The Breeding Bird Survey 1999

Report Number 5

by

D.G. Noble, R.I. Bashford & S.R. Baillie

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BREEDING BIRD SURVEY

The Breeding Bird Survey partnership comprises:

British Trust for Ornithology
The Nunnery
Thetford
Norfolk
IP24 2PU
www.bto.org

Joint Nature Conservation Committee
Monkstone House
City Road
Peterborough
PE1 1JY
www.jncc.gov.uk

Royal Society for the Protection of Birds
The Lodge
Sandy
Bedfordshire
SG19 2DL
www.rspb.org.uk

BBS National Organiser:
Richard Bashford
British Trust for Ornithology

email bbs@bto.org

For further BBS information, visit our web site at www.bto.org/survey/bbs.htm

ACKNOWLEDGEMENTS

The fifth BBS Annual Report for the Breeding Bird Survey (BBS) allows us to look at the progress of the scheme over a five-year period (1994-1999). We have also detailed the changes from the most recent years 1998-1999. Data have been collected from 2379 squares representing a massive effort from our volunteer fieldworkers and Regional Organisers. We would like to take this opportunity to thank everyone who has contributed to the success of the BBS so far.

The BBS is organised by the British Trust for Ornithology (BTO), and funded jointly 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 Richard Gregory (RSPB), Dr Stephen Baillie (BTO) and Dr David Noble (BTO).

We are grateful to the following people who have provided assistance to the scheme since its inception: Dr Mark Avery (RSPB), Dr Ian Bainbridge (RSPB), George Boobyer (JNCC), the late Dr Steve Carter (BTO), Jackie Coker (BTO), Anita Donaghy (RSPB), Dr Colin Galbraith (JNCC), Dr David Gibbons (RSPB), Viv Hiom (BTO), Mike Meharg (EHS), Ken Perry (BTO Honorary), Samantha Rider (BTO), Dr Derek Thomas (BTO Honorary), Susan Waghorn (BTO), and Richard Weyl (EHS).

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Maps of coverage and distribution were produced using DMAP which was written by Dr Alan Morton. The cover illustration is by Simon Gillings and the BBS logo is by Andy Wilson. Other illustrations in this report are by Andy Chick, David Thelwell and Rodney Ingram. Thanks also to Derek Toomer, Graham Austin and John Marchant for their assistance during the production of this report. Report production and design are by Angela Rickard.

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

Profiles

Dr David Noble is the Head of the Census Unit and oversees the running of bird surveys such as the CBC, WBS, WBBS and the BBS, as well as associated research on bird populations. Before joining the BTO he worked at Cambridge University on the relationships between cuckoos and their hosts, in the UK and in Africa.

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. Before working for the BTO, Richard worked as an Information Officer for the RSPB, coordinating the Birdbus project.

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The Breeding Bird Survey 1999

Summary

• This is the fifth annual report of the BTO/JNCC/RSPB Breeding Bird Survey (BBS), covering the years 1994 to 1999. The primary aim of the survey is to provide population trends for a range of common and widespread birds in the UK.

• Survey plots are based on 1 x1 km squares of the National Grid. Squares are chosen on the basis of a stratified, random sampling design, with larger numbers of squares selected in regions with more potential volunteers. The same squares are surveyed year after year.

• 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 about five hours' fieldwork per year, enabling a large number of people to become involved across the UK.

• The scheme is administered centrally by BTO Headquarters staff and organised by voluntary BTO Regional Organisers (ROs), who in most cases are BTO Regional Representatives, with help from the BTO Scottish, Welsh and Irish Officers. ROs play a vital role in co-ordinating and fostering local fieldwork effort.

• The number of BBS squares covered each year has increased steadily from 1569 in 1994 to 2379 in 1999. The long-term aim is to survey 2-3000 squares on an annual basis and to increase the number of squares in areas that are poorly covered.

• A total of 217 species (including subspecies) was recorded in 1999. Population indices are calculated using methods that take regional differences in sampling effort into account. Across the UK, we were able to measure population changes with a medium to high degree of precision for about 100 species. *(Table 4).*

• Ten widespread species (Grey Partridge, Turtle Dove, Skylark, Song Thrush, Spotted Flycatcher, Tree Sparrow, Linnet, Bullfinch, Reed Bunting and Corn Bunting) have been red-listed on the basis of long-term population trends (see Gibbons *et al* 1996). Six of these species have declined significantly on BBS squares between 1994 and 1999.

