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No. 382

SERVICES IN ORNITHOLOGY ANNUAL REPORT 2004-05

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Foreword

The long-standing partnership between the statutory conservation agencies and BTO supports many of the bird surveillance schemes currently organised in Britain and Northern Ireland. This report gives an overview of some key results from the first year of the current BTO/JNCC Partnership and it is intended to help you locate more detailed information should you wish to do so.

The work of the Partnership is only possible because of the dedication and hard work of thousands of volunteers who freely give their time and expertise to count birds throughout Britain and Northern Ireland. The BTO and JNCC are greatly indebted to all those who contribute in this way to all the surveys and investigations organised by the Partnership and we would like to record here our sincere thanks for all these good efforts.

At the centre of the Partnership is a suite of long-term surveillance schemes that assess annually the abundance of birds in Britain and Northern Ireland. Together with two additional schemes, funded also by other partners (the RSPB for the Breeding Bird Survey and the RSPB and WWT for the Wetland Bird Survey), this surveillance covers the great majority of breeding and wintering birds with the exception of very scarce species.

The results from different schemes are combined in various ways to give a more complete picture of how bird populations are changing and whether recruitment, survival or movement are responsible for the patterns observed. The web pages for each species under the heading of Breeding Birds of the Wider Countryside Report (www.bto.org/birdtrends2004/index.htm) give summaries of their trends and some interpretations of the probable causes.

The work of the BTO/JNCC Partnership is also the basis for much additional surveying and research funded by other organisations, including Defra and other agencies. This further work seeks to investigate some species in more detail and also to discover more about the reasons for the changes observed. Thus, the Partnership is the foundation for an extensive body of research that examines the responses of birds to changing environmental conditions and this enables predictions to be made on the consequences of alternative scenarios for the future of our birds.

The work of the Partnership is reported extensively in technical peer-reviewed scientific journals, other periodicals, books and increasingly via web pages that can be readily accessed via the Internet (www.bto.org). This report includes a list of publications and other outputs from the Partnership to facilitate access to detailed information, analyses and interpretations.

We hope that you find this report informative and a useful link to more detailed and extensive information about changes in bird numbers and some of the causes responsible. If you would like to know more, please explore the BTO and JNCC (www.jncc.gov.uk) websites and then follow the links to the different subject areas.



Dr Nick Carter
British Trust for Ornithology
October 2005



Dr Ian McLean
Joint Nature Conservation Committee

INTRODUCTION

Birds are hugely popular and the public demands their conservation. Ornithology has made an enormous contribution to the advancement of wider nature conservation goals by virtue of this popular support. The value of birds as environmental indicators has been greatly enhanced by voluntary data collection on a wide scale over many years, resulting in the use of bird population trends as one of the Government's headline indicators for sustainable development. Working with volunteers has enabled the development both of extensive and intensive methods of data collection in an extremely cost-effective manner.

This report covers BTO work under the Partnership during 2004/2005 (the first year of the new agreement), including much collation and analysis of data collected in previous years.

Key results and news from 2004/2005

Data from the Wetland Bird Survey underpinned the conservation argument against developing a deep-sea container port at Dibden Bay. The Survey shows that the area supports internationally important populations of wintering birds and the development would have destroyed more than 300 hectares of prime habitat. Disturbingly, WeBS data also showed that diving ducks such as Pochard, Tufted Duck and Goldeneye have suffered catastrophic declines at their internationally important site of Loughs Neagh and Beg. Several papers using WeBS data were published in the BOU's Conference Proceedings on the effects of climate change on coastal birds (see reference list).

Results from the Breeding Bird Survey are critical to the UK Biodiversity Action Plan (BAP) and the Population Status of Birds in the UK, processes. In 2004, the survey showed that populations of some red-listed, BAP species, such as Grey Partridge, Turtle Dove, Spotted Flycatcher, Starling and Corn Bunting, have continued to decline (by between 24 and 45%) since 1994. Further analysis of the Winter Farmland Bird Survey data showed the importance of over winter stubble for breeding bird populations in the following spring. Crucially the study showed that in those 1-km squares that had 10% or more stubble in the previous winter, had increased populations of two nationally declining farmland bird species, Skylark and Yellowhammer. Several papers using data collected under the partnership were published in the important BOU Conference Proceedings on the ecology and conservation of farmland birds (see reference list).

There were great advances in electronic and online data collection and online information dissemination. Over 90% of ringing data and almost 50% of nest records were submitted electronically. It was the first full year for BBS Online, the development of which was funded by RSPB, and 30% of participants submitted their records by this method. The Breeding Birds in the Wider Countryside website, a one-stop-shop for information about the population status of our common terrestrial birds, was enhanced and updated in February 2005. In it, attention was drawn to the alerts for three species that have recently crossed the 50% decline threshold and may thus be candidates for future editions of the red section of the Population Status of Birds (PSoB) list <http://www.bto.org/psob/index.htm>: Yellow Wagtail (-67%), Willow Warbler (-58%) and Cuckoo (-56%). Two further species may become candidates for joining the amber list: Common Sandpiper (-29% over 27 years) and Lesser Whitethroat (-27% over 25 years).

Such population declines can be driven by changes in productivity and/or survival. Demographic monitoring is a key component of the Partnership programme in understanding the causes of population changes. Four species were added to the Nest Record Scheme's Concern List in 2004 because of newly detected declines in breeding performance for species with declining population trends or uncertain population status: Barn Owl, Pied Wagtail, Wheatear and House Sparrow. It is possible that such declines in breeding performance may indicate environmental problems and might exacerbate population declines or hinder population recovery.

Thanks to volunteers

We are grateful to the many volunteers who contribute so much to the conservation of wildlife in the UK by participating in the BTO/JNCC work programme. The time they spend on fieldwork alone is the equivalent of many hundreds of full-time staff. We particularly thank the BTO Regional Representatives who, also in a purely voluntary capacity, organise the fieldwork at a local level.

Thanks to land owners and managers

We would also like to thank all of the farmers, land owners and managers, who have been supportive of our work, especially in allowing volunteers ready access to their land.

The Partners

The Joint Nature Conservation Committee (JNCC) is the forum through which the three Country Nature Conservation Agencies, the Countryside Council for Wales, English Nature and Scottish Natural Heritage, deliver their special statutory responsibilities for Great Britain as a whole and internationally. These responsibilities, known as special functions, contribute to sustaining and enriching biological diversity, enhancing geological features and sustaining natural systems. For the purposes of the Partnership with BTO, JNCC also represents the Environment and Heritage Service Northern Ireland.

The special functions are: to devise and maintain common standards and protocols for nature conservation; to promote, through common standards, the free interchange of data between the country agencies and with external Partners; to advise on nature conservation issues affecting Great Britain as a whole; to pursue wider international goals for nature conservation (encouraging sustainable development, biological diversity and earth science conservation), including the provision of relevant advice to the Government; and to commission new research and collate existing knowledge in support of these activities, and to disseminate the results.

