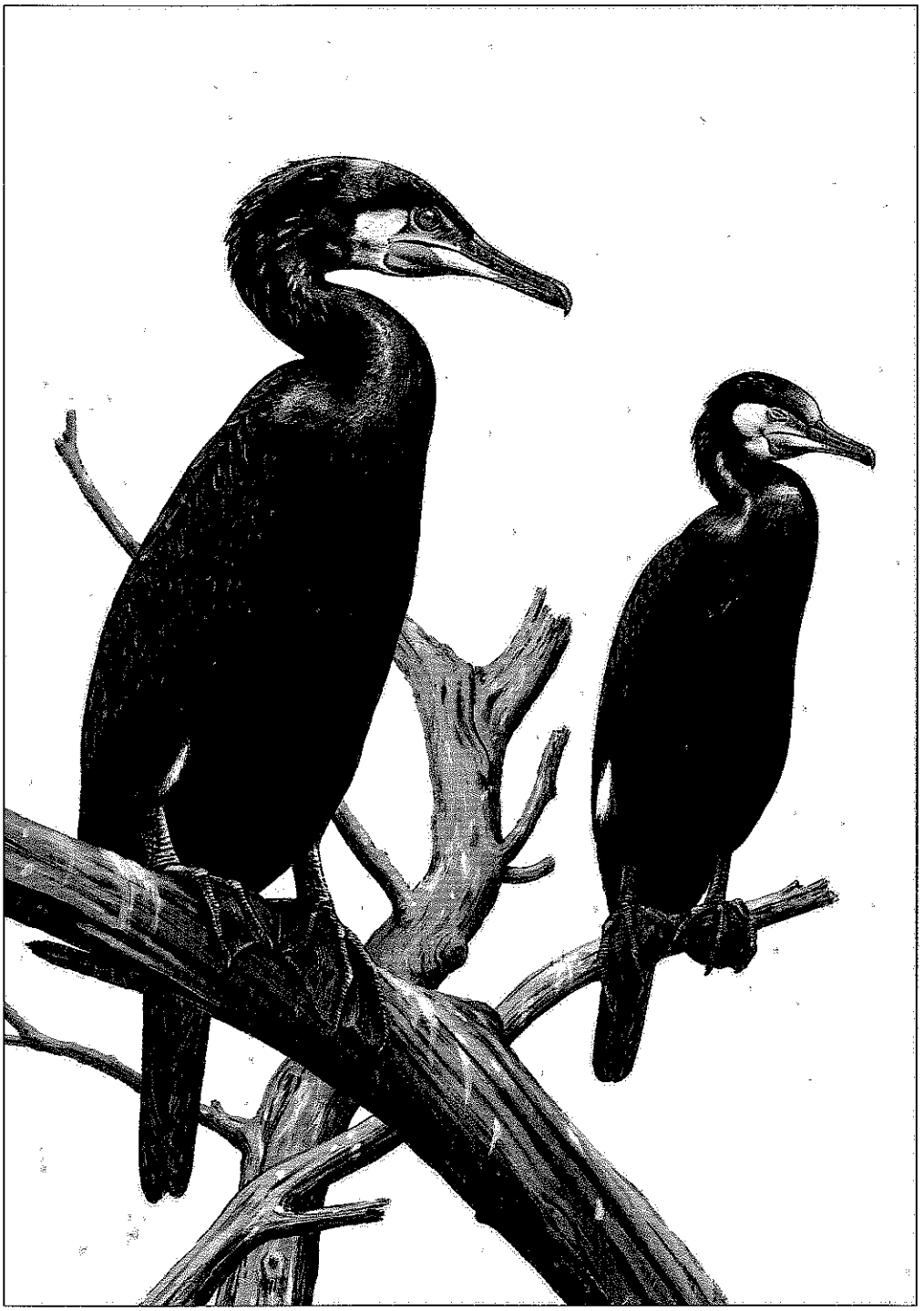
Wets



The Wetland Bird Survey 1992-1993

Wildfowl and Wader Counts

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The Wetland Bird Survey 1992-1993:
Wildfowl and Wader Counts

The results of the Wetland Bird Survey in 1992-93

by

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with the assistance of

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Waders - **Ray Waters**, British Trust for Ornithology

This report is provided free to all WeBS counters, none of whom receive financial rewards for their invaluable work. Further feedback from BTO and WWT HQs is provided in the form of the *WeBS Newsletter*. BTO members can read about WeBS work in the regular "Shorelines" section of *BTO News*, while a summary of the each season's counts are published annually in WWT's journal *Wildfowl*.

ACKNOWLEDGEMENTS

This book represents the fourteenth combined report of the Wetland Bird Survey, previously the National Waterfowl Counts and the Birds of Estuaries Enquiry (see *Introduction* for further details). It provides a national overview of the count information, collected during 1992-93 and previous years, which is critical to the conservation of waterfowl populations both within the United Kingdom and internationally. It is thus 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 coordinate these counts deserve special thanks.

We are also grateful to the following people for providing technical assistance, supplementary information and comments on the draft texts: Dawn Balmer (BTO), Bernie Bell (WWT), Mike Bell (WWT), Andy Brown (EN), John Bowler (WWT), Stephen Browne (BTO), Alison Browning (WWT), Ali Buck (JNCC), Marie Callaghan (WWT), Jacquie Clark (BTO), Nigel Clark (BTO), Deirdre Craddock (JNCC), Sue Davies (JNCC), Tim Davis (WWT), Simon Delany (WWT), Julianne Evans (BTO), Richard Evans (RSPB), Claire Forrest (BTO), Tony Fox (GWGS), Rob Fuller (BTO), Ian Henderson (BTO), Steven Holloway (BTO), Baz Hughes (WWT), John Holmes (JNCC), Jeff Kirby (WWT), Rowena Langston (BTO), Alan Law (JNCC), John Marchant (BTO), Carl Mitchell (WWT), Ken Norris (RSPB), Rosie Ounsted (WWT), Myrfyn Owen (WWT), Richard Pettifor (WWT), Simon Pickering (WWT), Carol Powley (BTO), Dave Price (WAS), Eileen Rees (WWT), Mark Rehfisch (BTO), Ken Smith (RSPB), Mark Tasker (JNCC), Derek Toomer (BTO), Tony Warne (JNCC) and Mike Wilkinson (EN). Many amateur observers also provide us with reports of their studies. These are acknowledged in the text.

The map of WeBS coverage (page 14) was produced using DMAP, written by Dr Alan Morton. The *Weather* section was summarised from reports provided by Tim Hull of the Meteorological Office.

The cover painting of Cormorants is by Mark Hulme. Other illustrations in this report are by Joe Blossom, Steve Carter, Mark Hulme, Paul Johnsgard, Daphila Scott, Thelma Sykes and Suzanne Yarnton.

The Wetland Bird Survey 1992-1993:
Wildfowl and Wader Counts

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IMPORTANT NOTICES

WeBS is of critical importance in both national and international conservation work and, to this end, others are dependent upon us producing up-to-date and accurate data. Please, therefore, return counts to your local organiser as soon as possible. Remember that "winter" counts (October to March) should be submitted by the end of **March**. Any counts made during "summer" months (April to September) should be forwarded to the Local Organiser at the end of **September**. For estuarine coastal sites, counters are strongly advised to forward each count to their Local Organiser directly after it has been made so that organisers can collate and summarise the results. The rapid return of information helps to ensure that annual analyses are completed on time, the results summarised promptly in this report, and the most up-to-date data used by conservation bodies. It also allows data to be submitted to the International Waterfowl and Wetlands Research Bureau (IWRB) in time for their annual report. Local organisers please remember that all data should be sent to WWT, Slimbridge. Many thanks for your help.

We would be pleased to advise on the positioning of count boundaries so that they can be matched, for example, with SSSI and other statutory site boundaries, hence increasing the applicability of the count data collected. Please ensure to consult one of the WeBS National Organisers before making any changes to the overall site or sector boundaries of your count area. It is necessary for us to be sure of the precise details of such changes and to amend our computer files and maps accordingly. For ease of administration, we recommend that counters should contact Ray Waters at BTO with queries regarding estuarine/coastal sites and Peter Cranswick at WWT regarding inland ones.

Counting divers, grebes and seaducks in coastal waters is fraught with difficulties and we are aware that trying to do so on set dates is rarely successful. For these species, we would very much welcome more opportunistic records, i.e. counts made when the weather and sea conditions are suitable. Such records will allow important feeding and roosting areas to be identified, and will allow their frequency of use to be examined so send in all records of these please.

Please remember that, under WeBS, we are asking observers to record numbers of wildfowl *and* waders at all sites. Also, because of the increasing demand to identify the importance of particular areas within a large site, we are asking observers to provide data at the finest practical level. For example, if you count a complex of gravel pits, we would be most grateful if you could sub-divide the area into smaller groups of pits or even provide pit-by-pit data. In practical terms, this may allow us to monitor numbers on an individual pit that is, for example, a Site of Special Scientific Interest, which would otherwise be "lost" in a total for the whole pit complex. Such fine-scale data greatly enhance the potential for its positive conservation uses. Many thanks for all your help.

Late Summer Survey 1993

The majority of data from this survey have now been received. However, would those observers who have still to return forms to their Local Organiser, please do so as soon as possible. This will allow us to produce a complete report and provide rapid feedback. Many thanks for your cooperation.

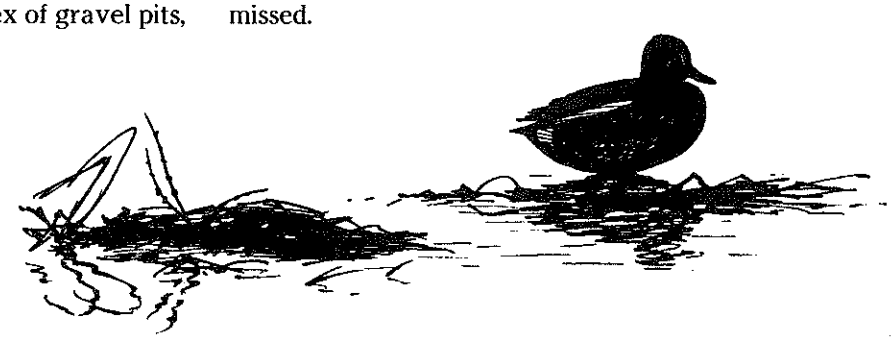
Ringing Schemes

While many species of birds are caught and ringed with the traditional BTO metal ring to identify movements of birds, many waterfowl are also ringed with colour ring combinations or "darvic" rings, tags or collars (coloured plastic with large, engraved letters or numbers that can be read at large distances using binoculars or a telescope). As active fieldworkers, WeBS counters are in an ideal position to record sightings of ringed birds. Please send your sightings of marked wildfowl to Carl Mitchell at WWT and of waders to Jane Marchant at BTO.

Local Organisers

An up-to-date list of Local Organisers is provided with this report. Very many thanks to all those who retired during the last year for their invaluable work, and welcome to all newcomers. However, we still need organisers in Central, Co. Down, Meirionnydd (Gwynedd), North Humberside and Co. Tyrone. If you would be willing to coordinate counts at inland sites in any of these areas (or can volunteer someone who might!) please contact Peter Cranswick at WWT.

It is with much sadness that we have to report the death of George Arnold in May 1993. Our sincere condolences go to his brother Maurice, with whom George had organised counts throughout much of west central England, including the West Midlands, Staffordshire, Worcestershire and Warwickshire, for many years. George will be sorely missed.



INTRODUCTION

October 1993 saw one of the most important developments in the monitoring of waterfowl in the UK for many years with the launch of the Wetland Bird Survey (WeBS). This represents the amalgamation of the two previous major schemes for surveying non-breeding wildfowl and waders, namely the National Waterfowl Counts (NWC) and the Birds of Estuaries Enquiry (BoEE). WeBS retains the objectives of the old schemes:

- to obtain population estimates for wildfowl and waders in the UK during the non-breeding season
- to monitor trends in abundance of these populations
- to identify adverse trends at particular sites
- to provide a sound basis for the protection of sites and populations

The new scheme, however, provides a greatly enhanced capacity for forward planning, improved co-ordination of research, analyses, and handling of data, and its use for conservation purposes. In many ways, WeBS represents a logical development of the count schemes in their various guises, which began in 1947. A brief history of the origin and major developments in waterfowl monitoring in the UK is given in Table i.

Table i. Major events in the history of monitoring of non-breeding waterfowl in the UK

1947	Wildfowl counts instigated by the British section of the International Wildfowl Inquiry Committee in response to increasing threats to wetlands
1954	Wildfowl Counts, later the National Wildfowl Counts (NWC), moved to Slimbridge and organised by The Wildfowl Trust
1967	International Wildfowl Census initiated by International Waterfowl Research Bureau (IWRB)
1969	BoEE launched, organised by British Trust for Ornithology, improving coverage of estuarine sites, extending species coverage to waders and geographical coverage to Northern Ireland
1985	NWC scheme extended to Northern Ireland
1989	Combined BTO/WWT recording form introduced for coastal sites
1991	NWC extended to become National Waterfowl Counts, including all waterfowl, including waders
1993	WeBS launched

All past data, collected under the forerunners of WeBS, are now treated as WeBS data and called such in this and future publications. While the methodologies of the schemes are fundamentally the same, there are differences in a few areas and these are highlighted in the text where the collection of 1992-93 data under the NWC and BoEE schemes are incompatible in the WeBS context.

The WeBS scheme is funded by 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 Department of the Environment for Northern Ireland (DoENI)). All four WeBS partners take an active role in the planning of the scheme and the rolling programme of analyses that use WeBS data. The day-to-day running of the scheme is the responsibility of the two National Organisers based at the BTO Headquarters, Thetford, and WWT Headquarters, Slimbridge.

The success and growth of the count scheme in its various guises accurately reflects the enthusiasm and dedication of the several thousands of volunteer ornithologists throughout the UK who participate. Counts are made at a wide variety of wetlands including lakes, lochs/loughs, ponds, reservoirs, gravel pits, rivers, freshwater marshes, canals, estuaries, sections of open coast and other coastal habitats. Counts are conducted once per month, normally on pre-selected dates. With the aim of monitoring non-breeding waterfowl, September to March are identified as priority months for counting, although pre-selected dates are provided for all months should observers wish to continue their counts throughout the year - these additional data are always welcome.

Additional surveys of other species, principally geese and swans, that are difficult to monitor accurately by the once-monthly counts alone, are also conducted by volunteer counters, organised by WWT. The results of these surveys are used in this report to complement WeBS data where relevant (see also *Progress and Developments*).

A new recording form was introduced in October 1993 for the collection of WeBS data. This allows standardisation of data collected from all sites and, although basically similar to the previous forms of the NWC and BoEE, it asks observers to record information relating to count accuracy and disturbance in a slightly different way with a view to making greater use of these data when analysing the counts.

The launch of WeBS has been taken as an opportunity to make several changes to this report. Firstly, we have changed the name to reflect the new organisation of the count scheme, but more importantly, we have aimed to provide a "seamless" report, with all waterfowl treated sequentially under each of the various headings as an improvement over the previously separate wildfowl and wader sections. We hope this meets with the approval of counters and other readers of this report and welcome any comments and suggestions for further improvements.

PROGRESS AND DEVELOPMENTS

Staff changes

There were no changes in BTO staff directly involved with WeBS during the year. However, the Waterfowl Monitoring and Wetland Ecology Unit of the WWT at Slimbridge, which includes those staff involved with WeBS, saw many changes in its staff complement as part of wider changes within WWT generally in 1992 and 1993. On the departure side, André Gilburn returned to Nottingham University to research the genetics of seaweed flies, and Marie Callaghan left to become a mother. Our thanks and best wishes to both. Richard Pettifor joined in summer 1993 as a Senior Research Officer. Richard comes to WWT with a strong statistical background and experience in life history theory, particularly reproductive decisions in tits (Parus spp.). Richard has taken a key role in WeBS, especially in directing and undertaking the programme of research that arises from the WeBS data. Mark Pollitt joined the Unit in October 1993 as an assistant to the WeBS National Organiser (Wildfowl) and will assist with the day-to-day running of the scheme. Ian Stenhouse also joined the WWT in October and, based in Scotland, will greatly enhance our monitoring and research into geese in that area, especially Pinkfeet and Icelandic Greylags. Jeff Kirby, who, as many of you will no doubt remember, has organised both the BoEE and the NWC in recent years, was appointed Head of Research at the WWT in November. Jeff will consequently be less involved in WeBS issues but, as one of the key players in establishing WeBS, he will be keeping a close eye on developments in the near future. Many thanks to Jeff for his valuable input in the past and (hopefully) the future also.

Low Tide Counts

An important development this year has been the incorporation of the BTO/RSPB National Low Tide Count Programme into WeBS. The main aim of the programme is to collect and regularly update information on the feeding distributions of intertidal waterfowl on the majority of UK estuaries. The main WeBS counts enable the number of each species wintering on estuaries in the UK to be calculated and changes in population levels to be monitored. The WeBS Low Tide Count Programme will augment these data by providing detailed information on estuary usage by wildfowl and waders.

The methods currently being used to collect this information have been developed over a number of years and draw on the experience gained from a variety of short-term studies carried out by the BTO. These standardised methods are applicable to all but the very largest estuaries, where the most distant mudflats cannot be viewed without the considerable danger of observers walking out onto the estuary. Data collection for each estuary is based on pre-established sub-divisions of the intertidal area which can be between 1 and 250 ha in size. A simultaneous complete count is carried out in each winter month (November to February inclusive). Counts are conducted in the period between two hours before and two hours after low tide with feeding and roosting birds recorded separately. Around 10 to 15 estuaries will be counted annually on a rotating basis, thus incorporating all but the smallest and very largest estuaries at least once very five years. The problems associated with counting waterfowl on estuaries vary according to the estuary's size, shape and habitat composition. In all cases, the advice of the experienced local counters is invaluable in adapting the basic counting procedure to help overcome these problems.

