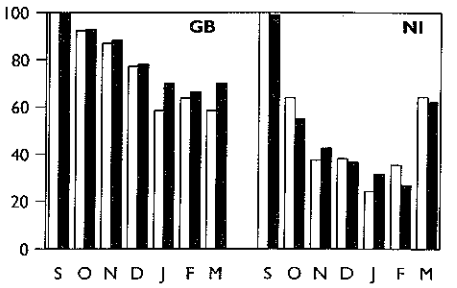


Figure 6. Monthly indices for Great Crested Grebe in GB and NI (white bars 1998-99; black bars 1993-94 to 1997-98)

Peak totals in both Great Britain and Northern Ireland were low compared with those of recent years. Whilst annual indices for the former show a slight decline in 1998-99 also, the picture is one of considerable stability during the 1990s with index values varying by ±6%. In complete contrast, indices in Northern Ireland (which incorporate counts from all months between September and March) fluctuate considerably, and fell by over 55% from 1997-98. Monthly indices in Northern Ireland show a broadly similar pattern to Britain of decreasing numbers as the winter progresses, but with pronounced peaks in September and March. These represent post-breeding birds on Lough Neagh, prior to dispersal during winter and, in spring, the arrival of birds which breed at the site and probably others on route to favoured breeding areas in the Irish midlands.

The 1998-99 maxima at the UK's two internationally important sites, Lough Neagh & Beg and Belfast Lough, were both equivalent to their 5-year means, although counts at these sites have varied considerably in recent years. Maximum numbers at the majority of key sites were either average or low. The only obvious exceptions were Rutland Water and Lade Sands, although counts at the latter are subject to prevailing weather conditions and thus likely to vary considerably between years, particularly using WeBS methods; the 1998-99 count is thus all the more impressive. Markedly low counts were recorded on the Forth Estuary, Solway Estuary, Thanet Coast, Loch Ryan and Pegwell Bay; the mobility of flocks in coastal areas and perhaps poor weather also may have hampered counts in 1998-99. Several London reservoirs, notably Queen Mary, Queen Elizabeth II and King George VI, also held smaller than normal numbers in 1998-99.

	94-95	95-96	96-97	97-98	98-99	Mon	Mean
Sites of international importance in the UK							
Loughs Neagh & Beg	2,533	2,440	1,537	863	1,596	Aug	1,794
Belfast Lough	1,650	1,350	1,200	2,403	1,935	Feb	1,708
Sites of national importance in Great Britain							
Rutland Water	741	579	378	767	843	Sep	662
Chew Valley Lake	600	615	645	460	585	Oct	581
Forth Estuary	627	411	597	491	319	Aug	489
Lade Sands	-	[5]277	(7)	425	730	Jan	477
Lavan Sands	[10]508	[10]283	[10]244	[10]360	[10]389	Aug	357
Queen Mary Reservoir	307	298	593	271	185	Nov	331
Grafham Water	175	377	506	197	272	Dec	305
Solway Estuary	113	36	[25]430	430	191	Feb	296
Morecambe Bay	277	296	286	282	191	Jan	266
Cardigan Bay	[7]341	[7]176	[7]311	[7]177	(58)	Jan	251
Stour Estuary	260	312	261	185	196	Sep	243
Wraysbury Gravel Pits	167	167	263	246	289	Dec	226

	94-95	95-96	96-97	97-98	98-99	Mon	Mean
Pitsford Reservoir	215	188	304	147	(218)	Sep	214
Cotswold Water Park (West)	233	189	181	175	235	Oct	203
Abberton Reservoir	59	238	248	149	185	Nov	176
Thanet Coast	504	-	166	15	5	Jan	173
Lee Valley Gravel Pits	157	132	164	175	148	Nov	155
Queen Elizabeth II Reservoir	105	258	118	168	88	Sep	147
Bough Beech Reservoir	(33)	145	-	-	-		145
Loch Ryan	[15]258	[15]201	(15)	54	64	Nov	144
Pegwell Bay	450	82	8	137	28	Feb	141
Blithfield Reservoir	155	70	169	105	198	Aug	139
Attenborough Gravel Pits	137	120	155	135	107	Nov	131
Loch Leven	102	210	98	112	-		131
Wraysbury Reservoir	112	265	93	43	(37)	Sep	128
Blackwater Estuary	145	171	118	99	100	Oct	127
Southampton Water	68	169	94	169	[27]127	Jan	125
Alton Water	183	120	109	73	139	Oct	125
King George VI Reservoir	123	401	41	16	37	Sep	124
Mersey Estuary	95	61	169	214	[27]70	Feb	122
Blagdon Lake	87	67	270	73	89	Aug	117
Hanningfield Reservoir	185	124	59	123	80	Dec	114
Dee Estuary (Eng/Wal)	147	110	205	73	34	Oct	114
Eyebrook Reservoir	99	167	155	103	37	Nov	112
Ardleigh Reservoir	123	82	84	171	91	Jul	110
Bewl Water	107	74	73	111	136	Sep	100
Sites of all-Ireland importance in Northern Ireland							
Lough Foyle	[26]480	488	116	86	[25]189	Oct	272
Carlingford Lough	295	143	364	231	270	Nov	261
Upper Lough Erne	111	90	276	304	145	Jan	185
Larne Lough	122	147	124	76	124	Oct	119
Strangford Lough	[27]60	182	83	64	69	Feb	92
Craigalea to Newcastle	-	35	-	-	-		35

Sites no longer meeting table qualifying levels
Colne Estuary
Medway Estuary
Wash

Other sites surpassing table qualifying levels in 1998-99

Draycote Water	133	Nov	Lower Windrush Valley Gravel Pits	108	Nov
Clyde Estuary	110	Sep	Middle Tame Valley Gravel Pits	102	Sep

RED-NECKED GREBE

Podiceps grisegena

GB max: 43 **Mar**
NI max: 1 **Dec**

International threshold: 330
Great Britain threshold: 1*†
All-Ireland threshold: ?
* 50 is normally used as a minimum threshold

As a consequence of relatively low numbers on the Forth Estuary, British totals also fell to a five year low. In Northern Ireland, a single bird was recorded at Carlingford Lough.

The count in Scapa Flow was the largest at a single count away from the Forth during the 1990s. Although made during the passage period, three to five birds were recorded each month from October to February, with 21 in January, showing continued use throughout the winter (Williams 1999). Birds favoured Bay of Sandoyne, the same location where small numbers had also been recorded during *ad hoc* counts in 1997-98. These counts contrast with surveys of Scapa Flow in 1988-89 which found none, and with the *1981-84 Winter Atlas* which indicates just two birds in the islands (Lack 1986). It might be speculated that this expansion in wintering range so far north results from birds taking a northern route across the North Sea from

breeding grounds around the Baltic. However, given the location and the small numbers involved, ringing recoveries and counts of birds on passage past headlands will be few and far between and any theories about the exact origins of these birds are likely to remain largely speculation.

Red-necked Grebes wintering in southwest Norway were found to feed either solitarily or in close association with Velvet Scoters (Byrkjedal *et al.* 1997). Grebes feeding solitarily brought fish to the surface significantly more often than grebes feeding with scoters. The sandy substrate where both species fed contained a high density of polychaete worms which emerged if the sand was stirred. Grebes associating with scoters were mainly first-year birds, and the association decreased markedly as the winter progressed. The association appears to be a way naive birds could easily obtain prey (behavioural observations showed competition between the two species and/or kleptoparasitism by the grebes were probably not involved). Skills needed to dive for more nutritious but agile fish are probably acquired gradually through the winter as more grebes adopt solitary feeding.

	94-95	95-96	96-97	97-98	98-99	Mon	Mean	
Sites of national importance in Great Britain †								
Forth Estuary	89	[33]52	44	64	41	Aug	58	
Scapa Flow	-	-	-	-	[28]23	Mar	23	▲
North Norfolk Coast	4	19	2	17	8	Nov	10	

† *as the British threshold for national importance is so small, a qualifying level of five has been chosen to select sites for presentation in this report*

SLAVONIAN GREBE

Podiceps auritus

International threshold: **50**
Great Britain threshold: **4***
All-Ireland threshold: **?**
* 50 is normally used as a minimum threshold

GB max: **201** **Dec**
NI max: **1** **Dec**

Following the highest total of 331 in 1997-98, the peak British count fell in 1998-99 to the lowest level of the last five winters. Correspondingly, maxima at individual sites were also low, with counts at all but four below their respective five-year averages. Low numbers on the Forth Estuary coincided with smaller numbers of other grebe species at that site also. In Northern Ireland, just one bird was noted, at Carlingford Lough.