The British Trust for Ornithology (BTO) promotes and encourages the wider understanding, appreciation and conservation of birds. A key element of BTO's approach is the synergistic combination of unpaid contributions of the time and expertise of over 30,000 members and volunteers, with the professional skills of trained staff.

In pursuit of its aims, the Trust seeks to: conduct high-quality, impartial research in field ornithology; provide scientific evidence and advice on priority issues in bird conservation; and base this work on a partnership between amateurs and professionals, conducting fieldwork that is both enjoyable and scientifically rigorous.

Co-operation between JNCC (and its predecessor bodies) and BTO has been long and particularly fruitful. JNCC and the country agencies have used data and information collected by thousands of BTO members to promote the conservation of sites and habitats of importance for bird conservation throughout Britain, as well as to highlight the specific needs of individual species. More detailed research has been undertaken to investigate conservation problems and to suggest solutions.

As well as applying the results generated by BTO, JNCC contributes its conservation expertise to the Partnership, thus helping to ensure that the work addresses priority issues. BTO contributes not only the fieldwork of the volunteers but also both the ornithological and ecological expertise of its staff and members and the experience that it has of organising large-scale surveys, collating the data, and analysing the results. Both Partners contribute to the costs.

The BTO/JNCC Partnership overlaps with Partnerships responsible for the Breeding Bird Survey (with RSPB) and the Wetland Bird Survey (with WWT and RSPB).

PROGRAMME 1: LICENSING

Background

The individual Country Agencies have statutory responsibility for the licensing of ringing activities within their countries. They have related responsibilities for licensing the visiting of nests of species on Schedule 1 of the Wildlife and Countryside Act 1981 for the purpose of ringing and nest recording. The Country Agencies allow the BTO to issue permits on their behalf to suitably qualified ringers through a system of a delegated organisational licence issued to the BTO. As part of this procedure the Country Agencies require the BTO to produce reports on the numbers of licences for different activities issued.

There are three categories of BTO ringing permit: A (fully independent); C (limited independence); and T (training, operating under direct supervision only). All permits expire on the 31 March each year but the renewal period is staggered to spread the process.

Objectives

To operate a fair and strict licensing system to ensure that birds are ringed safely in accordance with high standards to ensure their welfare and to ensure that nests are recorded without harming the birds concerned.

Key Results

The number of licensed ringers in the UK has gradually increased since 1998. Only in Wales has there been no growth over the seven years.

Table 1. Total Numbers of The Three Types of Permit Issued, by Country of Residence of Ringer, in 1998 (first year of previous agreement), 2003 and 2004 (first year of new agreement)

	ENGLAND	SCOTLAND	WALES	N IRELAND	TOTAL
1998	1,409	318	106	47	1,880
2003	1,505	327	105	52	1,989
2004	1,535	329	106	51	2,021

The number of ringers with cannon-net endorsements has decreased slightly over the period, from 47 in 1998 to 43 in 2003 and 2004, following a five-year review in 2002/03. The number of licences to use unconventional marks and methods has increased rapidly from 86 in 1998 to 150 and 195 in 2003 and 2004, respectively. The number of licenses for disturbing species on Schedule 1 has remained relatively stable over the period, at 362 in 1998 and 379 and 369 in 2003 and 2004, respectively.

Key Events

BTO Guidelines published for organising Ringing training courses

Further Sources of Information

Blackburn, J.R. (2004) *Report of the British Trust for Ornithology to JNCC on Licences Issued during 2003*. British Trust for Ornithology, Thetford.

Blackburn, J.R. (2005) *Report of the British Trust for Ornithology to JNCC on Licences Issued during 2004*. British Trust for Ornithology, Thetford.

See website: <http://www.bto.org/ringing/ringinfo/become-a-ringer.htm>

Contact Point

Jez Blackburn is the Recoveries and Licensing Team leader in the Ringing Unit of the Populations Research Department. Email: ringing@bto.org.



PROGRAMME 2: SURVEYS OF BRITISH NON-BREEDING WATERBIRDS

Wetland Bird Survey

Background

The UK supports internationally important numbers of non-breeding waterbirds. In line with the requirements of international conservation Conventions and Directives, the Wetland Bird Survey (WeBS) has been designed to provide the principal data for the conservation of these birds and their habitats. WeBS data are also used in updates of the Population Status of Birds in the UK and State of the UK's Birds (www.bto.org/research/pop_trends/state_uk_birds.htm). The Wetland Bird Survey is a four-way partnership between BTO, WWT, RSPB and JNCC, the last on behalf of the individual country agencies. The day-to-day running of the Wetland Bird Survey, which includes the WeBS Low Tide Count scheme and the WeBS Alerts programme, is undertaken by the BTO.

Objectives

Wetland Bird Survey Core Counts - to assess the size of waterbird populations, determine trends in numbers and distribution, and assess the importance of individual sites for waterbirds.

Wetland Bird Survey Low Tide Counts - to count accurately, feeding and roosting waterbirds on defined sectors of intertidal habitat on major estuaries, and to assess the relative importance of different areas for feeding birds.

Wetland Bird Survey Alerts – to describe, in a standardised manner, the direction and magnitude of changes in waterbird numbers, at a variety of spatial and temporal scales. These "Alerts" are intended to be advisory and, subject to careful interpretation, to provide a platform from which to direct research and subsequent conservation efforts.

Methods

Wetland Bird Survey Core Counts – Volunteers make counts of defined wetland sites on a monthly basis, mostly within the period September to March although many counters provide data year-round. Counts are provided for all waterbirds present, although counting of gulls and terns is optional at the discretion of the counter.

Wetland Bird Survey Low Tide Counts - Volunteers count feeding and roosting waterbirds each month between November and February on pre-established areas of the intertidal habitat in the period two hours either side of low tide.

Wetland Bird Survey Alerts - Raw counts are first converted into annual indices (using counts from those months in which wintering numbers of the particular species are most stable). A smoothed line is fitted through the indices using a 'Generalised Additive Model' (or GAM), a specialised statistical technique. Changes in numbers are then calculated using values from the smoothed trend. The Alerts process assesses the change in numbers over short-, medium- and long-term periods (5, 10 and 25 years, respectively). Increases or decreases in the smoothed trend are calculated as the proportional change over the relevant time period and are categorised according to its magnitude and direction:

thus, declines of between 25% and 50% trigger Medium Alerts and declines of greater than 50% trigger High Alerts.