By using methods which sub-divide estuaries in this way, the WeBS Low Tide Count Programme provides data which can be used to assess the relative importance of different parts of individual estuaries for different species. Amongst other uses, this type of detailed information is particularly important as a means of assessing the potential impact of localised activities and developments on estuaries. It will also be used in ongoing site designations and management planning carried out by the country agencies (English Nature, Scottish Natural Heritage and Countryside Council for Wales).

The results so far have highlighted the common factors affecting species distributions on a range of estuaries. They have also demonstrated differences in the use made of estuaries by waterfowl at different states of tide. Golden Plover and Lapwing, for example, were often present on estuaries in larger numbers during the Low Tide Counts than during the WeBS counts carried out at high tide. This is largely due to their habit of roosting on the mudflats at low tide but flying inland to feed during the high tide period. In contrast, the numbers of Ringed Plover recorded during the Low Tide Counts were consistently lower than those recorded by the main WeBS counts due to the difficulty of detecting this small, solitary, well-camouflaged species. These differences reflect ecological characteristics of the species concerned. They should not be used to compare the value of the WeBS Low Tide Count Programme with the main WeBS counts because they fulfil very different roles. Taken together, however, the two schemes have provided new insights into the usage of estuarine systems and their hinterland by waders and wildfowl. They are therefore a valuable tool for conservation as well as applied ecological research.

During the 1992-93 winter, counts were carried out on the Camel, Clwyd, Dengie, Eden, Forth, Hamford Water, Lindisfarne, Montrose Basin, NW Solent, Portsmouth Harbour, Strangford Lough, Swale and Wigtown Bay. Thanks to the enthusiasm and hard work of all those involved, a great deal of vital count data were collected. The continuing support of counters means that the following estuaries will be participating in the programme during the 1993/94 winter: Chichester Harbour, Duddon, Inner Thames, Kingsbridge, Langstone Harbour, Poole Harbour, Strangford Lough, Taw/Torridge and Tay.

Surveys and projects

The behaviour and habits of many of the UK's waterfowl require additional surveys to monitor their populations, including surveys relating to their distribution and habitat requirements. Often, these involve different methodologies, such as dawn or dusk counts at roost sites, or searching non-wetland areas by day, usually for geese or swans. In 1992-93, there were specific surveys of Pink-footed and Icelandic Greylag Geese in October and November (Mitchell & Cranswick 1993) and of native Greylag Geese in the Uists in February 1993 (Mitchell *et al.* 1993). Full censuses of Greenland White-fronted Geese, including birds in Ireland, were undertaken in autumn 1992 and spring 1993 by the Greenland White-fronted Goose Study (Fox 1993a). Censuses of Greenland Barnacle Geese on Islay were undertaken in December and March and an aerial survey of wintering birds in Ireland was made in March. There were also regular counts of the Svalbard population on the Solway Firth (Shimmings *et al.* 1993). Dark-bellied Brent Geese was censused in January and February (Cranswick 1993b) and fortnightly counts of Light-bellied Brent Geese at Lindisfarne were made throughout the 1992-93 winter. Age-counts of arctic nesting geese were also made to assess the often dramatically varying breeding productivity of these birds (e.g. Cranswick 1993a). The results of these censuses are referred to in the relevant tables and *Species Accounts* in this report.

"Special Surveys" are conducted by WWT to monitor wildfowl during the breeding and moulting periods and are the responsibility of Simon Delany. Outstanding data for the 1991 survey of introduced geese were received giving revised totals of 63,581 Canada and 19,501 Greylag Geese (Delany 1993a). A "mop-up" survey of areas not originally covered for the 1992 survey of breeding Shelducks in Britain has resulted in almost complete coverage of suitable areas, and has produced a provisional total of 44,700 adult individuals in early summer.

Ongoing surveys by WWT staff and volunteers saw the sixth year of monitoring breeding Shelduck on the River Severn. Initial analyses show the Severn Estuary has held around 2,500 moulting birds in recent summers, concentrated in Bridgwater Bay. However, numbers at Bridgwater have declined in recent years, with slight increases recorded in other parts of the estuary. The fourth season of midweek counts of wintering wildfowl of the Cotswold Water Park in Wiltshire, Gloucestershire and Oxfordshire was undertaken in 1992-93. A recent report (Delany 1993b) ranks pits according to their importance throughout the four year period and also identifies those used during freezing conditions. These data, plus those from a survey of breeding wildfowl in 1993 (Pickering 1993), have been used as evidence to highlight the conservation importance of this area at a public enquiry as two of the most important pits are subject to development proposals.

Summer and autumn 1993 saw a national survey of moulting wildfowl. WeBS sites throughout the UK were visited at least once between mid July and the end of August to count numbers of wildfowl present in a repeat of the 1985 survey (Salmon 1988). Initial feedback suggests the survey was a big success, with the data received to date rivalling the coverage achieved for winter counts. Preliminary results from the survey are expected in mid 1994. Many thanks to all those who participated.

Continuing surveys by the RSPB saw intensive coverage of three important areas for waterfowl in the UK. The 12th season of counts on the Moray Firth, sponsored by British Petroleum, censused the large flocks of sea-duck that prove difficult to monitor accurately using the standard WeBS counts (Evans 1993). WeBS counts on the Somerset Levels and Moors, under the direction of the RSPB Exeter Office, sustained the exhaustive coverage established the previous winter. Counts of the northern half of Cardigan Bay were undertaken for the third successive season, using a combination of boat-, land-based and aerial counts (Green & Elliott 1993). Where compatible, these data have been incorporated into the WeBS databases, whilst the additional counts of sea-ducks have been cited in the relevant *Species Accounts* in this report.

Work continued on Islay, where WWT have been contracted by SNH since 1991 to investigate the ecological requirements of Greenland White-fronted Geese with reference to the social structure of the population, habitat use and feeding site selection. The study also analysed the distribution of the geese on Islay from 1988 onwards and on the movements of marked birds. Fieldwork by Clive MacKay in 1991-92 concentrated on identifying sub-populations of the geese throughout Islay and describing their distribution. Work in 1992-93 by Steve Ridgill included a more intensive study on a smaller area (within a 10 km square near Loch Gorm) to obtain more detailed information on the ecological requirements of the geese, which would be used in developing a conservation management strategy for the birds on Islay.

Wader Productivity Database

Annual fluctuations in breeding success are likely to have a profound effect on the numbers of waders which winter on British estuaries. For the third year ringers have responded to the BTO's request to record the numbers of juveniles in wader catches in order to assess and monitor the effects of productivity on winter numbers.

International Waterfowl and Wetlands Research Bureau (IWRB)

WeBS data from January counts were, as in previous years, supplied to IWRB for inclusion in the International Waterfowl Census. Through this scheme, IWRB monitors waterfowl populations throughout the Western Palaearctic and, as of 1993, south West Asia also. The

annual report (Rose & Taylor 1993) also included counts of waders for the first time. In discussing trends for North-west Europe as a whole, totals for many duck species reached record high levels, in many cases mirroring the recent increases observed in the UK. A cold period in January 1993 resulted in low totals for many wader species in some countries, especially in the Netherlands.

In order to make the best use of available resources whilst still providing accurate and rapid feedback on the fortunes of waterfowl, a sample of key wetlands have been selected for annual monitoring in each country. The "reduced sitelist" thus derived will serve as the basis for calculating annual international population indices. IWRB's UK dataset was refreshed in 1993 with up-to-date waterfowl data for all years of the IWC. Provisional results are expected shortly for the selection of the reduced sitelist for the UK.

Waterfowl Monitoring in the Republic of Ireland

While waterfowl counts are long-established in Great Britain, and have been extended to Northern Ireland for a number of years (see Table i), few regular data are available for the Republic of Ireland. Although there have been two periods of intensive monitoring of wintering birds in the early 1970s and mid 1980s (Hutchinson 1979, Sheppard, in prep.), counts in the Republic have otherwise generally been sporadic. While there have been several co-operative single species studies in the Republic as well as the UK, e.g. continuing surveys of Greenland White-fronted Geese (e.g. Fox 1993a), Barnacle Geese, Brent Geese and recently Icelandic Whooper Swans in 1991 (Kirby *et al.* 1992), the absence of regular monitoring represents an obvious gap in our understanding of the waterfowl populations using the geographical unit of Britain and Ireland. To this end, the WeBS partners, the Irish Wildbird Conservancy, the National Parks and Wildlife Service, the Department for the Environment for Northern Ireland and the World Wide Fund for Nature are currently involved in talks to make the exciting possibility of regular monitoring a reality. We are very hopeful that a monitoring scheme in the Republic of Ireland, which will be called *I-WeBS* and which will work closely with WeBS, will be in place before too long.

Data Requests

WeBS data are in constant demand by a variety of bodies for a multitude of reasons. First and foremost amongst these is conservation, with county and local conservation trusts seeking data for sites within their areas, often for management plans, while bodies such as the RSPB and WWT regularly use WeBS data as the basis for many of their conservation policies. The JNCC and conservation agencies also make frequent use of the data to underpin statutory conservation of waterfowl and wetlands in the UK, including site safeguard and wider countryside measures. January data are provided for IWRB's International Waterfowl Census (IWC), which monitors waterfowl populations on an international scale.

A large number of requests are received in relation to research proposals, often from Universities in relation to MSc or PhD studies, but also from other education establishments for various student projects. The BTO and WWT similarly conduct much research on waterfowl using the WeBS dataset. A large number of requests are also made by the commercial sector, usually via consultancies, often to investigate the importance of sites prior to development proposals, with local government offices also requesting WeBS data for similar reasons.

The demand for WeBS data continues to grow and over 200 requests, involving over 1,000 sites, were serviced by BTO and WWT over the last year. To obtain WeBS data, please contact either Peter Cranswick at WWT (wildfowl) or Ray Waters at BTO (waders) for a data request form and further details.

RESEARCH AND COMMERCIAL CONTRACTS

Research

Waterfowl research at the BTO consists of projects administered and funded through WeBS as well as work conducted on a contractual basis by the BTO Habitats Advisory Unit. Recent contracts have focused on the effect of man's changing use of the estuarine environment. Such studies range from assessing impartially the impact of a development or road scheme close to an estuary, to looking at the effects of disturbance on waterfowl using estuarine habitats. During the past year, members of the Habitats Advisory Unit team have been involved in 15 projects relating to the estuarine environment. Some of the projects have involved collecting new data to answer specific questions, whilst others involved analysing the wealth of information already collected by volunteers and held in the BTO's data banks.

For the past four years, the BTO has been monitoring the area around Cardiff Bay as part of a long-running study to assess any possible effects of the proposed Cardiff Bay barrage. This study is unique in that, if the barrage goes ahead, we will have at least five years of monitoring information prior to construction starting. Such a wealth of baseline information extending over several years is exceptionally rare when looking at the effects of large-scale development. This study will not make any difference to Cardiff Bay and its bird populations, but will mean that when it is completed we will have a much better understanding of the impact of such large developments on bird populations. Even before the barrage is built, there have been considerable developments within Cardiff Bay related to the construction of a new road crossing which have led to the loss of some traditional roost sites. In response two mitigation measures were suggested by the BTO. Firstly, the construction of an undisturbed high tide island within the Bay and secondly, a floating high tide roost site. The

island is now being used by virtually all the birds roosting in the Bay during high spring tides. Unfortunately, the raft was not as successful as it was damaged before the birds returned from their breeding grounds (Toomer & Clark 1993).

Over the last 20 years, there has been a considerable increase in man's use of estuaries often resulting in increased disturbance to waterfowl. However, we still do not know how far birds are prepared to move between roost sites in order to avoid disturbance. The Wash is an ideal site to look at the distances that individuals move as there are a large number of roosting locations around the estuary. An analysis by the BTO of the Wader Study Group's wader ringing data archive (commissioned by English Nature) revealed that Dunlin and Grey Plover are remarkably site faithful both within and between years (Rehfisch *et al.* 1993). This information is vital when it comes to deciding the distance needed between disturbance-free refuges in order to accommodate our important waterfowl populations without forcing them to fly longer distances than they do normally.

Another recent example of man's impact on the estuarine environment has been the introduction of new sophisticated methods of cockle fishing. This has led to a dramatic increase in the amount of cockling on some estuaries. The BTO were asked by Scottish Natural Heritage to investigate past BoEE counts of the Solway estuary to identify changes in waterfowl populations and to see if these were associated with the introduction of large-scale commercial cockling on the estuary (Shepherd & Clark 1993). The study did not show any large scale changes in numbers or distributions of waterfowl but there were indications that cockling had a negative effect on bird populations as a whole on those parts of the estuary where it had been concentrated. These declines appeared to be progressively more obvious after several years of cockling. Much of the bird data needed for this project had already been collected before commercial cockling started on the Solway, illustrating the importance of continually monitoring of all Britain's estuaries. Without the long-term dedication of waterfowl counters such retrospective research would not be possible.

Commercial contracts

The Wetlands Advisory Service (WAS), the consultancy wing of WWT, was established four years ago with the aim of applying the expertise of the Trust staff in wetland issues to win contracts in the commercial sector. Many of the contracts involve intensive surveys of particular areas or waterfowl species and thus use the same or a slightly modified methodology as that of WeBS. Some of the larger contracts undertaken in 1992-93 are summarised below.

1993 saw the completion of two years' work to assess the ornithological importance of the Solway Firth and the River Annan catchment on behalf of British Nuclear Fuels Ltd. These baseline data will be used to assess the possible impact of an expansion to the current nuclear power station at Chapelcross. Many local volunteers assisted with regular high and low-tide counts on the estuary, including goose roosts, whilst night-time work, boat-based surveys of sea-duck and continuous monitoring of birds using key areas throughout the tidal cycle were the responsibility of John Quinn, Liz Still, Phil Lambdon and Mike Carrier. The final report (Quinn *et al.* 1993) concluded that the Solway may be internationally important for up to 14 waterfowl species and nationally important for a further 22, and identified important sectors within the estuary for roosting turnover suggested that numbers of Ringed Plover and Sanderling, which pass through the site in large numbers in spring, were much greater than the peak count, whilst breeding surveys found significant numbers of Lapwing, Oystercatcher and Redshank. Many thanks to all who assisted with this project over the last two years.

The investigation into the importance of reservoirs for waterfowl in the northeast England region, on behalf of Northumbrian Water plc, entered its second season in 1993. Anne Westerberg, Andrew Donnison and Lys Muirhead, assisted by many of the local volunteer counters, have undertaken comprehensive surveys throughout the region, including a "blitz" of 200 standing waters, 12 major rivers and all coastal areas in January 1993. With the assistance of local anglers, work in summer 1993 has sought to determine the effect of different numbers of fishermen and Northumbrian Water personnel on waterfowl usage of sites.

The waterbodies in south-west London and adjacent areas of Berkshire and Surrey represent one of the most important inland areas for waterfowl in southeast England. However, the strong pressure for development, owing to the high population density and huge infrastructure in this area, presents many potential problems when trying to resolve the issues affecting waterfowl conservation, especially when the habitats used by waterfowl are "working" waterbodies, such as reservoirs, gravel pits or sewage farms. As a result, WAS was commissioned to conduct several projects in this area, which have been largely the responsibility of Mark Underhill, assisted by other Trust staff and many local volunteers. On behalf of Thames Water Utilities plc and English Nature, weekend and midweek counts were undertaken on all waterbodies in the study area during 1992-93 (Underhill & Robinthwaite 1993a). More birds were present during weekend counts compared with midweek ones, notably Tufted Duck, Gadwall and Great Crested Grebe. Further analyses examined bird assemblages with respect to environmental features, and found the numbers and diversity of species to be correlated with the size of the site and the length and complexity of the perimeter, with food availability thought to be the major factor influencing abundance (Underhill *et al.* 1993). Subsequently, a late summer survey was conducted on behalf of English Nature to examine the populations of waterfowl present at this time. Preliminary results revealed large numbers of several species, notably Shoveler, and showed there to be a large difference in the sex ratios of several species in the study area. Using these

data, suites of individual waterbodies were identified which supported certain proportions (from 40% to 100%) of the total numbers of birds for 13 key species. These WAS recommendations will be presented to English Nature for use in statutory site designation.

Further work in the southwest London area, including weekend and midweek counts during winter and breeding surveys, was undertaken for Ecoscope Applied Ecologists, under contract to the Department of Transport, to investigate the possible effects of widening the M25 between Junctions 12 and 25. The study area was found to support 30% of the waterfowl within the southwest London proposed Special Protection Area, with Wraysbury Gravel Pits, Thorpe Water Park and Staines Moor being particularly important areas (Hill *et al.* 1993). Nocturnal monitoring of Staines Moor, using night-vision equipment, found 15 species of waterfowl feeding at the site, including 22 European White-fronted Geese. Further analysis of data for Wraysbury Gravel Pits was undertaken for WS Atkins Environment, funded by Surrey Water Ltd, in relation to the proposed use of two pits as a source of pure water for blending with the River Thames in the event of excessive nitrate levels from agricultural run-off occurring during dry weather (Underhill & Robinthwaite 1993b). Many thanks to the counters who assisted in these surveys.

WAS was also commissioned by the National Rivers Authority (NRA) to determine the numbers and distribution of Goosanders and Cormorants wintering on the lower River Wye and the numbers and distribution of breeding Goosander on the upper Wye. A total of 164 wintering Cormorants were found widely located along the river, being absent from around 50% of the stretches surveyed, and almost 250 Goosanders, females outnumbering males by 1.8 : 1 (Underhill 1993). Most males had departed for moulting areas in Norway by the time of the summer counts. Nineteen females and 128 juveniles were identified in July. These numbers represent a 153% increase on those recorded by a similar RSPB survey in 1985.