The peak during dedicated seaduck counts of Scapa Flow was one of three monthly totals to exceed 100. Numbers had begun to fall by March, suggesting birds had already dispersed to breeding areas, in contrast to other Scottish sites where increased numbers at this time of year suggest pre-breeding or passage gatherings. The October to March average for Scapa Flow was of almost 90 birds, compared with just 25 in 1988-89, but an estimate of 60 for 1974-78 (Williams 1999).

	94-95	95-96	96-97	97-98	98-99	Mon	Mean	
Sites of international importance in the UK								
Scapa Flow	-	-	-	-	[28]124	Jan	124	▲
Moray Firth	[19]66	(8)	(22)	[20]163	[20]98	Nov	109	
Forth Estuary	78	[33]108	107	75	57	Dec	85	
Lough Foyle	[26]71	103	20	6	[25]48	Nov	50	
Sites of national importance in Great Britain								
Pagham Harbour	75	[27]26	37	39	22	Dec	38	
Whiteness to Scarvister	-	-	-	-	[23]33	Jan	33	
Loch Indaal	37	20	(13)	32	21	Nov	28	
North Norfolk Coast	6	77	17	9	11	Nov	24	
Loch of Harray	36	31	6	14	14	Jan	20	
Clyde Estuary	8	25	32	25	2	Jan	18	
Studland Bay	17	16	-	-	-		17	
Blackwater Estuary	13	22	14	18	10	Dec	15	

	94-95	95-96	96-97	97-98	98-99	Mon	Mean
Traigh Luskentyre	9	24	13	8	19	Nov	15
North West Solent	5	13	12	(16)	14	Dec	12
Poole Harbour	15	13	10	9	10	Jan	11
Lindisfarne	3	15	2	12	19	Nov	10
Loch Ryan	[15]6	[15]19	0	11	9	Nov	9
Chichester Harbour	10	3	13	[27]9	[27]6	Jan	8
Exe Estuary	5	6	2	11	7	Dec/Jan	6
Loch of Swannay	4	8	10	5	4	Oct	6
Tamar Complex	2	9	7	5	4	Dec	5
Upper Loch Torridon	0	-	-	-	9	Mar	5

Sites no longer meeting table qualifying levels
Langstone Harbour

Internationally or nationally important sites not counted in last five years
Sound of Taransay

Other sites surpassing table qualifying levels in 1998-99

Fleet/Wey	6	Jan	Rye Harbour & Pett Level	5	Mar
Kingsbridge Estuary	6	Jan	St Johns Loch	4	Oct

BLACK-NECKED GREBE

Podiceps nigricollis

International threshold: 1,000
Great Britain threshold: 1*†
All-Ireland threshold: ?
* 50 is normally used as a minimum threshold

GB max: 31 Nov
NI max: 0

As with all other *Podiceps* grebes, national totals of Black-necked Grebes in 1998-99 were the lowest of the last five winters. For this species, however, a large factor will have been the absence of counts from Carrick Roads during the year, the sector of the Fal which alone holds up to half the national counted total. However, counts at other sites were also low, and only at two did the maximum exceed double figures.

This species' stronghold occurs from central Europe through the central Asian republics to China, and enormous concentrations occur at some sites, especially during migration. Although Black-necked Grebes expanded slightly westwards in the late 19th and early 20th century, numbers near its distribution limits fluctuate considerably between years, accentuated by its use of irregularly flooded areas and its sensitivity to disturbance and habitat degradation. Between 50 and 80 pairs bred in Britain in the early and mid 1990s, declining to just 46 in 1997 (Ogilvie *et al.* 1999a). Contrary to the suggestion in the *1981-84 Winter Atlas* (Chandler 1986), these figures suggest that British wintering birds could all be derived from the local breeding population, although with small concentrations occurring regularly in southeast England during passage periods, it seems likely that a component is derived from continental stock also.

	94-95	95-96	96-97	97-98	98-99	Mon	Mean
Sites of national importance in Great Britain †							
Fal Complex	(0)	24	23	33	(0)		27
Langstone Harbour	21	24	19	9	17	Feb	18
Studland Bay	14	12	-	-	-		13
Poole Harbour	16	15	7	12	2	Jan	10
Woolston Eyes	4	4	6	17	1	Mar	6
Kilconquhar Loch	7	4	5	4	5	Jul	5

Other sites surpassing table qualifying levels in 1998-99

William Girling Reservoir	11	Oct	Holme Pierrepont Gravel Pits	5	Jun/Aug
Hilfield Park Reservoir	6	Jul	Kirby-on-Bain Gravel Pits	5	Aug
Tamar Complex	6	Dec/Jan			

† *as the British threshold for national importance is so small, a qualifying level of five has been chosen to select sites for presentation in this report*

CORMORANT

Phalacrocorax carbo

International threshold: 1,200
Great Britain threshold: 130
All-Ireland threshold: ?†

GB max: 14,475 Oct
NI max: 2,605 Oct

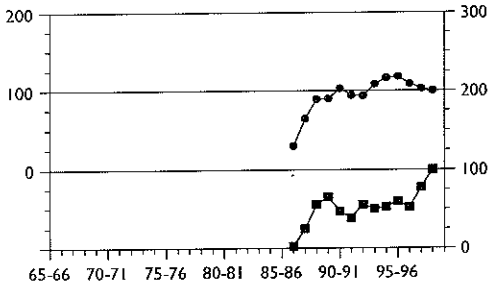


Figure 7. Annual indices for Cormorant in GB (circles, left axis) and NI (squares, right axis)

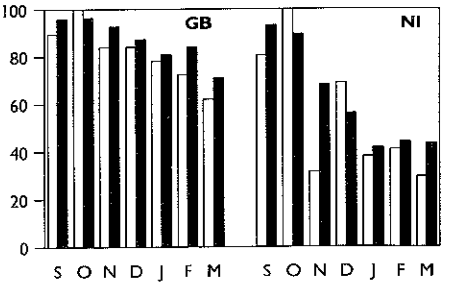


Figure 8. Monthly indices for Cormorant in GB and NI (white bars 1998-99; black bars 1993-94 to 1997-98)

The peak count in Britain increased for the first time in two years and in Northern Ireland, numbers continued to increase to their highest level. Accordingly, peak counts for many sites were higher than average, with noticeable increases recorded on the Alt and Dee (Eng/Wales) Estuaries, Hanningfield Reservoir, Ouse Washes, Dungeness Gravel Pits and Besthorpe & Girton Gravel Pits. Smaller increases were noted at several other localities. In Northern Ireland, three of the five key sites showed significant increases, notably at Outer Ards where the peak was more than double that of the previous three years whilst Loughs Neagh & Beg held the greatest number in Britain and was the only site where numbers surpassed the international importance threshold.

Notable decreases were recorded at fewer sites. At Abberton Reservoir, numbers fell for a second year, a reflection of the decline in the breeding colony. Numbers at both Queen Mary and Queen Mother Reservoirs were very low for the second year in succession. Numbers were also extremely low at Chew Valley Lake and Draycote Water, perhaps suggesting a significant reduction in food availability. On the Inner Moray Firth, numbers recovered slightly but remained well below the current peak mean.

Cormorant research was highly topical during the late 1990s due to the expansion of inland colonies in southeast England, the increasing tendency of birds to winter at inland waters and the conflicts this behaviour caused with commercial fisheries. Goostrey *et al.* (1998) identified the genotype of individuals from 21 European populations of Great Cormorant. They detected significant population differentiation, with populations of *P. c. carbo* showing greater levels of divergence than populations of *P. c. sinensis*. Analyses indicated that the populations in southeast England, which are of unknown racial origin but within the geographical distribution of *P. c. carbo*, clustered with *P. c. sinensis* populations, were not comprised solely of *P. c. sinensis*, but that both subspecies were living sympatrically and were probably hybridizing.