Key Results

WeBS Core Counts

The counts up to the end of the 2003-04 winter have been analysed and the findings will be summarised in the annual report, *Wildfowl & Wader Counts 2003-04* <http://www.bto.org/survey/webs/webs-downloads.htm>

WeBS counters covered 3,400 count sectors at around 2,000 count sites. Species exhibiting particular declines included, both European and Greenland White-fronted Geese, Dark-bellied Brent Geese, Mallard, Grey Plover, and three waders particularly dependent upon non-estuarine coasts, Ringed Plover, Purple Sandpiper and Turnstone. Conversely, some species are currently exhibiting upward trends, including Cormorant, Little Egret, Mute Swan, Pink-footed Goose, naturalised Greylag Goose, Canada Goose, naturalised Barnacle Goose, Gadwall, Avocet and Black-tailed Godwit. The previous increase in the Ruddy Duck, however, appears to have been halted and reversed, no doubt as a result of the ongoing control measures against this introduced species.



*Turnstone – one of three non-estuarine dependent wader species showing a significant decline in 2003/04.
Photo: Derek Belsey*

WeBS Low Tide Counts

During the winter of 2003-04, a total of 13 estuaries were surveyed at low tide, including Swansea Bay for the first time within this scheme, as well as the major sites of the Firth of Forth and the Humber Estuary. In total, around 130 volunteers surveyed over 36,000 ha of coastline with over 380,000 waterbirds counted. The 2003-04 surveys will be summarised in the forthcoming *Wildfowl & Wader Counts 2003-04* <http://www.bto.org/survey/webs/webs-downloads.htm>. The following year, in 2004-05, Low Tide Counts were carried out at an even higher total of 16 estuaries. The results from the 2004-05 counts are now being processed.

WeBS Alerts

A great deal of work has been undertaken to improve the automation of the WeBS Alerts processing. As a result, we are now aiming to report on the Alerts status of every statutory site on an annual basis, instead of every third year as originally envisaged. This is in addition to reporting on trends at national levels. One of the biggest conservation issues highlighted by WeBS Alerts is the demise of diving ducks on Loughs Neagh and Beg in Northern Ireland. Species such as Pochard, Tufted Duck and Goldeneye have all undergone precipitous declines triggering High-Alerts. This drop in numbers is particularly worrying given the international importance of this site for these species. To illustrate the scale of the problem, in the winter of 1995-96, these Loughs hosted almost 30,000 Pochard, about 8% of the northern European population and almost three-quarters of the UK population. In the winter of 2003/04, less than 8,000 were recorded by WeBS counters.

Key Events

The key event during 2004-05 was the transfer of the Wetland Bird Survey from The Wildfowl and Wetlands Trust to the BTO. In particular, a large amount of database development work was carried out to make the processing for reporting functions plus individual requests for data more efficient. Simultaneously, much work has been carried out in the digitisation of WeBS count site boundaries

around the UK, to the extent that virtually all sites in England, Wales and Northern Ireland, plus about half of Scotland, are now digitised.

Further Sources of Information

Websites:

General: <http://www.bto.org/survey/webs/index.htm>

Low Tide Counts: <http://www.bto.org/survey/webs/webs-ltc.htm>

WeBS Alerts: <http://blx1.bto.org/webs/alerts/index.htm>

Latest published reports:

Pollitt, MS, C Hall, SJ Holloway, RD Hearn, PE Marshall, AJ Musgrove, JA Robinson & PA Cranswick. 2003. *The Wetland Bird Survey 2000-2001; Wildfowl and Wader Counts*. BTO/WWT/RSPB/JNCC, Slimbridge. <http://www.bto.org/survey/webs/webs-downloads.htm>

Musgrove, A.J., Langston, R.H.W., Baker, H. & Ward, R.M. (Eds.) (2003) *Estuarine Waterbirds at Low Tide: The WeBS Low Tide Counts 1992-93 to 1998-99*. WSG/BTO/WWT/RSPB/JNCC, Thetford.

Contact Point

Dr Andy Musgrove is WeBS National Coordinator at the BTO.

Email: webs@bto.org



PROGRAMME 3: SURVEYS OF BRITISH TERRESTRIAL BIRDS

Breeding Bird Survey

Background

The status of wild bird populations is an important indicator of the health of the countryside. In 1994, after two years pilot work, the BTO/JNCC/RSPB Breeding Bird Survey (BBS) was launched, with the aim of improving the geographical scope of UK bird monitoring by including all habitats, and, therefore, more species of breeding birds than the previous Common Birds Census (CBC). Since the final year of the CBC in 2000, the BBS has become the primary scheme for monitoring the population changes of our common and widespread bird species in the UK. More than 2,000 sites are surveyed each year allowing the population trends for 100 species to be generated for the UK. The methodology for producing long-term joint CBC/BBS trends for about 70 species was developed under the BBS programme. These results are published annually on the BTO website, and BBS results also contribute to the Pan-European Common Bird Monitoring initiative funded by the RSPB. BBS data are important for updates to the UK Biodiversity Action Plan (BAP), Population Status of Birds in the UK and State of the UK Birds 2004 (www.bto.org/research/pop_trends/state_uk_birds.htm).

BBS data are also used in various research and conservation projects, including the development of maps of relative abundance, for estimating national population sizes, and for determining the influence of changes in land management.



*BBS is tracking the spread and increase of numbers of Buzzards.
Photo: John Harding*

Objectives

To provide population trends for a range of common and widespread birds in the UK.

Methods

The BBS uses a line-transect method in randomly selected 1-km squares. Each surveyor visits their plot twice within the breeding season, walking two 1-km transects across their square and recording all birds seen or heard. Birds are recorded in one of three distance bands, to allow species density to be calculated and detectability to be assessed, or in flight. A separate visit is made to record habitat. A large proportion of surveyors also monitor mammals in their bird transects.

Key Results

A total of 219 species and subspecies was recorded in 2004 in a record total of 2,512 squares. This compares with 212 species in 2,325 squares in 2003. Twenty-three species declined and 49 increased significantly between 1994 and 2004. The remaining species showed no significant change in abundance. Table 2 shows the species that either declined or increased during this ten-year period. Long-distance migrant species in particular showed an improvement in population status since the drops in numbers recorded in 2003, with 22 of 25 species increasing since 2003.

Table 2. Declining and Increasing Populations of Bird Species in 1994-2004.

Declining		Increasing
>50%	25-50%	>50%
Wood Warbler		Greylag Goose
Willow Tit	Shelduck	Canada Goose
	Grey Partridge	Red-legged Partridge
	Curlew	Buzzard
	Turtle Dove	Coot
	Tawny Owl	Snipe
	Yellow Wagtail	Sand Martin
	Lesser Whitethroat	Great Spotted Woodpecker
	Spotted Flycatcher	Nuthatch
	Pied Flycatcher	Stonechat
		Raven
		Grasshopper Warbler
		Goldcrest
		Chiffchaff
		Blackcap
	Starling	
	Siskin	
	Corn Bunting	

Key:

Red = Species of High Conservation Concern (Red Listed)

Orange = Species of Medium Conservation Concern (Amber Listed)

Taken from - Population Status of Birds in the UK: Birds of Conservation Concern 2002-2007

<http://www.bto.org/psob>

Key Events

This was the first full season that BBS-online, the development of which was funded by the RSPB, was operating and 30% of participants submitted their records by this method. BBS Online allows observers to submit their BBS records electronically via the web, manage their data, view results of the BBS and download reports (see website address below).