• Summaries are provided for all four constituent UK countries – Scotland, England, Wales and Northern Ireland. This is the first time we have reported separate trends for England and Northern Ireland.

• Population trends for each of the Government Office Region/Regional Development Agency (RDA) regions of England are also provided for the first time. *(Table 9).*

• In England, 24 species declined and 28 species increased significantly between 1994 and 1999. Golden Plover and Lesser Redpoll declined by more than 50%, and Grey Partridge, Snipe, Cuckoo, Tree Pipit, Yellow Wagtail, Willow Tit and Bullfinch showed moderate declines (25-50%). Increases greater than 50% were recorded for Siskin, Goldcrest and Redstart. *(Table 5).*

• In Scotland, nine species declined and 12 species increased significantly between 1994 and 1999. Kestrels declined by 61%, and Golden Plover and Pheasant showed moderate declines (25-50%). Increases greater than 50% were recorded for Grey Heron, Mallard, House Martin, Wren and Goldcrest. *(Table 6).*

• In Wales, seven species declined and 14 species increased significantly between 1994 and 1999. Bullfinch declined by 50%, and Mallard, Pheasant, Cuckoo, Starling and Yellowhammer showed moderate declines (25-50%). Increases greater than 50% were recorded for Swift, House Martin, Treecreeper, Blackcap, House Sparrow and Goldfinch. *(Table 7).*

• In Northern Ireland, one species declined and nine species increased significantly between 1994 and 1999. Mistle Thrush have declined by 60%. Increases greater than 50% were recorded for Rook, Dunnock, Great Tit, Willow Warbler and Chaffinch. *(Table 8).*

• A number of resident passerines, mainly woodland species such as Goldcrest, Wren, Robin, Dunnock, Blackbird, Great Spotted Woodpecker, Treecreeper, Blue Tit and Great Tit, show increases throughout their range. Other increasing species include House Martin (except in parts of England), Blackcap, Jackdaw, Carrion/Hooded Crow, Lesser Black-backed Gull and Buzzard.

• Widespread species whose populations appear to be stable (i.e. not significantly or consistently increasing or decreasing) include Wood Pigeon, Collared Dove, Song Thrush, Swallow, Wheatear, Pied Wagtail, Whitethroat, Goldfinch and Greenfinch.

• A number of farmland and upland species appear to be declining in all regions. These include Linnet and Bullfinch (except in Scotland), Yellowhammer, Skylark (except in Wales), Cuckoo, Kestrel, Black-headed Gull and Golden Plover.

• Species that exhibited marked regional differences in population trends include Mallard, Pheasant, Meadow Pipit, Willow Warbler, Rook, Starling, Swift, Song Thrush, Stock Dove, Swallow, House Sparrow, Chaffinch and Reed Bunting. There are no consistent patterns among these species.

Breeding Bird Survey

Background

The status of wild bird populations is an indicator of the health of the wider countryside. The importance of monitoring bird populations became evident following the dramatic changes in the post-war landscape and the widespread use of harmful pesticides in the 1960s. The subsequent population changes among many widespread breeding birds have been monitored by the Common Birds Census (CBC) since 1962 using a detailed territory mapping method. Although the information gathered by the CBC is of tremendous value, the scheme is largely based in the south and the east of the UK and monitors only farmland and woodland species. Acknowledging these limitations, a new scheme was devised following a desk-based study and two years of pilot census work. In 1994, the BTO/JNCC/RSPB Breeding Bird Survey (BBS) was launched aiming to improve the geographical scope of UK bird monitoring by including all habitats and therefore, more species of breeding birds.

Methods

The BBS uses a transect method on randomly selected 1x1km squares. Each surveyor visits their plot twice within the breeding season, undertaking two 1km transects across their square recording all birds seen or heard. Birds are recorded in one of three distance bands, or in flight, to enable density calculations to be made. A separate visit is required to record the habitat. Through its careful design, the BBS is able to provide precise population trends for a large proportion of our breeding species across all habitats. Data from the BBS can also be summarised for individual countries, counties and habitats.

For a more detailed account of the survey design and methodology, please refer to previous BBS reports (available from BTO HQ).

