The Breeding Bird Survey 1995-1996

British Trust for Ornithology

JOINT NATURE CONSERVATION COMMITTEE

RSPB

The Breeding Bird Survey 1995-1996

Report Number 2

BBS

by

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Published by
British Trust for Ornithology, Joint Nature Conservation Committee and
Royal Society for the Protection of Birds,
August 1997

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RSPB

BTO Research Report Number 181
ISSN 1368-9932
ISBN 0-903793-79-2

BREEDING BIRD SURVEY

The Breeding Bird Survey partnership comprises:

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ACKNOWLEDGEMENTS

This second Annual Report for the Breeding Bird Survey (BBS) covers the years 1995 and 1996. Over 2000 volunteers are now involved in the BBS, generously donating their free time to collect bird, habitat and mammal data across the whole of the UK. We would like to thank everyone who has been involved with the BBS since it began in 1994 either as a volunteer carrying out the leg-work and counting the birds or by acting as a Regional Organiser promoting the survey to local birdwatchers.

The BBS is organised by the British Trust for Ornithology (BTO), and jointly funded by BTO, the Joint Nature Conservation Committee JNCC: (on behalf of English Nature, Scottish Natural Heritage, Countryside Council for Wales and the Environment and Heritage Service in Northern Ireland) and the Royal Society for the Protection of Birds (RSPB). The BBS Steering Group comprises David Stroud (JNCC), Dr David Gibbons (RSPB), Dr Stephen Baillie (BTO) and Dr Richard Gregory (BTO).

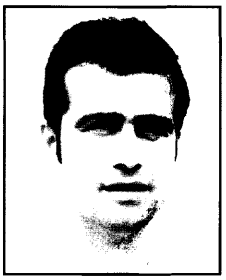
We are grateful to the following people who have provided assistance to the scheme since its inception: Dr Mark Avery (RSPB), Lyn Aylward (BTO), Dr Ian Bainbridge (RSPB), George Boobyer (JNCC), Tracey Brookes (BTO), the late Dr Steve Carter (BTO), Anita Donaghy (RSPB), Dr Colin Galbraith (JNCC), Dr David Gibbons (RSPB), Dr Jeremy Greenwood (BTO), Viv Hiom (BTO), Mike Meharg, Chris Morley (BTO), Ken Perry (BTO), Carol Povey (BTO), Nicki Read (BTO), Samantha Rider (BTO), Dr Ken Smith (RSPB), David Stroud (JNCC), Susan Waghorn (BTO), Jane Wells (BTO) and Richard Weyl.

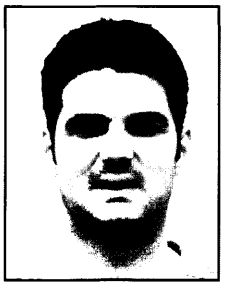
The Pilot Census Project, which was a forerunner of the BBS, was supported under a contract from the Joint Nature Conservation Committee (on behalf of English Nature, Scottish Natural Heritage, Countryside Council for Wales and the Environment and Heritage Service in Northern Ireland). The project to evaluate sampling strategies was funded by the Royal Society for the Protection of Birds. Members of the BTO's Integrated Population Monitoring Working Group, Dr Rhys Green, Prof. Steve Buckland, Dr Nicholas Aebischer, Dr John Goss-Custard, Dr Dorian Moss, David Stroud, Dr Ken Smith, Dr Jeremy Greenwood, Dr Will Peach and Dr Humphrey Crick, provided invaluable advice on the survey design.

Maps of coverage and distribution were produced using DMAP which was written by Dr Alan Morton. The cover illustration and BBS logo are by Andrew Wilson. Other illustrations in this report are by: Simon Gillings, Maxine Grover, Harriet Mead and Mike Toms. Report production and design is by Sonia Davies.

This report is provided free to all BBS fieldworkers. Further copies are available from BTO at a cost of £5 incl. p&p.

Profiles





Dr Richard Gregory is the Head of the Census Unit and oversees the running of the CBC, WBS and most recently, the BBS for which he played a key role in its design, development and implementation. He is responsible for the analytical development of the BBS and for associated research. Richard is also involved in a number of other ecological projects at the BTO. He previously studied ecology at York and Oxford Universities.

Richard Bashford is the National Organiser of the BBS and is responsible for the day-to-day-running of the scheme which involves liaison with BTO Regional Organisers and volunteers, promotion of the scheme and providing feedback by giving presentations around the country. Prior to working for the BTO, Richard worked as an Information Officer for the RSPB, coordinating the Birdbus project.

Citation: Gregory, R.D., Bashford, R.I., Balmer, D.E., Marchant, J.H., Wilson, A.M. & Baillie, S.R. 1997. *The Breeding Bird Survey 1995-1996.* British Trust for Ornithology, Thetford.

The Breeding Bird Survey 1995-1996

BBS

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Breeding Bird Survey

EXECUTIVE SUMMARY

1. This is the second annual report of the BTO/JNCC/RSPB Breeding Bird Survey (BBS), covering the years 1995 and 1996. The report details progress since the scheme's introduction in 1994. The primary aim of the survey is to provide representative population trend indices for a range of common and widespread birds in the UK.

2. Survey plots are based on 1x1 km squares of the National Grid. Squares are chosen on the basis of a formal, stratified, random sampling design, with larger numbers of squares selected in regions with more potential volunteers. The same squares are surveyed year after year. Population indices are calculated using methods that remove the potential for sampling bias.

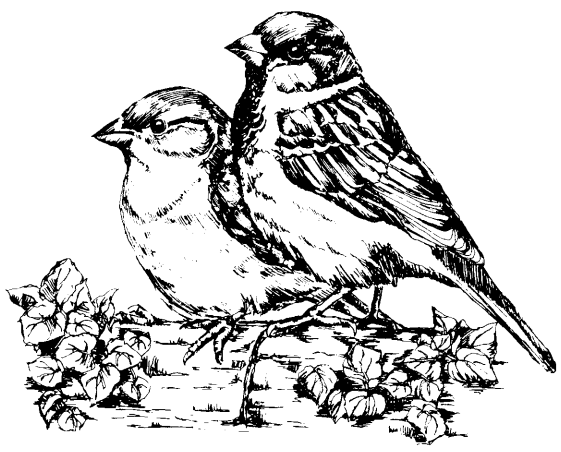
3. Volunteer observers visit their squares three times a year. The first visit is used to establish a transect route and to record details of land use and habitat type. The second and third are early morning counts to survey breeding birds. A line transect method is used with birds recorded in distance bands. Each survey requires just five hours' fieldwork per year, enabling a large number of people to become involved across the UK.

4. The scheme is organised centrally by BTO Headquarters and regionally by voluntary Regional Organisers (ROs), who in most cases are BTO Regional Representatives. ROs play a vital role in co-ordinating and fostering local fieldwork effort.

5. While the majority of fieldwork is carried out by volunteers, professional fieldworkers, supported by RSPB and the Environment and Heritage Service in Northern Ireland, have covered a number of squares in remote parts of Scotland and Northern Ireland respectively in recent years.

6. Survey coverage and promotion during 1994-1996 are discussed. The number of BBS squares covered each year has increased steadily from 1565 in 1994 and 1747 in 1995 to 1906 in 1996. The long-term aim is to survey 2-3000 squares on an annual basis.

7. A total of 194 species were recorded in 1994, 202 in 1995 and 213 in 1996. For around 100 species we hope to be able to measure population changes with a medium to high degree of precision. Among these abundant species, seven have declined significantly between 1995 and 1996, while nine species have increased. Declines were marked among small insectivores, almost certainly as a consequence of cold winter weather. Over the period 1994 to 1996, 16 species have declined significantly and 35 species have increased significantly; changes being spread across a variety of birds. Among species of conservation concern, population gains outweighed population losses but note that the confidence limits on these changes are wide for some species. The time series is too short for firm conclusions to be drawn from the trends but they illustrate the breadth of the species and habitat monitoring achieved to date.



8. Mammal recording within the BBS was introduced in 1995 and continued in 1996. A total of 38 species were recorded in 1995 and 40 in 1996. Coverage is limited to the more detectable mammals. The four most widespread species were Rabbit, Brown Hare, Grey Squirrel and Red Fox. Species distributions, as indicated by the BBS data, closely resemble those published in the mammal atlas.

9. Analysis of bird and habitat data demonstrates, first, the importance of farmland to populations of declining species in Britain and, second, identifies the value of a range of other habitat types to particular species. This underlines the significance of the conservation of all major habitats within the wider countryside.

INTRODUCTION

Changes in bird populations have long been recognised as a useful indicator regarding the health of our environment. The pace of change in our surroundings from urban growth, new roads and housing to changes in farming practices, all have an effect on bird populations and their habitats.

In recent years, it has become clear that we need to improve the monitoring of common land birds across the UK. Following a number of field- and desk-based studies, the BTO, in conjunction with the JNCC (on behalf of English Nature, Scottish Natural Heritage, Countryside Council for Wales and the Environment and Heritage Service in Northern Ireland) and the RSPB, introduced the Breeding Bird Survey (BBS) in 1994. The final design for the BBS combined the need for precise and detailed information with an efficient methodology. The simple and quick nature of fieldwork has allowed a large number of people to become involved across the UK.

Previous Monitoring

The BTO has an international reputation for bird monitoring work based largely on the long-running Common Birds Census (CBC) which has been the main monitoring tool for common birds in the UK over the last 35 years. It is based on a survey method known as "territory mapping" which involves intensive fieldwork designed to map breeding territories of birds within a chosen plot. Skilled volunteers make typically nine or ten visits to their plot each year to record birds. Survey maps are returned to BTO HQ where the position and number of bird territories are assessed by trained staff.

The CBC has proved highly valuable in revealing population fluctuations among British birds and helping to understand their causes. Long-term information of this kind is extremely rare and valuable for that reason. The CBC has played a key role in revising the conservation priorities of British birds within the *Birds of Conservation Concern*, the *Birds of Conservation Importance* and the *Biodiversity Steering Group* reports.