Counts of mammals recorded by BBS participants were analysed to produce population trends for seven species, and information on an additional six species were used to assess their population status. This information was published in Newson and Noble (2005) and in the first major report of the UK Tracking Mammals Partnership (www.trackingmammals.org).

Further Sources of Information

Raven, M.J., Noble, D.G. & Baillie, S.R. (2005) *The Breeding Bird Survey 2004*. BTO Research Report 403, British Trust for Ornithology, Thetford. www.bto.org/bbs/results/latest_results.htm

Newson, S.E. & Noble, D.G. (2005). The production of population trends for UK mammals using BBS mammal data: 1995-2003 update. BTO Research Report 404, British Trust for Ornithology, Thetford. www.bto.org/bbs/research/reports_papers.htm

Website: www.bto.org/bbs

Contact Points

Dr David Noble is the Head of the Census Unit, in the Populations Research Department, and oversees the running of the BBS and other bird surveys.

Mike Raven is the National Organiser for the BBS and is responsible for its day-to-day running.

Email: bbs@bto.org



Dr David Noble

Mike Raven

PROGRAMME 4: NATIONAL RINGING SCHEME

Numbers of Birds Ringed and Recovered in 2004 and Research

Background

Much has been discovered about birds by watching and counting them, but such methods rarely allow birds to be identified as individuals. This is essential if we are to learn about how long they live and when and where they move, questions that are vital for bird conservation. Placing a lightweight, uniquely numbered, metal ring around a bird's leg, provides a reliable and harmless method of identifying birds as individuals. Each ring carries an address so that anyone finding a ringed bird can help by reporting its whereabouts and fate. Some ringing projects also use colour rings to allow individual birds to be identified in the field. Information from the National Ringing Scheme is used in the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention)

Methods

Birds are caught for ringing in a variety of ways. About twenty percent are ringed as chicks in the nest; this is valuable because their precise age and origin are then known. The method most frequently

used to catch fully-grown birds is mist-netting, where a fine net is erected between poles and traps birds in flight. This method is very effective but birds can only be removed safely from mist-nets by experienced ringers, who have received special training.

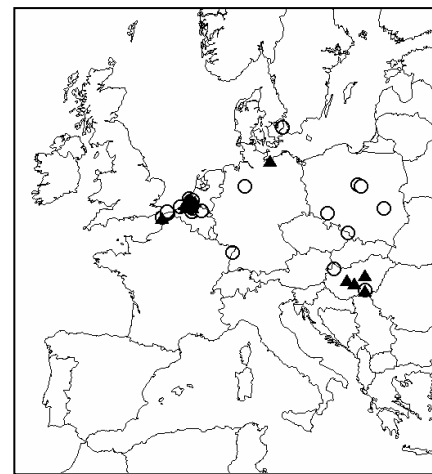
Objectives

The primary aim of the Ringing Scheme is to contribute to our understanding of population changes by monitoring the survival rates, productivity and dispersal of a wide range of species. The Ringing Scheme places increasing emphasis on the development of planned projects following specific study designs. The Scheme also makes an important contribution to our knowledge of bird movements, particularly through analyses of ring recoveries. The Ringing Scheme also aids other aspects of basic science, particularly studies of life history strategies, moult, condition and taxonomy.

Key Results

2003

The number of birds ringed (848,532) was the highest since 1996 and was 16% higher than the mean from the previous five years. The recovery total of 11,554 was the highest since 1998 and around 5% higher than both the 2002 total (11,041) and the mean for the previous five years (10,972). Recoveries of particular note included three species that are expanding. They were the second report of a BTO-ringed Little Egret that moved 24 km from its natal site, eight reports of foreign-ringed Great White Egrets bringing the total to 13 and 10 Mediterranean Gulls bringing the total to 46. One Great White Egret was first sighted in South Yorkshire on 19 July, was in Essex on 26 July, Cambridge on 28 July and at the end of August had moved to Devon. Also of interest was the movement of a Blue Tit, normally a sedentary species, from Bardsey Island, Gwynedd (where few Blue Tits are ringed) to Cape Clear, Cork where they are rare migrants.



Foreign ringing locations of Mediterranean Gulls reported in Britain and Ireland. Triangles show ringing locations of all birds first seen pre-2000, and circles show ringing locations of all birds first seen post-2000. The increase in colour-ringing effort across Europe is reflected in the greater geographical spread of ringing locations.

Work was carried out during the year on the post-release survival of rehabilitated birds. This was assessed by calculating the elapsed time between release after rehabilitation and death and comparing it with the elapsed time for healthy ringed birds. The median time elapsed was significantly shorter for rehabilitated birds of nearly all species, with most rehabilitated birds being recovered in the first year. For some species it seems unlikely that rehabilitated birds will rejoin the population although some, particularly Mute Swan, are able to do so. Large numbers of BTO-ringed seabirds, particularly Guillemots, were recovered following five major oil spills between 1993 and 2002. An analysis of the age structure and origins of the Guillemots reported showed differences depending on the area where the spill took place. Birds from eastern colonies winter in more northerly areas than birds from western colonies and immatures winter further from the colonies than adults.

Biometric data collected by ringers for 17,744 Blackbirds was used to model how mass changes both diurnally and seasonally. As predicted, reduced temperature and day length resulted in increased mass *i.e.* birds put on weight in winter when the risk of starvation increased. The birds appear to be determining their weight in response to environmental conditions. Work on post-fledging survival of passerines showed that daily mortality was much higher during the eight to ten weeks after fledging than in the rest of the first year or while an adult. Recent analyses of Song Thrushes suggest this is



*Ringling is helping to unravel where Guillemots spend the winter and what happens to rehabilitated birds.
Photo: Stuart Newson*

not likely to be a key driver of population trend, although it may be a factor in the decline of Spotted Flycatchers.

Recovery data for 45 species were supplied to 22 ornithologists to assist with their research. Recoveries of all species to or from Benin, Niger and Guinea Bissau were supplied, as were summaries for Essex, Ireland, Lundy Island and Scotland. Biometric data for ten species were supplied to one researcher. A list of publications resulting from the analysis of recoveries and other studies involving ringing is included below. In 2003, 45 papers by non-BTO staff were published that used ringing data.

Key Events

In 2004 90% of ringing data was submitted electronically by ringers.

A reduction in ring prices from the manufacturers and increased efficiency at HQ, as a result of computerisation, allowed a decrease in ring prices and led to an increase in ringing totals.

A first ringing course for beginners was run, and led to a number of new trainees being recruited.

Posters describing the work of the Scheme were produced and made available for ringing demonstrations and conferences.