An analysis of ring recoveries to assess changes in survival rates of Cormorants in Britain and Ireland between 1965 and 1994 (Wernham & Peach 1999) found that 99% were ringed as nestlings, thus necessitating an assumption of constant reporting rate across age-classes. However, this may be violated for British and Irish Cormorants because first-year birds are more likely to be shot or caught in fishing nets than older birds and have a differing seasonal pattern of recoveries. A simple simulation showed that first-year, but not adult, survival estimates were particularly sensitive to age-specific variation in reporting rates. However, the observed trend in first-year survival appeared robust to the assumption of constant reporting rates across age-classes. Declining reporting rates in Britain and Ireland imply that larger numbers of Cormorants will need to be ringed in order to monitor future changes in survival. Regional colour-marking schemes for Cormorants have the potential to provide high quality survival information, to supplement that provided by dead recoveries and to offset the observed decline in reporting rates.

Bearhop *et al.* (1999) used stable isotope analysis techniques to assess the extent of freshwater feeding. They found that of the birds they examined, nearly all had been feeding entirely on freshwater prey. The move to freshwater habitats from coastal breeding grounds occurred over several months but, once established, Cormorants appear to have fed at freshwater sites throughout the autumn and winter.

	94-95	95-96	96-97	97-98	98-99	Mon	Mean	
Sites of national importance in Great Britain								
Morecambe Bay	793	1,115	977	1,099	963	Sep	989	
Abberton Reservoir	722	800	900	710	600	Mar	746	
Forth Estuary	579	806	657	632	701	Sep	675	
Solway Estuary	450	639	457	510	(586)	Jan	528	
Rutland Water	661	655	391	385	350	Aug	488	
Alt Estuary	447	285	514	397	779	Oct	484	
Clyde Estuary	459	464	404	610	470	Sep	481	
Tees Estuary	396	676	471	320	444	Sep	461	
Loch Leven	442	410	405	[16]400	-		414	
Dee Estuary (Eng/Wal)	354	460	253	374	613	Sep	411	
Walthamstow Reservoirs	400	300	450	430	430	Feb	402	
Poole Harbour	284	471	375	400	440	Oct	394	
North Norfolk Coast	398	463	492	224	310	Sep	377	
Hanningfield Reservoir	283	211	223	272	758	Oct	349	
Grafham Water	170	310	610	297	341	Dec	346	
Ranworth & Cockshoot Broads	462	295	254	405	308	Feb	345	
Queen Mary Reservoir	137	387	1050	91	59	Mar	345	
Wash	394	348	337	295	279	Oct	331	
Ouse Washes	244	285	391	125	426	Mar	294	
Blackwater Estuary	269	249	348	273	278	Mar	283	
Inner Moray Firth	624	388	133	99	[27]153	Dec	279	
Dungeness Gravel Pits	161	186	144	330	550	Aug	274	
Chichester Gravel Pits	[16]222	[16]265	[16]38	[16]213	[16]252	Dec	260	
Queen Elizabeth II Reservoir	118	169	380	268	360	Sep	259	
Besthorpe & Girton Gravel Pits	176	255	262	236	359	Jun	258	
Rostherne Mere	273	244	229	270	243	Dec	252	
Irvine to Saltcoats	197	(250)	(230)	(230)	-		227	
Wraysbury Reservoir	43	241	142	479	(16)	Sep	226	
William Girling Reservoir	(400)	(200)	(91)	(180)	(200)	Oct	(214)	
Lee Valley Gravel Pits	156	231	210	229	229	Dec	211	
Medway Estuary	212	310	154	179	188	Nov	209	
Dysynni Estuary	141	248	214	173	-		194	
Pagham Harbour	158	204	246	183	177	Dec	194	
Swale Estuary	208	174	200	187	(128)	Sep	192	
Queen Mother Reservoir	180	105	600	46	7	Oct	188	
Thames Estuary	246	205	164	150	162	Nov	185	
Draycote Water	347	292	130	125	33	Dec	185	
Chew Valley Lake	195	250	170	190	90	Oct	179	
South Stoke	[16]118	[16]105	[16]332	[16]187	[16]136	Dec	176	
Wraysbury Gravel Pits	217	206	169	105	180	Nov	175	
Sonning Gravel Pit	130	72	150	312	161	Feb	165	
Southampton Water	138	[27]138	[27]37	150	195	Jan	159	▲
Farmoor Reservoirs	97	225	185	120	168	Dec	159	
Ribble Estuary	167	191	179	123	132	Nov	158	
Tay Estuary	95	245	212	98	134	Jan	157	
Breydon Wtr & Berney Marshes	187	198	132	129	127	Aug	155	
Stour Estuary	169	157	153	137	123	Oct	148	
Rye Harbour & Pett Level	152	131	61	179	187	Aug	142	
Herne Bay	[16]140	-	-	-	-		140	
Coombe Country Park	233	44	-	(43)	(32)	Sep	139	
Middle Tame Valley Gravel Pits	114	157	82	150	171	Nov	135	▲
Blithfield Reservoir	90	88	323	77	92	Sep	134	
Clwyd Estuary	156	123	255	84	50	Mar	134	▲
Exe Estuary	107	123	169	125	143	Aug	133	▲
Windermere	(167)	137	142	87	-		133	
Attenborough Gravel Pits	115	121	181	137	103	Nov	131	

	94-95	95-96	96-97	97-98	98-99	Mon	Mean
Sites of all-Ireland importance in Northern Ireland †							
Loughs Neagh & Beg	631	951	927	1,184	2,071	Oct	1153
Belfast Lough	401	536	352	514	[27]349	Sep	430
Outer Ards	177	147	152	158	359	Nov	199
Strangford Lough	165	180	167	164	300	Oct	195
Carlingford Lough	101	244	187	174	150	Nov	171

Sites no longer meeting table qualifying levels

Carmarthen Bay	Deeping St James
Colne Estuary	Staines Reservoirs

Other sites surpassing table qualifying levels in 1998-99

Berwick Little Beach	450	Jan	Middle Yare Marshes	144	Mar
Lindisfarne	255	Aug	Tyne Estuary	138	Oct
Trinity Broads	171	Oct	Earls Barton Gravel Pits	136	Aug
Colne Estuary	155	Feb	Duddon Estuary	130	Sep
Orwell Estuary	150	Nov	Swithland Reservoir	130	Oct
Chasewater	144	Nov			

† *as no all-Ireland threshold has been set for Cormorant, a qualifying level of 130 has been chosen to select sites for presentation in this report*

GREAT WHITE PELICAN

Pelecanus onocrotalus

Vagrant

Native range: E Europe, Asia, Africa

A presumed escape was at Wigtown Bay from October to January.

BITTERN

Botaurus stellaris

International threshold: ?
Great Britain threshold: ?
All-Ireland threshold: ?

GB max: **29** **Dec**
NI max: **0**

Record numbers of Bitterns were found during WeBS counts in 1998-99, the peak of 29 just surpassing the previous best of 27 and birds recorded at 31 different sites. As in 1996-97, the sharp upturn in numbers followed a cold snap in continental Europe in November.

Not surprisingly, Leighton Moss again heads the table, although the five at Chew Valley Lake is also remarkable. Perhaps notable by their absence are the several north Norfolk sites that form the traditional stronghold for this species in the UK.

Sites with two or more birds in 1998-99

Leighton Moss	7	May	Stodmarsh & Collards Lagoon	2	Dec
Chew Valley Lake	5	Mar	Aqualate Mere	2	Jan
Middle Tame Valley Gravel Pits	3	Dec/Jan	Cosmeston Lakes	2	Jan
Fleet Pond	3	Dec	Marton Mere	2	Feb
Attenborough Gravel Pits	2	Dec	Minsmere Levels	2	Mar
Rye Harbour & Pett Level	2	Dec			

SQUACCO HERON

Ardeola ralloides

Vagrant

Native range: S Europe, Middle East, Africa

Singles were at Martin's Pond, Notts, in June and Doxey Marshes in August.

CATTLE EGRET

Bubulcus ibis

Vagrant

Native range: SW Europe, Asia, Africa, Americas

One was seen at Rye Harbour & Pett Level in April.