Few monitoring programmes can compare with the quality and duration of the CBC. Despite its considerable achievements, there are a number of limitations to the territory mapping method as carried out by BTO:

- The geographical distribution of survey plots is not representative of the UK as a whole, with most squares in the south and east.
- Only farmland, woodland and riparian habitats are represented.
- Because observers choose areas they wish to census, the area sampled may not be representative of UK bird populations as a whole.
- Relatively few plots can be covered in total (approximately 200 CBC and 100 WBS plots) because of the time-consuming nature of the fieldwork and analysis required by the mapping method.

Aims of the BBS

Our reasons for setting up the BBS were:

- To improve the geographical scope of bird monitoring in the UK;
- To improve the habitat representation of bird monitoring in the UK;
- To increase species coverage of bird monitoring in the UK, largely as a product of the points above.

The BBS aims to provide precise information on year-to-year and longer-term changes in population levels for a broad spectrum of our commoner breeding birds across the range of regions and habitats in the UK. Our primary objective is to identify declining species that require conservation action and, in combination with other data from the BTO's Integrated Population Monitoring Programme, to provide pointers as to the causes of population changes.

In a wider context, the BBS will promote a greater understanding of British birds through a unique partnership of large numbers of skilled volunteers with a small number of professional staff at BTO HQ. The result is high quality monitoring information collected in a highly cost-effective manner.

In terms of population trends the BBS will provide:

- Trends for as many species as possible for the UK as a whole because this information is essential for bird conservation.
- Trends for individual countries within UK. This information is required by the three country agencies (English Nature, Scottish Natural Heritage and the Countryside Council for Wales) and by the Environment and Heritage Service in Northern Ireland.
- Trends for European Union (EU) regions within the UK. The EU Birds Directive is a key piece of legislation in international bird conservation.
- Trends by habitat type. Conservation of particular species and habitat types will be greatly improved by a more complete understanding of relationships between birds and habitats.

SURVEY METHODS

Selecting survey squares

Survey squares are selected at random from within 83 sampling regions across the UK. In most cases, these are standard BTO regions, but we have linked a few smaller regions with larger ones. BBS regions with larger numbers of potential volunteers are allocated a larger number of squares enabling more birdwatchers to become involved in these areas. This does not introduce bias in our results because the analysis takes account of differences in the size and sampling intensity between regions.

Survey design

The principal features of BBS are:

- Standardised bird counts are made in randomly selected 1-km squares of the National Grid.
- An initial site visit is made to set up two 1-km line transects and to record habitat and land use details.
- Two morning visits are made to count birds of all species seen or heard. Birds are recorded from the transect line in one of three distance categories or as in flight.
- Fieldwork is coordinated through a network of BBS Regional Organisers, who, like most of the fieldworkers, are volunteers.

Fieldwork

Full details of methods are given in the BBS instructions which we issue freely from BTO HQ. In brief, fieldwork involves three visits to each survey square each year. The first is to record details of the habitat and to establish the survey route, the second and third to count birds early and late in the season. Early counts take place between early April and mid-May, late counts between mid-May and late June. Both the bird and habitat information are recorded on specially designed forms so that the data can be readily processed and computerised.

The survey route is made up of two parallel lines, each 1 km in length, although for practical reasons routes typically deviate somewhat from the ideal. Each of these lines is divided into five sections, making a total of 10 200 m sections, and birds and habitats are recorded within these units. Habitat type and land use are recorded annually on a habitat form. Habitat information is essential in interpreting why bird numbers are changing through time and thus focusing conservation effort. BBS habitat recording is also valuable in its own right in measuring land use changes through time across the UK. In this respect, the survey is of unique value, because there is surprisingly little comparable information.

Organisation

The survey is organised locally through a network of Regional Organisers (ROs), who are mostly BTO Regional Representatives. Each RO is provided with a list of target squares for their region at the beginning of each season with the instruction that squares should be allocated in strict order from the top downwards. The highest priority each year is to resurvey squares covered in the previous year and then to find volunteers for any gaps in the list. This ensures the random design of the scheme is maintained. The same squares are surveyed year after year and a new surveyor is found if the original one drops out.

Timetable

Survey forms are sent out to ROs at the start of each year with the bulk of fieldwork being completed between April and June. **We ask that completed forms are then returned to the ROs in July and August, and then on to BTO HQ.** While the great majority of forms are received by the late autumn, forms continue to trickle in, even into the New Year. While we very much welcome these late forms, they can cause difficulties in terms of data checking and inputting. Please try to get your forms back to us as soon as possible after completing fieldwork.

Once received by BTO HQ, the job of checking and processing can then begin in earnest and with 5,000-10,000 separate forms this is a considerable task. Forms are double-checked by staff for clarity and obvious mistakes. Forms are then sent away to be input, before final checking can be completed. All this obviously takes time and so results for any one year will not be available until the following spring or summer. The earlier we receive data, the quicker we are able to report the results back to participants.

Feedback

We acknowledge the safe receipt of BBS forms directly with observers when they reach BTO HQ. Each spring everyone taking part will receive a copy of *Census News*, the newsletter of the Census Unit, and in the autumn a copy of the BBS annual report. Survey news is also reported regularly in *BTO News*, the BTO's bimonthly membership magazine.

Species summaries

Many county-based bird reports have incorporated species summaries from BBS data. These are available from the Census Unit from May each year for the previous year's figures and include counts of Common species which are often missing from local reports. Use of BBS data in this form also helps to promote the survey to potential volunteers

Professional coverage

While the vast majority of fieldwork is carried out by skilled volunteers, professional input is needed in some remote areas in the north and west. The RSPB and the Environment and Heritage Service in Northern Ireland have supported professional fieldwork in Scotland and Northern Ireland respectively. While our aim in the medium term is to increase volunteer effort in these areas, this coverage is extremely valuable in monitoring species and habitats that are rare within the BBS as a whole.

Mammal recording

Mammal recording was introduced to the BBS on a trial basis in 1995, with a view to help improve our knowledge of the distribution and population trends of some of our commoner mammals. Of course, the focus of the BBS is on birds but we recognise that the collection of information on extra groups can add great value to the scheme as a whole, in addition to providing added interest for participants. The response so far has been very encouraging and mammal recording within the BBS looks set to continue, providing valuable and much needed data which will be evaluated in due course to determine the value of this form of data collection for mammal monitoring (see Results).

Which species do we monitor?

The BBS attempts to monitor as many terrestrial breeding species as possible. Of the 215 or so species which breed regularly in the UK, around 80% of them are monitored annually through a variety of surveys: Heronries Census (one species); Wetland Bird Survey (10 species: based on autumn/winter counts for species that are difficult to census in the breeding season); Seabird Colony Register (22 species); rarer species monitored by other organisations such as RSPB, JNCC, the country agencies, and the Rare Breeding Birds Panel (56 species); the remaining 89 abundant species are the focus of our monitoring work.

SURVEY NEWS

The 1996 season

Promotion of the BBS to potential volunteers across the UK continued in 1996. Areas without ROs were targeted by circulating information directly to BTO members. This has resulted in an encouraging increase in survey coverage in, for example, Merseyside and Ayrshire. Following the success of the 1995 season, where several talks were given to Scottish Ornithologists' Club branches, a further Scottish tour was undertaken in 1996 in the hope that even more people would hear about the survey. In February 1996 a BBS workshop was held in Belfast where a number of new volunteers came forward. Ken Perry was appointed as the BTO's Ireland Officer and he has worked closely with the ROs in Northern Ireland to promote the BBS to potential volunteers. The survey was also promoted at Bird Fairs in England, Scotland and Northern Ireland in the summer of 1996 and at the BTO Annual Membership Conference in Swanwick,which gave many BBS participants the chance to raise any queries they had about the scheme and hear about progress.

1997 targets

The aim in 1997 is to continue building on the achievements of the first three seasons, and to promote the scheme in new areas. Following pre-fieldwork-season promotion, many areas should see another increase in coverage in 1997 including Bedfordshire, where over 20 vacant squares were allocated, and Shropshire where an initiative between the Wildlife Trust, Shropshire Ornithological Society and the BTO may result in over forty new squares being covered. We are confident of receiving returns from over 2000 BBS squares. We will continue to promote the survey at various clubs and societies around the country in an effort to fill in any remaining gaps in the map of coverage.

Habitat recording - extra guidelines for recorders

Completing a habitat form each year may seem strange to some birdwatchers but the data collected are essential to the success of the BBS because they tell us why populations are changing. The first two columns on the form are by far the most valuable to us, so if you are only able to fill these in you are still collecting very valuable information.

Overall, habitat forms are completed to a high standard but we do find a few problems. Here is a quick reminder on how to complete the form.

- Don't panic! Fill in what you can to describe the overall landscape.
- Habitat should be recorded separately for each of the 10 transect sections.
- You can describe the predominant habitat (first habitat on form) and the secondary habitat (second habitat on form). If you feel two habitats have equal importance, they can be entered in any order.
- It is vital that habitat information is completed for the first habitat at least.
- For each transect section, choose one of the 10 habitat types from Level 1 (coded A to J on the form). For example, if your first transect section is predominently farmland, then write 'E' in the box under Level 1.
- Then choose one number from Level 2 which best describes the type of farmland, woodland etc in that transect section. Remember, if you have chosen farmland (E) as your Level 1 habitat, then codes for Levels 2, 3 and 4 **must** also be chosen from this section. Do not choose codes listed under other major headings.
- You can choose up to two codes from Level 3 and up to two codes from Level 4. Write the appropriate codes under Level 3 and Level 4 respectively.
- Follow this procedure for each of the ten transect sections. If your transect route differs from the "ideal" transect, record a separate set of habitat codes for the "ideal" transect.

Below we have defined a few words which may be unfamiliar to some of you, if you have any queries about their meaning then please contact us.

Habitat glossary

Coppice: practice of cutting broad-leaved trees to promote regrowth of pole-like timber from stumps. "Standards" are mature trees which provide large timber.

Machair: a grass-covered, flat sandy plain found on the coasts of west Ireland, west Scotland and Orkney.

Montane: a dense, wind-flattened carpet of ground-hugging plants, with a substantial proportion of mosses and lichens. It occurs above the altitude at which woody scrub can grow.