CONSERVATION AND MANAGEMENT

Site designations

Any site recognised as being of international ornithological importance qualifies for classification as a Special Protection Area (SPA) under the EC Directive on the Conservation of Wild Birds (EC/79/409), whilst a site recognised as an internationally important wetland qualifies for designation as a Ramsar site under the Convention on Wetlands of International Importance especially as Waterfowl Habitat. Criteria for recognising internationally important concentrations of waterfowl have been drawn up by the Ramsar Convention Bureau and require a site regularly to support either 1% of the international population of a particular species or sub-species, or a total of more than 20,000 waterfowl of all species (see Appendix 1 for further details). A list of potential SPAs and Ramsar sites in the UK, including those identified for their importance for waterfowl, is maintained by JNCC (see Stroud *et al.* 1990). Until recently, slow progress on the designation of Ramsar sites and SPAs by government had drawn criticism from many bodies within the UK and also the EC Commission. However, more headway has been made in 1993, with the designation of a further 11 Ramsar Sites and classification of a further 15 SPAs since *Wildfowl and Wader Counts 1991-92*. These new designations reflect real progress in the SPA/Ramsar designation programme, and the Department of the Environment (DoE) and Scottish Office are to be congratulated on this achievement. This commitment to the international community to protect these areas serves to strengthen further the protection given to sites under national legislation. A complete list of all sites currently designated under the Directive and the Convention is given in Appendix 1.

Conservation directives and international legislation

The Directive on the Conservation of Natural Habitats and Wild Fauna and Flora (92/43/EEC), or "The Habitats and Species Directive" for short, is important for conservation in the UK and Europe as a whole. The Directive has already been signed by government and a consultation paper has recently been circulated to conservation bodies and other interested parties for comment. However, many conservation bodies feel that the government has missed an opportunity to enhance nature conservation in the UK by not introducing new legislation to accompany the Directive.

Under the Directive, Special Areas of Conservation (SACs) will be designated to afford protection to internationally important sites and, with current and future SPAs, will comprise the EC Natura 2000 network of protected sites. The Habitats and Species Directive provides the potential for significant progress to be made in the conservation of important marine areas, including those areas important for birds. Although the protection of marine areas is

required by the EC Birds Directive, it has not until now been possible to fulfil these obligations since the government has linked UK implementation of SPAs to the SSSI mechanism, which only extends to the Low Water Mark. However, if the potential of the Habitats and Species Directive is realised, then we could hope to see an effective mechanism of implementing both marine SACs and SPAs, thereby protecting important offshore areas. Marine habitats have featured prominently in news headlines in 1993, notably because of the *Braer* incident in Shetland. Also, under the 14th round of offshore oil and gas licensing by the Department of Trade and Industry (DTI) in July 1992, 21 licences were granted in environmentally sensitive areas, including areas important for sea-ducks, against the advice of JNCC, their statutory conservation advisors. However, the country agencies are working with government and oil exploration companies to minimise potential impacts in these areas. While no licences have been granted for drilling to take place in these areas, we await the possible outcome of the discovery of large reserves in these areas with justified concern given the apparent DTI approach to environmental issues.

The conservation "buzz-word" of the moment is undoubtedly biodiversity. The UK government signed the Convention on Biological Diversity at Rio in 1992, although it has yet to ratify the Convention. It calls, amongst other things, for governments to conserve biological diversity and ensure the sustainable use of habitats and species, a call which has been recognised in the Habitats and Species Directive obliging the government to "contribute towards ensuring biodiversity through the conservation of natural habitats and wild fauna and flora". A UK Action Plan for biodiversity has recently been published by the government (Anon 1994), while the non-governmental conservation organisations have also published their aspirations for the implementation of the Biodiversity Convention in the UK (Anon 1993). Biodiversity can be expected to feature even more prominently on conservation agendas in the coming year.

Population estimates

Population estimates for wintering waterfowl in Great Britain have recently been revised using WeBS data (Kirby in prep., Cayford & Waters in prep.). With the dynamic nature of many populations, these updates are not only of scientific interest, but are particularly important for conservation, providing the basis by which sites holding nationally important numbers of a species may be identified. New 1% criteria have been derived from these estimates, and are provided in the *Species Accounts* and in Appendix 1. It is planned to revise population estimates on a regular basis in the future to ensure that up-to-date criteria are used in the conservation of Britain's waterfowl. Similarly, the 1% levels for all-Ireland populations of wintering wildfowl and waders have recently been assessed (Way *et al.* 1993). These are given in Appendix 1 and in the Species Accounts as appropriate.

Some international population estimates for waterfowl were also revised in 1993 by IWRB and 1% levels were agreed at a recent meeting in Denmark. These figures have been used throughout this report. International population estimates will be reviewed on a regular basis, with a major revision scheduled for presentation to the 1996 Ramsar meeting.

Introduced species

The UK, as with many other countries, has gained part of its fauna from introductions, both deliberate and accidental, of non-native birds. Many populations have grown to become self-sustaining in the UK and the British Ornithologists' Union has recently assessed the status of Britain's birds, identifying several wildfowl populations to be partly or wholly feral in origin (Vinicombe *et al.* 1993). They point out that the consequences of these introductions have rarely been beneficial, with the threat posed by the Ruddy Duck to the already endangered White-headed Duck a topical example (Hughes & Grussu in press). Although, under both the Wildlife and Countryside Act 1981 and The Wildlife (Northern Ireland) Order 1985, it is an offence to release or allow to escape any animal not regularly occurring in Britain in the wild state, many non-native species, especially wildfowl, continue to occur in the wild (e.g. Delany 1993a). Many of these species already feature in WeBS and data are published in this report and, in accordance with recent papers and county bird reports, we would encourage all observers to record "alien" species in future.

The IWRB, JNCC and DoE jointly organised the International Ruddy Duck Workshop at the WWT's centre at Arundel, West Sussex, in March 1993. Over 50 delegates from 10 countries in Europe and North Africa attended, along with representatives from BirdLife International, the European Commission and the Bonn Convention Secretariat. The meeting agreed a common goal to stop and reverse the population and range expansion of the introduced Ruddy Duck in the Western Palaearctic, in order to safeguard populations of the globally threatened White-headed Duck. The workshop recommended a range of actions to tackle the problems posed by captive and feral Ruddy Ducks.

Cormorants

Cormorants have received much press during the past year, often accused of the depletion of fish stocks in rivers and still-water fisheries. A recent meeting of the Cormorant Research Group in Gdansk, Poland, saw the formulation of a Position Statement (Kirby 1993) outlining, amongst other things, the intention of the Cormorant Group to conduct further research into this conflict. Although a recent WWT survey found densities of Cormorant on the River Wye not to be particularly high (Underhill 1993), and despite there being no proven evidence of Goosanders having a detrimental effect on fish stocks, licences were recently issued by the Ministry of

Agriculture, Fisheries and Food (MAFF), permitting the control of Cormorants and Goosanders on the English section of the River Wye. Although this is the first time licences have been issued for a river in England, licensed killing of sawbills and Cormorants has been occurring on Scottish rivers for many years. Given the lack of scientific evidence against these birds, particularly regarding riparian fisheries, the question has to be asked as to what criteria MAFF and the Scottish Office, Agriculture and Fisheries Department, have applied in deciding that they are causing "serious damage" to fisheries on rivers.

WINTER WEATHER IN 1992-93

The winter of 1992-93 was generally mild with no prolonged periods of sub-zero temperatures. Autumn began cool and unsettled, followed by a series of mild spells with heavy rainfall and occasional cold snaps prior to Christmas. The New Year saw the onset of a stormy period, which in turn gave way to exceptionally dry and mild weather for the remainder of the winter months.

September began as a continuation of the summer's unsettled weather. Temperatures until the 26th were notably cool, with westerly winds bringing showers and periods of heavy rain to all parts of the country. A freak storm on 17-18th rained down 7 cm hailstones on the Foulness area of the Thames Estuary. Over 3,200 dead birds were recovered including over 900 waders and 1,000 gulls. A change to southerly winds for the latter part of the month allowed temperatures to rise once again to normal and above.

In one of the coldest **Octobers** since the war, prolonged periods of unsettled weather dominated. All parts of the country suffered temperatures well below the seasonal norm, with strong northerly winds dominating in the first half of the month and temperatures falling as low as -7°C in Norfolk and the Grampians. The east of the country received above average levels of rainfall, which in turn produced the earliest heavy snow falls in the Cairngorms for 10 years.

In contrast, southerly and south-westerly winds and high rainfall combined to make **November** one of the mildest this century. Continued spells of persistent rain affected many areas, with 28 rivers being placed on full flood alert by the end of the month. Strong winds and gales affected many parts of the country during the middle of the month, particularly northern Britain. Average monthly temperatures were higher than those for October for the first time in over 50 years.

December began unsettled, with strong southerly and south-westerly winds and widespread heavy rain or showers. Northern and western parts of the country were wetter than average, with remaining areas receiving less than average rainfall. From the 17th, a high pressure area provided settled conditions over most places for the remainder of the month. Temperatures stayed below zero for many days in some places, with thick fog patches persisting throughout the day around York and the north Midlands on the 21st.

1993 produced the fifth warmest **January** this century, with almost all parts of the country recording average temperatures 2-3°C above average. The mild temperatures were accompanied by strong winds and gales, producing one of the stormiest months ever in Scotland and forcing the *Braer* oil-tanker aground in the Shetlands. Much of the UK had higher than average rainfall, up to three times the norm in some places, with flooding occurring on the 10th in western and southern England and parts of Wales.

February saw the storms subside and progress into settled, benign weather, even in the north. Everywhere was mild, particularly in northern England and Scotland, temperatures averaging 2-3°C above normal. A wintry spell in the last few days saw many roads blocked by drifting snow in northeast Scotland.

The cold spell at the end of February was short-lived and **March** saw a period of mild, dry and settled weather become established over the country. Temperatures were again above average throughout the country, and only heavy rain on the last day of the month prevented March 1993 being one of the driest months on record.

INTERPRETATION OF WATERFOWL COUNTS

Caution is necessary regarding the interpretation of waterfowl counts and their application, and the limitations of these data, especially in the summary form which, of necessity, is used in this report. The 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 headquarters.

Explanation of the basis for the qualifying levels used for defining both the international and national importance of sites is provided in Appendix 1. In the *Species Accounts and Principal Sites* sections, it is necessary to bear in mind the distinction between sites that **regularly** hold wintering populations of national/international importance and those which may happen to exceed the appropriate qualifying levels only in occasional winters. This follows the recommendations of the Ramsar Convention, which states that key sites identified on the basis of numbers of birds should support such numbers on a regular basis (calculated as the mean winter maxima from the last five seasons in this report). Nevertheless, sites which irregularly support nationally/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 (both in the *Species*

Accounts and Table 55) 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 numbers, may nevertheless be of critical importance to certain species or populations at particular times.

Peak counts based on a number of monthly 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 during 1992-93. 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 normal once-monthly WeBS visits are necessary to assess more accurately the rapid turnover of waterfowl populations that occurs during times of migration or cold weather movements.

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 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 specific requirements. This should always be borne in mind when using data presented here.

DATA PRESENTATION

The format of data presentation follows closely that of the last report. The period covered comprehensively by this report comprises the entire winter (September to March for wildfowl, November to March for waders). Counts of wildfowl made outwith the September to March period have been used in cases where they represent the maxima for the count season (June to May), whilst additional information for waders relating to the spring (April to June) and autumn (July to October) is provided for species with notable passage populations. In *Species Accounts* for waders, non-estuarine coastal sites are identified by an asterisk (*). Wader data for inland sites is provided for the second season (see *Coverage*) and these are identified by a hash (#).

Data derived from sources other than the routine monthly counts are clearly identified throughout, either by means of specific references or by use of a cross (+) to identify counts derived from WWT's goose censuses. The flagging of goose counts in this way is important as such surveys rely on different methodology (e.g. dawn/evening flight counts, field searching) from that adopted in the mid-monthly visits to wetlands. Furthermore, the dates of goose surveys have frequently differed from those used for the standard monthly counts.

In Tables 1 & 2, total counts for all species have been presented except for hybrid and domestic wildfowl. This enables an assessment of the true scale of WeBS monitoring with regard to particular species. In order to save space, the following abbreviations for wetland types have been used for site names in all tables:

Br.	Broad(s)	GP(s)	Gravel pit(s)	R.	River
Est.	Estuary	Hbr	Harbour	Rsr	Reservoir(s)
Fth	Firth(s)	Lo.	Loch(s) or Lough(s)	WP	Water Park

The location of all sites, including all estuaries, mentioned in this report are given in Appendix 2.

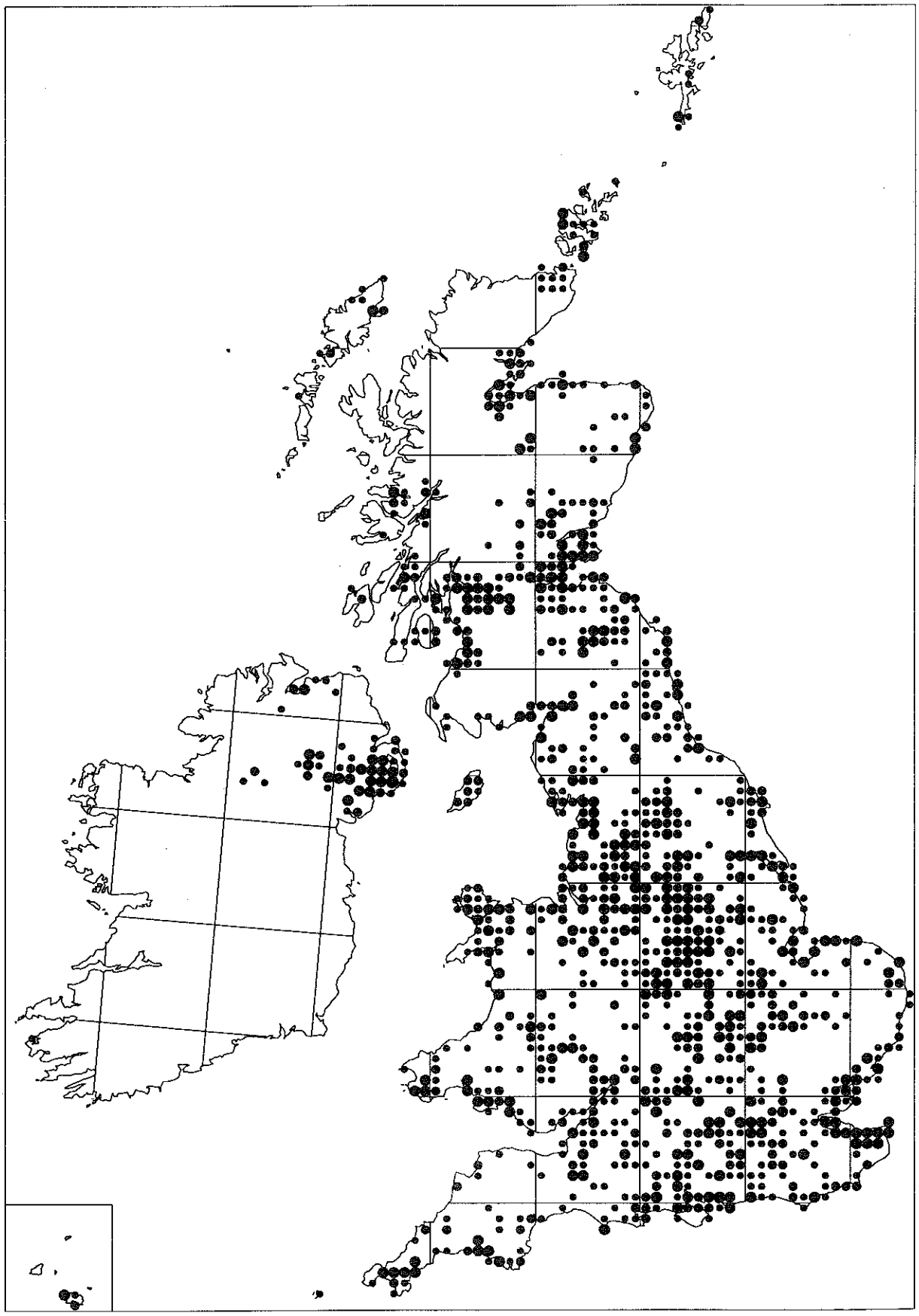
COVERAGE IN 1992-93

The priority dates scheduled for monthly winter counts at inland sites in 1992-93 were 13 September, 18 October, 15 November, 13 December, 17 January, 14 February and 14 March, whilst those at coastal sites, timed to coincide with the best tidal conditions for censusing estuarine birds, were 19 July, 16 August, 13 September, 11 October, 15 November, 13 December, 10 January, 7 February, 7 March, 11 April, 9 May and 20 June. From 1993-94, the recommended priority dates will be the same for all sites. As in earlier years, special effort in January was directed at covering as many extra sites as possible to coincide with the International Waterfowl Census organised by IWRB throughout Europe.

Count data from a total of 2,375 WeBS count units (either the site or its subdivisions, termed sectors, used by individual observers when a team is required to count a large site) in the UK were stored individually on computer files 1992-93. This is considerably more than last season, but still fewer than the record total of 1990-91. However, the numbers of units counted in each month were generally higher than in either of the last two seasons in Great Britain, but slightly lower in Northern Ireland. Although more intensive coverage was achieved in some areas, much of the increase is attributable to the computerisation of data from large or complex sites (e.g. estuaries and gravel pits) at the level of their constituent count units.

A total of 1,530 count units were covered in England. Notable county returns included Lancashire (90 sites), Derbyshire (71), Hampshire (70) and Kent (60), the top three counties remaining in the same positions as in 1991-92, while excellent coverage in north Kent elevated the county's position in these rankings. Cumbria, Lincolnshire, Surrey, Humberside and North Yorkshire all returned 50 or more units. The 485 Scottish units counted included large returns

Figure 1. COVERAGE BY 10 KM GRID SQUARES FOR THE WETLAND BIRD SURVEY IN 1992-93.
Small dots represent one WeBS count unit per 10 km square, medium dots represent two units and large dots represent three or more units.



from Strathclyde (118), Highland (69) and Borders (62). The 194 units covered in Wales represented a welcome increase on 1991-92, with returns from Gwynedd (63) and Dyfed (40) the most significant. Only 127 units were counted in Northern Ireland, with County Down (89) contributing the majority of returns. The Isle of Man (11) and the Channel Islands (10) both returned one less unit than in 1991-92.