Organisation

The BBS National Organiser based at BTO HQ is responsible for the overall running of the scheme and acts as the main point of contact for the network of voluntary Regional Organisers (ROs). Each RO is responsible for allocating squares to volunteers in their particular region and for finding additional volunteers should existing ones drop out. They also ensure that survey forms are collected for each region and sent to the Nunnery by September. Since the success of the survey depends on the volunteer surveyors throughout the UK, up-to-date feedback is vital. All forms are acknowledged on receipt, and the Census Unit newsletter *Census News* and a copy of the annual report are sent to all BBS surveyors.

Survey Coverage

To date, we have received 2379 sets of forms for 1999, compared with 2310 in 1998. Only a slight increase in the overall coverage was expected as many parts of the country have reached optimum coverage, and promotion to expand the scheme is now focussed on specific areas. A second factor is the end of funded professional coverage in Scotland, which has reduced coverage in three Scottish regions.

England

The excellent coverage in England increased by 67 squares in 1999. Kent tops the list with a staggering 95 squares covered in 1999. Welcome increases in Buckinghamshire (11 extra squares), Cornwall (6), Cheshire (18), Gloucestershire (10) and Sussex (9) help to ensure that we are able to maintain the high standard of monitoring within the country. We are now routinely publishing a table of population changes for England, for comparison with those for the other countries.

Scotland

Our coverage in Scotland currently stands at 267 squares – down from 307 in 1998. This is because last season was the first year without coverage of remote Scottish squares by professional fieldworkers. When the BBS was first started, the RSPB agreed to fund coverage in the far north and west of Scotland for the first five years. Around 50 squares each year have been covered by professional fieldworkers, to allow a period for building up volunteer participation in these areas. Given the remote nature of many of the BBS squares in the far north and west, the loss of forty squares was not unexpected. Loss of these squares will not have too serious an impact on overall bird monitoring because they hold relatively few species. However, in order to monitor Scottish birds to the same degree as elsewhere, we are very interested in maintaining coverage in these areas, and will be considering other options in the future. Elsewhere in Scotland, coverage was mainly good. Tremendous efforts in Ross-shire and Argyll (two regions which previously had professional coverage) in 1999 actually resulted in increases in coverage in those areas! These efforts are timely and help to maintain overall coverage in Scotland.

Wales

More vital increases in Wales during 1999 mean that 223 squares are now being covered. Considering that only 137 squares were covered two seasons ago, this represents a fairly dramatic increase, and allows us to monitor a greater number of Welsh species with better precision. Most counties in Wales increased coverage by a few squares, and if this continues in 2000, we could well reach our target of around 250 squares covered annually. Much of this increase is thanks to the efforts of the BTO's Welsh Officer, targeted promotion through the RSPB Welsh Newsletter *Barcud* and support from the Welsh Ornithological Society.

Northern Ireland

Our coverage in Northern Ireland has improved steadily since the start of the BBS and 95 squares were covered in 1999. Thanks to the generous support of the Environment and Heritage Service in Northern Ireland, 26 of these squares (largely in the west) were surveyed by a professional fieldworker. It is important to ensure that volunteer coverage is increased further so that we can cover these squares without additional funding in future. This level of coverage means that we now include a table of population changes in Northern Ireland for around 25 common species.

Reed Buntings are found throughout the UK but are declining significantly only in England. It will be interesting to see if their fortunes vary in different habitats. (Artwork by Andy Chick)

Table 1. A breakdown of the 1999 BBS coverage by country with percentage of issued squares covered in parentheses.

	England	*Scotland*	*Wales*	*N Ireland*	*Channel Is*	*Isle of Man*	*Total*
Squares covered	**1782** (70%)	**267** (43%)	**223** (65%)	**95** (83%)	**7** (58%)	**5** (45%)	**2379** (65%)
Squares issued	2556	627	344	116	12	11	3666

Habitat

We ask all volunteers each year to make an initial visit to their square to record the habitat, and especially to note any changes. We know that changes in habitat cause fluctuations in bird populations and it is therefore vital that once a decline or increase has been identified, we are in a position to match it to any changes in habitat (see BBS Research). We acknowledge that some habitats are less likely to change than others, such as urban or upland areas, but, since we cannot assume that there has been no change, we do need notification of the habitat each year.