Breckland: finely mixed heath and grassland with areas of moss and lichens (occurring in Norfolk, Suffolk and small areas of Lincolnshire).

Dune slack: a wet area with marshy vegetation within a dune system.

Tilled land: any cultivated land or land to be cultivated, ie ploughed and planted with crops annually.

Brassicas: plant of the genus *Brassica* (cabbage, sprouts etc).

Brackish: slightly saline water.

Eutrophic: water usually situated in lowland farmland where high nutrient inputs promote production of green algae and water-weeds.

Oligotrophic: clear water with low productivity of plants and algae. Water that is occasionally discoloured by algae (ie mesotrophic) should be included here.

Dystrophic: water stained with peat and found in areas of bog.

Table 1. A breakdown of the BBS squares by country from 1994 to 1996. These are the numbers of squares issued, surveyed or reported as 'uncoverable' by volunteers. The numbers in parentheses are the percentages of squares surveyed out of those selected.

		England	*Scotland*	*Wales*	*N Ireland*	*Total*
1994	Issued	1669	506	189	74	2438
	Surveyed	**1172 (70%)**	**247 (49%)**	**121 (64%)**	**25 (33%)**	**1565 (64%)**
	Uncoverable	87	53	15	0	154
1995	Issued	1861	540	206	76	2683
	Surveyed	**1327 (71%)**	**283 (52%)**	**120 (58%)**	**17 (22%)**	**1747 (65%)**
	Uncoverable	90	64	14	2	170
1996	Issued	2071	568	219	79	2937
	Surveyed	**1419 (69%)**	**307 (54%)**	**115 (52%)**	**65 (82%)**	**1906 (64%)**
	Uncoverable	79	42	9	1	131

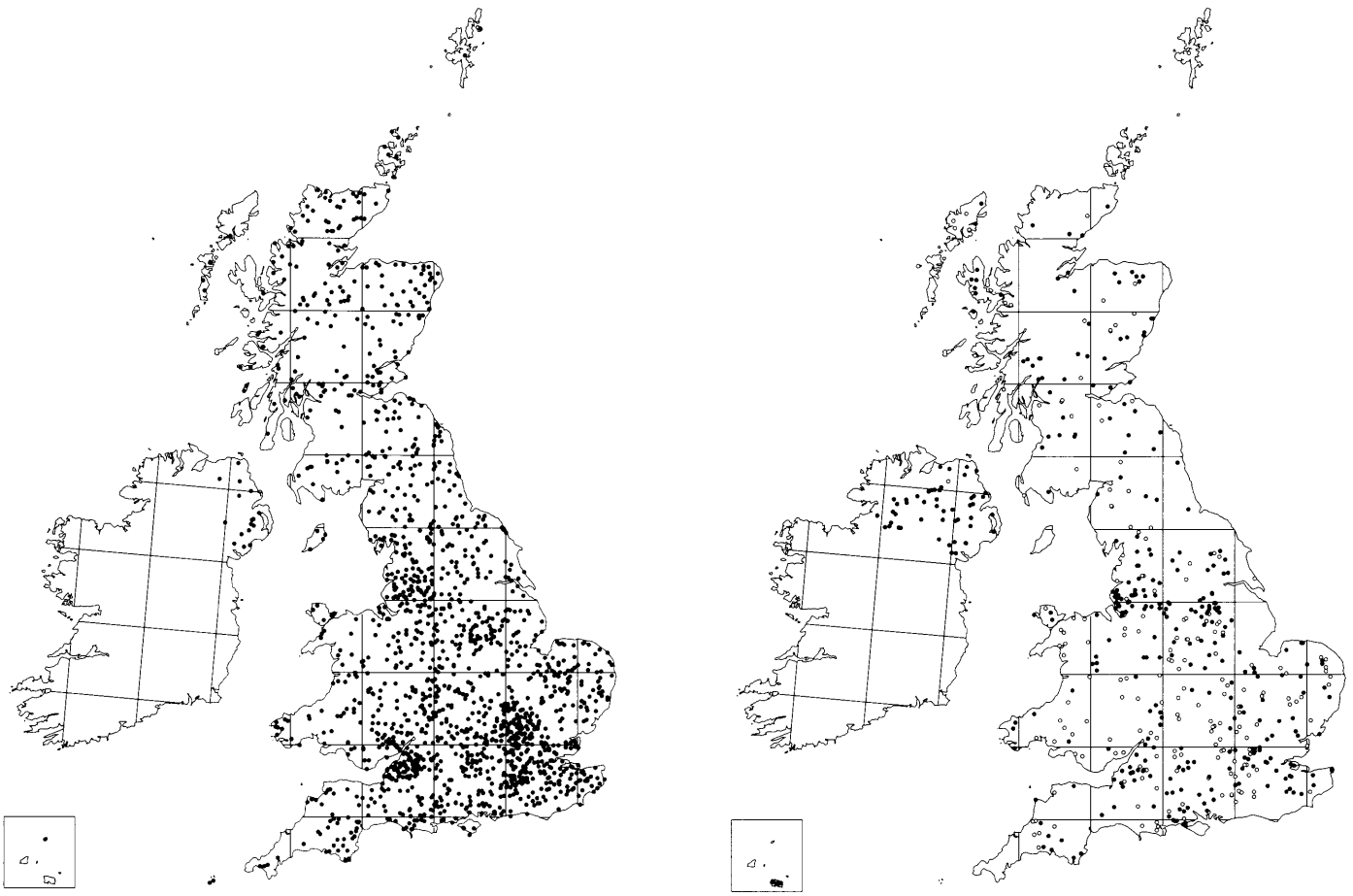


Figure 1. The distribution of BBS squares in 1995 and 1996. The left-hand map shows those 1x1 km squares covered in both 1995 and 1996. The right-hand map shows 1x1 km squares surveyed for the first time in 1996 (closed symbols) and those surveyed in 1995 but not in 1996 (open symbols). Note that the Republic of Ireland is not covered by the BBS.

SURVEY RESULTS

Survey coverage

With another major increase in 1996 taking our total to 1906 squares covered, we are poised to pass the 2000 squares mark in our fourth season (Table 1).

Coverage was substantially increased in 1996 (Figure 1) and survey forms were returned to BTO HQ much sooner. Several sets of forms from previous years were also received. An encouraging 1552 squares were covered in both 1995 and 1996 against 1376 in both 1994 and 1995. This increase is welcome since any measure of change in 1995-96 will be calculated from this larger data set. Increases in England, Scotland and Northern Ireland were encouraging but coverage in Wales fell slightly for a second year. Volunteer support in Northern Ireland was doubled in 1996 following a BBS workshop in Belfast, and 31 squares were covered by two fieldworkers funded by the Environment and Heritage Service in Northern Ireland and organised through the RSPB Northern Ireland office. Professional fieldworkers funded by the RSPB covered a total of 62 squares in remote areas of Scotland mainly in Caithness, Sutherland, Argyll, Ross-shire and Inverness-shire. Overall, survey coverage is extremely good and there are now only a few areas in England where we hope to improve coverage and many areas are close to their capacity. Scotland has excellent coverage in many areas but we are still eager to get more people involved in some of the more remote areas. We hope to find more volunteers to cover squares presently covered by professional fieldworkers in Northern Ireland and Scotland. The coverage in Wales has declined slightly over the last few years so promotion in this area is now a priority.

Species coverage

A total of 213 species were recorded in 1996 which included 11 feral and 13 scarce or rare species not previously recorded in the survey. Fortunate observers managed see the following species during their fieldwork: Manx Shearwater, Spoonbill, White-fronted Goose, Garganey, Scaup, Long-tailed Duck, Black Kite, Montagu's Harrier, Purple Sandpiper, Guillemot, Razorbill, Waxwing and, finally, several Short-toed Treecreepers in the Channel Islands. Although several of these species are not breeding birds, every bird sighting is a useful record and with around two thousand fieldworkers surveying a BBS square each year, unusual birds are bound to be discovered.

The most important data collected by BBS fieldworkers are the many thousands of common and widespread bird sightings collected each season. In 1995-96, a total of 79 species were recorded in over 100 squares in at least one of the years (Table 2), indicating that we will be able to measure population change for most of these with precision. Note, however, that the BBS is unlikely to provide representative monitoring information for species such as the large gulls and some of the water birds because their primary habitats are not covered. There are three additions to Table 2 from last year, reflecting increased coverage: Cormorant, Redstart and Marsh Tit. Considering that Redstart has a westerly bias, this is particularly welcome and shows that the BBS is achieving one of its main aims - to achieve good geographical spread of survey plots. While we will be able to monitor population changes of the 20 species recorded from 51-100 squares (Table 3), it will be with less certainty than the above species. We have already seen the promotion of three species to Table 2. Species like Red Grouse, Whinchat, Reed Warbler, Redpoll and Siskin are all around the 100 squares mark so we can look forward to improved monitoring in future years.

The birds listed in Table 4 are recorded from 1-50 squares in at least one of the years. The majority of them are too rare for us ever to monitor their populations effectively but many are being monitored by organisations like the RSPB. These species do indicate the range of habitats our volunteers visit as part of their fieldwork and are really a bonus to those taking part in survey work. The relatively large number of Fieldfare and Redwing counted does suggest that wintering birds are encountered on BBS visits early in the breeding season. A total of 11 feral or escaped species (Table 5) were recorded by volunteers. As birdwatchers we need to keep a close eye on expanding feral populations.

Table 2. Species recorded by the BBS in 1995-96 in more than 100 squares in each year. For each year the figures on the left are the number of squares a species was recorded from (n) and the figures on the right the percentage of squares with that species (%).