Further Sources of Information

Clark, J.A., Robinson, R.A., Balmer, D.E., Adams, S.Y., Collier, M.P., Grantham, M.J., Blackburn, J.R. & Griffin, B.M. (2004) Bird ringing in Britain and Ireland in 2003. *Ringling & Migration* **22**, 85-127. http://blx1.bto.org/pdf/ringmigration/22_2/rr03vers1.pdf

Joys, A.C., Clark, J.A., Clark, N.A. & Robinson, R.A. (2003) An Investigation of the Effectiveness of Rehabilitation of Birds as shown by Ringling Recoveries. BTO Research Report No 324. BTO, Thetford. Abstract: www.bto.org/research/reports/researchrpt_abstracts/2005/rpt_324.htm

Grantham, M.J. (2004) Age structure and origins of British & Irish Guillemots recovered in recent European oils spills. *Atlantic Seabirds* **6 SI**, 95-108.

MacLeod, R., Barnett, P., Clark, J.A. & Cresswell, W. (2005) Body mass change strategies in Blackbirds *Turdus merula*: the starvation-predation risk trade-off. *Journal of Animal Ecology* **74**, 292-302.

Website: www.bto.org/ringling

Ringling and Migration website: www.bto.org/ringling/rmj

Contact Point

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PROGRAMME 5: BIRD SURVIVAL AND MOVEMENTS

Population Dynamics

Background

Information on changes in abundance, changes in productivity and changes in survival rates can be drawn together as part of the Integrated Monitoring Programme to help understand the demographic and environmental causes of population change. This then helps to inform the Partnership about where conservation action and research might be focussed.

Programme 5 also includes the organisation and running of two ringing programmes: RAS (Retrapping Adults for Survival) and CES. RAS is a relatively new scheme that aims to provide data for the analysis of survival rates for species for which ringing recoveries provide insufficient data for the production of annual estimates. CES provides information on annual population changes as well as survival rates and breeding success for species in scrub and reed habitats.

Objectives

Three research elements were included in the programme of work: (a) publication of analyses of (i) nesting success and (ii) survival rates and weather, within the context of global climate change described previously in the 03/04 Annual Report; (b) the completion of work started in 03/04 on an analysis of temporal trends in reporting rates and how they vary between species and regions – this is described below; and (c) commencement of the development of novel methods to permit the analysis of survival rates from Constant Effort Sites (CES), where a large number of sites each contribute small numbers of recaptures to the data set; to be completed in 05/06.

Methods

Several recent analyses of survival rates have highlighted continuing reductions in ring reporting rates that are having a negative impact on the precision with which changes in survival can be measured. This in turn will affect the demographic monitoring framework that is being developed by JNCC and BTO. This work aims to identify the main patterns of variation in reporting rates, in order to inform actions aimed at increasing the numbers of recoveries that are reported.

For all species with adequate data (>100 recoveries of birds ringed since 1950) we accumulated the proportions of birds recovered within five years of ringing, calculating separate proportions for each decade (1950s, 1960s....1990-1998). Most small birds will have died within a five-year period, although it should be noted that for longer-lived birds this proportion underestimates the ultimate probability of recovery. In each case however, variation between decades gives a credible picture of the extent to which the likelihood of reporting has declined. For these analyses, species were combined into groups of species with similar ecology (*e.g.* seabirds, migrants, seed-eaters *etc.*)

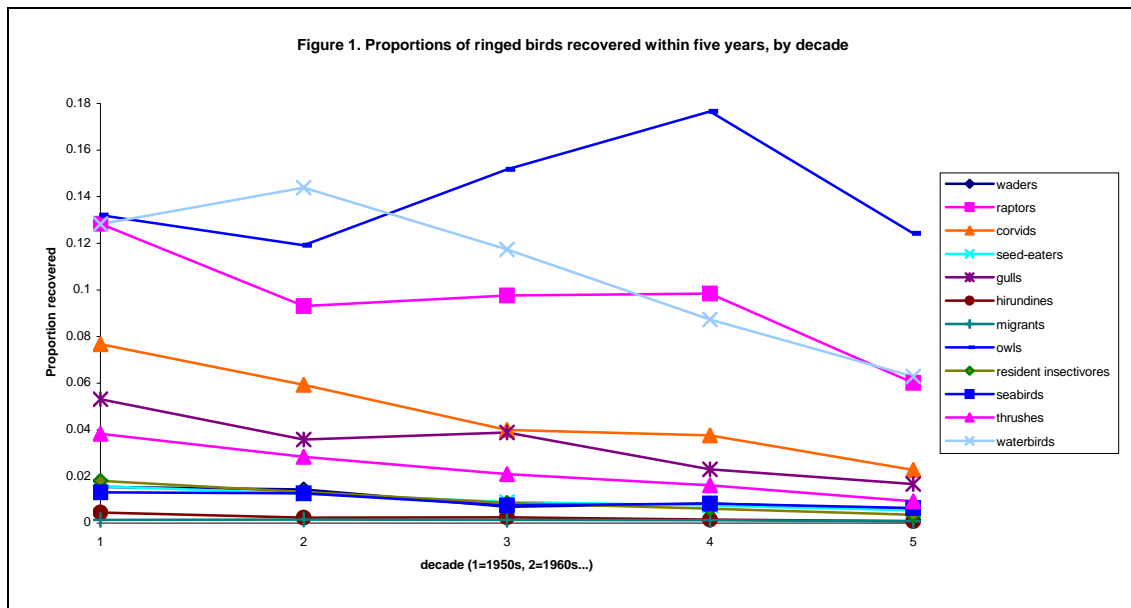
A more sophisticated approach was applied to six example species: the fitting of very simple standard stochastic models for the survival and reporting processes. This approach explicitly adjusts the probability of reporting to account for birds that survive beyond the period of the study.

Key Results

The chances of recovery are dependent upon the size of the bird, being highest for owls, raptors and waterfowl and lowest for hirundines and migratory insectivores. The latter two groups are not only small bodied but also spend much of the year in, or *en route* to, Africa where lower (human) population density means the chances of recovery are lower. Seabirds, though large, are an exception to the general pattern as their largely maritime existence results also in a very low likelihood of recovery.

For all categories of bird there has been a general decline in reporting probability, frequently by more than 20% per decade (Figure 1). Species of similar ecology tend to show similar rates of decline. Those that defy the general trend are easily explicable: increasing reports of Barn Owls and Siskins can probably be attributed to an increase in traffic, and in the utilisation of garden feeders, respectively. The greatest declines tend to be experienced by resident insectivores, thrushes and hirundines.

Investigation into means of enhancing reporting rates is now being pursued. The BTO has developed a system of multi-lingual, pan-European, web-based reporting for ring recoveries through the EURING website. In addition, experimental trials have begun in five European countries, including the UK, to investigate the value of internet addresses on rings for returns in comparison to postal addresses.



Key Events

A paper is in preparation for 'Ringed & Migration'.