We are collecting excellent amounts of farmland, woodland and human site information as well as many data from upland areas. Some of the habitat types encountered less frequently, such as lakes, marshes, rivers and coast, are the subject of specific surveys such as the Waterways Bird Survey, Waterways Breeding Bird Survey and Wetlands Bird Survey, etc.

The breakdown of different habitat types in 1999 was similar to that in previous years. Farmland accounted for 55% of transect sections, with human-dominated landscapes (including urban, suburban and rural) accounting for 17%. Around 11% of transect sections were woodland, with heathland at 6% and grassland at 5%. Other habitats were covered in much smaller amounts – scrubland and water bodies both at 2% and rock, coastal and miscellaneous making up the remaining 2%. Due to the sampling strategy these figures do not reflect the exact proportions of these habitats in the UK as a whole. However, percentage figures that have been corrected for the effects of sampling effort can readily be calculated for specific research projects.

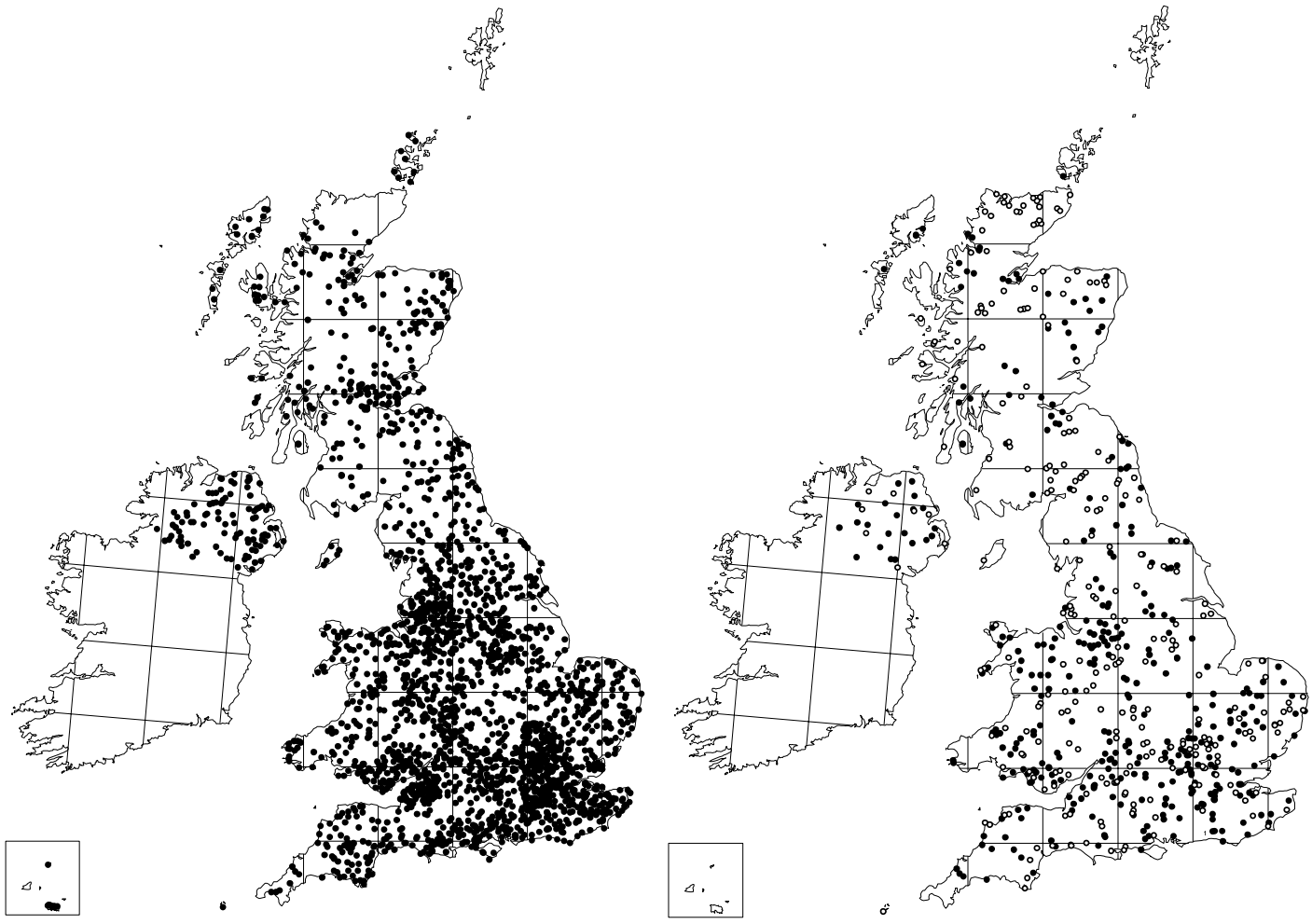


Figure 1. The left-hand map shows the distribution of BBS plots covered in 1999 and the right-hand map shows the distribution of squares covered in 1999 but not 1998 (closed symbols) and squares covered in 1998 but not 1999 (open symbols).

Table 2. Species recorded in 50 or more squares for the whole of the UK during the 1999 BBS survey. 'Number' is the number of squares a species was recorded from and '%' the percentage of squares that the species occurred in. Species in parentheses are usually recognised as races or forms rather than full species.

Species	Number	%	Species	Number	%	Species	Number	%
Little Grebe	58	2	Collared Dove	1185	50	Blackcap	1316	55