Species	1995		1996		Species	1995		1996	
	n	%	n	%		n	%	n	%
Cormorant	114	7	114	6	Robin	1447	83	1563	82
Grey Heron	398	23	412	22	*Redstart*	114	7	115	6
Mute Swan	128	7	150	8	Wheatear	229	13	254	13
Canada Goose	229	13	260	14	*Blackbird*	1510	86	1654	87
Mallard	751	43	846	44	**Song Thrush**	1168	67	1281	67
Sparrowhawk	216	12	226	12	Mistle Thrush	785	45	855	45
Buzzard	323	18	352	18	Sedge Warbler	192	11	247	13
Kestrel	457	26	438	23	Lesser Whitethroat	190	11	217	11
Red-legged Partridge	306	18	368	19	Whitethroat	788	45	963	51
Grey Partridge	198	11	267	14	Garden Warbler	312	18	346	18
Pheasant	1014	58	1133	59	Blackcap	800	46	826	43
Moorhen	455	26	439	23	Chiffchaff	740	42	797	42
Coot	154	9	160	8	Willow Warbler	1088	62	1186	62
Oystercatcher	196	11	238	12	Goldcrest	445	25	453	24
Lapwing	507	29	570	30	**Spotted Flycatcher**	164	9	196	10
Snipe	119	7	133	7	Long-tailed Tit	544	31	549	29
Curlew	376	22	430	23	*Marsh Tit*	116	7	103	5
Black-headed Gull	421	24	419	22	Coal Tit	425	24	507	27
Common Gull	119	7	141	7	Blue Tit	1387	79	1551	81
Lr Black-backed Gull	327	19	379	20	Great Tit	1266	72	1380	72
Herring Gull	335	19	417	22	Nuthatch	217	12	258	14
Feral Pigeon	450	26	479	25	Treecreeper	216	12	270	14
Stock Dove	537	31	525	28	Jay	396	23	431	23
Woodpigeon	1542	88	1699	89	Magpie	1148	66	1278	67
Collared Dove	818	47	888	47	Jackdaw	956	55	1041	55
Turtle Dove	163	9	198	10	Rook	855	49	951	50
Cuckoo	717	41	770	40	Carrion Crow	1456	83	1556	82
Swift	769	44	785	41	Raven	123	7	144	8
Green Woodpecker	409	23	448	24	*Starling*	1293	74	1379	72
Gt Spotted Woodpecker	462	26	517	27	House Sparrow	1054	60	1152	60
Skylark	1240	71	1334	70	**Tree Sparrow**	126	7	142	7
Swallow	1119	64	1318	69	Chaffinch	1523	87	1665	87
House Martin	620	35	698	37	Greenfinch	1066	61	1170	61
Tree Pipit	112	6	118	6	*Goldfinch*	839	48	944	50
Meadow Pipit	559	32	628	33	**Linnet**	895	51	961	50
Yellow Wagtail	167	10	184	10	**Bullfinch**	354	20	463	24
Grey Wagtail	144	8	119	6	Yellowhammer	908	52	948	50
Pied Wagtail	815	47	912	48	**Reed Bunting**	305	17	332	17
Wren	1540	88	1599	84	**Corn Bunting**	140	8	149	8
Dunnock	1245	71	1355	71					

Species in bold are red listed in *Birds of Conservation Concern* or within Tables 1-3 on the list of *Birds of Conservation Importance*. Species in italics are listed as amber in *Birds of Conservation Concern* or within Table 4 on the list of *Birds of Conservation Importance* (see Focus).

Table 3. Species recorded by the BBS in 1995-96 in 51-100 squares in at least one of the years. For details see Table 2. Species in parentheses are usually recognised as races or forms of species already represented.

Species	1995		1996		Species	1995		1996	
	n	%	n	%		n	%	n	%
Gt Crested Grebe	53	3	46	2	Sand Martin	82	5	114	6
Greylag Goose	64	4	75	4	Whinchat	79	5	92	5
Shelduck	96	5	109	6	Stonechat	63	4	46	2
Tufted Duck	95	5	114	6	Grasshopper Warbler	46	3	56	3
Red Grouse	92	5	102	5	Reed Warbler	70	4	82	4
Golden Plover	77	4	77	4	Wood Warbler	50	3	50	3
Redshank	66	4	74	4	Willow Tit	59	3	65	3
Common Sandpiper	46	3	73	4	(Hooded Crow)	72	4	111	6
Gt Black-backed Gull	68	4	87	5	Siskin	93	5	115	6
Little Owl	71	4	85	4	Redpoll	90	5	134	7
Tawny Owl	61	3	71	4					

Table 4. Species recorded by the BBS in 1995-96 in 1-50 squares in at least one of the years. The table shows the number of squares occupied in each year. Annual monitoring of these rarer species within the BBS will be limited. Species in parenthesis are usually recognised as races or forms of species already represented.

Species	*1995*	*1996*	*Species*	*1995*	*1996*	*Species*	*1995*	*1996*
Red-throated Diver	11	14	Goshawk	5	7	Little Tern	1	3
Black-throated Diver	1	1	Golden Eagle	7	10	Black Tern	1	2
Great Northern Diver	0	1	Osprey	6	3	Guillemot	0	3
Little Grebe	38	43	Merlin	12	15	Razorbill	0	3
Fulmar	19	17	Hobby	23	28	Black Guillemot	2	2
Manx Shearwater	0	1	Peregrine	22	29	(Rock Dove)	6	8
Gannet	8	5	Ptarmigan	1	3	Ring-necked Parakeet	6	6
Shag	6	8	Black Grouse	13	9	Barn Owl	13	12
Little Egret	1	4	Quail	17	6	Long-eared Owl	3	1
Spoonbill	0	1	Golden Pheasant	4	4	Short-eared Owl	12	25
Whooper Swan	3	0	Water Rail	3	3	Nightjar	2	0
Pink-footed Goose	1	4	Corncrake	2	1	Kingfisher	41	34
White-fronted Goose	0	1	Crane	1	0	Lr Spotted Woodpecker	17	25
Snow Goose	0	1	Avocet	2	2	Woodlark	9	9
Barnacle Goose	4	5	Stone Curlew	2	4	Rock Pipit	11	12
Brent Goose	1	5	Little Ringed Plover	4	5	Waxwing	0	1
Egyptian Goose	2	0	Ringed Plover	20	22	Dipper	37	46
Mandarin	8	3	Dotterel	0	3	Nightingale	25	20
Wigeon	7	3	Grey Plover	3	1	Black Redstart	1	0
Gadwall	16	18	Sanderling	1	2	Ring Ouzel	20	19
Teal	25	27	Purple Sandpiper	0	1	Fieldfare	40	25
Pintail	1	3	Dunlin	29	32	Redwing	6	14
Garganey	0	1	Ruff	1	0	Cetti's Warbler	4	6
Shoveler	11	9	Jack Snipe	1	0	Marsh Warbler	1	0
Red-crested Pochard	1	0	Woodcock	10	7	Dartford Warbler	3	3
Pochard	10	11	Black-tailed Godwit	3	1	Firecrest	1	0
Scaup	0	1	Bar-tailed Godwit	2	1	Pied Flycatcher	37	33
Eider	9	6	Whimbrel	22	23	Crested Tit	0	2
Long-tailed Duck	0	1	Spotted Redshank	1	0	Short-toed Treecreeper	0	3
Common Scoter	2	1	Greenshank	13	11	Golden Oriole	0	1
Goldeneye	7	2	Green Sandpiper	4	2	Great Grey Shrike	1	0
Red-breasted Merganser	7	10	Turnstone	3	4	Chough	5	2
Goosander	31	32	Arctic Skua	6	10	Brambling	3	4
Ruddy Duck	4	8	Great Skua	5	5	Twite	25	19
Honey Buzzard	1	0	Little Gull	1	0	Crossbill	20	38
Black Kite	0	1	Kittiwake	1	1	Scottish Crossbill	2	2
Red Kite	10	12	Sandwich Tern	4	2	Hawfinch	1	3
Marsh Harrier	9	11	Common Tern	36	31	Snow Bunting	1	0
Hen Harrier	9	10	Arctic Tern	10	5	Cirl Bunting	1	3
Montagu's Harrier	0	2						

Table 5. Feral or non-native species not on the official British list that were recorded by the BBS during 1995-96.

Species	*1995*	*1996*
Alexandrine Parakeet	0	1
Peacock	1	2
Guineafowl sp.	0	1
Reeves's Pheasant	0	1
Harris Hawk	0	1
Wood Duck	0	2
Ruddy Shelduck	0	1
Australian Shelduck	0	1
Muscovy Duck	0	1
Bar-headed Goose	1	0
Black Swan	0	1

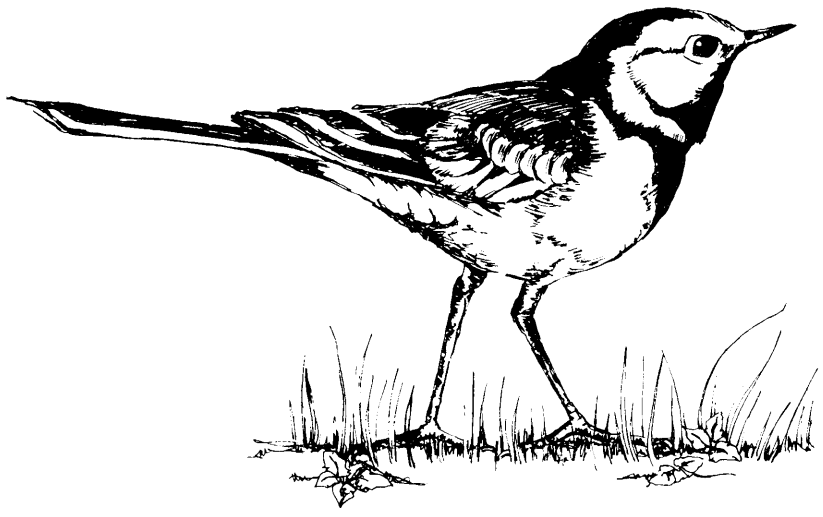


Table 6. Top 20 species from the BBS in 1996. Distribution is measured as the number of squares occupied, abundance is measured as the highest bird count from either visit for each species for each square and summed across all occupied squares. The numbers in brackets are the percentage of squares occupied and average counts across occupied squares respectively.