LITTLE EGRET

Egretta garzetta

International threshold: 1,250
Great Britain threshold: ?†
All-Ireland threshold: ?†

GB max: 785 Sep
NI max: 0

The peak count in Britain rose to a new high, surpassing that of 733 in 1995-96 and around twice the total of other years. Accordingly, many sites experienced small increases over their respective means, with notable counts at Chichester Harbour, the highest single-site count by WeBS to date, Exe Estuary, Fal Complex and Burry Inlet. Day-time WeBS counts, however, appear to underestimate the importance of many south coast estuarine sites, and a massive 235 were recorded at Thorney Deeps, Chichester Harbour, in September, a record site count for Britain (James 1999).

	94-95	95-96	96-97	97-98	98-99	Mon	Mean	
Sites of national importance in Great Britain †								
Longueville Marsh	(90)	(82)	130	(98)	(125)	Dec	130	
Chichester Harbour	55	99	74	90	134	Oct	90	
Tamar Complex	45	83	69	42	50	Oct	58	
Poole Harbour	42	68	57	60	50	Nov	55	
Camel Estuary	29	49	46	(33)	56	Sep	45	
Kingsbridge Estuary	23	48	47	45	59	Nov	44	
North West Solent	16	86	16	14	27	Jan	36	
Exe Estuary	11	38	34	37	47	Oct	32	
Langstone Harbour	(14)	36	32	19	36	Aug	31	
Pagham Harbour	14	19	30	27	41	Sep	29	
Fowey Estuary	20	30	35	27	39	Feb	27	
Newtown Estuary	16	(34)	21	34	26	Sep	26	
Fal Complex	20	16	24	21	45	Sep	25	
Taw/Torridge Estuary	9	22	23	19	32	Sep	21	
Medway Estuary	(0)	(30)	(17)	8	(21)	Sep	20	
Burry Inlet	10	23	9	14	32	Mar	18	
Cleddau Estuary	(11)	9	14	21	21	Feb	16	
Helford Estuary	13	11	7	7	(23)	Oct	15	▲
Portsmouth Harbour	(0)	10	(0)	14	17	Jan	14	
Erme Estuary	8	17	13	13	12	Aug	13	
Guernsey Shore	12	13	18	-	(17)	Jan	12	
Beaulieu Estuary	5	14	21	9	11	Oct	12	
Avon Estuary	10	11	8	10	(12)	Aug	10	▲
Looe Estuary	9	9	17	6	8	Sep	10	▲

Other sites surpassing table qualifying levels in 1998-99

Teign Estuary	23	Sep	Hayle Estuary	10	Sep
Southampton Water	17	Aug	North Norfolk Coast	10	Sep
Yealm Estuary	15	Oct	Severn Estuary	10	Sep
Yar Estuary	12	Aug			

† *as no British or all-Ireland threshold has been set, a qualifying level of 10 has been chosen to select sites for presentation in this report*

GREY HERON

Ardea cinerea

International threshold: 4,500
Great Britain threshold: ?†
All-Ireland threshold: ?†

GB max: 3,683 Oct
NI max: 390 Oct

The peak count was almost identical to that of the previous year, suggesting continued stability in the population. Peak counts again occurred during October, some months after the end of the breeding season. Numbers at the majority of sites were also remarkably stable, with just those at Coombe Pool and Besthorpe & Girton Gravel Pits markedly higher than normal, whilst the Taw/Torridge Estuary and River Avon: Fordingbridge to Ringwood experienced continued decreases: numbers at the former were just 38% of the peak count two years ago, and those at the latter comprised just a handful of birds.

	94-95	95-96	96-97	97-98	98-99	Mon	Mean
Sites of national importance in Great Britain †							
Walthamstow Reservoirs	110	310	300	(0)	330	Jul	263
Coombe Pool	120	53	-	-	169	May	114
Somerset Levels	89	(99)	115	(119)	(105)	Nov	108
Thames Estuary	95	117	93	89	81	Sep	95
Morecambe Bay	72	86	70	88	101	Sep	83
Taw/Torridge Estuary	68	78	125	94	47	Aug	82
Tamar Complex	114	87	64	75	62	Nov	80
Ribble Estuary	42	(40)	99	95	(54)	Aug	79
R. Avon: Britford Water Meadows	(68)	56	70	65	92	Aug	71
Dee Estuary (Eng/Wal)	64	73	58	76	(61)	Aug	68
Severn Estuary	41	121	54	59	51	Sep	65
Montrose Basin	86	(74)	71	42	42	Jul	63
Clyde Estuary	58	40	46	86	79	Sep	62
Wash	84	55	(35)	45	42	Aug	57
Besthorpe/Girton Gravel Pits	34	16	22	102	107	Jun	56
Burry Inlet	67	57	50	64	43	Aug	56
Deeping St James	110	0	-	-	-		55
R. Avon: F'bridge to Ringwood	37	123	(11)	44	6	Feb	53
Alde Complex	48	68	46	50	-		53
Ouse Washes	66	42	34	63	54	Mar	52
Southampton Water	57	57	33	58	48	Aug	51
Sites of all-Ireland importance in Northern Ireland †							
Loughs Neagh & Beg	123	207	198	217	359	Aug	221
Strangford Lough	69	87	79	87	85	Sep	81

Sites no longer meeting table qualifying levels
Colne Valley Gravel Pits

Other sites surpassing table qualifying levels in 1998-99

Solway Estuary	75	Sep	Southill Lake	55	Apr
Swale Estuary	62	Aug	Tees Estuary	51	Sep
Hanningfield Reservoir	57	Oct			

† *as no British or all-Ireland threshold has been set, a qualifying level of 50 has been chosen to select sites for presentation in this report*

WHITE STORK

Ciconia ciconia

Vagrant and escape
Native range: Europe, Africa and Asia

The known escapes which frequent Harewood Park were seen regularly throughout the year, and one was at Cowden Loch & Ponds, Dumfries & Galloway in September, interestingly the only month in which none were recorded at Harewood.

SACRED IBIS

Threskiornis aethiopicus

Escape

Native range: Africa and Middle East

A single was at Outwood Swan Sanctuary between December and March.

SPOONBILL

Platalea leucorodia

Scarce

Birds were reported from a remarkable 22 sites, with summed site maxima suggesting as many as 37 birds, although some records undoubtedly involved the same individuals.

Sites with two or more birds in 1998-99

Dee Estuary (Eng/Wales)	5	Apr/May
Breydon Wtr & Berney Marshes	3	May
Solway Estuary	3	May
Tees Estuary	3	Aug

LESSER FLAMINGO

Phoenicopterus minor

Escape

Native range: Africa and S Asia

One frequented the Mersey Estuary from October to January.

GREATER FLAMINGO

Phoenicopterus ruber

Escape

Native range: S Europe, Africa and Central America

A single was on the Dee Estuary (Eng/Wales) in April and May.

FULVOUS WHISTLING DUCK

Dendrocygna bicolor

Escape

Native range: C & S America, Africa and S Asia

Singles were observed on the Tees Estuary and Loch Ardinning in May and June, respectively, and two were at Blagdon Lake in November.

MUTE SWAN

Cygnus olor

GB max: 18,847 **Dec**
NI max: 2,461 **Oct**

International threshold: 2,400
Great Britain threshold: 260
All-Ireland threshold: 55

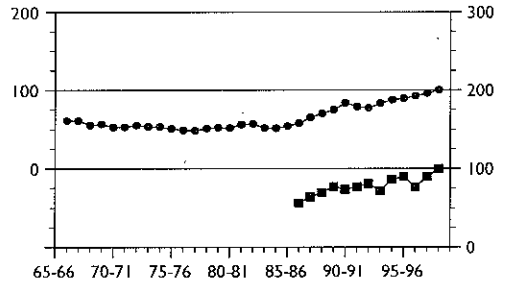


Figure 9. Annual indices for Mute Swan in GB (circles, right axis) and NI (squares, right axis)

In Great Britain, peak totals reached record heights for the third consecutive winter. High totals were sustained in several other months, with three counts over 18,000, a figure exceeded for the first time only the previous winter. Correspondingly, the index of the national population rose to its highest ever level, 4.5% up on the previous winter.