Great Crested Grebe	59	2	Turtle Dove	214	9	Wood Warbler	56	2
Cormorant	188	8	Cuckoo	804	34	Chiffchaff	1070	45
Grey Heron	592	25	Little Owl	99	4	Willow Warbler	1424	60
Mute Swan	218	9	Tawny Owl	103	4	Goldcrest	671	28
Greylag Goose	100	4	Swift	990	42	Spotted Flycatcher	219	9
Canada Goose	367	15	Green Woodpecker	695	29	Long-tailed Tit	762	32
Shelduck	127	5	Great Spotted Woodpecker	735	31	Marsh Tit	130	5
Mallard	1143	48	Skylark	1565	66	Willow Tit	62	3
Tufted Duck	148	6	Sand Martin	122	5	Coal Tit	624	26
Sparrowhawk	311	13	Swallow	1731	73	Blue Tit	2012	85
Buzzard	594	25	House Martin	868	37	Great Tit	1859	78
Kestrel	573	24	Tree Pipit	141	6	Nuthatch	346	15
Red Grouse	111	5	Meadow Pipit	690	29	Treecreeper	342	14
Red-legged Partridge	440	19	Yellow Wagtail	156	7	Jay	597	25
Grey Partridge	185	8	Grey Wagtail	202	9	Magpie	1702	72
Pheasant	1474	62	Pied Wagtail	1173	49	Jackdaw	1421	60
Moorhen	627	26	Dipper	54	2	Rook	1160	49
Coot	238	10	Wren	2123	90	Carrion Crow	2022	85
Oystercatcher	260	11	Dunnock	1790	75	(Hooded Crow)	121	5
Golden Plover	71	3	Robin	2063	87	Raven	197	8
Lapwing	586	25	Redstart	152	6	Starling	1714	72
Snipe	116	5	Whinchat	80	3	House Sparrow	1453	61
Curlew	492	21	Stonechat	120	5	Tree Sparrow	150	6
Redshank	67	3	Wheatear	273	12	Chaffinch	2136	90
Common Sandpiper	52	2	Blackbird	2153	91	Greenfinch	1557	66
Black-headed Gull	442	19	Song Thrush	1656	70	Goldfinch	1184	50
Common Gull	127	5	Mistle Thrush	1177	50	Siskin	101	4
Lesser Black-backed Gull	526	22	Grasshopper Warbler	57	2	Linnet	1169	49
Herring Gull	558	24	Sedge Warbler	295	12	Lesser Redpoll	120	5
Great Black-backed Gull	92	4	Reed Warbler	100	4	Bullfinch	459	19
Common Tern	58	2	Lesser Whitethroat	220	9	Yellowhammer	1134	48
(Feral Pigeon)	635	27	Whitethroat	1124	47	Reed Bunting	393	17
Stock Dove	711	30	Garden Warbler	454	19	Corn Bunting	162	7
Wood Pigeon	2163	91						