Rank	*Most widespread* species	*Percentage of squares occupied*	Rank	*Most abundant* species	*Average count*
1	Woodpigeon	(89)	1	Starling	(28)
2	Chaffinch	(87)	2	Woodpigeon	(20)
3	Blackbird	(87)	3	Rook	(25)
4	Wren	(84)	4	House Sparrow	(18)
5	Robin	(82)	5	Chaffinch	(11)
6	Carrion Crow	(82)	6	Blackbird	(11)
7	Blue Tit	(81)	7	Carrion Crow	(10)
8	Great Tit	(72)	8	Blue Tit	(9)
9	Starling	(72)	9	Jackdaw	(11)
10	Dunnock	(71)	10	Wren	(7)
11	Skylark	(70)	11	Robin	(7)
12	Swallow	(69)	12	Skylark	(8)
13	Song Thrush	(67)	13	Swallow	(6)
14	Magpie	(67)	14	Meadow Pipit	(13)
15	Willow Warbler	(62)	15	Feral Pigeon	(15)
16	Greenfinch	(61)	16	Swift	(9)
17	House Sparrow	(60)	17	Greenfinch	(6)
18	Pheasant	(59)	18	Magpie	(5)
19	Jackdaw	(55)	19	Great Tit	(5)
20	Whitethroat	(51)	20	Herring Gull	(15)

Table 6 shows the top 20 most widespread and abundant birds counted by volunteers. The Woodpigeon occurs on the highest number of squares across the UK followed by Chaffinch, Blackbird, Wren and Robin. In contrast the most abundant bird was the Starling followed by Woodpigeon, Rook, House Sparrow and Chaffinch. The average counter records 28 Starling, 20 Woodpigeon, 25 Rook, 18 House Sparrow and 11 Chaffinch as the maximum count across early and late visits for occupied squares.

Between-year changes

The main purpose of the BBS is to monitor population changes and Table 7 shows changes for an impressive 99 species. With our third full year completed, we can look at the changes between 1994 and 1996. We have concentrated on the species recorded from more than 50 squares (i.e. those listed in Tables 2 and 3) since sample sizes are sufficient to allow a medium to high degree of precision in the results (Table 7). The table shows the percentage change in population level over different time periods; a change without a sign is an increase while a negative sign indicates a decrease. Those changes labelled with an asterisk are statistically significant and we can therefore be confident that a real change in population level has occurred. It is important to reiterate that it is the long-term trend which is of most interest; the between-year changes are bound to fluctuate for some species and these are often driven by the weather. Further work is planned to examine population changes in more detail and to understand their variability. Only once we have many more years of data will we be able to look at long-term changes in populations.

One of the first tasks is to compare the 1995-96 change measures with those of the CBC. Since the BBS will ultimately take over the monitoring role of the CBC, it is vital that we understand how the results from the two schemes interrelate. For the second year running, both CBC and BBS have identified similar increases and decreases across our commoner birds. Overall, the balance of population gains and losses between 1995-96 for the BBS was fairly even. There were, however, some notable declines (eg Wren, Robin and Goldcrest) which appear to have been driven by cold winter weather. Here we concentrate on those species for which we have calculated significant population changes across years and look mostly at the changes between 1995 and 1996 and 1994 and 1996.

The analysis is based on the standard bird counts and so excludes the colonial nest counts that BBS observers make for Rook, Sand Martin and gulls. Analysis of these data will be included in future reports.

Grebes to Gulls

It is encouraging to see so many wetland species recorded by the BBS considering the small proportion of wetland habitat included in the overall sample. There were relatively few significant population changes during 1995-96 among these birds. Lapwing and Black-headed Gull declined following previous increase - the three larger gulls all increased in 1995-96.

There were a large number of significant changes between 1994 and 1996. Numbers of Mute Swan, Sparrowhawk, Kestrel, Oystercatcher, Golden Plover, Redshank and Black-headed Gull all declined, the largest declines being among the waders. For the latter group of birds, and others in this report, the presence of migrant individuals that breed outside the UK may well influence population trends. The Sparrowhawk, which has increased dramatically over recent decades, has declined significantly within the BBS over 1994-96. The Kestrel has been in decline for some time according to the CBC and this trend continues in the BBS. Greylag Goose, Canada Goose, Buzzard, Red-legged Partridge, Grey Partridge, Pheasant, Coot and the three larger gulls all increased. The increase in the numbers of Buzzards may well be associated with their gradual spread from western to eastern Britain. The upturn in Grey Partridge populations is most encouraging for this Red-data species but the population levels are still worryingly low.

Pigeons to Woodpeckers

The only significant change in 1995-96 was a decline in Swifts. Over the whole period there were significant declines in numbers of Feral Pigeon, Woodpigeon and Swift. The relatively modest decline in Woodpigeon numbers is rather surprising given recent increases as evidenced by the CBC. Population gains were shown by Stock Dove, Collared Dove and Great Spotted Woodpecker - all trends that are also apparent in the CBC.

How the percentage changes are calculated

Population changes were assessed using a Loglinear model with Poisson error terms. We used the highest count from the early or late visit for each species on each square as our best estimate of the abundance of that species. Counts were modelled as a function of square and year effects, with counts weighted to account for the under- or over-sampling of BBS regions within the UK. Correction for under- or over-dispersion of the count data was also incorporated. Any square with two annual counts between 1994 and 1996 was included in the analysis. Note that missing data for particular years are imputed using these methods.

Table 7. Population changes of common and widespread species 1994-1996. The sample size is the number of squares used in the calculations. The figures presented are percentage changes in population levels for the respective time periods. Those figures marked with an asterisk are statistically significant at the 5% level. The lower (lcl) and upper (ucl) 95% confidence limits are given for the population changes from 1994 to 1996. See box above for further details. As in Table 2 species in bold are red listed in *Birds of Conservation Concern* or within Tables 1-3 on the list of *Birds of Conservation Importance*. Species in italics are listed as amber in *Birds of Conservation Concern* or within Table 4 on the list of *Birds of Conservation Importance*.

Species	Sample	Change 94-95	Change 95-96	Change 94-96	lcl	ucl	Species	Sample	Change 94-95	Change 95-96	Change 94-96	lcl	ucl
Great Crested Grebe	70	19	-29	-16	-39	16	Wren	1626	16 *	-32 *	-21 *	-24	-18
Cormorant	189	-7	-10	-16	-36	10	*Dunnock*	1425	6 *	-3	3	-2	8
Grey Heron	692	20 *	-9	10	-4	26	Robin	1555	12 *	-10 *	2	-2	5
Mute Swan	215	-22	-1	-23 *	-37	-6	*Redstart*	163	34 *	7	44 *	15	80
Greylag Goose	123	213 *	2	218 *	108	387	Whinchat	139	3	34	38 *	8	77
Canada Goose	402	22 *	10	34 *	13	59	*Stonechat*	94	58 *	-22	23	-18	86
Shelduck	149	2	2	4	-16	29	Wheatear	378	39 *	1	40 *	22	61
Mallard	1055	6	-7	-1	-8	7	*Blackbird*	1587	0	2	1	-2	4
Tufted Duck	163	3	1	3	-18	31	**Song Thrush**	1416	-2	2	0	-6	6
Sparrowhawk	472	-9	-20	-27 *	-41	-10	Mistle Thrush	1152	-5	-5	-10 *	-18	-1
Buzzard	471	10	4	14 *	1	30	*Grasshopper Warbler*	102	11	24	37	-11	112
Kestrel	832	-14 *	-6	-20 *	-30	-8	Sedge Warbler	308	16 *	10	27 *	10	47
Red Grouse	135	6	-9	-3	-23	21	Reed Warbler	102	3	0	3	-20	32
Red-legged Partridge	450	18 *	12	32 *	17	49	Lesser Whitethroat	375	-5	-19	-23 *	-38	-6
Grey Partridge	386	3	19	22 *	2	46	Whitethroat	1084	14 *	12	28 *	19	38
Pheasant	1225	3	6	9 *	3	15	Garden Warbler	525	12	6	18 *	2	37
Moorhen	613	13 *	-7	5	-6	18	Blackcap	1029	8 *	-5	3	-4	11
Coot	204	24 *	3	27 *	7	51	Wood Warbler	101	-11	-30	-38 *	-58	-10
Oystercatcher	272	-29 *	-3	-32 *	-39	-24	Chiffchaff	945	7	2	9 *	2	18
Golden Plover	112	-44 *	-27	-59 *	-70	-43	Willow Warbler	1317	14 *	0	14 *	9	19
Lapwing	775	25 *	-23 *	-4	-13	6	Goldcrest	606	43 *	-24 *	9	-2	21
Snipe	187	11	-18	-9	-28	16	**Spotted Flycatcher**	358	-12	-2	-14	-30	7
Curlew	527	8	-7	1	-8	11	Long-tailed Tit	858	16 *	-20	-7	-19	6
Redshank	108	8	-38	-33 *	-50	-11	*Marsh Tit*	209	44 *	-6	35 *	1	79
Common Sandpiper	99	-13	25	8	-20	46	*Willow Tit*	123	-27	11	-19	-44	17
Black-headed Gull	629	20 *	-30 *	-15 *	-26	-3	Coal Tit	660	9	21	31 *	19	44
Common Gull	221	6	8	14	-8	42	Blue Tit	1501	7 *	15 *	22 *	17	27
Lesser Black-backed Gull	552	9	33 *	46 *	28	66	Great Tit	1448	4	8	13 *	7	19
Herring Gull	565	1	56 *	58 *	39	81	Nuthatch	360	8	25	35 *	15	57
Great Black-backed Gull	125	-26	91 *	42 *	6	91	Treecreeper	443	19	4	24 *	3	49
Feral Pigeon	650	-10 *	-3	-13 *	-22	-3	Jay	670	-22 *	17	-9	-20	3
Stock Dove	765	2	12	14 *	2	28	Magpie	1334	-1	2	1	-4	6
Woodpigeon	1598	-13 *	6	-8 *	-12	-4	Jackdaw	1172	-1	6	5	-2	12
Collared Dove	1045	0	11	11 *	4	18	Rook	1135	1	7	8	-1	18
Turtle Dove	277	9	-5	3	-15	26	Carrion Crow	1684	0	-1	-1	-6	5
Cuckoo	1061	2	-3	-1	-10	8	Raven	213	49 *	-10	33 *	4	72
Little Owl	163	-15	17	-1	-29	40	*Starling*	1435	3	-2	1	-5	7
Tawny Owl	150	-23	30	1	-31	47	House Sparrow	1204	0	1	1	-3	6
Swift	1128	0	-19 *	-19 *	-26	-11	**Tree Sparrow**	216	5	10	15	-8	43
Green Woodpecker	651	-10	1	-9	-20	3	Chaffinch	1599	-2	8 *	6 *	3	9
Great Sp. Woodpecker	728	13	15	30 *	15	47	Greenfinch	1294	7 *	1	8 *	2	15
Skylark	1385	1	-3	-1	-5	3	*Goldfinch*	1203	-3	11	7	-2	16
Sand Martin	161	10	102 *	123 *	70	193	Siskin	173	-20	115 *	73 *	36	119
Swallow	1407	-13 *	19 *	4	-2	10	**Linnet**	1149	15 *	-15 *	-3	-10	5
House Martin	893	13 *	-7	5	-4	16	Lesser Redpoll	185	2	14	16	-10	50
Tree Pipit	185	-9	23	11	-11	39	**Bullfinch**	693	-19 *	48 *	19 *	4	36
Meadow Pipit	726	5	-1	4	-1	9	Yellowhammer	1057	-7 *	0	-7 *	-12	-2
Yellow Wagtail	254	21 *	24	51 *	26	80	**Reed Bunting**	450	4	-14	-11	-22	1
Grey Wagtail	234	23	-35	-20	-39	5	**Corn Bunting**	210	4	-24	-21 *	-34	-6
Pied Wagtail	1168	26 *	-8	16 *	7	26							