All of the 129 UK estuaries identified by WeBS (including the 12 sites reclassified as estuaries in last year's report) were counted in 1992-93 with the exception of the Dart, the Looe and the Tyne. Although the total number of waterfowl on all three estuaries combined is less than 1,000, it is important to achieve as complete coverage as possible on all estuaries. Allowing for these three sites, a total of 126 estuarine and over 40 open coast sites were counted in 1992-93. At all of these sites, complete counts were made at least once in the 1992-93 winter except at Carmarthen Bay and Swansea Bay.

In 1992-93, for only the second winter, waders were recorded at around 1,400 inland WeBS sites. This represents a large proportion of all inland sites. However, under WeBS, we are asking observers to record waders at all inland sites to improve our monitoring and understanding of the UK's wader populations.

Several supplementary surveys of geese plus counts of sea-ducks at various sites using non-WeBS methodology were also conducted at WeBS and other sites in 1992-93 (see *Progress and Developments*).

All 10 km squares containing WeBS sites visited in 1992-93 are signified by a dot in Figure 1. The location of a count unit is shown using only its central grid reference. Thus, for example, 11 dots are used in Figure 1 to display the Humber Estuary WeBS site since counts from all sectors are stored individually on computer. Loughs Neagh and Beg are represented by just one dot, even though the site stretches over several 10 km squares, as only the total figures for the whole site are stored on computer.

A total of 1,067 10 km squares contained WeBS count units that were visited in 1992-93, 18 more than in the previous season. Of these, 513 (48%) contained one count unit, 265 (24%) contained two count units and the remaining 300 (28%) held three or more count units. Seven 10 km squares contained 10 or more units visited during 1992-93, with those around southwest London featuring highly as a result of the intense coverage and computerisation of data at the level of individual waterbodies.

The map highlights some gaps in coverage, notably where there is an absence of either human population or wetland habitat. Notable, however, is the lack of data for inland sites in Dumfries & Galloway, which unfortunately were lost in transit. Efforts to obtain another copy were hampered by the Local Organiser moving to Norway. We hope to be able to update the data by the next report.

TOTAL NUMBERS

Tables 1 and 2 show the total numbers of waterfowl recorded by the WeBS scheme in winter 1992-93 in Britain (including the Isle of Man but excluding the Channel Isles) and Northern Ireland respectively. Figures in these tables are derived from the WeBS monthly counts and goose censuses only. Higher totals for certain species (e.g. some sea-ducks) can be calculated by including counts from special surveys made by other organisations and these are highlighted in the *Species Accounts*. The totals for England, Scotland, Wales, the Isle of Man and the Channel Islands are given separately for each area in Appendices 3 to 7.

Numbers of waders are provided separately for estuarine/coastal and inland sites within the tables. This allows comparison of coastal figures with previous reports and also provides some indication of the proportion of each species that utilises inland wetlands. Although waders were counted at many inland sites in 1992-93, coverage is not comparable with that for wildfowl and for this reason also, 1992-93 data for waders at coastal and inland sites are presented separately.

Wildfowl and associated species

Numbers of divers in Britain were similar to those recorded in 1991-92, although they increased in Northern Ireland. Numbers of Great Crested and several of the rarer species of grebe were present in large numbers throughout the UK, although Little Grebe numbers remained rather low. Cormorant numbers were noticeably higher in Northern Ireland and slightly less so in Britain. Generally, fewer Grey Heron were recorded in 1992-93 than in the previous winter. Mute Swan numbers were about average, though migrant swan numbers were well down on 1991-92 levels. Peak counts of migratory geese, as with the swans, were generally low following poor breeding success in 1992, while Canada Goose numbers were also reduced after the high counts in 1991-92. Species of feral or introduced wildfowl, such as Snow Geese and Red-crested Pochard, were recorded in larger numbers, no doubt partly as a result of increased observer interest.

Shelduck, along with several species of dabbling ducks, were recorded in smaller numbers in 1992-93, with particularly large declines of Pintail and Shoveler. Wigeon numbers remained very high, although lower than last season's record totals. Mallard numbers were almost identical to 1991-92 and Gadwall numbers rose slightly. Pochard and Tufted Duck numbers were considerably lower than normal in Northern Ireland, although around average for Britain. Sea-duck numbers were much reduced for several species, although they are notoriously difficult to monitor even under favourable viewing conditions. Red-breasted Merganser numbers were higher throughout the UK, although Goosander numbers recorded in Britain declined. Numbers of Coot recorded in 1992-93 were higher than last season, although around average for recent years, whilst fewer records of Moorhen and Water Rails were received.

Waders

The totals presented in Tables 1 and 2 combined should approximate the total UK population size for those species which are heavily concentrated on estuaries (i.e. Grey Plover, Knot, Dunlin, Black-tailed Godwit and Bar-tailed Godwit) since these are comprehensively covered by WeBS. However, recorded UK count totals for Purple Sandpiper, Turnstone, Sanderling and Ringed Plover will be well below the national population level since WeBS covers only part of the non- estuarine or open coast shores. Open coast waders have been comprehensively counted only in 1984-85 for the Winter Shorebird Count, so a repeat survey is long overdue. Recorded WeBS national totals for Lapwing, Golden Plover, Snipe, Jack Snipe, Ruff and Green Sandpiper have increased greatly as a result of counts at inland sites. However, the absence of data for some sites, means that these totals still represent very conservative estimates on the total national population of these birds. Numbers of the highly cryptic and skulking Jack Snipe and Snipe counted at each site are likely to be far smaller than the populations of those species actually present but for other species the figures should provide reliable estimates of the numbers present on the sites counted. Other wader populations not included in WeBS are the sizeable flocks of Lapwing and Golden Plover that are present on agricultural land well away from any wetland.

Estuaries and coastal wetlands

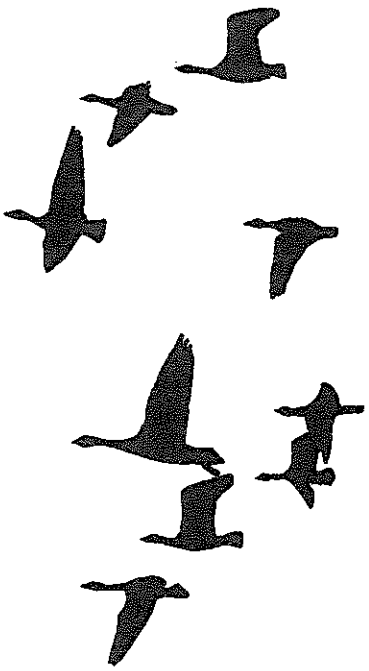
Tables 1 and 2 show the total numbers of each wader species counted in each winter month of 1992-93 in both Great Britain and Northern Ireland. The numbers of sites (including both estuaries and non-estuarine sites) covered in each month are also given. In the 1992-93 winter, British totals for five wader species reached the highest levels ever reached since the BoEE began in 1969. Three of these record winter counts were made in December 1992, thus pushing the UK all wader total to a new high of over 1,835,000 birds. The main contributory factor was the British count of over 370,000 Lapwing but also responsible were the record counts of Golden Plover and Knot. In Northern Ireland the December counts were typical of recent winters except that particularly low counts of Golden Plover and Ringed Plover were made. The low Northern Irish Golden Plover total was more than quadrupled in the February count, suggesting that birds may have moved in from Britain, where numbers dropped by around 30,000 birds between December and February. The British Lapwing total fell by over 50% between December and January whereas numbers recorded in Northern Ireland rose only slightly. The other species producing record-breaking counts in other winter months were Avocet and Black-tailed Godwit. Both species are concentrated in S Britain and have been wintering in the UK in increasing numbers over the past decade or so. The UK total of Avocet exceeded 2,100 for the first time and over 10,000 Black-tailed Godwit were recorded in a winter month for the first time. This was also true for Northern

Ireland where the January count of 440 Black-tailed Godwit was also a winter record.

In contrast, numbers of Sanderling, Snipe and, in particular, Turnstone recorded in the UK were below the averages of recent winters. Sanderling and Turnstone winter predominantly on open coasts in the UK and many are therefore missed by WeBS counts. Of more concern are the low numbers of Dunlin recorded in both Britain and Northern Ireland.

Inland wetlands

In 1992-93, for the second winter, waders were recorded at inland wetlands. Totals recorded in Great Britain and Northern Ireland are given in Tables 1 & 2, together with the number of sites covered. As at tidal wetlands Lapwing and Golden Plover numbers were high, especially in December. Also in accordance with counts at coastal sites, Dunlin numbers were lower than in 1991-92. In contrast to the coast, however, inland totals of Curlew were well up with the exception of March. For Oystercatchers and Redshank the rise in numbers recorded due to birds moving into their inland breeding sites in late winter was again noted, but no clear peak was recorded for Curlew in March 1993. In Northern Ireland numbers of Lapwing and Golden Plover were surprisingly lower than in the previous winter, although Curlew totals were more than double those of 1991-92. It is relevant, however, that in 1992-93 waders were monitored at around 30% fewer inland sites in Northern Ireland than in the previous winter.



Key to Table 1

\+ *Counts include data from the following goose censuses: national census of Pink-footed and Greylag Geese in October and November; December and March censuses of Barnacle Geese on Islay; December census of Barnacle Geese on the Solway; December census of Dark-bellied Brent Geese; November census of Light-bellied Brent Geese on Lindisfarne; international censuses of Greenland White-fronted Geese in November/December and March/April. See Progress and Developments and Species Accounts for more details.*

* *In all months except September, the feral component of this species is approximated by totalling counts from English (excluding Northumberland) and Welsh sites only and adding 2,340 (after Delany 1992) for the feral birds in Scotland. All other birds in Great Britain (apart from the native population in the Outer Hebrides, Coll, Tiree, Colonsay and parts of Sutherland) are considered to be from the Icelandic population.*

** *Total wildfowl represents numbers of all divers, grebes, Cormorant, swans, geese, ducks and rails.*

*** *Total waterfowl represents numbers of all wildfowl (as above), waders and Grey Heron.*

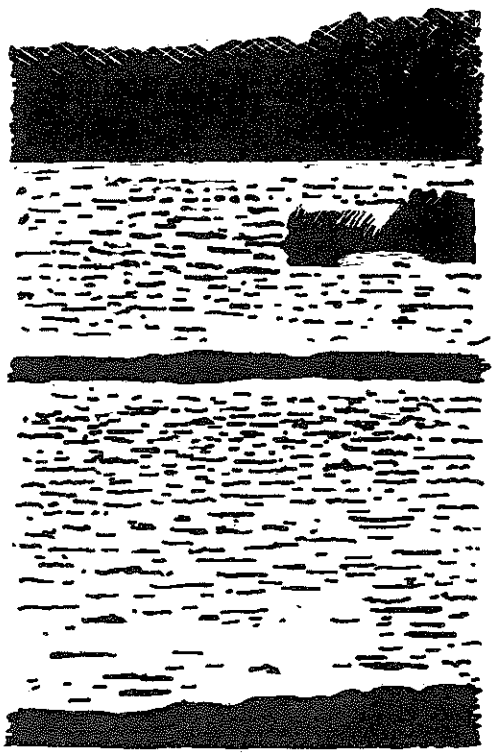


Table 1. TOTAL NUMBERS OF WATERFOWL RECORDED BY WeBS IN GREAT BRITAIN DURING WINTER 1992-93.

Wildfowl at all sites	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Number of sites counted	1,756	1,922	1,911	1,946	2,026	1,993	1,934
Red-throated Diver	107	186	198	642	260	302	423
Black-throated Diver	4	3	23	19	6	14	29
Great Northern Diver	5	9	20	24	24	39	26
Little Grebe	2,600	2,534	2,230	1,877	1,631	1,968	2,072
Great Crested Grebe	9,232	9,580	8,407	7,447	5,425	8,269	8,720
Red-necked Grebe	21	15	18	11	20	34	23
Slavonian Grebe	17	57	79	103	86	163	143
Black-necked Grebe	20	11	7	38	37	36	39
Cormorant	12,175	13,931	11,662	12,198	12,003	11,595	10,776
Grey Heron	2,981	2,939	2,411	2,340	1,984	2,297	2,337
Mute Swan	13,249	13,844	13,688	13,313	13,467	12,561	11,738
Bewick's Swan	0	54	2,668	1,071	6,774	7,016	572
Whooper Swan	7	1,252	3,225	2,698	2,084	2,581	1,793
Bean Goose	0	2	0	2	352	8	39
Pink-footed Goose	12,863	+197,861	+167,512	107,712	71,057	87,830	65,255
European White-fronted Goose	28	106	640	1,529	1,819	1,741	3,088
Greenland White-fronted Goose	0	940	+13,968	391	205	527	+15,221
Lesser White-fronted Goose	1	0	1	0	0	2	1
Greylag Goose: Icelandic*	0	+93,163	+98,144	45,191	28,262	20,380	15,079
Greylag Goose: feral*	15,142	14,773	12,694	13,458	15,084	11,322	10,902
Snow Goose	13	70	67	37	61	76	40
Canada Goose	36,285	35,437	34,545	39,104	34,989	27,788	22,223
Barnacle Goose	190	5,392	10,599	+39,425	5,670	15,580	+29,246
Dark-bellied Brent Goose	2,692	60,134	93,805	97,033	+95,272	95,131	86,819
Light-bellied Brent Goose	466	1,320	+1,790	1,196	1,823	213	25
Red-breasted Goose	1	1	0	0	0	1	0
Egyptian Goose	153	108	77	63	44	51	65
Shelduck	28,241	49,810	56,379	71,914	71,078	67,615	63,582
Mandarin	102	159	141	170	142	119	107
Wigeon	25,120	188,119	188,401	285,868	299,666	170,952	152,342
American Wigeon	0	1	3	1	2	1	2
Gadwall	5,663	7,534	7,762	7,903	7,488	6,968	3,943
Teal	56,452	80,401	92,995	110,048	99,251	78,326	37,763
Mallard	142,260	149,836	158,862	170,954	149,752	105,454	66,068
Pintail	5,248	20,449	15,532	20,993	19,572	13,208	5,481
Garganey	25	2	0	1	3	2	12
Shoveler	7,536	7,785	7,530	7,873	6,186	6,837	5,783
Red-crested Pochard	53	78	134	85	127	74	102
Pochard	14,433	25,155	33,522	33,901	36,490	31,318	12,197
Ferruginous Duck	0	0	2	1	1	1	0
Ring-necked Duck	0	1	4	4	5	0	2
Tufted Duck	37,526	41,103	46,764	52,639	50,105	43,835	35,952
Scaup	289	1,319	1,995	2,291	3,460	3,734	2,384
Eider	27,567	21,416	21,790	14,564	16,809	21,015	25,314
King Eider	0	1	0	0	0	0	0
Long-tailed Duck	5	416	682	969	1,198	1,197	1,028
Common Scoter	1,539	2,178	1,310	1,855	2,275	2,293	1,663
Surf Scoter	0	0	3	1	6	2	2
Velvet Scoter	30	115	205	262	190	265	294
Goldeneye	250	3,049	9,163	12,230	14,844	16,388	13,174
Smew	0	0	14	49	92	108	33
Red-breasted Merganser	2,191	3,343	3,326	3,137	2,778	4,033	3,417
Goosander	906	1,514	1,970	2,410	2,911	2,480	2,171
Ruddy Duck	1,591	2,065	1,912	2,253	2,006	1,997	2,041
Water Rail	73	150	64	142	107	126	146
Moorhen	6,414	7,738	7,412	6,421	7,342	7,216	7,689
Coot	79,460	89,158	95,319	88,416	83,668	56,005	42,121
TOTAL WILDFOWL**	**547,213**	**1,153,747**	**1,222,379**	**1,282,453**	**1,174,051**	**946,848**	**769,235**

notes to Table 1 are provided on page 17.

Waders at estuarine/coastal sites			**Nov**	**Dec**	**Jan**	**Feb**	**Mar**
Number of sites counted			146	152	145	153	139
Oystercatcher			291,225	265,463	284,981	205,797	154,847
Avocet			1,776	1,950	1,851	2,137	1,392
Little Ringed Plover			0	0	1	0	0
Ringed Plover			10,495	9,919	8,334	9,464	6,263
Kentish Plover			0	1	1	1	0
Golden Plover			65,072	106,492	55,689	78,203	49,512
Grey Plover			36,967	38,320	38,465	35,513	8,249
Lapwing			186,892	370,455	143,326	216,794	77,463
Knot			289,768	308,468	303,826	164,353	163,398
Sanderling			4,364	6,173	5,008	3,791	4,689
Little Stint			4	3	1	0	0
Curlew Sandpiper			1	0	0	0	0
Purple Sandpiper			1,425	1,421	1,571	1,623	1,698
Dunlin			352,458	448,198	411,368	362,418	307,727
Ruff			117	135	52	149	161
Jack Snipe			48	26	22	32	19
Snipe			2,843	2,049	1,241	1,411	1,289
Woodcock			5	0	2	0	1
Black-tailed Godwit			9,937	8,941	6,394	6,086	8,102
Bar-tailed Godwit			40,764	37,287	40,239	34,083	35,682
Whimbrel			0	4	20	2	8
Curlew			61,495	82,401	62,072	71,194	59,916
Spotted Redshank			69	64	49	53	63
Redshank			70,682	73,000	66,991	62,373	60,680
Greenshank			165	219	136	179	121
Green Sandpiper			38	32	24	46	34
Common Sandpiper			20	14	20	18	12
Turnstone			15,671	14,349	15,895	13,472	13,646
Grey Phalarope			0	0	1	0	0
TOTAL			**1,442,301**	**1,775,384**	**1,447,580**	**1,269,192**	**1,046,807**
Waders at inland sites							
Number of sites counted			1,371	1,366	1,451	1,412	1,410
Oystercatcher			244	436	704	4,828	6,487
Little Ringed Plover			0	0	0	0	4
Ringed Plover			17	11	5	65	175
Golden Plover			16,177	37,684	22,586	20,562	14,641
Grey Plover			3	0	0	2	0
Lapwing			66,288	148,900	127,893	96,965	19,903
Knot			3	0	0	1	0
Sanderling			1	0	0	1	0
Dunlin			508	287	620	1,250	676
Ruff			47	109	225	168	259
Jack Snipe			37	36	36	45	46
Snipe			3,886	3,157	2,063	3,417	2,746
Black-tailed Godwit			3	3	121	4	78
Bar-tailed Godwit			14	1	0	29	0
Curlew			3,526	3,145	3,471	5,915	4,009
Spotted Redshank			1	1	1	1	2
Redshank			507	606	624	813	1,313
Greenshank			4	1	2	3	9
Green Sandpiper			32	39	37	47	64
Common Sandpiper			12	7	5	7	7
Turnstone			27	7	39	8	0
TOTAL			**91,337**	**194,430**	**158,432**	**134,131**	**50,419**
TOTAL WADERS			**1,533,638**	**1,969,814**	**1,606,012**	**1,403,323**	**1,097,226**
TOTAL WATERFOWL* **			**2,758,428**	**3,254,607**	**2,782,047**	**2,352,468**	**1,868,798**
Kingfisher (all sites)	271	259	206	169	126	151	195

Table 2. TOTAL NUMBERS OF WATERFOWL RECORDED BY WeBS IN NORTHERN IRELAND DURING WINTER 1992-93.