The trend is largely mirrored in Northern Ireland, which also reached its highest level in 1998-99. The magnitude of the increase since 1986 (almost 75%) is exactly the same as in Great Britain during that period. The peak count was the second highest recorded by WeBS (after 2,517 in October 1989), this despite site coverage of smaller inland waters having diminished significantly over this period.

Being a highly dispersed population, relatively few sites hold nationally important concentrations of Mute Swan. Peak numbers at many of these traditional strongholds often remain relatively stable, and few showed notable counts in 1998-99. Loughs Neagh & Beg, the most important UK site, did however record the largest ever WeBS count for this species. A number of sites held peaks during the summer months, presumably moult gatherings of non-breeding birds. An unusually large number of additional sites held numbers exceeding the respective 1% thresholds for national or all-Ireland importance in 1998-99.

	94-95	95-96	96-97	97-98	98-99	Mon	Mean	
Sites of national importance in Great Britain								
Fleet/Wey	1,227	1,151	1,185	1,313	1,141	Oct	1,203	
Somerset Levels	687	608	731	734	733	Dec	699	
Tweed Estuary	593	[25]450	[25]664	544	615	Jul	573	
Ouse Washes	726	427	364	432	663	Dec	522	
Abberton Reservoir	624	538	480	428	512	Aug	516	
Rutland Water	280	295	396	485	465	Aug	384	
Christchurch Harbour	(340)	-	-	-	-		340	▲
Montrose Basin	297	299	356	315	304	Sep	314	
Loch of Harray	211	219	249	413	441	Dec	307	
Morecambe Bay	330	285	281	237	269	Feb	280	
Stour Estuary	144	226	426	307	276	Jan	276	▲
Sites of all-Ireland importance in Northern Ireland								
Loughs Neagh & Beg	1,683	2,179	1,844	1,612	2,422	Aug	1,948	
Upper Lough Erne	456	456	590	468	351	Jan	464	
Castlecaldwell Refuge	-	-	-	116	-		116	
Lough Foyle	102	104	130	110	115	Nov	112	
Strangford Lough	133	98	83	96	111	Sep	104	
Upper Quoile River	114	73	104	116	50	Mar	91	
Dundrum Bay	80	59	67	76	69	Dec	70	
Broadwater Canal	26	-	78	66	71	Dec	60	

Sites no longer meeting table qualifying levels
River Avon: F'bridge to Ringwood

Internationally or nationally important sites not counted in last five years
Ballyroney Lake

Other sites surpassing table qualifying levels in 1998-99

Nene Washes	400	May	Fairburn Ings	280	Aug
Hornsea Mere	394	Aug	River Tweed: Kelso to Coldstream	274	Oct
Humber Estuary	311	Dec	Monlough	66	Nov
Tring Reservoirs	310	Nov	Drumgay Lough	63	Dec
Severn Estuary	299	Dec	Lough Aghery	59	Oct
Fisherwick & Elford Gravel Pits	288	Dec	Larne Lough	57	Nov

BLACK SWAN

Cygnus atratus

Escape
Native range: Australia

GB max: 43 **Sep**
NI max: 0

Reports of this species by WeBS showed a sharp increase in 1998-99. The number of sites at which it was recorded rose to 59 (*cf.* 37 in 1997-98 and 44 in 1996-97) and summed site maxima reached a remarkable 111 (*cf.* 67 and 62). Whilst this last figure undoubtedly includes a number of, in effect, double-counted birds, the fact that many sites hold birds for several months at a time suggests that the majority are relatively sedentary. It seems likely, therefore, that the true number of birds on WeBS site is nearer the figure of 111 than the maximum monthly total of 43.

A report on non-native breeding birds in the UK, compiled primarily via county recorders, noted two instances of breeding in 1997, one at Deene Lake and the other in Lothian (Ogilvie *et al.* 1999b).

Sites with three or more birds in 1998-99

Dene Lake	8	Sep	Thorpe Water Park	3	Jun
Fleet/Wey	7	several	Loch Lomond	3	Aug/Oct
Woburn Park Lakes	6	Sep/Dec	Ramsbury Lake	3	Oct
Cotswold Water Park (West)	6	Jan/Mar	Ashleworth Ham	3	Jan
Nosterfield Gravel Pits	4	Sep/Oct			

BEWICK'S SWAN

Cygnus columbianus

International threshold: 170
Great Britain threshold: 70
All-Ireland threshold: 25*
* 50 is normally used as a minimum threshold

GB max: 1,742 **Feb**
NI max: 66 **Feb**

% young: 9-22 **brood size:** n/a

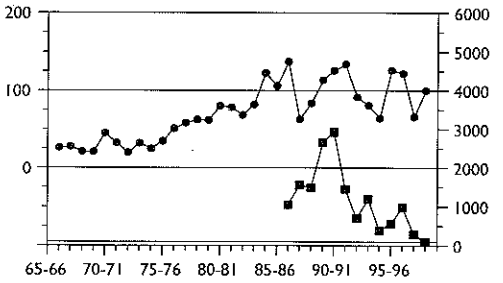


Figure 10. Annual indices for Bewick's Swan in GB (circles, right axis) and NI (squares, right axis)

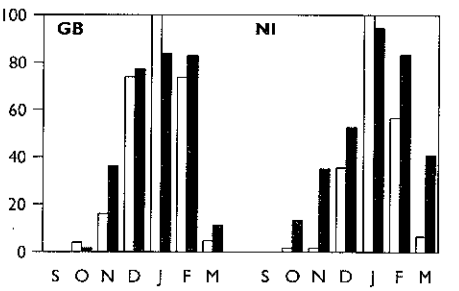


Figure 11. Monthly indices for Bewick's Swan in GB and NI (white bars 1998-99; black bars 1993-94 to 1997-98)

The peak count for Great Britain suggests that numbers of Bewick's Swans in Britain were particularly low in 1998-99. However, the national total does not include counts of roosting birds made at the Ouse Washes, the most important site for this species in Britain. WeBS Core Counts at the Ouse Washes are generally lower than roost counts because birds disperse to feed in surrounding fields during the day. Using roost counts from Ouse Washes and Martin Mere, the

number of Bewick's Swans in Britain peaked during January at 6,787, about average for a mild winter. Annual population indices for Great Britain (including the roost counts in the analysis) indicated an increase over the previous winter.

Productivity, measured at key resorts, was about average: 22% juveniles in flocks at WWT Slimbridge, 17% at WWT Martin Mere and 9% at WWT Welney (WWT unpubl. data). These data continues to illustrate a bias in the distribution of family parties in Britain with a higher proportion of young occurring in the resorts in the west of the country, although the reasons for this bias remain unclear.

In Northern Ireland peak numbers and the annual index continued to decline. The peak total for 1998-99 was the lowest ever recorded since co-ordinated wildfowl counts began. The continued run of mild winters is likely to be a major factor influencing this decline in numbers. In keeping with the decline in the province overall, peak numbers at the main sites, Loughs Neagh & Beg, were 36% below the five year average. A similar trend has also been recorded in the Republic of Ireland (Colhoun 2000).

Peak counts at the Ouse Washes and the Medway Estuary were well above average. High numbers at the former site may be linked to a particularly low peak count at nearby Nene Washes. Numbers at other key resorts in Britain, especially those in the north and west of England, e.g. Martin Mere/Ribble Estuary, Severn Estuary and the Somerset Levels, were much lower than average. Relatively mild conditions in northern Europe throughout the winter may, in part, explain why so few swans moved across from the continent and, of those that did, why so few ventured further west than the Ouse Washes.