Larks to Thrushes
While Sand Martin and Swallow increased between 1995 and 1996, Wren and Robin both declined. The latter changes seem to be the result of hard winter weather in 1995/96. Both the CBC and the Constant Effort Sites (CES) scheme, which uses ringing data to monitor populations, recorded significant declines in Wren numbers of around 30%. Robins were also down significantly on CBC and non-significantly on CES at around 10%. The period 1994-96 shows a larger number of significant trends and these were predominantly upwards. Sand Martin, Yellow Wagtail, Pied Wagtail, Redstart, Whinchat and Wheatear all showed population gains - the Sand Martin has increased dramatically by 123% over this period but the confidence limits on this change are very wide. . It is particularly encouraging to see that the BBS is able to monitor species with relatively northern and western distributions. The only species showing overall declines were Wren, largely as a result of the 1995-96 change, and Mistle Thrush.

Warblers to Flycatchers
The resident Goldcrest was the only species to show a significant population change, a dramatic decline, between 1995 and 1996. This is again a sign of the cold winter weather that affected other small insectivorous birds in 1995-96. Population trends 1994-96 were more encouraging, Sedge Warbler, Whitethroat, Garden Warbler, Chiffchaff and Willow Warbler have all increased suggesting good conditions on their wintering grounds in drought-prone areas of West Africa. In contrast, numbers of Lesser Whitethroat and Wood Warbler have gone down. The latter is based on small sample sizes and should be treated with caution. The decline in the Lesser Whitethroat is intriguing; this is a species with a different migration strategy from most other warblers wintering predominantly in East Africa. Deterioration of the wintering grounds or migration route, for whatever reasons, may be responsible for the decline because other closely related species are faring well.

Tits to Starlings
An increase in Blue Tit populations was the only significant change between 1995 and 1996. Over the period 1994-1996, however, the numbers of Marsh Tit, Coal Tit, Blue Tit, Great Tit, Nuthatch, Treecreeper and Raven were all up significantly.

Sparrows to Buntings
Chaffinch, Siskin and Bullfinch all increased, the latter two to a considerable degree, between 1995 and 1996, while Linnet declined. Over 1994 to 1996, numbers of Chaffinch, Greenfinch, Siskin and Bullfinch all increased - the latter trend is most encouraging for a species of high conservation value. However, numbers of Yellowhammer and Corn Bunting were both down. The downward trend of the Yellowhammer was first detected around 1990 in the CBC and has continued unabated ever since - the Yellowhammer shows every sign of following the downward spiral seen in a range of farmland birds over the last 20 years. Overall, the prognosis for the birds of high conservation concern is inconclusive - there are both population gains and losses. Note that for many of these birds sample sizes are small and our measures of population change may be highly variable from year to year, although we will be able to provide reliable measures of long-term trends in due course.

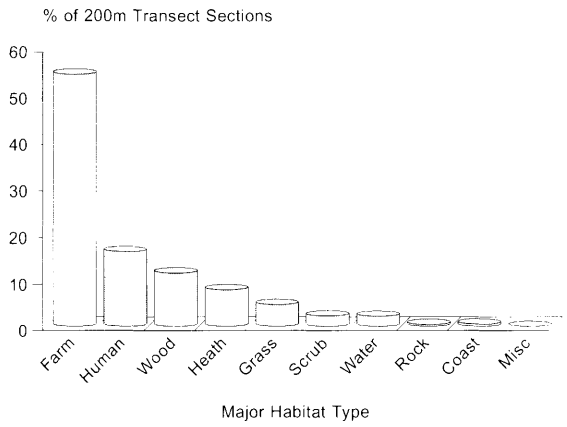
Country-based Trends

One of the strengths of the BBS is our ability to look at population trends among birds for individual regions and countries. Country-based trends over the period 1994 to 1996 illustrate how similar many trends are, but also point to important regional differences. In England, for example, the vast majority of trends identified at a UK level were also evident but populations of Tufted Duck, Swallow, Robin, Goldcrest, Jackdaw and Carrion Crow increased significantly while those of Snipe, Skylark and Reed Bunting declined. The latter trends are particularly worrying because all these birds are of high or medium conservation concern. The numbers of squares covered in Scotland and Wales is much smaller than in England (Table 1) and we are keen to expand coverage in both areas. Scottish populations tended to fluctuate in synchrony with those in the rest of the UK between 1994 and 1996. Notable exceptions include significant increases for Grey Heron, Magpie and Starling but declines for Lapwing, Robin, Spotted Flycatcher and Linnet. Three of the last four species are of high or medium conservation concern and their declines are disturbing. The situation in Wales between 1994 and 1996 is more encouraging (although sample sizes are quite small) with significant gains for Black-headed Gull, Swallow, Spotted Flycatcher, Magpie, Rook, House Sparrow and Linnet. Curiously, the Black-headed Gull declined in the UK as a whole but was up in Wales.

Habitat coverage

It is important that every square has a habitat form for each year surveyed so that changes in land use can be followed and their impacts on wildlife understood. We were delighted that 99% of volunteers completed a habitat form in 1996. The results for 1996 show a similar habitat composition to 1995, and we expect little change in the proportions of habitats surveyed over the next few years (Figure 2). Farmland is a clear leader in the proportions of habitat surveyed (54.1%), reflecting the predominance of this landscape in our environment. Human Sites come in as the second most frequent habitat surveyed, confirming that the BBS is getting to all sorts of habitats. A range of other habitats were covered by volunteers, including woodland, scrub, heath and grassland - each of these habitats being of value to certain bird populations (see Focus, page 14).

Figure 2. Overall habitat coverage in the BBS in 1996. The histogram shows the percentage (%) of 200 m transect sections falling into the major categories. These figures have not been corrected for the distribution of BBS effort so that they do not represent the proportions of these habitats in the UK as a whole.



Mammals

Trial mammal recording continued in 1996 and an impressive 84% of squares were covered. Most fieldworkers were able to find mammals on their squares and only 8% recorded none at all. Please remember to return a nil form if you didn't come across any mammals - this is still valuable information in its own right.

A total of 40 species were recorded in 1996, two more than in 1995. Six new species were added to the list including Polecat (Herefordshire), Natterer's Bat (Hertfordshire and Cheshire) and Lesser White-toothed Shrew (Isles of Scilly).

Rabbit was again by far the most widespread species, recorded in 69% of squares, followed by Brown Hare and Grey Squirrel. The top 15 most widespread species are listed in Table 8. The table differs in two ways from the 1995 list. Weasel moved into 13th position; it was recorded from a staggering 69 squares compared with only 17 squares in 1995. Mountain Hare has been lost from the top 15, yet was recorded from 53 squares.

Below, we present distribution maps for Rabbit, Brown Hare, Grey Squirrel and Muntjac Deer. The Grey Squirrel map is particularly interesting and corresponds well with published data. Grey Squirrels were recorded from central and southern England, much of northern England and from a band across central Scotland. The map also shows the absence of Grey Squirrels from the fens of East Anglia and Lincolnshire where trees may be limiting. Muntjac Deer first escaped from Woburn in south Bedfordshire earlier this century. This map clearly shows how they have spread in recent decades. The Rabbit is widespread in Britain and Ireland up to the treeline and on most small islands. The Brown Hare occupies a similar range but is largely absent from the north-west and western Highlands. Like many of our farmland birds, the Brown Hare population has been declining since the 1960s and it seems that changes in agricultural practice are partly responsible.

Table 8. Mammal recording within the BBS 1996. The table shows the number (n) and percentage (%) of squares occupied for the top 15 most widespread species.