Further Sources of Information

Baillie S.R. & Green R.E. (1987) The importance of variation in recovery rates when estimating survival rates from ringing recoveries. *Acta Ornithologica* **23**, 41-60

The EURING website is www.euring.org

Contact Point

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Constant Effort Sites Scheme

Background

The Constant Effort Sites (CES) scheme was the first national standardised ringing programme within the BTO Ringing Scheme and has been running since 1983. Ringers set their nets in the same pattern, for the same time period at regular intervals through the breeding season at around 130 sites throughout Britain and Ireland.

Objectives

The scheme provides valuable key information on (1) changes in population size, (2) changes in breeding success and (3) adult survival rates for 28 species of common songbird. The scheme provides such information from habitats that are not well covered by other schemes: particularly reedbeds and lowland scrub.

Methods

The CES scheme uses catches from standardised mist-netting to monitor key aspects of the demography of 28 common breeding songbirds. At over 120 sites throughout Britain and Ireland, dedicated ringers erect mist-nets in the same positions and for the same length of time, during twelve visits spread between early May and late August each year. Changes in the total number of adults caught provide a measure of changing population size, while the proportion of young birds caught forms an index of breeding success. Retraps of adult birds ringed in previous years are used to estimate annual survival rates. The ringers also collect detailed habitat information about their sites every three years. We have begun developing a methodology to enable the routine production of annual adult survival rates.

Key Results

A total of 121 and 122 sites were covered in 2003 and 2004 respectively. Coverage after the Foot and Mouth outbreak in 2001 has not yet returned to the record level of 147 sites in 2000. The majority of sites are located in reedbeds, wet and dry scrub and a small number of sites in deciduous woodland. There were statistically significant increases in the numbers of adults caught between 2003 and 2004



*Good overwinter survival resulted in more adult Sedge Warblers being caught in 2004.
Photo: Dawn Balmer*

for Sedge Warbler, Reed Warbler, Whitethroat, Blackcap, Willow Warbler and Reed Bunting. Interestingly all these species had a below average breeding season in 2003 which suggests overwinter survival must have been good. All, except Reed Bunting, are long-distance migrants, which suggests conditions in Africa might have been good. Four species showed a statistically significant decline in the number of adults caught between 2003 and 2004: Dunnock, Blackbird, Song Thrush and Blue Tit. Comparing productivity to 2003 (which was below average) eleven species showed a statistically significant increase: Wren, Dunnock, Robin, Blackbird, Song Thrush, Cetti's Warbler, Blackcap, Chiffchaff, Long-tailed Tit, Blue Tit and Great Tit. Only Willow Warbler and Goldfinch showed a statistically significant decline in productivity between 2003 and 2004 and for both species breeding success was below the long-term average. Willow Warbler shows a long-term decline in productivity although in 2002 and 2003 productivity was actually above average. Goldfinch shows quite large annual variation in breeding success and has shown a shallow increase over the last ten years.

Key Events

CES News published in spring 2003 & 2004
CES meeting at the BTO Annual Conference, December 2004

Further Sources of Information

Website: www.bto.org/ringing/ringinfo/ces

Contact Point

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Retrapping Adults for Survival

Background & objectives

Retrapping Adults for Survival (RAS) uses recaptures (or resightings of colour-marked individuals) of adult birds to calculate what proportion survives between breeding seasons. The retrapping of marked individuals enables adult survival to be estimated much more precisely than using ring recoveries, especially for species that have low recovery rates.

RAS aims to provide information on adult survival for a range of species in a variety of habitats, particularly those of conservation concern and those not well monitored by other BTO ringing.

Methods

An individual ringer or a group of ringers choose a study species and a study area. They aim to catch all of the adults (or all adults of one sex) of their chosen species in the study area each year. Species targeted under RAS need to show a high fidelity to breeding sites from year to year: otherwise, birds that die cannot be separated from those that move away from the study area. Each RAS study should run for at least five years, but preferably much longer, so that high-quality survival rates can be calculated and changes monitored.



Pied Flycatcher is the most commonly selected species for RAS studies.

Photo: Tommy Holden

Key results

In 2004, we received 114 data sets, covering 44 species. This is the same number of projects as in 2003. All but 23 projects were on passerines, although there were studies on 14 species of seabird, wader and other non-passerines. Pied Flycatcher, with 17 studies, Sand Martin, with 16, and Swallow and House Sparrow, with 7, were the most popular species for studies. Tree Sparrow, Linnet and Arctic Tern are proving difficult species for RAS ringers, and have dropped out of the sample.

The number of data sets submitted to RAS has now passed a thousand. There are 26 projects with 10 or more years of data.

Key events

Details of a RAS study have been published for Reed Warblers at Rostherne Mere (Calvert 2005) and a paper on a RAS-style study of Sand Martins is in press (Cowley & Siriwardena 2005). Further assessments are taking place of which studies have produced sufficient data for survival analysis. The

RAS database has been upgraded. Improvements to the RAS submission pages have been proposed for the next version of IPMR.

Further sources of information

Website: www.bto.org/ringing/ringinfo/ras

Contact point

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PROGRAMME 6: BREEDING PERFORMANCE AND PRODUCTIVITY

Background

The Nest Record Scheme (NRS) gathers data collected by volunteer birdwatchers throughout Britain and Ireland who find individual nests and record their progress. It is the largest and most computerised survey of its type in the world and is an important component of the BTO's Integrated Population Monitoring Programme, which aims to understand the demographic and environmental factors underlying population changes of birds in the UK. Over 250 papers that use NRS data have been written since the scheme began in 1939, covering not only information on the breeding biology of UK birds, but also providing contributions to population dynamics studies. More recently, the long-term nature of the NRS dataset has allowed it to play an important role in the study of the impacts of global climate change.

Objectives

To monitor the productivity of the UK's bird populations and produce annual trends for a range of breeding parameters, including laying dates, clutch size, brood size and failure rates during the egg and young stage. These trends are reported annually to the JNCC and are published in the web-based *Breeding Birds in the Wider Countryside* report (<http://www.bto.org/birdtrends/>), which highlights statistically significant declines in reproductive success over a range of time scales for over 90 species. The Scheme makes important contributions in the diagnosis of the demographic and environmental causes underlying population changes of birds in the UK, in combination with data on abundance and survival from other BTO schemes. The Scheme also aims to improve our understanding of the nesting habits of the UK's birds, identifying preferred nesting sites and habitats and investigating their influence on the productivity of breeding attempts.

Methods

A network of approximately 450 volunteer nest recorders and recording groups across the UK currently submit about 30,000 records to the Nest Record Scheme each year. Each record details the history of a single breeding attempt at an individual nest. Observers record species, county, year, place name, six-figure grid reference, altitude, dates of each visit, numbers of eggs or young, standardised codes to describe the developmental stage of nests, eggs, young, activity of the parents and the outcome of the nest (giving cause of failure if known). In addition, observers record specific details of the nest site and the habitat surrounding it, using a set of standard habitat codes. Data are computerised, undergo integrity checks and are then incorporated into the NRS Oracle database. A range of specially developed analytical programs is then used to produce information on the key breeding performance variables for the Scheme.