	94-95	95-96	96-97	97-98	98-99	Mon	Mean	
Sites of international importance in the UK								
Ouse Washes	3,920	4,830	[29]4,977	[29]4,257	[29]5,129	Jan	4,619	
Nene Washes	1,913	1,025	863	2585	723	Feb	1,422	
WWT Martin Mere/Ribble Est	[29]548	[29]350	[29]669	[29]368	[16]144	Jan	416	
Breydon Wtr & Berney Marshes	209	752	476	231	210	Feb	376	
Severn Estuary	253	[29]370	555	[29]393	[29]287	Jan	372	
Walland Marsh	-	[5]327	324	306	256	Jan	303	
St Benet's Levels	404	391	286	161	126	Feb	274	
Somerset Levels	119	345	[16]285	68	120	Feb	187	
Sites of national importance in Great Britain								
Alde Complex	18	178	52	165	-		103	
Walmore Common	75	106	135	(68)	43	Dec	90	
Arun Valley	68	133	68	98	52	Feb	84	
R. Avon: F'bridge to Ringwood	73	109	114	91	21	Dec	82	
Medway Estuary	16	9	[27]32	15	302	Jan	75	▲
Sites of all-Ireland importance in Northern Ireland								
Loughs Neagh & Beg	90	80	117	77	53	Jan	83	▼
Lough Foyle	37	94	90	14	10	Dec	49	
Canary Road	-	43	-	26	-		35	
River Lagan: Flatfield	18	32	17	38	-		26	
Upper Lough Erne	0	0	122	7	0		26	
Sites no longer meeting table qualifying levels								
Lower Derwent Valley								
Strangford Lough								

WHOOPER SWAN

Cygnus cygnus

GB max: 2,788 Jan
NI max: 1,881 Dec

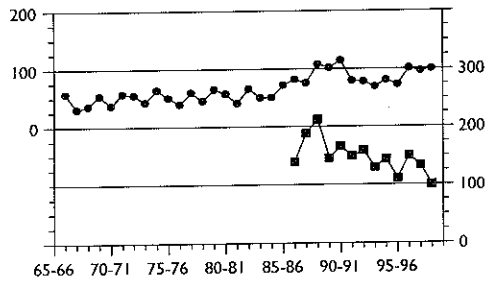


Figure 12. Annual indices for Whooper Swan in GB (circles, right axis) and NI (squares, right axis)

International threshold: 160
Great Britain threshold: 55
All-Ireland threshold: 100

% young: 18-21 **brood size:** n/a

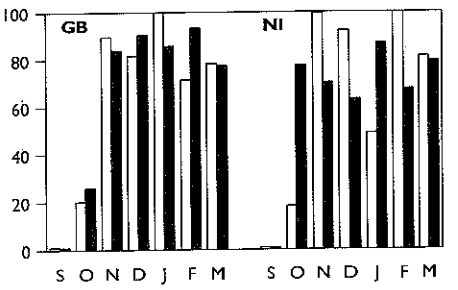


Figure 13. Monthly indices for Whooper Swan in GB and NI (white bars 1998-99; black bars 1993-94 to 1997-98)

When roost counts at the Ouse Washes are incorporated, the peak count for Great Britain was about average for a mild winter, i.e. around 4,000 birds. In mild winters many birds may remain in northern Britain, where many birds are widely dispersed across small sites and make extensive used of non-wetland sites, rather than moving further south. Consequently, a larger number probably remains undetected by WeBS during these winters. The annual index for Britain remained at a similar level to the previous two years and productivity, as measured at WWT centres, was about average: 21% of young in flocks at Martin Mere, 18% at Welney and 19% at Caerlaverock (WWT unpubl. data).

As with Bewick's Swans, numbers of Whooper Swans at WeBS sites in Northern Ireland continue to decline. Numbers at Loughs Neagh & Beg and Lough Foyle were well below average in 1998-99. This is also borne out in the annual indices which have continued to decline slowly since the late 1980s (the use of a nominal rather than logarithmic scale in presenting indices demonstrates this decline more clearly; compare with the 1997-98 report). In contrast, the population index in the Republic of Ireland has continued to increase over recent years (Colhoun 2000). It has been shown that many Whooper Swans move from Northern Ireland through the Republic of Ireland or into Britain during the winter and are generally not site faithful (McElwaine *et al.* 1995). WeBS continues to identify Lough Foyle as a key landfall site in the province during the late autumn, where studies of colour-marked birds have shown a high degree of turnover at this time of the year. The reasons behind the apparent distribution change resulting from increasing numbers of birds moving from the north into the Republic during the winter require further attention.

In Britain, peak counts were much higher than average at the Ouse Washes (+24%) Martin Mere and the Ribble Estuary (+26%) and especially at Loch of Strathbeg (+87%), the last presumably reflecting a successful year for growth of favoured food plants at the site. Numbers at other internationally important sites and most nationally important sites were similar to their respective five year averages.

	94-95	95-96	96-97	97-98	98-99	Mon	Mean
Sites of international importance in the UK							
Ouse Washes	[29] 1,142	1,288	[29] 1,211	1,299	[16] 1,623	Mar	1,313
Loughs Neagh & Beg	1,102	906	1,169	1,113	830	Feb	1,024
Upper Lough Erne	756	980	1,094	799	989	Jan	924
WWT Martin Mere/Ribble Est	[29] 738	[29] 740	[16] 827	[16] 1,041	[16] 1,130	Jan	895
Lough Foyle	596	1521	671	566	642	Nov	799
R. Foyle: Grange	-	266	380	150	-		265
Loch of Strathbeg	75	(221)	158	310	476	Nov	255
Solway Estuary	[29] 176	[29] 220	[29] 350	[29] 221	[29] 188		231
Black Cart Water	[31] 250	[31] 149	[31] 163	[31] 180	[31] 244	Nov	197

	94-95	95-96	96-97	97-98	98-99	Mon	Mean	
Sites of national importance in Great Britain								
Loch Insh & Spey Marshes	200	115	82	-	-		132	
Loch of Spiggie	84	180	-	-	-		132	
River Clyde: Carstairs Junction	-	-	60	(157)	125	Dec	114	
Loch of Wester	(49)	-	98	114	(123)	Nov	112	
Loch of Lintrathen	136	(1)	67	(77)	(36)	Dec	102	
River Nith: Keltonbank to Nutholm	-	-	75	(115)	100	Feb	97	
Loch Leven	96	94	97	98	-		96	
Cromarty Firth/Loch Eye	191	89	120	52	28	Oct	96	
River Tweed: Kelso to Coldstream	75	88	48	(138)	105	Jan	91	
Wigtown Bay	98	72	59	75	102	Jan	81	
Loch of Skaill	104	95	78	51	33	Oct	72	
River Tweed: Magdalenehall	70	-	-	-	-		70	
Loch Heilen	110	51	51	99	38	Dec	70	
Merryton Ponds	72	67	72	74	58	Feb	69	
Lower Derwent Valley	73	42	96	61	45	Feb	63	
Loch a'Phuill	-	-	-	23	101	Dec	62	▲
Milldam & Balfour Mains Pools	57	46	87	76	42	Feb	62	
River Clyde: The Meetings	-	-	60	-	-		60	
River Tweed: Rutherford	-	110	36	-	29	Dec	58	
Tyninghame Estuary	18	44	65	44	113	Jan	57	▲

Sites no longer meeting table qualifying levels
Loch of Skene

Internationally or nationally important sites not counted in last five years
R. Teviot: Kalemouth to Roxburgh
Easterloch /Uyeasound
Islesteps

Other sites surpassing table qualifying levels in 1998-99

Killimster Loch	102	Mar	Inner Moray Firth	74	Oct
River Earn: Millands Marsh & Floods	91	Nov	Loch Bhasapoll	63	Mar
Dornoch Firth	89	Dec	St Benet's Levels	56	Feb
Forth Estuary	79	Nov	Morecambe Bay	55	Dec
Lower Teviot Valley	75	Mar			

SWAN GOOSE

Anser cygnoides

Escape
Native range: Eastern Asia

After large counts in the previous winter, the only records received in 1998-99 were of two at Grafham Water and a single and Seamer Road Mere. The three key sites (holding eight or more birds) in 1998-99 were all visited during 1998-99.

BEAN GOOSE

Anser fabalis

International threshold (*fabalis*): 800
Great Britain threshold: 4*†
All-Ireland threshold: +*
* 50 is normally used as a minimum threshold

GB max: 334 Jan
NI max: 0

% young: 3.1 brood size: n/a

The two regular wintering flocks of Taiga Bean Geese *A. f. fabalis*, at the Middle Yare Marshes, Norfolk and the Slamannan Plateau, Stirling, both showed slight increases compared to the previous winter. The count of 168 at Slamannan was the highest recorded to date whilst the Norfolk flock approached the high levels of the early 1990s again.