Mammal	*n*	%
Rabbit	1117	69
Brown Hare	594	37
Grey Squirrel	571	35
Red Fox	526	33
Roe Deer	295	18
Mole	283	18
Badger	151	9
Hedgehog	138	9
Red Deer	100	6
Common Shrew	99	6
Stoat	86	5
Brown Rat	78	5
Weasel	69	4
Muntjac Deer	66	4
Fallow Deer	58	4

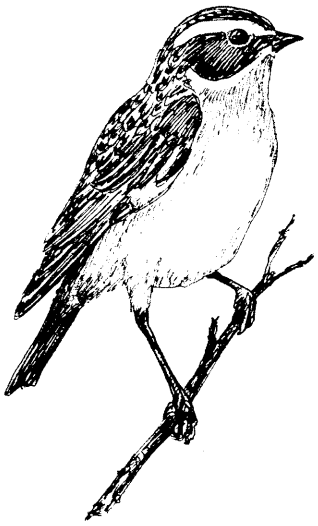
FOCUS

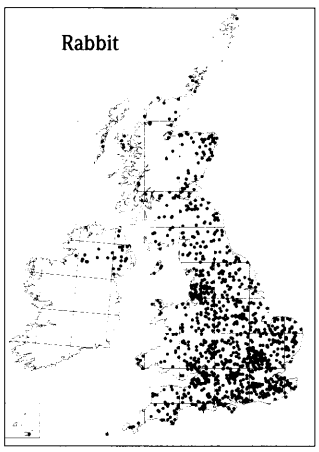
Priorities for species conservation

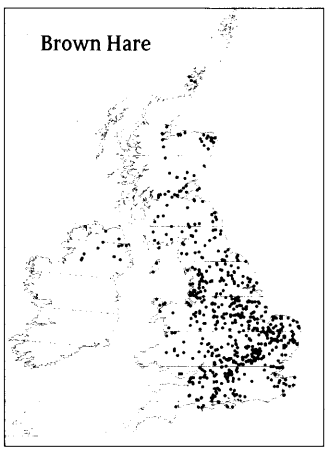
Within the last year, three important documents have been published which pave the way for bird conservation action over the next few years. The *Birds of Conservation Concern* and the *Birds of Conservation Importance* both set out priorities for ornithological conservation effort. The documents are basically lists, which use the best scientific evidence available to categorise species according to their conservation status. The criteria used to categorise species in both documents are broadly similar. For inclusion in one of the lists, species must either be globally threatened, show a decline in population or range, be nationally uncommon or be of international importance.

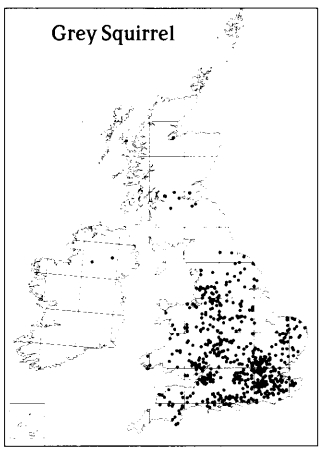
The *Birds of Conservation Concern in the UK, Channel Islands and the Isle of Man* was devised by the RSPB and the UK's leading non-governmental bird conservation organisations, including BTO. The list is divided into three sections: red, amber and green. The red list species are of greatest conservation concern and require urgent conservation action (36 species). Amber list species are of medium conservation concern (110 species). All other regularly occurring species (134 species) are on the green list.

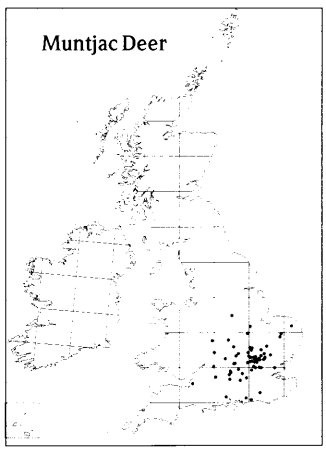
The *Birds of Conservation Importance* was launched by the JNCC and arises from work between the statutory agencies (Countryside Council for Wales, English Nature and Scottish Natural Heritage) and non-governmental organisations. The list is split into four tables. Tables 1, 2 and 3 are equivalent to the red list, while Table 4 is similar to the amber list.











On Table 2 of this report we present species that were recorded from over 100 squares, these are the species that we feel can be monitored well by the BBS. Ten of these species (in bold) fall into the red list/ Tables 1-3 category; these include Skylark, Song Thrush, Linnet and Bullfinch. Sixteen species (shown by italics) are on the amber list/ Table 4 category, including widespread birds such as Swallow, Dunnock, Blackbird and Starling.

The third document, *Biodiversity: The UK Steering Group Report* specifies action plans for a range of taxa, including birds that are globally threatened and/or declining. These include Aquatic Warbler, Skylark, Bittern, Stone Curlew, Corncrake, Scottish Crossbill, Grey Partridge, Capercaillie and Song Thrush. The action plans are designed, first, to identify the causes of population decline and, second, to instigate remedial action against set targets.

Bird distributions

Improved coverage in 1996, particularly in Scotland and Northern Ireland, allows us to plot distribution maps with greater confidence. The four maps presented here illustrate the extensive nature of BBS fieldwork.

The Yellowhammer map is particularly impressive, the resemblance to *The New Atlas of Breeding Birds* distribution map being remarkable! The absence of Yellowhammers from the higher ground of Wales, northern England and the uplands and islands of Scotland is striking. There is also a break in distribution around London.

The widespread nature of the Skylark is clearly shown on the map. Unlike the Yellowhammer, it is also recorded from areas of high ground and it is more widespread than Yellowhammer in Northern Ireland.

Coal Tit shows an interesting distribution. It is widespread throughout but is particularly abundant in areas of coniferous forest. The map shows concentrations around Thetford Forest in Norfolk/Suffolk, Kielder Forest in Northumberland and the area around Ebbw Vale in Gwent. They are absent as breeding birds from the fenland of eastern England and the outer Scottish islands.

The distribution of Red Grouse reflects the presence of heather-dominant moorland. It is easy to pick out the Pennines, the North York Moors and the Monadhliath Mountains in Highland. Due to the efforts of the many volunteers who trek into the hills, we are able to plot the broad distribution of this species. The distribution pattern compares well with *The New Atlas*, although improved coverage in Wales would surely add a few more dots to this map.

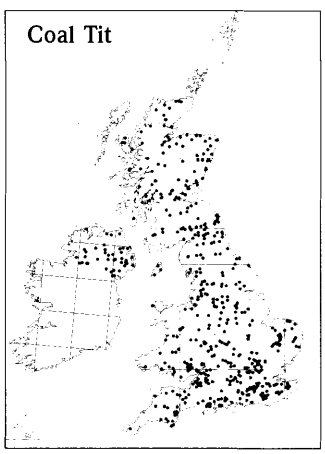
Birds and habitats

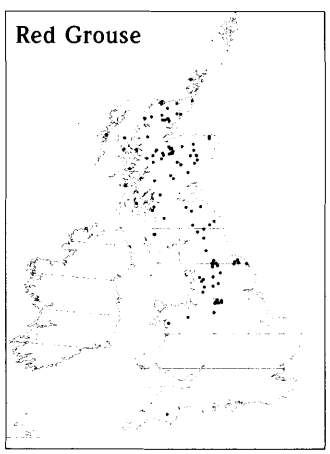
Many BBS volunteers will be interested to know that the bird and habitat data they collect each year enable the BTO to undertake exciting analyses alongside our monitoring work. Recent work has used habitat information gathered by the BBS to examine bird-habitat relationships for the Skylark. For a declining species such as this, it is useful to know its particular habitat requirements and so gain an insight into the reasons for the population decline. Skylarks tended to occur at low densities on heavily grazed farmland and on farms with many field boundaries and much surrounding woodland, indicating their strong preference for open habitat. The highest densities occurred on farmland with the greatest diversity of field use, thus giving some support to the hypothesis that a decrease in the diversity of farmland has been a contributory factor to the decline of the Skylark.

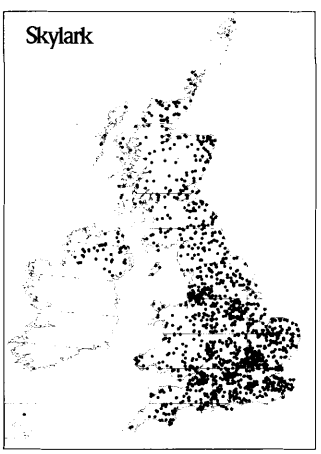
We have also looked at the habitat use of eight species of bird whose populations are declining in the UK: Skylark, Dunnock, Blackbird, Song Thrush, Starling, Linnet, Bullfinch and Reed Bunting

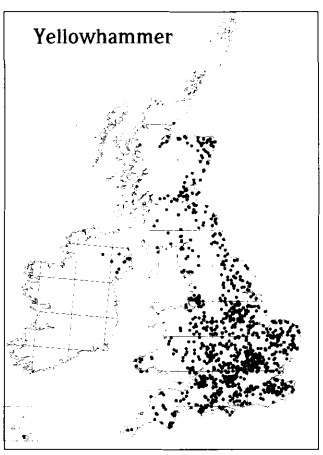
First, using the information on the habitat forms from 1995 we were able to estimate the occurrence of broad habitat types across Britain. These follow the major divisions of the habitat form. Second, using the bird data collected in 1995 we were able to calculate the average densities of each species in each of the habitat types using 'distance sampling' techniques. The latter use the number of birds recorded in different distance bands to come up with estimates of bird density. Only by recording birds in distance bands is this possible. Finally by multiplying bird densities by area, we can come up with an estimate of total population size for Britain and see how the population is distributed among habitats.

We found that unsuprisingly, that over half of the British Skylark population was in farmland, with a large proportion of these found on tilled land. Grassland moor and heathland also held a significant part of the population. Over half of the Dunnock population was found in farmland; where they are likely to be making use of hedges and scrub within this habitat. About half of British Blackbirds were found in farmland, whilst human sites accounted for over a quarter of the population and a smaller proportion were found in woodlands. Densities at human sites were around 100 birds per km^2, being highest at suburban sites. The Song Thrush shows a similar pattern of habitat use to the Blackbird (see pie chart). Approximately half of the British Starlings (see pie chart) were associated with human settlement, demonstrating









the importance of this habitat to this species, while farmland accounted for only around a third of birds. Urban, suburban and rural sites, where densities can be as high as 250 birds per km^2, were strongly preferred by Starling. Most Linnets were found in farmland habitats (see pie chart), as would be expected, although they were found in a range of other habitats including scrub, heathland and rural sites. Bullfinches were found mainly in farmland, woodland and scrub. Around half of British Reed Buntings were on farmland and the remainder mostly in wetland habitats. Within farmland, Reed Buntings are likely to be making use of hedges, ditches and other damp areas, as well as the crops themselves.