Key Results

The total number of nest records submitted for 2004 was 31,264 (172 species), which is a 10% increase on the previous year and the highest total since 1999. In 2004, 18,117 records for over 90 species were added to the NRS Oracle database. This number is significantly higher than in previous years because of the substantial contribution (11,322 records) made by data submitted using IPMR, the home inputting computer program (see below).

Species are placed on the *NRS Concern List* if they display statistically significant declines in any aspect of breeding performance measured over at least the 15 years prior to the analysis, providing that they are also either on the Red or Amber Lists of conservation concern or there is some uncertainty over their population status. The most recent analysis (November 2004) placed 15 species on the Concern List: Moorhen, Ringed Plover, Lapwing, Barn Owl, Yellow Wagtail, Grey Wagtail, Pied Wagtail, Dunnock, Wheatear, Willow Warbler, House Sparrow, Linnet, Bullfinch, Yellowhammer and Reed Bunting. Four of these species — Barn Owl, Pied Wagtail, Wheatear and House Sparrow were new to the list in 2004.

Key Events

As a result of vigorous promotion by NRS staff, 49% of nest records were submitted electronically, using Integrated Population Monitoring Reporter (IPMR), in 2004, and absolute increase of c. 2,500 records relative to 2003. The proportion of recorders using IPMR to submit their records also rose from 33% to 39%. NRS Staff have also been actively involved in the further development of IPMR. In the forthcoming v2.2, the validation of nest record data will be greatly enhanced, of great benefit to the efficiency of the scheme.

Nest Record News, the NRS newsletter sent annually to all nest recorders and ringers, has benefited from a substantial number of articles written by nest recorders on nest finding techniques. The newsletter highlighted a long-term fall in the number of records submitted for open-nesting species and it is hoped that such articles will help to reverse this trend.

The NRS email discussion group set up in 2003 has thrived, expanding to 129 members. Thus far, over 350 messages have been posted and it is certainly facilitating discussion between nest recorders on topics including nest finding techniques and the progress of each season. The annual Nest Record Meetings at the main BTO conference at Swanwick are also gaining momentum, with over 60 delegates attending the meeting in December 2004.

Further Sources of Information

Nest Record News No. 21, published 2005.

Website (redesigned in November 2004): www.bto.org/survey/nest_records/index.htm

Crick, H.Q.P., Baillie, S.R. & Leech, D.I. (2003) The UK Nest Record Scheme: its value for science and conservation. *Bird Study* **50** 254-270. www.bto.org/membership/birdstudy.htm

Contact Point

Dr David Leech is the Head of the Nest Record Scheme and a new Nest Records Officer is currently being appointed. Both work in the Demography Unit in the Populations Research Department. Email: nest.records@bto.org.



PROGRAMME 7: ALERTS AND POPULATION ASSESSMENT

Background

This programme consists of the Breeding Birds in the Wider Countryside website (details below) that is a “one-stop-shop” for information about the population status of our common terrestrial birds (over 100 species). Each species has one page devoted to it giving details of trends in population size and breeding productivity, currently over the period 1967-2002 as measured by BTO monitoring schemes.

Objectives

To provide a comprehensive, easy-to-understand synopsis of the current state of the nation’s terrestrial birds.

Methods

A range of surveys organised by the BTO are utilised in this programme: BTO/JNCC/RSPB Breeding Bird Survey; Common Birds Census; Waterways Bird Survey; Heronries Census; Constant Effort Sites Scheme; and Nest Record Scheme. For each species covered there is general information concerning species’ conservation listings, a brief summary of observed changes in the size of the population and information concerning the possible causes of these changes. A series of graphs and tables are presented showing the trends and changes in relative abundance and breeding performance over the past 35 years. Trends from the BBS for England, Scotland, Wales and Northern Ireland are also presented. A system of Alerts is used to highlight population declines of greater than 25% or 50% that have occurred over the past 5, 10, 25 and 35 years.

Key Results

Twenty-three species have shown declines of 50% or more over the longest available time period (usually 35 years) and 12 have shown moderate declines of between 25 and 49% over periods of between 25 and 35 years. In the 2004 report, attention was drawn to the alerts for three species that have recently crossed the 50% decline threshold and may thus be candidates for future editions of the red section of the Population Status of Birds (PSoB) list: Yellow Wagtail (-67%), Willow Warbler (-58%) and Cuckoo (-56%). Two further species may become candidates for joining the amber list: Common Sandpiper (-29% over 27 years) and Lesser Whitethroat (-27% over 25 years).

Species showing declines of 50% or greater and 25 to 49% between 1967 and 2002.

DECLINES OF			
	>=50%		25-49%
Grey Partridge	Little Grebe		Red-legged Partridge
Woodcock	Turtle Dove		Kestrel
Cuckoo	Lesser Spotted Woodpecker		Lapwing
Skylark	Tree Pipit		Redshank
Yellow Wagtail	Song Thrush		Common Sandpiper
Whitethroat	Willow Warbler		Meadow Pipit
Spotted Flycatcher	Marsh Tit		Grey Wagtail
Willow Tit	Starling		Duncock
House Sparrow	Tree Sparrow		Mistle Thrush
Linnet	Lesser Redpoll		Lesser Whitethroat
Bullfinch	Yellowhammer		Goldcrest
Corn Bunting			Reed Bunting

Key Events

Website updated in February 2005 (updated annually). Improvements this year included a new section on key findings and the addition of links to on-line Atlas maps.

Further Sources of Information

Website: www.bto.org/birdtrends2004/index.htm.

Contact Point

Dr Stephen Baillie is Director of Populations Research at the BTO and has overall responsibility for producing the Breeding Birds in the Wider Countryside website.

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PROGRAMME 8: ENVIRONMENTAL CHANGE PREDICTION

Background and objectives

Habitat loss, deterioration of habitats and shifts in land use have frequently been identified as factors underlying population changes in bird populations. The widespread declines in farmland birds since the 1970s form an especially clear example, though some of the recent declines in woodland birds may also be linked to habitat change. This programme covers a range of topics concerned with understanding and predicting the effects of environmental change, especially habitat change, on British bird populations. Several of the projects in this programme focus on habitat requirements and distribution patterns of birds at different scales with the aim of identifying key habitats and regions for species. The information derived from these studies contributes to finding solutions to the loss and degradation of habitats, in terms of both policy and habitat management practices. Work undertaken in 2004/05 focused on lowland farmland and woodland habitats with the following objectives:

- (1) Lowland farmland: An analysis of broad-scale patterns of habitat selection and regional distribution of birds in winter was conducted. This work provides new information on the requirements of farmland birds in winter at a national scale. Two specific pieces of work, for which results are summarised below, provided detailed insights to the winter ecology of farmland birds. Firstly, an analysis of winter habitat needs for farmland birds was undertaken and provision of these habitats was then related to spatial and temporal variation in bird abundance in the breeding season. The results of this study have important implications for conservation measures to reverse declines in farmland bird numbers. Secondly, a study was carried out of the status and changing distribution of the internationally important wintering Golden Plover and Lapwing populations in Britain. These populations are spread widely over inland farmland, as well as throughout coastal areas, and information about their distribution and trends is far less complete than that for the predominantly coastal wader species.