Wildfowl at all sites	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Number of sites counted	110	106	107	99	114	96	100
Red-throated Diver	4	23	40	33	22	14	14
Great Northern Diver	0	0	29	40	18	17	1
Little Grebe	675	789	626	486	571	315	270
Great Crested Grebe	1,750	2,308	708	820	2,081	1,725	1,496
Slavonian Grebe	0	0	51	0	0	4	0
Cormorant	1,849	1,182	1,108	1,243	1,375	1,124	999
Grey Heron	378	347	275	115	147	119	55
Mute Swan	2,290	1,851	2,385	1,747	1,996	1,623	1,241
Bewick's Swan	0	0	46	119	141	222	86
Whooper Swan	4	1,602	2,389	1,114	1,831	1,822	1,133
Pink-footed Goose	4	5	6	0	0	0	0
Greenland White-fronted Goose	0	61	145	0	126	99	122
Greylag Goose*	146	148	383	497	567	772	393
Canada Goose	123	13	346	60	304	468	138
Barnacle Goose	77	76	77	76	75	66	78
Dark-bellied Brent Goose	2	0	0	0	0	0	0
Light-bellied Brent Goose	4,771	10,132	6,236	7,037	6,737	3,618	1,973
Shelduck	135	248	1,183	1,361	2,780	2,368	2,356
Wigeon	3,541	7,194	10,962	4,852	6,475	6,144	4,098
Gadwall	176	289	192	260	314	144	215
Teal	799	2,947	3,272	3,334	3,252	4,437	1,955
Mallard	9,232	8,170	7,473	8,014	6,063	3,737	2,268
Pintail	3	146	212	232	136	140	76
Shoveler	51	112	153	152	114	137	111
Pochard	2,035	10,364	15,332	11,273	23,928	17,062	3,659
Ring-necked Duck	0	0	0	0	0	1	0
Tufted Duck	4,557	14,942	16,502	18,491	19,006	16,643	10,520
Scaup	9	850	982	2,266	2,083	3,567	3,955
Eider	658	663	523	606	568	468	80
Long-tailed Duck	0	3	8	35	16	15	0
Common Scoter	0	117	0	499	0	2	0
Goldeneye	71	2,897	8,458	5,411	14,729	12,601	7,728
Smew	0	0	1	0	0	1	0
Red-breasted Merganser	471	787	825	374	393	468	314
Goosander	0	0	0	0	1	0	0
Ruddy Duck	39	38	0	0	18	0	29
Water Rail	1	5	3	4	2	7	2
Moorhen	373	438	413	241	412	346	282
Coot	7,041	7,935	6,549	10,403	5,111	3,390	1,772
TOTAL WILDFOWL**	**40,509**	**75,869**	**87,082**	**80,762**	**100,791**	**83,178**	**47,065**

Waders at estuarine/coastal sites	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**
Number of sites counted	7	8	9	8	7
Oystercatcher	10,942	14,034	14,830	14,992	8,224
Ringed Plover	522	392	851	146	39
Golden Plover	9,006	3,574	10,005	15,034	9,452
Grey Plover	22	75	133	132	37
Lapwing	12,815	16,802	22,395	17,162	10,321
Knot	1,871	292	875	4,487	3,432
Sanderling	2	0	85	0	42
Purple Sandpiper	12	46	87	45	10
Dunlin	5,353	9,263	11,935	9,955	3,107
Ruff	3	0	1	0	0
Jack Snipe	0	0	1	0	0
Snipe	65	35	37	80	22
Black-tailed Godwit	242	152	440	309	314
Bar-tailed Godwit	327	1,423	2,885	1,618	1,122
Curlew	5,030	7,073	5,229	6,440	3,218
Whimbrel	0	0	0	0	3
Spotted Redshank	2	1	0	2	0
Redshank	5,837	6,188	6,143	6,352	3,993
Greenshank	67	65	76	63	33
Turnstone	866	972	2,223	1,014	785
TOTAL	**52,984**	**60,387**	**78,231**	**77,831**	**44,154**
Waders at inland sites					
Number of sites counted	96	86	95	84	89
Golden Plover	3,369	2,677	3,898	4,735	2,545
Lapwing	6,076	7,281	6,709	5,257	218
Common Snipe	19	14	25	9	11
Curlew	418	671	887	853	280
Redshank	9	0	6	6	96
TOTAL	**9,891**	**10,643**	**11,525**	**10,860**	**3,150**
TOTAL WADERS	**62,875**	**71,030**	**89,756**	**86,691**	**47,304**
TOTAL WATERFOWL* **	**150,768**	**152,225**	**191,148**	**172,258**	**94,743**
Kingfisher (all sites) 1 0	1	0	0	0	0

* *It is not possible to separate the feral from the wild component of this population in Northern Ireland.*
** *Total wildfowl represents numbers of all divers, grebes, Cormorant, swans, geese, ducks and rails.*
*** *Total waterfowl represents numbers of all wildfowl (as above), waders and Grey Heron.*

MONTHLY FLUCTUATIONS

The vast majority of the wintering population of most wader species is found on estuaries. Coverage of estuaries by WeBS remained at a relatively high and constant level throughout the winter, enabling, for many species, meaningful comparisons of total monthly counts to be made. However, the total numbers of WeBS sites of all habitats counted differ in each month, e.g. a much larger number of inland sites was counted in January to coincide with the International Waterfowl Census. Since wildfowl are more widely distributed across both inland and coastal habitats than waders, changes in monthly count totals given in Tables 1 & 2 may not necessarily reflect true changes in relative abundance during the season. Also, the presentation of data for seven months, which includes the migratory periods for some species, means that there are real fluctuations in total numbers of wildfowl during the period considered in this report.

These fluctuations may be examined by using only counts from sites covered in all seven months (September to March). Once totals from these sites only have been calculated, the number present in each month can be compared directly (expressed as a percentage of the maximum numbers), thus revealing patterns of seasonality for the species considered. This is shown in Tables 3 & 4, for Britain and Northern Ireland separately, giving 1992-93 figures and averages from the last five seasons. Non-migratory, scarce and irregularly counted species are omitted. Caution should be used in interpreting figures for species which only occur in small numbers (see Tables 1 & 2). Thus, numbers tend to fluctuate more widely for many species in Northern Ireland as a result of the smaller numbers of birds involved.

Peak numbers of many of the species considered occurred in December in Britain in 1992-93, with rather fewer peaks than normal in January. Peak abundance for species in Northern Ireland was much more scattered. A smaller proportion than normal of the total of Little Grebes was present during mid-winter in Britain, especially surprising considering the low peak of counted birds. Mid-winter numbers of Great Crested Grebe in Great Britain were similarly low, although the proportion of the peak in Northern Ireland was both markedly lower and higher than expected in different months. There was a noticeable trough in Bewick's Swan numbers in December while Whooper Swan figures were consistently lower than expected in Britain. With the exception of Whooper numbers in October, figures for both species in Northern Ireland were also low throughout the winter. The influx of geese from Holland in March resulted in peak abundance of European White-fronted Geese in that month, more normally recorded in January or February. Numbers of Dark-bellied Brents remained remarkably constant from November to March, presumably since the smaller population resulting from poor breeding success meant that birds wintering on the continent could be accommodated throughout the winter. Gadwall numbers also remained constant and at high levels throughout the winter in Britain, particularly noteworthy in view of the high peak of counted birds. The large fluctuations in numbers for Northern Ireland lacked obvious patterns, although the large deviation from the norm of figures for Pochard coincided with the low national total. Numbers of Goosander in Britain were consistently higher than normal throughout 1992-93.

Table 3. PROPORTIONS IN EACH MONTH OF THE PEAK WINTER POPULATION OF CERTAIN WILDFOWL PRESENT ON 1,403 BRITISH SITES THAT WERE COUNTED IN ALL SEVEN MONTHS OF 1992-93
Bracketed figures give averages for the 1988-89 to 1992-93 period.

	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Little Grebe	100 (100)	88 (89)	74 (82)	62 (74)	52 (70)	65 (63)	72 (63)
Great Crested Grebe	100 (100)	95 (94)	84 (89)	76 (77)	56 (74)	78 (74)	88 (82)
Cormorant	92 (94)	100 (100)	78 (92)	88 (90)	85 (89)	77 (87)	78 (81)
Bewick's Swan	0 (0)	1 (1)	40 (42)	13 (69)	95 (95)	100 (94)	7 (26)
Whooper Swan	<1 (1)	32 (27)	100 (93)	82 (92)	64 (88)	76 (82)	52 (70)
European White-fronted Goose	1 (<1)	3 (2)	21 (12)	51 (52)	61 (85)	58 (88)	100 (43)
Dark-bellied Brent Goose	3 (1)	64 (53)	97 (82)	99 (92)	100 (97)	97 (95)	93 (53)
Shelduck	29 (23)	62 (60)	78 (77)	100 (86)	97 (98)	98 (97)	89 (80)
Wigeon	10 (19)	52 (62)	70 (85)	89 (95)	100 (98)	69 (78)	52 (43)
Gadwall	82 (80)	98 (90)	98 (94)	100 (99)	96 (91)	90 (74)	54 (50)
Teal	50 (51)	73 (68)	85 (81)	100 (98)	89 (88)	74 (76)	35 (32)
Mallard	86 (90)	86 (90)	93 (93)	100 (97)	83 (94)	59 (64)	39 (36)
Pintail	30 (37)	86 (92)	56 (70)	100 (99)	98 (84)	81 (68)	32 (17)
Shoveler	97 (93)	98 (96)	97 (78)	100 (75)	77 (67)	86 (65)	75 (57)
Pochard	39 (34)	71 (64)	92 (86)	93 (88)	100 (100)	86 (86)	34 (31)
Tufted Duck	76 (80)	77 (79)	87 (93)	100 (98)	90 (98)	81 (86)	68 (74)
Goldeneye	2 (2)	22 (15)	60 (57)	77 (82)	97 (94)	100 (99)	90 (90)
Goosander	37 (26)	62 (33)	82 (59)	93 (90)	100 (94)	90 (85)	76 (58)
Coot	89 (92)	98 (97)	100 (95)	92 (91)	86 (84)	59 (64)	46 (43)

Table 4. PROPORTIONS IN EACH MONTH OF THE PEAK WINTER POPULATION OF CERTAIN WILDFOWL PRESENT ON 77 NORTHERN IRELAND SITES THAT WERE COUNTED IN ALL SEVEN MONTHS OF 1992-93.
Bracketed figures give averages for the 1988-89 to 1992-93 period (only 1992- 93 data are available for Light-bellied Brent Geese).

	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Little Grebe	82 (89)	100 (90)	78 (87)	63 (74)	71 (58)	37 (48)	30 (33)
Great Crested Grebe	6 (89)	100 (68)	29 (38)	26 (43)	88 (51)	59 (38)	65 (75)
Cormorant	100 (95)	62 (79)	54 (73)	59 (88)	55 (59)	47 (61)	50 (58)
Bewick's Swan	0 (0)	0 (3)	9 (44)	21 (72)	60 (73)	100 (86)	28 (14)
Whooper Swan	<1 (<1)	84 (42)	100 (80)	50 (68)	59 (81)	64 (88)	58 (79)
Light-bellied Brent Goose	47 (-)	100 (-)	62 (-)	67 (-)	63 (-)	33 (-)	19 (-)
Shelduck	5 (4)	10 (9)	45 (40)	49 (82)	100 (87)	81 (82)	90 (71)
Wigeon	35 (24)	70 (75)	100 (82)	45 (59)	55 (73)	52 (57)	40 (33)
Gadwall	58 (79)	96 (82)	64 (83)	86 (80)	100 (88)	48 (64)	71 (59)
Teal	20 (31)	72 (58)	80 (72)	83 (89)	71 (92)	100 (74)	49 (38)
Mallard	100 (98)	92 (85)	80 (69)	89 (68)	61 (57)	39 (39)	26 (22)
Pintail	1 (16)	63 (37)	91 (80)	100 (92)	59 (85)	59 (78)	33 (31)
Shoveler	33 (51)	73 (91)	100 (81)	99 (77)	75 (71)	88 (50)	73 (44)
Pochard	8 (6)	43 (26)	64 (69)	48 (74)	100 (63)	70 (31)	15 (7)
Tufted Duck	24 (20)	80 (50)	87 (77)	100 (89)	100 (90)	85 (70)	56 (47)
Scaup	<1 (<1)	21 (9)	25 (18)	49 (74)	41 (36)	75 (57)	100 (89)
Goldeneye	<1 (2)	20 (9)	57 (59)	37 (79)	100 (73)	85 (73)	53 (55)
Coot	64 (88)	77 (93)	60 (78)	100 (73)	45 (56)	30 (43)	15 (30)

INDICES

As a result of the variable list of sites covered in different seasons, population changes cannot be derived from simply comparing total numbers of waterfowl counted in each year. Consequently, indexing techniques have been developed which allow between year comparisons of populations, even if the true population size is unknown. A new technique has been developed in recent years specifically for waterbird populations, the "Underhill index" (Underhill 1989), which has been adopted for use in this report, replacing the previous "Ogilvie index" used in previous reports. The term "index", when used in this report, refers specifically to the Underhill Index.

Papers fully explaining the new indexing process and its application for major waterfowl populations in the UK will be published shortly (Underhill & Prŷs-Jones in press, Kirby *et al.* in press, a, Prŷs-Jones *et al.* in press). In summary, the index assumes that a count of a species at any site in any month and year can be represented by the combination of a site factor, a month factor and a year factor. The formula derived from this assumption is then used to calculate any missing counts, i.e. when a site was not counted. The year and month factors are set to equal one in a base year and a base month, which varies for each species according to the month of peak abundance. Once the "holes" in the data have thus been filled, the numbers on those sites monitored can be compared between years, and the fluctuations in the population become apparent. Underhill (1989) recommends that, where possible, the index is based on counts from more than one month. The months chosen for each species are given in Tables 5 & 6. The most appropriate grouping of months on which to base the annual index for waders is December, January and February, the period when the wintering population in Britain and Northern Ireland is most stable. However, the peak abundance of different wildfowl species occur in different months according to species, and thus different months and different numbers of months were selected for these species.

Not all species are included in the indexing process however. 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 the whole of the British populations negates the need for an index to be calculated using the Underhill technique. Thus, the indices for Pink-footed and Greylag Geese have been derived from the highest total count during the October and November census of the population in each year (e.g. Mitchell & Cranswick 1993). Many sea-ducks are also excluded from the indexing process because of the extreme censusing 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. Waterfowl species which only occur in small numbers in Britain and Ireland have also been excluded.

Tables 5 & 6 give index values for waterfowl species in Britain and Northern Ireland, respectively. However, when the indexing model was used to calculate index values for the populations of waders in Northern Ireland, the results were found to be statistically unreliable due to the small number of estuaries contributing to each index value. It was therefore decided to combine the Northern Ireland data with that for Great Britain to produce UK indices for waders and these are given in Table 7.

The size of the species population has been constrained to equal 100 in the base year (1970-71 for wildfowl, 1972-73 for waders). The index values are provided in Tables 5 & 7 as five year summaries extending back to 1966-67 for wildfowl and 1973-74 for waders, representing the first years in which coverage was deemed sufficient for data to be included in the calculation of the index. Due to the shorter run of data available for wildfowl in Northern Ireland, annual index values are provided in Table 6. The annual index figures for the last five years, where calculated, are given in each of the *Species Accounts*.

For all species, the long-term trends in index values indicate significant changes in overall wintering populations. Because short-term fluctuations provide a less rigorous indication of population changes, care should be taken in their interpretation. The indexing technique is still being refined and investigations into the advantages and limitations of the index are ongoing. However, we are confident that this is a major step forward in understanding waterfowl population dynamics.

Wildfowl

The long-term trends in wildfowl populations in Great Britain are discussed in detail in the forthcoming papers. 1992-93 data show declines for many Arctic nesting swans and geese, following a cold, late spring in northern latitudes, with sharp decreases in Bewick's and Whooper Swans being especially noticeable following long-term rises. Index values for many of the duck species, notably Gadwall, Teal, Pintail and Shoveler, also exhibited sharp downturns in 1992-93 following recent increases. Values for Mallard in the last two seasons are noticeably lower than the stable long-term picture, while recent figures for Pochard suggest a continuation of the decrease from the early 1970s. The decline for Gadwall is difficult to explain in view of the peak count (Table 1) and high numbers present throughout the winter (Table 3). Goldeneye numbers continued to rise in 1992-93, whilst Red-breasted Merganser numbers appear to be staging a recovery after last winter's recent decline, although the population remains below the 1980s peak.