Regular monitoring undertaken allowed a more detailed understanding of phenology at each site. The first to be seen at the Yare Marshes were 63 on 12 November and the last, a flock of 192, were present on 8 January. An assessment of productivity in this flock on 2

January revealed a typically low 3.1% young (M. Parslow-Otsu *in litt.*). At Slamannan, the birds were present for longer, the first arriving on 10 October and the last flock of 88 observed on 19 February, although Simpson & MacIver (1999) draw attention to the shortening of the wintering period, with later arrivals and earlier departures of this flock.

Other than the monitoring of feeding distribution in the Slamannan population, no research is currently being undertaken, although plans to catch and mark a sample of the Slamannan flock are still active.

Away from these two key areas, Bean Geese remained scarce. Birds were not present for the third winter in succession at Heigham Holmes and none were found at North Warren. In contrast, numbers further north increased, with up to 42 present in the Lower Derwent Valley and 17 nearby on the Humber Estuary, although these flocks are likely to have involved the same individuals.

	94-95	95-96	96-97	97-98	98-99	Mon	Mean	
Sites of national importance in Great Britain †								
Middle Yare Marshes	[17]310	[17]195	[17]224	[17]266	[17]296	Dec	258	
Slamannan Plateau	[4]132	[4]123	[4]127	[4]157	[4]168	Nov	141	
Heigham Holmes	8	103	0	0	0		22	▼
North Warren & Thorpness Mere	13	48	36	12	0		22	
Lower Derwent Valley	11	8	18	11	42	Dec	18	▲
Ouse Washes	1	2	34	8	7	Feb	10	

Other sites surpassing table qualifying levels in 1998-99

Humber Estuary 17 Oct

† *as the British threshold for national importance is so small, a qualifying level of 10 has been chosen to select sites for presentation in this report*

PINK-FOOTED GOOSE

Anser brachyrhynchus

International threshold: 2,250
Great Britain threshold: 2,250
All-Ireland threshold: +

GB max: 229,408 Oct
NI max: 5 Sep/Oct

% young: 20.3 brood size: 2.4

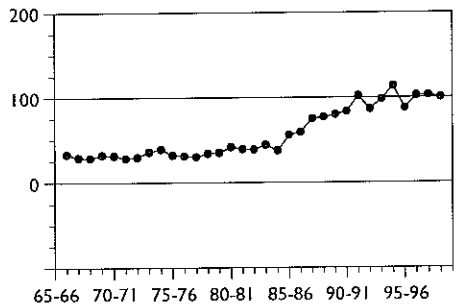


Figure 14. Annual indices for Pink-footed Goose in GB

The 39th national grey goose census in autumn 1998, comprising separate counts of known roosts in October and November, revealed a slight decrease in the number of Pinkfeet (Hearn 1999a). In view of the successful breeding season, this total suggests that the census may have slightly under-recorded the number of geese present. The overall population is considered to remain stable, with an estimate of 230,000 birds.

Unusually, over 95% of the autumn census total was located during the November count, although, as normal, a marked movement away from the key arrival areas in eastern Scotland, particularly to Norfolk, had already occurred by that time (Figure 15).

Peak counts at the majority of key roosts were typical of recent years. However, at the main roosts in north Norfolk there was increased use of Holkham Bay and, in particular, Scolt Head, while numbers at Snettisham, the main roost, were slightly lower than average. After several years of rapid increase at these roosts numbers have stabilised and the increases are now most prevalent in east Norfolk, notably Breydon Water & Berney Marshes, although counts there do not yet provide a detailed understanding of roost phenology. These increases have led to speculation that some of the birds may be from the Svalbard population, which is also wintering in increasing numbers in Belgium, the southernmost part of its range. However, sightings of marked birds indicate that interchange between Icelandic and Svalbard Pinkfeet has not increased, despite

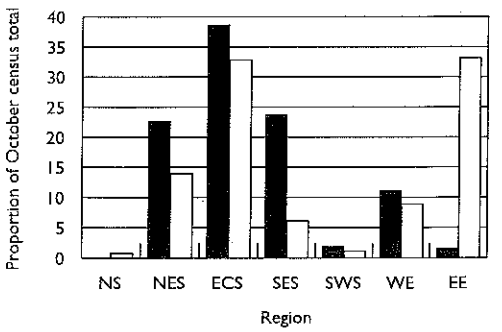


Figure 15. The regional distribution of Pink-footed Geese in Britain in October (black bars) and November (white) 1998. Key: NS - north Scotland, NES - northeast Scotland, ECS - east central Scotland, SES - southeast Scotland & northeast England, SWS - southwest Scotland & northwest England, WE - west England, EE - east England.

the increasing proximity of these two populations during midwinter.

Numbers were low at the key roost in Fife, Cameron Reservoir, for the second time in three years. Across the Forth, the highest ever count was recorded at Aberlady Bay and this may be a reflection of low numbers in Fife. Significant changes were noted at a number of less important roosts, although usage of many of these sites is often sporadic. Large counts were made at Lindisfarne, the Tay-Isla Valley and especially at Loch Long, Angus, although this site has been irregularly monitored in recent years and it is uncertain whether this count is unusual. Sustained high counts at Loch Tullybelton, Holburn Moss, Breydon Water & Berney Marshes suggest these may become firmly established as traditional roosts of some importance.

Many of the major sites in the Lothians and Borders, notably West Water Reservoir, Gladhouse Reservoir, Fala Flow, Hule Moss and nearby Upper Cowgill Reservoirs, held comparatively low numbers in 1998-99. Whilst the often very large peak counts in this area are short-lived, as a large proportion of the population moves *en masse* though southeast Scotland, the low counts at nearly all roosts in the area suggest that birds passed through earlier than normal, before counters had begun intensive counts, or that they passed through more quickly than normal, perhaps as a result of a clean or poor harvest in the area. Use of the Cromarty Firth was again very low, although 1,500 were recorded at the satellite roost of Loch Flemington, and very low numbers were also recorded at Morecambe Bay, although there are a number of key roosts very close to this site.

Numbers at three sites have now fallen below thresholds for international importance. Kinnordy Loch experienced a period of high use during the late 1980s to mid 1990s, coinciding with the overall population increase but numbers have been decreasing during the current phase of population stability. Glenfarg Reservoir does not have a long history of use by roosting geese and is undoubtedly a satellite for birds from Loch Leven; use made during the early 1990s has now ceased. Alloa Inch is also an infrequently used roost that held unusually high numbers of birds during 1994-95 and 1995-96, but which now appears to have ceased, again illustrating the rather fickle use of some sites despite the known importance of tradition in this species' distribution.

Counts for the Solway Estuary for 1995-96 to 1997-98 have been updated since Cranswick *et al.* (1999), primarily with the addition of spring count data, revising the five year mean of last year from 15,502 to 19,534.

The proportion of young indicates a reasonably successful breeding season in 1998; between year fluctuations since the mid 1990s have been smaller than in preceding years (Figure 16). Brood size was about average also. Data collected in Iceland during July 1998 showed that mean brood size fell by a typical 0.7 goslings per successful pair between the breeding and wintering areas (WWT/Icelandic Institute of Natural History, unpubl. data). Hunting returns showed that a total of almost 15,102 birds were shot in Iceland in 1998, similar to numbers in previous years (Icelandic Wildlife Management Institute).

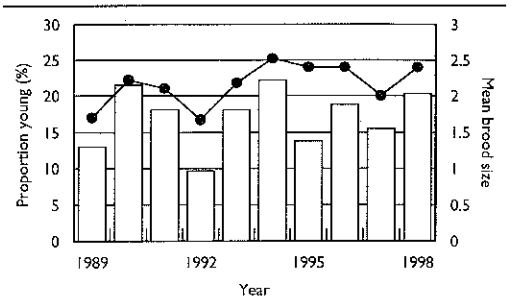


Figure 16. Productivity in Pink-footed Geese, 1989-1998: proportion of young (white bars) and mean brood size of successful pairs (black circles) from age assessments in Britain (see Hearn 1999a).

One of the most important moulting sites for Pink-footed Geese, Eyjabakkar, in south-east Iceland, is currently threatened by the construction of a hydroelectric power station that would create a reservoir, flooding the whole area.