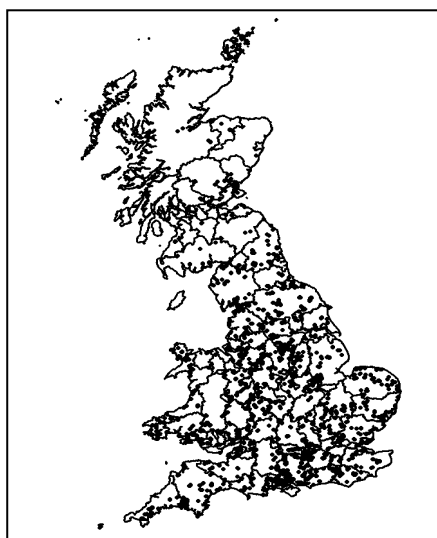
- (2) Lowland woodland: A review was published in March 2005 of the possible causes of recent declines in woodland birds. Current and future programmes of work will build on this review to examine selected hypotheses and to establish a better understanding of the habitat needs of declining species. The major new piece of woodland work undertaken in 2004/05 was the design and launch of a large-scale national survey of woodland birds – the BTO/JNCC Scarce Woodland Bird Survey (SWBS). The approach taken with SWBS is described below. The aims are to provide new information on the habitat needs of woodland birds, emphasising those species that have declined.

Methods

Both farmland projects demonstrated the enormous value of combining data from different large-scale data sets. In both cases much of the data derived from the BTO/JNCC Winter Farmland Bird Survey (WFBS). This project determined the population status, distribution and crop and habitat usage in winter of 30 species of farmland birds. The data were collected over three winters, the first in 1999/2000. For a full account of the methods see www.bto.org/survey/complete/wfbs/introduction.htm. The main part of the survey involved the systematic survey of >1000 1-km squares spread throughout British lowland farmland. In the study of the effects of winter habitat provision, WFBS data were combined with data from the BTO/JNCC/RSPB Breeding Bird Survey (BBS). In the Golden Plover and Lapwing study, WFBS data were supplemented with information from the BTO/WWT/RSPB/JNCC Wetland Bird Survey (see Programme 2).

The SWBS is a two-year project focusing on 28 target woodland species (listed below), some scarce and declining and others more common and widespread. The main part of the survey, termed ‘Woodland Walks’ involves volunteer surveyors choosing two comparable woods, one ideally containing at least one of the eight key species (see list). Within these woods transects of at least 500 metres are walked and all target bird species are mapped at 1:2500 scale. At least two visits are required, one between late March and late April; the second in May. Observers also provide information on stand structure using an innovative diagrammatic method, together with details of woodland management and tree species composition. The SWBS is also gathering ‘Casual Records’ of the eight key species (see list) from any habitat across the UK throughout the breeding season. These sightings are either being recorded on forms or through BirdTrack. This part of the project aims to both increase the sample of these particularly scarce and/or elusive species and also to gain an understanding of habitats other than woodland that may be important to them.

Map of SWBS coverage. Each dot represents at least one site/pair. By March 2005, some 650 volunteers had registered just over 1000 ‘Woodland Walks’ to be carried out in the first year of the survey.



List of 28 target species (*' denotes the 8 KEY Species)

Blackcap (BC)	Mistle Thrush (M)
Bullfinch (BF)	Nightingale (N)
Chiffchaff (CC)	Nuthatch (NH)
Crested Tit (CI)	Pied Flycatcher (PF)
Dunnock (D)	Redstart (RT)*
Firecrest (FC)*	Siskin (SK)
Garden Warbler (GW)	Song Thrush (ST)
Great Spotted Woodpecker (GS)	Spotted Flycatcher (SF)
Green Woodpecker (G)	Treecreeper (TC)
Goldcrest (GC)	Tree Pipit (TP)*
Hawfinch (HF)*	Turtle Dove (TD)
Lesser Redpoll (LR)*	Willow Tit (WT)*
Lesser Spotted Woodpecker (LS)*	Willow Warbler (WW)
Marsh Tit (MT)	Wood Warbler (WO)*

State of the UK's Birds 2004

www.bto.org/research/pop_trends/state_uk_birds.htm

Results

Effects of provision of overwinter habitat for farmland birds: Of the 1090 1-km squares covered by the WFBS, there were 601 squares that were also surveyed by the BBS. Comparison of the two data sets showed that abundance of individual species was highly correlated across seasons. Moreover, squares that contained key winter habitats (pasture for invertebrate feeders; stubbles for granivores) had relatively higher bird abundance in winter relative to summer than squares lacking these habitats. The habitat data collected under WFBS allowed 1-km squares to be categorised according to whether winter stubble was present or not. Breeding population trends (1994-2003) were then calculated for squares with and without stubble. For species known to require stubble fields, declines over the 10-year period were less in squares with stubble. Crucially, declines in Skylark and Yellowhammer breeding populations were reversed in squares with more than 10 ha of stubble. This is the first indication of the likely area of stubble needed to reverse declines in some farmland species. Critical areas of stubble could be reduced if stubble quality can be improved *i.e.* if the stubble was rich in weeds. These results indicate that promotion of high-quality stubble fields through Environmental Stewardship should help to reverse declines of seed-eating birds.

Changing distributions of wintering Golden Plovers and Lapwings: Regional trends showed a pronounced increase in numbers of both species since 1974 on the east coast, with a smaller increase on the south coast. Numbers in the west and north have tended to decline. Flocks on farmland are now more concentrated in eastern Britain than was the situation in the 1980s; this is especially evident for Golden Plover. Hence, wintering Golden Plovers and a large proportion of the Britain's wintering Lapwings are now concentrated into the arable zone of the country. These findings point to a shift in winter distribution in Britain over recent decades, particularly for Golden Plover. What has caused this redistribution? The most likely explanation is that milder winters have allowed birds to winter closer to their breeding grounds. Any advantage in wintering further west to avoid mortality from cold-weather is now presumably reduced. Several estuarine waders have shown a similar distributional shift within Britain which is also thought to be a consequence of climate change.

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Contact Points



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Dr Rob Fuller is Director of Habitats Research. Enquiries about the woodland research programme should be addressed to him in the first instance.

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Financial Statement

Total Costs	Income Net of VAT		
2004/05	JNCC	Others	BTO
£937,213	£500,832	£183,166	£253,215