This year's report has been taken as an opportunity to apply the new indexing method to those species regularly occurring in the UK, but which were first included in the count scheme only in the 1980s. Thus, annual indices are provided for Little and Great Crested Grebes, Cormorant and Coot, whilst those for Ruddy Duck, excluded by Kirby

et al. (in press, a), have also been included here. Also, for the first time, populations in Northern Ireland have also been indexed, using the Underhill technique. The methodology used follows that of Kirby *et al.* (in press, a) (see footnote) with the exception that the base year used was 1987-88. Although data for several of the species were collected prior to 1987, data for wildfowl in Northern Ireland are only available from 1985-86. The following winter was selected as the base year to allow for lack of coverage in some areas that inevitably occurred during the first season of coverage. For simplicity, 1987 has been used as the common base year for indexing all of the additional species to Kirby *et al.* (in press, a).

In Northern Ireland, many species appear to have increased in number slightly since the mid and late 1980s. The large increases for Little Grebe and Cormorant probably relate to coverage, since these species were only included in the count scheme in 1985-86 and 1986-87 respectively. Numbers of migrant swans appear to have fallen in recent years, particularly in the case of Bewick's. The indices also suggest a marked reduction in Teal numbers in the last few winters. Gadwall is one of the few species in Northern Ireland to show a sustained increase over the period, mirroring the population rise in Great Britain.

It should be reiterated that comparatively few seasons' data are available for these new species and for Northern Ireland. These indices should be viewed with caution. Many have comparatively large consistency intervals (which provide a measure of confidence in the accuracy of the index, but are not given here due to lack of space). Since the Underhill technique uses data from all available years to calculate index values, future data will refine the index values further.

Footnote: Selection of months was made by calculating monthly index values for all months September to March, and selecting that with the highest index value and any adjacent months with overlapping consistency intervals. Months selected for each species are given in Tables 5 & 6. Data from all available years were used for calculating the index for each species, with the exception of Ruddy Duck, using data from 1966-67 onwards only, as recommended in Kirby *et al.* (in press, a). These were: Little Grebe - 1985-86 onward, Great Crested Grebe - 1982-83, Cormorant - 1986-87, Coot - 1982-83, all species in Northern Ireland - 1986-87. The parameters were used for indexing each species follow Kirby *et al.* (in press, a).

Table 5. LONG-TERM INDICES FOR WINTER WILDFOWL POPULATIONS IN BRITAIN

	Month+	Mean 66-67 to 67-68	Mean 68-69 to 72-73	Mean 73-74 to 77-78	Mean 78-79 to 82-83	Mean 83-84 to 87-88	88-89	89-90	90-91	91-92	92-93
Little Grebe	SO	-	-	-	-	99	289	321	330	313	303
Great Crested Grebe	SON	-	-	-	87	102	109	130	129	124	140
Cormorant	SONDJFM	-	-	-	-	73	138	141	159	144	143
Mute Swan	SONDJFM	115	103	100	105	110	137	146	164	150	150
Bewick's Swan	JF	61	62	89	156	230	189	254	279	297	204
Whooper Swan	ND	102	113	116	129	157	265	251	272	187	185
Pink-footed Goose	O or N	99	96	107	120	173	245	254	266	324	275
Greylag Goose	O or N	88	100	102	131	142	168	129	177	136	152
Canada Goose	S	57	96	124	208	295	422	313	363	408	379
Dark-bellied Brent	DJF	74	86	160	242	297	354	268	350	448	301
Shelduck	JF	82	101	94	126	121	111	118	129	132	117
Wigeon	J	95	91	82	94	125	113	105	108	136	137
Gadwall	SONDJFM	39	89	128	255	388	525	515	551	498	459
Teal	D	70	108	158	242	222	254	315	277	263	230
Mallard	D	90	85	78	84	91	87	81	79	75	75
Pintail	ONDJ	52	91	178	182	198	189	188	163	194	149
Shoveler	SO	100	134	153	166	182	171	186	221	213	160
Pochard	NDJ	116	108	126	99	100	109	104	99	95	91
Tufted Duck	NDJF	80	103	115	113	107	126	99	109	99	102
Goldeneye	F	83	98	112	94	99	102	96	130	122	119
Red-breasted Merganser	ONDJFM	45	95	96	124	127	165	104	131	123	129
Goosander	DJF	64	89	112	156	168	187	117	146	127	121
Ruddy Duck	SONDJFM	25	116	652	2,343	4,695	5,737	6,148	6,103	6,341	4,884
Coot	SONDJ	-	-	-	87	105	111	114	100	98	101

- *indicates data are not available for these years*
+ *the first letter of the months September to March is used to indicate those months used for indexing each species*

Table 6. INDICES FOR WINTER WILDFOWL POPULATIONS IN NORTHERN IRELAND

	Month+	86-87	87-88	88-89	89-90	90-91	91-92	92-93
Little Grebe	SON	179	100	372	396	328	354	387
Great Crested Grebe	SONDJFM	76	100	118	92	80	94	117
Cormorant	SOND	10	100	219	273	193	158	226
Mute Swan	SONDJ	88	100	108	120	117	117	116
Bewick's Swan	NDJF	67	100	97	172	189	93	45
Whooper Swan	ONDJFM	77	100	103	80	90	80	85
Light-bellied Brent	SONDJFM	42	100	96	98	118	121	89
Shelduck	DJFM	117	100	173	119	139	115	103
Wigeon	SONDJFM	85	100	124	90	113	103	78
Gadwall	SONDJ	79	100	116	152	122	133	171
Teal	DJ	56	100	100	107	123	92	64
Mallard	SO	138	100	121	141	136	136	117
Pintail	NDJFM	51	100	120	79	124	152	115
Shoveler	SONDJFM	159	100	113	101	92	122	79
Pochard	NDJF	93	100	141	128	131	139	102
Tufted Duck	ONDJFM	52	100	105	111	105	117	109
Goldeneye	DJFM	88	100	83	77	99	107	94
Red-breasted Merganser	SONDJFM	61	100	115	109	105	85	110
Coot	SONDJFM	79	100	99	118	116	108	121

+ *the first letter of the months September to March is used to indicate those months used for indexing each species*

Waders

Long-term population trends of coastal wintering waders in the UK are presented in the forthcoming paper (Prŷs-Jones *et al.* in press). In 1992-93, the winter index changed by more than 10% compared to the previous winter for Sanderling, Dunlin and Turnstone. The index for Sanderling dropped by 30% to reach its lowest level for 11 years. A winter index drop of 15% was recorded for both Turnstone (which reached its lowest level for eight years) and for Dunlin (Prŷs-Jones *et al.* in press). The decline in the Dunlin index is of most concern as it is likely to reflect a real decline in the UK wintering population. The majority of both Sanderling and Turnstone wintering in the UK are present on non-estuarine shores, many of which are not counted for WeBS (Waters in prep.). Low recorded counts for these two species could be the result of birds moving from counted areas to nearby uncounted shores.

Table 7. LONG-TERM INDICES FOR WINTER WADER POPULATIONS IN THE UK

	Month+	Mean 73-74 to 77-78	Mean 78-79 to 82-83	Mean 83-84 to 87-88	88-89	89-90	90-91	91-92	92-93
Oystercatcher	DJF	121	134	149	161	157	167	153	165
Ringed Plover	DJF	113	91	100	133	123	113	103	104
Grey Plover	DJF	147	202	308	459	414	462	478	442
Knot	DJF	82	81	96	112	104	106	110	113
Sanderling	DJF	117	108	97	107	87	95	115	81
Dunlin	DJF	108	82	70	83	85	100	97	83
Bar-tailed Godwit	DJF	115	137	143	129	126	152	122	120
Black-tailed Godwit	DJF	87	91	114	167	188	143	168	183
Curlew	DJF	119	111	119	126	135	123	148	151
Redshank	DJF	105	91	98	119	120	101	112	103
Turnstone	DJF	116	110	145	144	152	141	153	134

+ *the first letter of the months September to March is used to indicate those months used for indexing each species*

SPECIES ACCOUNTS

The following tables rank the principal sites for each species according to average winter maxima calculated from counts received during the last five seasons, 1988-89 to 1992-93. Dashes indicate missing counts and incomplete counts are bracketed. In the first instance, averages were calculated using only complete counts, but if any incomplete counts exceeded this initial average they were then also incorporated and the averages recalculated. Averages enclosed by brackets are based solely on incomplete counts. The month in which the peak 1992-93 count occurred at each site is given in the column labelled "Mth". Yearly index values are provided for the last five seasons where calculated (see *Indices*). A cross (+) denotes counts made during WWT and other goose surveys. Other sources of information are cited accordingly. In wader accounts, non-estuarine coastal sites are identified by an asterisk (*) and inland sites are identified by a hash (#).

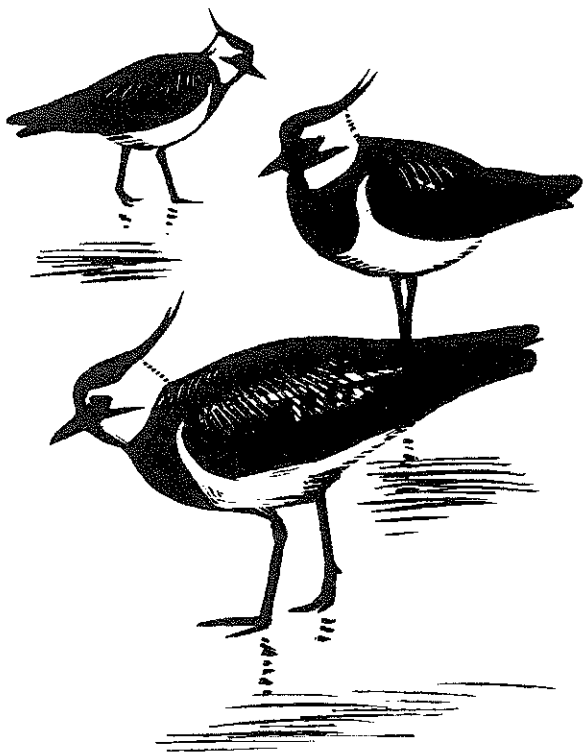
International, Great Britain and all-Ireland qualifying levels are given for each species, except where these are unknown (indicated using a question mark "?"), where the population is too small for a meaningful figure to be obtained (indicated using a plus "+"), or where the population is derived from a feral population and (indicated using "introduced"). Note also that, where the 1% level is less than 50 birds, 50 is normally taken as the minimum qualifying level. An asterisk (*) has been used to highlight these instances (see Appendix 1 for a full explanation of national and international qualifying criteria).

The sites included in the tables are, in most cases, those that exceed the appropriate qualifying level for national importance, derived from Kirby (in prep) and Cayford & Waters (in prep) for Great Britain, or all-Ireland importance in Northern Ireland, derived from Whilde (in prep.). The table of sites in each account is divided, where possible, into sites meeting international 1% levels, and those in Great Britain or Northern Ireland meeting either British or all-Ireland 1% levels. For some wader species, not all nationally important sites are given in the tables. In these cases, the names of the sites are listed in the text and the tables flagged accordingly. In cases where the 1% level is very small (less than 30 birds), an arbitrary level has been chosen as the cut off for including sites since data for these species is, in most cases, largely anecdotal. Where all-Ireland criteria have yet to be derived, sites in Northern Ireland have been included according to Great Britain criteria. The locations of sites included in the accounts are given in Appendix 2.

It should be recognised, however, that this report does not provide a definitive statement on the conservation importance of individual sites for waterfowl. The national criteria cut off is chosen for most species to provide a reasonable amount of information in the context of this report only. Thus, for example, many sites of regional importance, or those important because of the assemblage of species present, are not included here. International conservation Directives and Conventions stress the holistic approach needed for successful conservation, and lay great importance on the range of a species, in addition to the conservation of individual key sites.

1992-93 represents only the second season for which several of the wildfowl and associated species have been included in the count scheme. This report is thus still too early for a table of sites regularly supporting large numbers of these species to be drawn up with confidence. Instead, data for sites meeting qualifying criteria in the 1992-93 season only are compared with counts from the 1991-92 season (indicated using the symbol "*cf.*" in the text).

Similarly, counts of waders are now available for many inland wetlands for the last two seasons, 1991-92 and 1992-93. Sizeable populations of Lapwing, Golden Plover, Snipe, Jack Snipe, Ruff and Green Sandpiper were recorded. For these species, count data from inland sites have been included in the following accounts.



RED-THROATED DIVER
Gavia stellata

International importance: 750
Great Britain importance: 50
All-Ireland importance: 10*

GB maximum: 642 Dec
NI maximum: 40 Nov

Trend not available

The total numbers recorded in Britain in 1992-93 were similar in several respects to those in 1991-92, including a December peak of over 600 birds that greatly exceeded counts in other months. The Northern Ireland totals were much smaller, although the peak was higher than in 1991-92. These figures represent only a small fraction of the 4,300 to 5,400 birds estimated to winter in Great Britain (Danielsen *et al.* 1993). Principal concentrations reflect the easterly bias in the species' distribution in the UK, and counts of more than 50 birds were made at Minsmere (318, December, *cf.* 213 in 1991-92), the Dengie (175, December, *cf.* 150), the Clyde (73, February, *cf.* 9), the Forth (63, November, *cf.* 101) and the North Norfolk Marshes (59, January, *cf.* 26). The principal sites in Northern Ireland were Lough Foyle (34, November, *cf.* 2) and Dundrum Bay (29, December, *cf.* 12), and if suitable seawatching conditions had occurred at both sites in the same month the Northern Ireland totals would undoubtedly have been much larger. The third consecutive winter of comprehensive surveys of the northern half of Cardigan Bay, using aerial, land- and boat-based counts, found a maximum of 390 birds in February (Green & Elliott 1993), although this was fewer than normal for this site (e.g. 963 in 1990-91), partly due to bad weather hampering boat surveys. The majority of birds were located in the coastal strip up to 3 km offshore. A total of 350 birds were recorded by the RSPB/BP counts in the Moray Firth in October (*cf.* 248), with Spey Bay being a favoured site (Evans 1993). It is hoped that future marine SPAs (see *Conservation and Management*) will provide an effective mechanism for the protection of important marine areas such as Cardigan Bay and the Moray Firth.

BLACK-THROATED DIVER
Gavia arctica

International importance: 1,200
Great Britain importance: 7*
All-Ireland importance: 1*

GB maximum: 29 Mar
NI maximum: 0

Trend not available

Although the maximum count in 1992-93 showed an increase from the previous season, it represents only a small proportion of the British population, which was recently estimated to number 700 (Danielsen *et al.* 1993). The combination of the remote areas favoured by this species, such as southwest Scotland, and the fact that it only occurs in small numbers even in these regions, make for obvious difficulties when censusing. The counts between Turnberry and Dipple (15, March, *cf.* 0 in 1991-92) and in Machrie Bay (12, December, *cf.* 9) are therefore exceptional. The Forth (6, March *cf.* 6) and Kentra Bay (6, November *cf.* 0) were the only other sites to hold more than five birds. The peaks recorded in November and March reflect passage birds, which are perhaps more visible in flocks at this time of year than during mid winter. RSPB/BP counts in the Moray Firth recorded 13 birds in November and December (*cf.* 20), fewer than average owing to the absence of the normal influx in March (Evans 1993).

GREAT NORTHERN DIVER
Gavia immer

International importance: 50
Great Britain importance: 30*
All-Ireland importance: ?

GB maximum:	**39**	**Feb**
NI maximum:	**40**	**Dec**

Trend **not available**

Numbers of Great Northern Divers recorded in Great Britain in 1992-93 were lower than during 1991-92, probably due to counts missing the peak of birds returning north on spring passage. Conversely, counts were higher in Northern Ireland, and would have been higher still if the weather had permitted counts in the same month at the two key sites of Dundrum Bay (40, December, *cf.* 20 in 1991-92) and Lough Foyle (29, November, *cf.* 10), whilst more regular counts at Carlingford Lough (13, January, *cf.* 0) would no doubt have also boosted the total. In Great Britain, the principal concentrations were recorded at Loch Indaal (21, April, *cf.* 22), Machrie Bay (8, February, *cf.* 8) and Lochs Beg and Scridain (6, January, *cf.* 5). Forty birds were present in February in the Moray Firth (*cf.* 17), well above average for this area and particularly noteworthy given the species preference for sites on the west coast (Evans 1993).

LITTLE GREBE
Tachybaptus ruficollis

International importance: ?
Great Britain importance: 30*
All-Ireland importance: ?

GB maximum:	**2,600**	**Sep**
NI maximum:	**789**	**Oct**

Trend	88-89	89-90	90-91	91-92	92-93
GB	289	321	330	313	303
NI	372	396	328	354	387

The peak count of Little Grebe in Great Britain was well below that of recent seasons, which was as high as 3,500 in 1990-91, and monthly fluctuations showed that numbers declined from the customary September peak more rapidly than usual (Table 3). Although Little Grebe are known to be susceptible to cold winters (Moss & Moss 1993), the relatively mild winter precludes such an explanation in 1992-93. Such an apparently large decline in early winter numbers indicates a poor breeding season in 1992 and the very wet late spring and summer in Britain would have resulted in many nests being flooded, especially on small rivers and canals (Moss & Moss 1993). Numbers in Northern Ireland, however, remained much as normal, although they are prone to fluctuate more markedly from month to month here than in the rest of the UK.

Loughs Neagh and Beg and Strangford Lough remain key sites for Little Grebes. Numbers on the Thames Estuary showed a remarkable increase and this site was exceptional among those in Great Britain in supporting more birds in 1992-93 than expected from its five year average, most supporting fewer than normal numbers. In view of Little Grebes' penchant for quiet, vegetated backwaters, it is perhaps surprising that nine major estuaries feature in Table 8, compared with only two rivers. However, this is partly an effect of the relatively low number of counts received from riverine sites, rather than a reflection of habitat preference. Other sites supporting more than 30 birds in 1992-93 but not listed in the table were Wraysbury Gravel Pits (48, February), Linlithgow Loch (46, September), Portavo Lake (41, October), Kingsbury/Coton Pools (40, September), Blagdon Lake (39, September), Fisherwick/Elford Gravel Pits (39, September), Humber Estuary (39, July), Upper Avon Valley (34, October), North Norfolk Marshes (34, November) and Chatsworth Park Lakes (31, September).