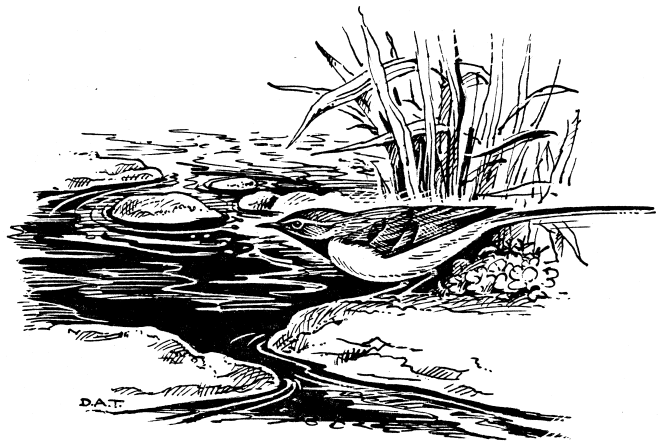
Table 3. Species recorded in less than 50 squares for the whole of the UK during the 1999 BBS survey. (Species marked with an asterisk are feral or non-native species on Category E of the official British Ornithologists Union British List). Species in parentheses are usually recognised as races or forms rather than full species.

Species	Number	Species	Number	Species	Number	Species	Number
Red-throated Diver	10	Ring-necked Duck	1	Grey Plover	2	Short-eared Owl	13
Black-throated Diver	5	Pochard	12	Knot	1	Nightjar	2
Great Northern Diver	3	Eider	6	Sanderling	2	Kingfisher	45
Black-necked Grebe	2	Long-tailed Duck	1	Dunlin	17	Lesser Spotted Woodpecker	30
Fulmar	20	Goldeneye	2	Woodcock	10	Woodlark	16
Manx Shearwater	1	Red-breasted Merganser	14	Black-tailed Godwit	4	Rock Pipit	13
Gannet	8	Goosander	30	Bar-tailed Godwit	1	Water Pipit	1
Shag	9	Ruddy Duck	8	Whimbrel	27	Nightingale	39
Little Egret	3	Red Kite	24	Spotted Redshank	2	Black Redstart	1
Black Swan*	4	Marsh Harrier	18	Greenshank	15	Ring Ouzel	23
Whooper Swan	3	Hen Harrier	15	Green Sandpiper	3	Black-throated Thrush	1
Pink-footed Goose	5	Montagu's Harrier	1	Turnstone	4	Fieldfare	21
White-fronted Goose	1	Goshawk	9	Arctic Skua	6	Redwing	5
Bar-headed Goose*	1	Golden Eagle	3	Great Skua	6	Cetti's Warbler	10
(Domestic Goose*)	2	Osprey	3	Mediterranean Gull	2	Dartford Warbler	5
Snow Goose	1	Merlin	9	Little Gull	1	Firecrest	2
Ne-Ne*	1	Hobby	31	(Yellow-legged Gull)	1	Pied Flycatcher	48
Barnacle Goose	4	Peregrine	30	Kittiwake	2	Crested Tit	1
Brent Goose	1	Ptarmigan	3	Sandwich Tern	5	Short-toed Treecreeper	4
Egyptian Goose	6	Black Grouse	10	Arctic Tern	5	Golden Oriole	1
Muscovy Duck*	2	Quail	16	Little Tern	5	Chough	6
(Domestic Mallard*)	3	Peacock*	7	Guillemot	1	(Hybrid Crow)	1
Mandarin	18	Water Rail	1	Razorbill	3	Brambling	5
Wigeon	2	Corncrake	2	Black Guillemot	2	Twite	22
Gadwall	29	Avocet	5	Rock Dove	8	Common Crossbill	23
Teal	19	Stone Curlew	4	Alexandrine Parakeet*	1	Scottish Crossbill	2
Pintail	2	Little Ringed Plover	7	Ring-necked Parakeet	15	Hawfinch	4
Garganey	3	Ringed Plover	23	Barn Owl	18	Cirl Bunting	2
Shoveler	15	Dotterel	3	Long-eared Owl	4		

Survey Results

Species recorded

Among the 217 species (including sub-species) recorded in 1999 are a number of unusual species for the survey including Ring-necked Duck, Yellow-legged Gull and even Black-throated Thrush! With continuing good coverage overall, we hope to gradually increase the number of species we are able to monitor reliably. In 1999, 88 species and two subspecies were recorded in at least 100 squares (up by four species from last year) and 13 more were recorded in at least 50 squares. Among the remaining 114 species recorded in smaller numbers on BBS squares are many waders, wildfowl and raptors (a number of which are better monitored by other surveys). It is likely that special surveys will continue to be needed for more cryptic species (such as Lesser Spotted Woodpecker and Hawfinch), nocturnal species (e.g. Nightjar), and some uncommon or widely dispersed species of upland habitats (Ring Ouzel and Twite).