	94-95	95-96	96-97	97-98	98-99	Mon	Mean	
Sites of international importance in the UK								
Dupplin Lochs	[32] 62,000	[32] 35,000	[32] 40,500	[32] 29,850	[32] 42,500	Oct	41,970	
Loch of Strathbeg	[32] 58,150	[32] 48,500	[32] 32,000	[32] 33,556	37,078	Oct	41,857	
Snettisham	[32] 31,038	[32] 39,130	[32] 35,930	[32] 40350	[32] 35,555	Dec	36,401	
West Water Reservoir	[32] 26,500	[32] 31,500	55,000	38,700	[32] 21,670	Oct	34,674	
SW Lancashire	[32] 31,000	[32] 28,850	[32] 41,680	[32] 28,960	[32] 36,260	Jan	33,350	
Montrose Basin	36,000	[32] 18,500	[32] 17,150	[32] 35,000	[32] 33,012	Nov	27,932	
Holkham Bay	[32] 16,000	[32] 19,230	[32] 26,000	[32] 33,700	[32] 34,100	Nov	25,806	
Solway Estuary	[32] 20,202	[32] 22,523	19,506	17,971	[32] (3,710)	Oct	20,051	
Scolt Head	[32] 13,150	[32] 15,635	17,900	18,800	[32] 28,510	Nov	18,799	
Ythan Estuary/Slains Lochs	[32] 22,590	[32] 25,000	[32] 17,400	[32] 12,200	[32] 16,400	Oct	18,718	
Hule Moss	8,700	24,900	[32] 19,400	[32] 19,675	11,253	Oct	16,786	
Loch Leven	[32] 16,154	[32] 17,900	[32] 18,150	[32] 14,740	[32] 14,100	Oct	16,209	
Carsebreck & Rhynd Lochs	[32] 14,500	[32] 13,500	[32] 12,000	[32] 13,560	[32] 18,500	Oct	14,412	
Cameron Reservoir	[32] 14,860	[32] 11,260	[32] 3,460	[32] 11,280	[32] 4,104	Nov	8,993	
Aberlady Bay	[32] 5,750	[32] 11,320	[32] 4,650	[32] 6,540	[32] 13,260	Oct	8,304	
Forth and Teith Valleys	[32] 7,780	-	-	-	-		7,780	
Carse of Stirling	-	[32] 6,700	-	-	-		6,700	
Wigtown Bay	[32] 5,912	7,229	[32] 7,280	5,234	[32] 5,029	Mar	6,137	
Tay Estuary	[32] 1,938	[32] 6,117	[32] 8,897	[32] 3,765	[32] 5,355	Nov	5,214	
Loch Tullybelton	[32] 1,800	[32] 1,395	[32] 4,658	[32] 8,000	[32] 8,100	Oct	4,791	
River Clyde: Carstairs Junction	[32] 1,500	-	-	8,000	-		4,750	
Upper Cowgill Reservoir	[32] 3,820	[32] 4,560	[32] 6,060	[32] 6,000	[32] 1,000	Sep	4,288	
Loch Eye/Cromarty Firth	[32] 9,668	[32] 9,350	[32] 1,570	465	[32] 295	Nov	4,270	
Fala Flow	[32] 3,500	[32] 2,437	[32] 5,000	[32] 7,500	[32] 2,100	Oct	4,107	
Gladhouse Reservoir	[32] 4,550	[32] 3,290	[32] 6,200	[32] 5,000	[32] 1,300	Oct	4,068	
Morecambe Bay	540	5,503	8,671	3,000	189	Jan	3,581	
Drummond Pond	[32] 2,250	[32] 110	[32] 7,000	[32] 3,300	[32] 2,644	Oct	3,511	
Haddo House Lakes	[32] 7,600	900	4,200	[32] 140	[32] 1,000	Jan	2,768	
Tay-Isla Valley	[32] 3,202	[32] 2,785	[32] 2,911	[32] 229	[32] 4,000	Nov	2,625	
Loch Long	0	[32] 650	-	-	[32] 7,200	Nov	2,617	▲
Holburn Moss	[32] 1,500	[32] 300	2,100	4,500	[32] 4,350	Oct	2,550	▲
Breydon Wtr & Berney Marshes	74	1	1,100	5,500	5,500	Feb	2,435	▲
Loch Mahaick	970	[32] 600	[32] 2,700	[32] 6,465	[32] 1,300	Nov	2,407	

Sites no longer meeting table qualifying levels

Alloa Inch
Glenfarg Reservoir
Kinnordy Loch

Internationally or nationally important sites not counted in last five years

Crombie Reservoir

Other sites surpassing table qualifying levels in 1998-99

Lindisfarne	[32] 4,100	Nov
Loch of Lintrathen	[32] 3,350	Nov
Threipmuir & Harlaw Rsrs	3,000	Mar
Dun's Dish	[32] 2,300	Oct

EUROPEAN WHITE FRONTED GOOSE

Anser albifrons albifrons

International threshold: 6,000
Great Britain threshold: 60
All-Ireland threshold: +

GB max: 4,139 Jan
NI max: 0

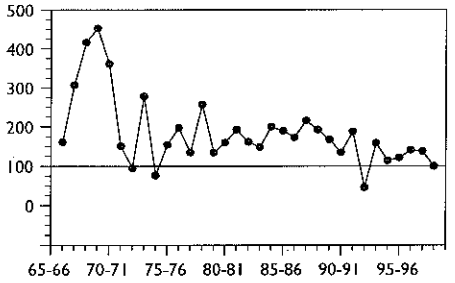


Figure 17. Annual indices for European White-fronted Goose in GB

% young: 14.4 brood size: 3.3

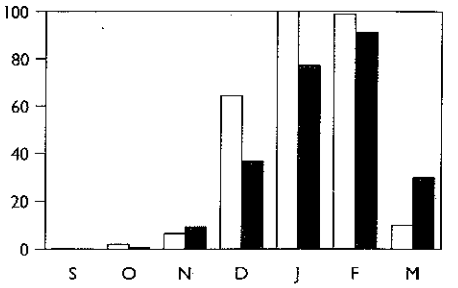


Figure 18. Monthly indices for European White-fronted Goose in GB (white bars 1998-99; black bars 1993-94 to 1997-98)

Numbers of European Whitefronts in Britain were much lower than normal and, with the exception of 1992-93, the lowest since the mid 1970s. The two key sites both supported smaller numbers than usual although, in contrast, numbers at most east coast localities continued to increase, notably at Heigham Holmes, North Warren & Thorpness Mere, Dungeness, Minsmere, although numbers at the Lower Derwent Valley declined.

Arrivals into Britain showed the typical pattern of recent years with the first large numbers during December, although peak numbers occurred slightly earlier than normal in January. Also typical of recent years was the early and rapid departure, with much smaller numbers present in March than during recent years.

Breeding success, measured among the wintering flock on the Severn Estuary, was rather low, with just 14.4% young among this flock. Mean brood size was 3.3 goslings per successful pair.

	94-95	95-96	96-97	97-98	98-99	Mon	Mean
Sites of national importance in Great Britain							
Severn Estuary	2,200	2,170	2,780	2,501	1,840	Jan	2,298
Swale Estuary	1,681	2,088	1,604	1,402	973	Jan	1,550
Heigham Holmes	185	1,043	(640)	475	740	Jan	617
North Norfolk Coast	248	476	491	290	383	Feb	378
North Warren & Thorpness Mere	47	450	302	220	[25]500	Feb	304
Walland Marsh	-	300	328	198	198	Jan	256
Alde Complex	0	427	317	60	-		201
Dungeness Gravel Pits	0	8	355	240	320	Feb	185
Minsmere Levels	64	83	215	236	196	Dec	159
Middle Yare Marshes	189	180	47	107	84	Jan	121
Lower Derwent Valley	1	244	114	152	60	Feb	114
Thames Estuary	107	59	146	69	76	Feb	91
Breydon Wtr & Berney Marshes	88	64	69	90	91	Dec	80

Sites no longer meeting table qualifying levels
Ouse Washes
Wash

Internationally or nationally important sites not counted in last five years
Kessingland Levels