A relatively inconspicuous bird even in winter when it frequents more open waters than during the breeding season, the total number of Little Grebes recorded by WeBS will inevitably be considerably fewer than the true population. Recent estimates suggest 5,000 to 10,000 breeding pairs in Britain (Moss 1993). This would result in a post-breeding population of at least four times that recorded by WeBS in September.

Table 8. LITTLE GREBE: WINTER MAXIMA AT MAIN RESORTS

	88-89	89-90	90-91	91-92	92-93	(Mth)	Average
Great Britain							
Thames Est.	146	104	88	108	182	(Nov)	126
Chew Valley Lake	42	83	100	80	83	(Aug)	78
Deben Est.	45	84	87	69	48	(Dec/Mar)	67
Swale Est.	-	71	108	94	65	(Dec)	65
R. Soar: Leicester	62	67	68	64	43	(Oct)	61
Wash	17	56	112	56	60	(Feb)	60
Medway Est.	39	60	57	53	49	(Dec)	52
R. Test: Full'ton-Stockbr'	-	-	-	39	63	(Sep)	51
Kings Mill Rsr	28	40	46	64	70	(Sep)	50
Morecambe Bay	(0)	86	41	36	30	(Dec/Jan)	48
Rutland Water	73	69	40	27	15	(Sep)	45
Southampton Water	87	50	23	33	25	(Dec)	44
Chichester Hbr	30	52	49	53	36	(Dec)	44
Hanningfield Rsr	85	4	21	46	54	(Aug)	42
Eversley Cross/Yateley GP	16	55	46	37	40	(Mar)	39
The Fleet/Wey	22	26	44	42	46	(Oct)	36
Holme Pierrepont GP	20	4	75	45	95	(Sep)	34
Northern Ireland							
Lo. Neagh/Beg	412	480	324	324	442	(Oct)	396
Strangford Lo.	-	103	122	105	134	(Nov)	116
Upper Lo. Erne	62	57	67	49	27	(Feb)	52

GREAT CRESTED GREBE
Podiceps cristatus

International importance: **?**
Great Britain importance: **100**
All-Ireland importance: **30***

GB maximum: **9,580** **Oct**
NI maximum: **2,308** **Oct**

Trend	88-89	89-90	90-91	91-92	92-93
GB	109	130	129	124	140
NI	118	92	80	94	117

After the apparent setback in 1991-92, the peak counts of Great Crested Grebe in 1992-93 exceeded previous maxima, continuing the trend of increasing numbers since the species was first included in the count scheme. The peak in Great Britain was 8% higher than the previous highest total in 1990-91, and while the count in Northern Ireland was only eight birds more than the previous record count in 1988-90, it was much higher than counts in intervening years. This is borne out by the trends analyses for Great Britain which show a fairly steady rise since the mid-1980s. In Northern Ireland, index values confirm the high numbers in 1992-93 following an obvious low in 1990-91.

Although Loughs Neagh and Beg remains the principal site for Great Crested Grebes in Table 9, peak numbers at this site usually occur in late autumn. This is followed by rapid dispersal so that, in most years, only 200 to 300 birds remain in mid winter. Conversely, numbers at Belfast Lough, which have shown a marked increase over the last five winters, usually exhibit a peak in October or November, with, in recent winters, large numbers being present in other months also.

All UK sites with average maxima of more than 95 birds are given in Table 9. Peak counts vary considerably, from year to year with no discernable pattern. Nevertheless, the 1992-93 peak for Loughs Neagh and Beg, the largest concentration of Great Crested Grebes recorded by the scheme, is exceptional and coincides with a decrease in diving ducks, notably Tufted Duck and Pochard, at the site in 1992-93. Counts on Belfast Lough, the Forth, the Colne, the Mersey and Lough Foyle were also much higher than expected. After several seasons of large counts, numbers at Grafham returned to levels similar to five winters ago, while numbers on the Swale remained low for the third winter in succession. In addition, Loch Ryan (252, September), the Dee Estuary (125, October), Ardleigh Reservoir (115, August), Weirwood Reservoir (112, November), Holme Pierrepont Gravel Pits (107, September), the Thames Estuary (103, March) and Pennington Flash (102, September) held over 100 birds in 1992-93.

Table 9. GREAT CRESTED GREBE: WINTER MAXIMA AT MAIN RESORTS

	88-89	89-90	90-91	91-92	92-93	(Mth)	Average
Great Britain							
Rutland Water	605	544	1,038	878	720	(Sep)	757
Forth Est.	311	849	524	678	923	(Feb)	657
Chew Valley Lake	560	490	440	550	520	(Oct)	512
Grafham Water	179	264	744	522	180	(Nov)	378
Queen Mary Rsr	251	360	526	359	349	(Oct)	369
Cardigan Bay	(190)	-	+385	+376	+322	(Dec)	361
Colne Est.	100	322	214	207	614	(Feb)	291
Morecambe Bay	277	236	229	332	353	(Nov)	285
NE Kent/Thanet	-	-	-	200	339	(Feb)	270
Stour Est.	127	322	200	161	187	(Oct)	199
Pitsford Rsr	202	142	243	243	141	(Dec)	194
Cotswold WP West	136	184	180	200	223	(Mar)	185
Medway Est.	177	254	183	110	135	(Feb)	172
Abberton Rsr	44	303	161	63	247	(Nov)	164
Hanningfield Rsr	130	142	186	233	117	(Nov)	162
Dengie Flats	70	67	34	312	253	(Dec)	147
Blithfield Rsr	69	66	233	166	122	(Nov)	131
Swale Est.	346	160	28	89	27	(Nov)	130
Wraysbury Rsr	-	241	113	87	70	(Oct)	128
Alton Water	-	151	119	93	142	(Dec)	126
Attenborough GP	115	144	142	108	120	(Sep)	126
Mersey	63	112	90	58	277	(Oct)	120
Eyebrook Rsr	30	120	164	112	146	(Sep)	114
S Muskham/N Newark GP	133	-	121	96	79	(Nov)	107
Wraysbury GP	94	108	104	67	156	(Feb)	106
Blackwater Est.	109	85	63	121	122	(Mar)	100
Northern Ireland							
Lo. Neagh/Beg	1,605	1,188	612	753	2,022	(Aug)	1,236
Belfast Lo.	776	886	1,162	1,141	1,771	(Oct)	1,147
Upper Lo. Erne	404	306	137	195	231	(Feb)	255
Carlingford Lo.	106	216	259	279	140	(Dec)	200
Larne Lo.	119	179	88	128	92	(Feb)	121
Lo. Foyle	85	35	60	101	224	(Nov)	101
Dundrum Bay	114	22	68	78	84	(Dec)	73
Strangford Lo.	64	49	67	60	71	(Nov)	62

\+ *from Green & Elliott (1993)*

RED-NECKED GREBE
Podiceps grisegena

International importance: 300
Great Britain importance: 1*
All-Ireland importance: ?

GB maximum: 34 **Feb** **Trend** **not available**
NI maximum: 0

Total numbers of Red-necked Grebe recorded in 1992-93 were generally lower than in 1991-92, and the peak count of 34 represents less than one quarter of the British population. The majority of records were of single birds, mainly in southern or eastern Britain, but included records from as far west as Cornwall and Wales. The Forth Estuary again held the largest number of birds (22, February, *cf.* 32 in 1991-92) and was the only site with more than five birds.

SLAVONIAN GREBE
Podiceps auritus

International importance: 50
Great Britain importance: 4*
All-Ireland importance: ?

GB maximum:	**163**	**Feb**
NI maximum:	**51**	**Nov**

Trend not available

Unlike 1991-92, when the number of Slavonian Grebes in Great Britain remained fairly constant across all months, 1992-93 saw a general increase through the winter. The late winter peak of 163 represented an increase of more than 50% on that of the previous season. In Northern Ireland, as in 1991-92, Slavonian Grebes were only recorded in two of the seven winter months, largely as a result of poor weather conditions hampering counts at the key coastal sites where they are found. The high national totals reflect large counts at individual sites, with those at Pagham Harbour (57, February, *cf.* 7 in 1991-92) and Lough Foyle (51, November, *cf.* 8) being particularly impressive, and considerably higher than their respective maxima from the previous season. A further seven sites held 10 or more birds in 1992-93: Loch of Harray (39, December, *cf.* 29), the Forth (32, February, *cf.* 17), the Cromarty Firth (27, February, *cf.* 4), Loch Indaal (19, November, *cf.* 36), Sound of Taransay (12, March, not counted in 1991-92), the Blackwater Estuary (11, March, *cf.* 18) and Poole Harbour (10, December and January, *cf.* 6). RSPB/BP counts on the Moray Firth recorded some 60 birds in December (*cf.* 57).

BLACK-NECKED GREBE
Podiceps nigricollis

International importance: 1,000
Great Britain importance: 1*
All-Ireland importance: ?

GB maximum:	**39**	**Mar**
NI maximum:	**0**	

Trend not available

Apart from the total of just seven birds recorded in November, numbers of Black-necked Grebes in Great Britain in 1992-93 were consistently higher than in 1991-92. The total count from December onwards remained almost constant, with 36 to 39 birds. Birds were recorded at 33 different sites, nearly all in the south or east, with only two in Scotland, one in Wales and, as during last season, none in Northern Ireland. Langstone Harbour was again by far the most important site (28, December, *cf.* 20 in 1991-92), with Loch Ryan (6, March, *cf.* 0) the only other site to support more than five birds.

CORMORANT
Phalacrocorax carbo

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

GB maximum:	**13,931**	**Oct**
NI maximum:	**1,849**	**Sep**

Trend	88-89	89-90	90-91	91-92	92-93
GB	138	141	159	144	143
NI	219	273	193	158	226

The maximum number of Cormorants counted in Britain and Northern Ireland in 1992-93 each represented the highest counts yet made for the species. This results from sustained increases in both British *(P. c. carbo)* and continental (*P. c. sinensis*) breeding populations, each of which contribute to the British wintering population. British population indices confirm that the winter population is on the increase, and Kirby *et al.* (in press, b), after allowing for incomplete coverage of the species for the WeBS counts, have suggested that the population may well exceed 19,000 birds.

After allowing for differences in the number of sites counted in each month, Cormorants are most numerous on British wetlands in October (Table 3), with a decrease thereafter to levels amounting to 70-80% of the October peak count. In Northern Ireland, the seasonal peak occurs in September and is followed by a sharp decrease to around 50-60% of the peak count. Both patterns presumably arise as a function of winter mortality and movements, the latter including migration overseas as well as movements off the sites covered by the WeBS network.

The principal sites for Cormorants are shown in Table 10, with some 46 UK wetlands represented. Naturally, for a predominantly marine species like the Cormorant, many estuaries rank highly in the list, but the appearance also of

many of the larger inland waterbodies is indicative of the species' new found reliance on freshwater wetlands, many of which are stocked with fish for angling purposes. Cormorant numbers fluctuate greatly at individual sites, presumably reflecting the extreme mobility of the species, but particularly striking trends include marked declines on the Medway and Inner Moray Firth, and increases on the Dengie and Exe estuaries. In addition to the sites listed in Table 10, the following wetlands supported more than 130 birds in 1992-93 but failed to qualify for inclusion in the table on the basis of five year average values: Little Paxton Gravel Pits (253, January), Wraysbury Reservoir (246, December), Clwyd Estuary (195, August), Staines Reservoir (183, October), Humber Estuary (181, January), Windermere (174, November), Pagham Harbour (161, November), Chew Valley Lake (160, November), Draycote Water (135, February), Coquet Island (133, February) and Farmoor Reservoirs (130, December).

There is growing conflict between fishery managers and conservationists about Cormorants, particularly with respect to the depredation of inland recreational fisheries. This was discussed in detail at the 3rd International meeting of the Cormorant Research Group in Poland, and resulted in the production of a Position Statement concerning Cormorant Research, Conservation and Management, Gdansk 1993 (Kirby 1993). At this meeting, Kirby & Sellers (in press) provided up-to-date information on status and population trends, highlighting the declines in parts of Scotland despite an overall increase in Britain. Kirby *et al.* (in press, c), reviewing the current position regarding Cormorant conservation and management in Britain, also noted the absence of adequate knowledge of diet in inland situations. They concluded that significant economic damage had not been scientifically demonstrated in Britain and highlighted the inadequacies in government policy with respect to Cormorant control. This does not place Britain in a unique situation since the same could be said for many other countries, but it does emphasise the need for basic research to underpin management plans for the species. The Cormorant Research Group formally affiliated with the International Waterfowl and Wetlands Research Bureau in October 1993, and provides a forum for the discussion of Cormorant issues world-wide.

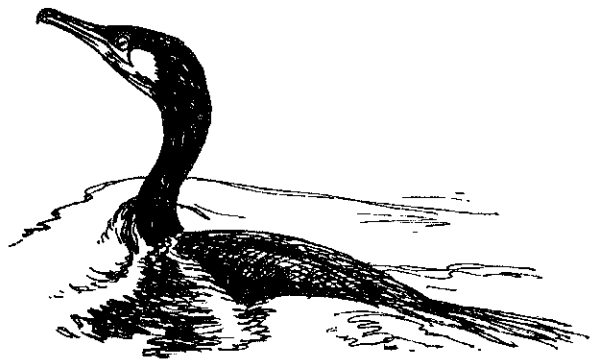


Table 10. CORMORANT: WINTER MAXIMA AT MAIN RESORTS

	88-89	89-90	90-91	91-92	92-93	(Mth)	Average
Great Britain							
Morecambe Bay	733	1,497	991	1,113	802	(Sep)	1,027
Forth Est.	479	766	962	951	737	(Sep)	779
Medway Est.	415	920	1,216	417	108	(Aug)	615
Inner Clyde	447	663	408	810	565	(Nov)	579
Solway Est.	483	600	492	606	757	(Aug)	588
Loch Leven	270	330	800	390	317	(Dec)	421
Abberton Rsr	-	570	320	380	351	(Oct)	405
Rutland Water	280	250	350	445	532	(Jan)	371
Ranworth/Cockshoot Br.	368	325	329	327	271	(Oct)	324
Queen Mary Rsr	438	315	467	226	124	(Mar)	314
Tees Est.	113	337	480	211	345	(Aug)	297
Grafham Water	32	574	450	350	270	(Nov)	294
Alt Est.	159	334	502	252	143	(Sep)	278
Inner Moray Fth	641	354	112	117	167	(Feb)	278
Dee Est.	290	291	286	201	313	(Sep)	276
Poole Hbr	615	232	417	377	380	(Sep)	273
Colne Est	108	409	169	286	384	(Jan)	271
Ouse Washes	182	533	163	182	248	(Jan)	262
Swale Est.	394	228	263	238	161	(Jul)	257
Blackwater Est.	345	219	208	210	244	(Mar)	245
Wash	294	224	263	206	206	(Nov)	239
Hanningfield Rsr	-	100	374	156	258	(Nov)	222
Carmarthen Bay	-	276	303	151	131	(Sep)	215
Queen Elizabeth II Rsr	99	138	320	430	70	(Sep)	211

	88-89	89-90	90-91	91-92	92-93	(Mth)	Average
Thames Est.	192	255	168	211	204	(Sep)	206
Ribble Est.	242	176	172	161	222	(Oct)	195
Rostherne Mere	109	214	222	159	261	(Feb)	193
Lindisfarne	0	0	720	82	141	(Sep)	189
Barn Elms Rsr	183	160	147	260	118	(Mar)	174
Stour Est.	244	162	124	175	145	(Aug)	170
William Girling Rsr	14	200	232	177	186	(Sep)	162
Dengie Flats	78	51	43	201	401	(Mar)	155
Southampton Water	79	171	171	145	175	(Oct)	148
Blithfield Rsr	141	135	209	144	102	(Sep)	146
Langstone Hbr	166	161	132	149	91	(Aug)	140
Breydon Water	129	180	141	126	122	(Aug)	140
Lo. of Strathbeg	126	128	110	155	175	(Feb)	139
Exe Est.	70	147	83	146	238	(Oct)	137
Alton Water	-	34	208	144	140	(Dec)	132
Northern Ireland							
Lo. Neagh/Beg	591	951	904	446	1,018	(Sep)	782
Belfast Lo.	235	369	284	343	380	(Jan)	322
Strangford Lo.	365	317	119	123	189	(Sep)	223
Outer Ards	379	197	245	146	97	(Sep)	213
Upper Lo. Erne	131	316	192	194	111	(Jan)	189
Carlingford Lo.	-	175	101	174	167	(Dec)	154
Lo. Foyle	65	136	147	188	120	(Nov)	131

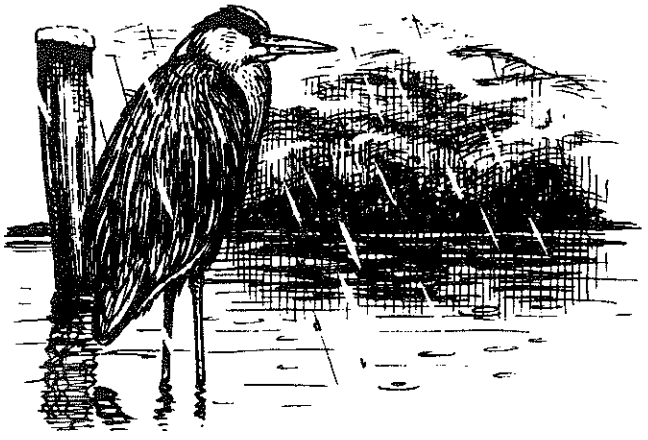
GREY HERON
Ardea cinerea

International importance: **4,500**
Great Britain importance: **?**
All-Ireland importance: **?**

GB maximum: **2,981** **Sep**
NI maximum: **378** **Sep**

Trend **not available**

The number of Grey Herons recorded in Great Britain declined steadily from a September peak to a December minimum before rising again in early spring. This pattern probably results from a combination of mortality, especially in first year birds, and dispersal to more secluded sites not counted for WeBS during mid-winter, with their early return to nesting colonies in spring when they are much more obvious. A similar pattern of decline was observed in Northern Ireland, but instead of a subsequent rise, numbers declined further to just 55 birds in March (Table 1), perhaps reflecting fewer heronries at WeBS sites in Northern Ireland. Total numbers in Great Britain and Northern Ireland were similar to 1991-92, but in view of the 10,300 and 3,600 nests in Britain and Ireland respectively (Marquiss 1993), they represent only a small proportion of the total population. Thirteen sites held 50 or more birds in 1992-93, with maxima occurring in all winter months: Loughs Neagh and Beg (226, August, *cf.* 206 in 1991-92), Deeping St. James Gravel Pits (100, March, *cf.* 152), the Tamar (99, December, not counted in 1991-92), the Thames (90, January, *cf.* 177), Somerset Levels (88, March, *cf.* 97), Strangford Lough (85, November, *cf.* 89), Stockers Lake (70, March, *cf.* 10), Longueville Marsh (68, October, not counted in 1991-92), the Ribble (54, October, *cf.* 9), Poole Harbour (53, September, *cf.* 51), Montrose Basin (52, August, *cf.* 66), the Solway (51, October, *cf.* 37), the River Wye: Chepstow to Tintern (50, February, not counted in 1991-92) and the Dornoch Firth (50, December, not counted in 1991-92).