Total population estimates for Dunnock, Blackbird, Bullfinch and Reed Bunting compare well with previously published figures in the last breeding atlas. We estimate there to be many fewer Skylarks and Song Thrushes in Britain than previously thought, but many more Starlings and Linnets; our estimate of 9.6 million Starlings is over four times larger than the previous estimate, this is because previous estimates made too little allowance for the human environment. The differences in the population estimates for Skylark, Song Thrush and Linnet are less easily explained, they may be genuine changes or they may be due to the way BBS records birds compared with previous census schemes.

These analyses show that while farmland is important to all these birds it is only one of a number of key habitats and so the conservation of all major habitats within the wider countryside should be a high priority. It also shows the value of the random sampling design of the BBS because all habitats are included in a representative way and some, like human settlement, are surprisingly good for many birds. These are the first attempts at analysing the habitat data collected by BBS volunteers and other studies are now being planned.

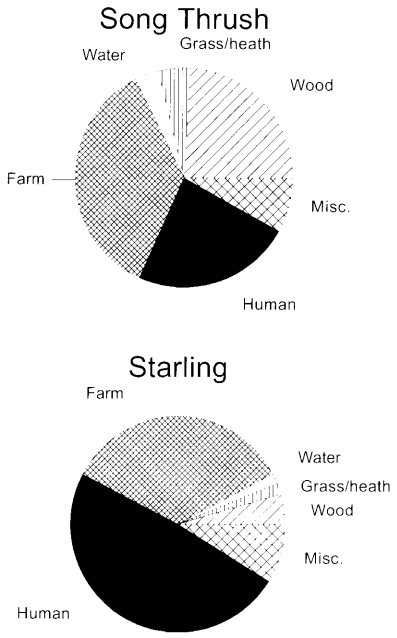
The future - a call for volunteers

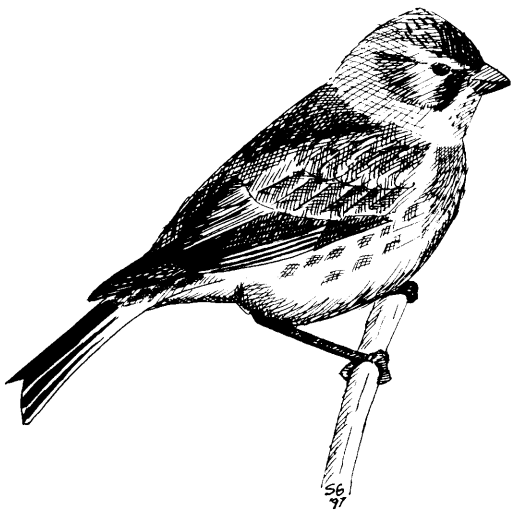
Our target in 1997 is to cover in excess of 2000 1-km survey squares in the UK and our longer-term goal is to cover between 2000 and 3000 squares annually. Progress to date is extremely encouraging as coverage has increased steadily each year, but there are areas across the UK where coverage could be improved. Scotland, Wales and Northern Ireland are the highest priorities for survey promotion at the present time but we would welcome new recruits to BBS in all areas. If you are interested in the findings of this report, and do not already participate in the BBS, then contact your nearest BTO Regional Representative, or Richard Bashford at BTO HQ, for more information.

If you are already a BBS surveyor, please think about taking on a second survey square or spreading the word to your birdwatching friends and getting them involved.

Over 2000 birdwatchers are already involved in the BBS across the UK. The baseline information they collect adds to the BBS database and, as more information is gathered, the value of the database greatly increases and the scope of our research expands. BBS monitoring is vital to the conservation of widespread breeding birds in the UK because it provides basic information on the health of their populations and pointers as to why populations are changing.

Pie charts show the proportion of the British populations of Song Thrush, Starling and Linnet occuring in different broad habitat types.





SPECIAL THANKS

We would like to thank all BBS volunteers and Regional Organisers for making the survey such a success. Space does not permit all observers to be acknowledged individually, but we would like especially to thank the Regional Organisers who, at the time of writing are:

BBS Regional Organisers

ENGLAND: *Avon* - John Tully; *Bedfordshire* - Phil Cannings; *Berkshire* - Chris Robinson; *Birmingham & West Midlands* - Jim Winsper; *Buckinghamshire* - David Hughes; *Cambridgeshire* - Roger Clarke; *Cheshire (mid)* - Roy Leigh; *Cheshire (north & east)* - Clive Richards; *Cheshire (south)* - Charles Hull; *Cleveland* - Russell McAndrew; *Cornwall* - Matt Southam; *Cumbria (north)* - John Callion; *Cumbria (south)* - Ian Kinley; *Derbyshire (north)* - Oly Biddulph; *Derbyshire (south)* - Dave Budworth; *Devon* - John Woodland (temporary cover); ***Dorset*** - **vacant**; *Durham* - David Sowerbutts; *Essex (north-east)* - Peter Dwyer; *Essex (north-west)* - Geoff Gibbs; *Essex (south)* - Maurice Adcock; *Gloucestershire* - Rob Purveur; *Hampshire* - Glynne Evans; *Herefordshire* - Steve Coney; *Hertfordshire* - Chris Dee; *Huntingdon & Peterborough* - Bob Titman; *Kent* - Geoffrey Munns; *Lancashire (east)* - Tony Cooper; *Lancashire (north-west)* - Dave Sharpe; *Lancashire (south)* - David Jackson; *Leicestershire & Rutland* - Jim Graham; *Lincolnshire (east)* - Rob Watson; *Lincolnshire (north)* - Ian Shepherd; *Lincolnshire (south)* - Richard and Kay Heath; *Lincolnshire (west)* - Peter Overton; *London & Middlesex* - Derek Coleman; *Manchester* - Judith Smith; *Merseyside* - David Glasson; *Norfolk (north-east)* - Moss Taylor; *Norfolk (north-west)* - Mike Barrett; *Norfolk (south-east)* - Paul Gallant; *Norfolk (south-west)* - Vincent Matthews; *Northamptonshire* - Phil Richardson; *Northumberland* - Tom Cadwallender; *Nottinghamshire* - Lynda Milner; *Oxfordshire (north)* - Michael Pritchard; *Oxfordshire (south)* - Peter Abbott; *Rugby* - David Porter; *Shropshire* - Allan Dawes; *Isles of Scilly* - Will Wagstaff; *Somerset* - Eve Tigwell; *Staffordshire (central)* - Frank Gribble; *Staffordshire (north)* - Alan Hancock; *Staffordshire (south)* - Peter Dedicoat; *Suffolk* - Mick Wright; *Surrey* - Hugh Evans; *Sussex* - Barrie Watson; *Warwickshire* - Joe Hardman; ***Isle of Wight*** - **vacant**; *Wiltshire (north)* - Richard Williams; *Wiltshire (south)* - Andrew Carter; *Wirral* - Kelvin Britton; *Worcestershire* - Harry Green; *Yorkshire (north-west)* - Malcolm Priestley; *Yorkshire (north)* - John Edwards; *Yorkshire (Harrogate)* - Mike Brown; ***Yorkshire (East)*** - **vacant**; *Yorkshire (north-east)* - Syd Cochrane; *Yorkshire (Bradford)* - Mike Denton; *Yorkshire (York)* - Peter Hutchinson; *Yorkshire (Leeds & Wakefield)* - Terry Dolan; *Yorkshire (south-west)* Geoff Carr; *Yorkshire (south-east)* - Chris Falshaw. **ISLE OF MAN:** Pat Cullen. **SCOTLAND:** *Aberdeen, Kincardine & Deeside* - Paul Doyle; *Angus* - Ken Slater; **Argyll (north & Mull) - vacant; Argyll (south) - vacant;** ***Arran*** - **vacant;** ***Ayrshire*** - **vacant**; *Islay, Jura & Colonsay* - Malcolm Ogilvie; *Benbecula & The Uists* - Paul Boyer; *Borders* - Michael Bickmore; ***Caithness*** - **vacant**; Central Scotland - Neil Bielby; *Dumfries* - Richard Mearns; *Fife & Kinross* - Norman Elkins; *Inverness* - Hugh Insley; *Kirkcudbright* - Joan Howie; *Lanark, Renfrew & Dunbarton* - John Simpson; *Lewis & Harris* - Chris Reynolds & Alistair Pout (jointly); *Lothian* - George Smith; *Moray & Nairn* - Bob Proctor; *Orkney* - Colin Corse; *Perthshire* - Bobby Sommerville; *Small isles (Rum, Eigg, Muck, Canna)* - Bob Swann; *Ross-shire* - Andrew Ramsay; *Shetland* - Dave Okill; *Skye* - Roger and Pat Cottis; ***Sutherland*** - **vacant**; *Wigtown* - Geoff Sheppard. **WALES:** *Anglesey* - Jim Clark; *Caernarfon* - John Barnes; *Brecon* - John Lloyd; *Cardigan* - Wendy Oliver; *Carmarthen* - Julian Friese; ***Clwyd (east)*** - **vacant**; Clwyd (west) - Peter Wellington; *Glamorgan (west)* - Dave Hanford; *Glamorgan (mid and south)* - Rob Nottage; *Gwent* - Stephanie Tyler; *Merioneth* - Peter Haveland; *Montgomery* - Brayton Holt; *Pembrokeshire* - Graham Rees; ***Radnorshire*** - **vacant**. **CHANNEL ISLANDS:** Ian Buxton. **NORTHERN IRELAND:** *Co Antrim* - Michael Robb; *Co Armagh* - David Knight; *Co Down* - Alistair McIlwain; *Co Londonderry* - Seamus Burns; *Co Tyrone (south) & Co Fermanagh* - Philip Grosse; *Co Tyrone (north)* - Mary Mooney.

Many thanks also to the following ROs who have retired during the last two years and contributed significantly in developing BBS in their respective regions: *Isle of Wight* - James Gloyn; *Yorkshire (east)* - Dave Porter; *Radnorshire* - Pete Jennings; *Argyll (north)* - Mike Madders; *Clwyd (east)* - Lawrence Baxter.

Coverage in areas without a Regional Organiser (in bold) is co-ordinated from the Census Unit. Please contact Richard Bashford in the Census Unit if you would be able to take on the role of Regional Organiser in any of these regions.

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BTO Research Report Number 181
ISSN 1368-9932
ISBN 0-903793-79-2