MUTE SWAN
Cygnus olor

International importance:		**1,800**
Great Britain importance:		**260**
All-Ireland importance:		**55**

GB maximum:	**13,844**	**Oct**
NI maximum:	**2,385**	**Nov**

Trend	**88-89**	**89-90**	**90-91**	**91-92**	**92-93**
GB	**137**	**146**	**164**	**150**	**150**
NI	**108**	**120**	**117**	**117**	**116**

Total numbers showed the usual pattern of a gradual decline through the winter after an October peak. The decline is too great to be entirely attributable to mortality, and probably reflects the movement, as winter progresses, of birds on to breeding territories where they are missed by WeBS. The maximum count in Britain represented a slight (1.5%) increase on the 1991-92 maximum (13,632) but was still considerably lower than the record 1990-91 total of 15,220. The annual indices show clearly that the population has levelled off since 1990 after a rapid increase in the second half of the 1980s. In Northern Ireland, the maximum count in November was a slight increase on the 1991-92 maximum of 2,278 in October, despite fewer sites having been covered.

Seventeen UK sites have five year average maximum counts indicating national or all-Ireland importance and are listed in Table 11. The maximum count at Loughs Neagh and Beg, the most important site for Mute Swans in the UK, increased slightly after the considerable increase of 1991-92, and the total is getting close to levels which, recorded regularly, would classify the site as internationally important for the species. The Fleet/Wey recorded a slight decline in its maximum count after three years of increase. At the Loch of Harray, Mute Swan numbers crashed to 261 birds, a decline of 54% following the 53% drop in the peak count between 1990-91 and 1991-92. The maximum count at Abberton Reservoir declined by nearly 15% for a second season. Three other sites, the Ouse Washes, the Tweed estuary and the Somerset Levels, recorded spectacular increases in their peak counts to the highest levels in the five most recent years. Of the 18 sites in Table 11, nine recorded declines between 1991-92 and 1992-93 and six increases. All of the increases brought counts to their highest levels in five years, whereas the declines were generally more moderate, with just two sites (Loch of Harray and the Thames estuary) recording their lowest counts for five years. Only one other site, Montrose Basin, recorded a count of more than 200 Mute Swans in 1992-93 (220 in August) in Great Britain, while in Northern Ireland, Ballyroney Lake (59, September) and Belfast Lough (59, December) both held more than 55 birds.

Provisional results of the 1990 breeding season survey showed a population in the spring of that year of 25,750, a 37% increase since the 1983 survey (Delany & Greenwood 1993). The banning of the sale of lead fishing weights was undoubtedly a contributory factor to this increase in England, and probably in Wales, but in Britain as a whole, a succession of mild winters in the late 1980s is also likely to have been important. A paper comparing the findings of the national surveys in 1978, 1983 and 1990 is currently in preparation. The Underhill index technique will be used to impute the number of birds in squares that were not covered in one or more of the years. Totals for each survey year will be calculated and river catchments will be used as the basis for comparison (Greenwood & Delany in press).

Table 11. MUTE SWAN: WINTER MAXIMA AT MAIN RESORTS

	88-89	89-90	90-91	91-92	92-93	(Mth)	Average
Great Britain							
The Fleet/Wey	(571)	891	1,029	1,173	1,126	(Jan)	1,055
Lo. of Harray	655	683	1,205	564	261	(Feb)	674
Abberton Rsr	440	599	635	562	487	(Sep)	545
Ouse Washes	399	544	414	365	615	(Nov)	467
Tweed Est.	240	360	368	370	640	(Aug)	396
Christchurch Hbr	402	538	150	352	210	(Sep)	330
Somerset Levels	271	332	256	252	525	(Jan)	327
Colne Est.	306	316	255	278	325	(Jan)	296
Lo. of Skene	-	175	275	329	375	(Dec)	288
Lo. Bee	-	254	307	-	-		281
Northern Ireland							
Lo. Neagh/Beg	1,120	1,465	1,205	1,601	1,746	(Aug)	1,427
Upper Lo. Erne	336	430	470	520	355	(Jan)	422
Strangford Lo.	212	174	195	114	118	(Nov)	163
Lo. Foyle	90	168	118	102	95	(Sep)	115
Dundrum Bay	164	101	113	79	100	(Nov)	111
Corbet Lo.	156	-	105	100	36	(Nov)	99
Upper Quoile	-	-	-	45	76	(Sep)	61

BEWICK'S SWAN
Cygnus columbianus bewickii

International importance: 170
Great Britain importance: 70
All-Ireland importance: 25*

GB maximum:	**7,016**	**Feb**
NI maximum:	**222**	**Feb**

Trend	88-89	89-90	90-91	91-92	92-93
GB	189	254	279	297	204
NI	97	172	189	93	45

The number of Bewick's Swans in Britain was well down on recent years. The 1992-93 peak was 23% lower than the 1991-92 maximum (9,118), the highest total yet recorded by WeBS, but also lower than the 1990-91 and 1989-90 maxima (8,444 and 7,905 respectively). Similarly, numbers were well down in Northern Ireland. As in the 1991-92 winter, peak 1992-93 counts were in February, rather later than the December or January peak recorded in earlier years (Table 3). Age counts of birds using the WWT centres indicated an exceptionally poor breeding season with around 5% young recorded at Welney and Martin Mere, and just 3.8% amongst the 398 individuals identified at Slimbridge (Bowler *et al.* 1993).

Numbers at the two principal sites for this species both exceeded their respective five year averages (Table 12) but amongst the top ten sites, only at the Nene Washes was the count a record for the site. Numbers recorded at Loughs Neagh and Beg were particularly low resulting in the return of the Severn Estuary to its position as the fifth largest flock in Britain. The counts at the Somerset Levels, the Wash and the lower Avon Valley were all higher than their respective five year averages, although the last count may have been at the expense of the Mid Avon Valley. Extensive flooding at Walmore Common in December attracted 163 of the Slimbridge birds to the site, a fair return to form following the dry and consequent poor showing of the 1991-92 winter. Other sites holding more than 70 Bewick's Swans were Southampton Water (80, March), the Dee Estuary (77, January) and the River Idle: Bawtry to Misterton (70, February).

The collaborative study of Bewick's Swans breeding in the Nenetski State Game Reserve, North-East European Russia, involving British, Russian, Dutch and Danish scientists, entered its second successive summer. Observations were made of the breeding ecology of the swans from June until August. A total of 60 swans were caught and marked at the Khabuicka study site. A further 310, mostly non-breeding birds, were also marked to the south on the Gulf of Korovinskaia by Dutch, Danish and Russian ringers (Rees *et al.* 1993).

Table 12. BEWICK'S SWAN: WINTER MAXIMA AT MAIN RESORTS

	88-89	89-90	90-91	91-92	92-93	(Mth)	Average
International							
Ouse Washes	3,834	5,984	5,100	5,542	5,169	(Feb)	5,126
Nene Washes	1,137	270	653	1,189	2,543	(Jan)	1,158
Martin Mere/Ribble Est.	639	660	+1,046	+848	+764	(Feb)	791
Breydon Water	698	528	167	394	268	(Mar)	411
Severn Est.	250	+339	340	320	267	(Jan)	303
Lo. Neagh/Beg	246	303	523	232	163	(Feb)	293
Walland Marsh	269	231	-	-	-		250
St Benet's Levels	-	266	182	294	173	(Jan)	229
Avon Valley (Mid)	133	146	296	213	128	(Feb)	183
Berney Marshes	-	187	121	292	113	(Feb)	178
Great Britain							
Somerset Levels	80	222	141	170	209	(Jan)	164
Walmore Common	112	137	164	+97	+163	(Dec)	135
Pulborough Levels	123	78	114	110	66	(Feb)	98
Avon Valley (Lower)	45	121	75	61	129	(Jan)	86
Woodsford Water Meadows	-	-	-	-	79	(Feb)	79
Wash	28	10	16	272	117	(Jan)	76
Northern Ireland							
Lo. Foyle	45	412	195	106	59	(Feb)	163
Boghill Fields	-	54	-	104	31	(Dec)	63
R. Lagan: Moira	-	111	-	11	41	(Dec)	54
Vow Meadows	-	47	-	22	15	(Nov)	28

\+ *from WWT annual swan reports (e.g. Bowler et al. 1992)*

WHOOPER SWAN
Cygnus cygnus

GB maximum:	**3,225**	**Nov**
NI maximum:	**2,389**	**Nov**

International importance:	**170**
Great Britain importance:	**55**
All-Ireland importance:	**100**

Trend	88-89	89-90	90-91	91-92	92-93
GB	265	251	272	187	185
NI	103	80	90	80	85

The arrival of Whooper Swans at The Wildfowl & Wetlands Trust Centres began in early October, and unusually large numbers were present by mid-month, with peak national totals occurring in November. However, the peak British total remained remarkably low for the second successive season, although the Northern Ireland total had risen considerably. Breeding success amongst Whooper Swans was much higher than for Bewick's, with 9-14% juveniles at WWT reserves (Bowler *et al.* 1993), so the fall in numbers seems likely to be due to the use of other countries within their wintering range. Indices for Great Britain show the population to have fallen slightly in the last two seasons, although numbers remain higher than in the 1960s and 1970s. Index values also indicated smaller numbers in Northern Ireland in recent seasons.

A total of 26 sites support nationally important numbers of Whooper Swans (Table 13). A cold snap in February led to a count of 856 at Welney, the largest concentration ever recorded in England. Numbers on Loch Eye and the Cromarty Firth have returned to more normal levels after the particularly high counts a few seasons ago. The site forms an important staging post for the swans, with peak numbers often recorded in autumn, before the birds disperse south within the British Isles, or in spring, before returning to Iceland. It is thought that the dry summers in 1989 and 1990 resulted in the growth of pondweed which may have provided favourable feeding conditions (J. Bowler, pers. comm.). Consequently, many birds remained longer than usual at Loch Eye in autumn, resulting in the high peaks. Other sites that recorded 56 or more birds in 1992-93 were Upper Nisbet Pond (82, March), Barons Haugh (79, November), Lochhouse Pond (76, December), Merryton Ponds (63, November) and the Lower Derwent Valley (61, January).

The continued study of Whooper Swans at their breeding sites in Iceland by WWT revealed that birds exhibited a high degree of fidelity to their nesting territories. Further, in 1993, one of the 1988-ringed cygnets was found nesting adjacent to the territory in which it had been reared by its parents (Bowler *et al.* 1993).

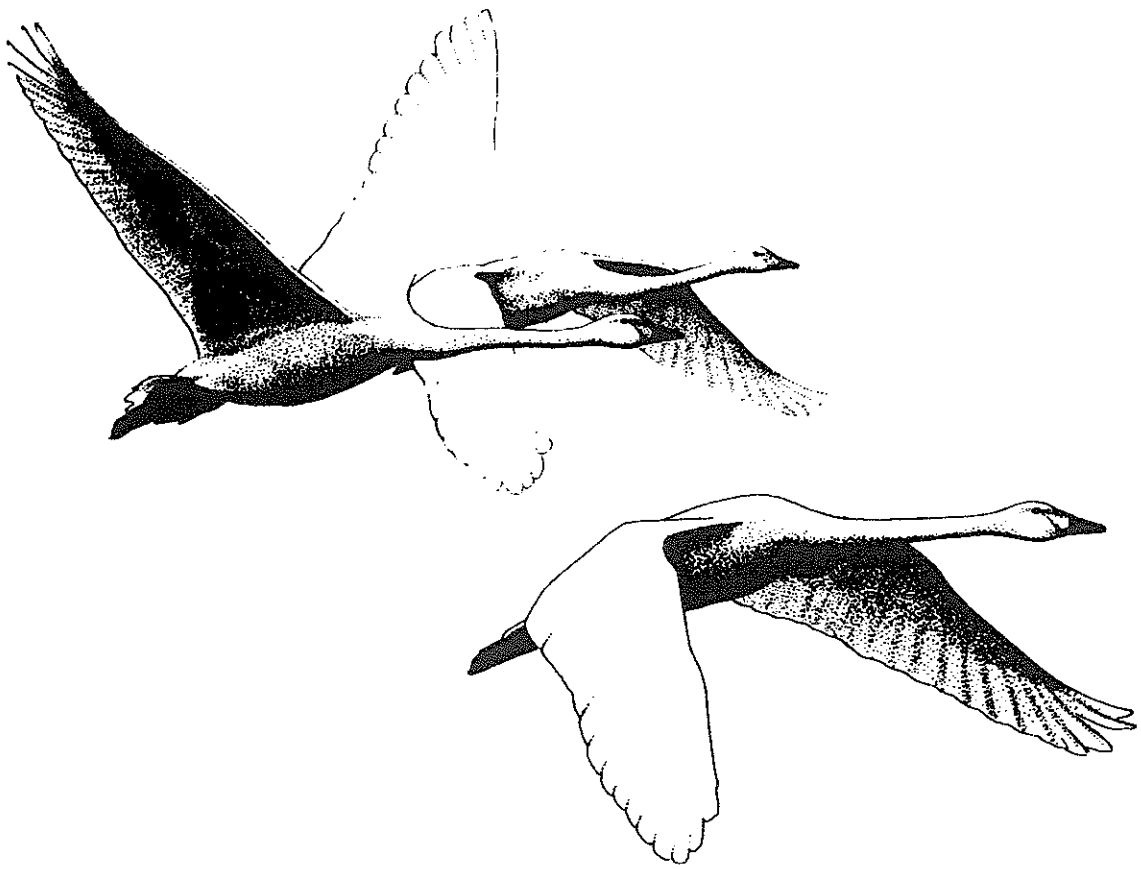


Table 13. WHOOPER SWAN: WINTER MAXIMA AT MAIN RESORTS

	88-89	89-90	90-919	1-92	92-93	(Mth)	Average
International							
Lo. Neagh/Beg	1,192	1,088	1,110	1,182	883	(Mar)	1,091
Lo. Foyle	1,960	519	988	596	1,166	(Nov)	1,046
Lo. Eye/Cromarty Fth	275	+1,695	+1,115	+340	+389	(Oct)	763
Upper Lo. Erne	582	726	896	889	612	(Feb)	741
Ouse Washes	603	686	578	707	840	(Feb)	683
Lo. of Harray	1,010	817	927	32	19	(Oct)	561
Martin Mere/Ribble Est.	406	572	538	619	530	(Nov)	533
Lo. of Skene	-	406	314	340	425	(Nov)	371
Solway Est.	446	277	96	190	94	(Mar)	221
Lo. of Strathbeg	225	264	129	176	140	(Nov)	187
Great Britain							
Lo. Leven	222	220	180	90	127	(Nov)	168
Loch of Spiggie	74	257	-	165	141	(Oct)	159
R. Tweed: J. Pool-Coldstream	263	135	131	51	139	(Jan)	144
Inner Moray Fth	112	234	87	97	+155	(Dec)	137
Wigtown Bay	75	57	103	80	105	(Mar)	84
Lindisfarne	117	102	82	70	50	(Mar)	84
R. Teviot: Nisbet-Kalemouth	-	-	-	66	82	(Nov)	74
Fairburn Ings	71	81	103	73	67	(Feb)	79
R. Teviot: Kalemouth-Roxburgh	-	-	-	65	80	(Feb)	73
Dinnet Lo.	62	152	75	35	31	(Dec)	71
Glaslyn Marshes	-	-	-	-	64	(Dec)	64
Milldam & Ballfour Mains Pools	-	-	-	66	58	(Nov)	62
Easterloch Uyeasound	61	65	-	56	57	(Nov)	60

\+ *R.J. Evans in litt*

BEAN GOOSE
Anser fabalis

International importance: **800**
Great Britain importance: **4***
All-Ireland importance: **+***

GB maximum: **352** **Jan** **Trend** **not available**
NI maximum: **0**

The number of Bean Geese recorded by WeBS returned to a more normal figure after the low of 1991-92. However, in common with other geese, this species often frequents non-wetland areas, and it is often rather hit or miss as to whether birds are present on WeBS sites at the time of the count. This is illustrated by the fact that, with the exception of December and March, fewer than 10 birds were recorded in each month (Table 1). The key site remains the Yare Valley, and 350 birds were recorded at Cantley in December, rather less than were recorded at this site in recent years (Parslow-Otsu 1992). Bean Geese featured in the spring influx of grey geese to eastern England, and 39 birds were recorded away from the two key sites, with 24 at Heigham Holmes being particularly noteworthy. The influx also included many European White-fronts and Barnacle Geese, suggesting that these birds had arrived from The Netherlands.