BBS shows that the elegant Grey Wagtail has made significant increases in the UK since 1994. (Artwork by David Thelwell).

Between-year population changes (1998-1999)

Although the main aim of the BBS is to monitor long-term trends in bird populations, we also report inter-annual population changes. Counts of 11 species have changed significantly since the previous year (1998). Two species for which there is a Biodiversity Action Plan, Grey Partridge and Skylark, declined again, as did Meadow Pipit, Wheatear, Grasshopper Warbler, Chiffchaff and Willow Warbler. The only four species to show significant increases were Wren, Blackbird, House Martin and Grey Wagtail. For most species, these between-year changes are most likely due to the effects of weather variables during the breeding season or over the preceding winter.

At the regional level, very few inter-annual changes were detected. In England, populations of only nine species changed significantly since 1998. Redpoll, Black-headed Gull, Herring Gull, Turtle Dove and Chiffchaff declined, whereas Wren, Robin, Blackbird and Goldcrest increased. In Scotland, only two species showed significant effects: counts of Wheatear and Meadow Pipit were significantly lower than in 1998, and in Wales, Lesser Black-backed Gull was the only species to change significantly - however, this three-fold difference is most likely due to movement among colonies. No inter-annual changes were detected in Northern Ireland.

Five-year population changes (1994 - 1999)

The main aim of the BBS is to detect changes in populations of birds. The following tables show the estimated population changes for species recorded in more than 50 squares, at the UK level, or 30 squares, at the regional level. Where the estimated population change is statistically significant, we are confident that a real population change has occurred. Population changes were estimated using a log-linear model with Poisson error terms. For these analyses, we use the higher count – from the two visits – for each species, summed over all distance categories and transect sections. Counts are modelled as a function of year and site effects, corrected for over-dispersion, and weighted to account for differences in sampling effort among regions of the UK. Only squares that were counted in at least two years are included in the analyses. Counts for five wader species are corrected by excluding flocks and observations in unsuitable breeding habitat.

Considering only those species that exhibit significant population changes within the UK between 1994 and 1999, 35 species have increased and 26 have decreased (Table 4). Trends for some of these species are discussed in the country summaries: here we concentrate on species for which the country trends were broadly similar, or which were too uncommon to be monitored at the regional level. Because English squares comprise such a large component of the UK sample, population trends in the UK are often strongly influenced by those in England. Moreover, some species are now so rare outside England that populations cannot be reliably monitored. This applies to once familiar species such as Grey Partridge, Turtle Dove, Spotted Flycatcher, Tree Sparrow and Corn Bunting, whose declines in the UK have led to their inclusion in the Biodiversity Action Plan process.

Aerial-feeding species such as Swallow and House Martin have increased significantly on BBS squares since 1994, and Sand Martin and Swift also showed a tendency to increase. Of these species, House Martin exhibited significant regional differences in population trends. Two wagtails – Pied and Grey – have increased, whereas Yellow Wagtail and Meadow Pipit have declined significantly in the UK since 1994. There was no significant UK trend for Tree Pipit, but this species has experienced a significant decline in England and a significant increase in Scotland. Skylark numbers continue to decline in the UK, particularly England and Scotland. Other species which have exhibited significant UK declines since 1994 are Cuckoo, Kestrel, Shelduck, Black-headed Gull and Great Black-backed Gull. With the exceptions of Golden Plover and Snipe, most wader species (Oystercatcher, Redshank, Lapwing, and Curlew) monitored by BBS, appear to be declining. In contrast, counts of Buzzard, Grey Heron, Greylag and Canada Geese, Moorhen, Coot, Red-legged Partridge and Red Grouse have all increased significantly in the UK since 1994. Mallard also shows a significant increase. BBS trends of waterfowl may reflect the situation for a different component of the population than those monitored by the Wetland Bird Survey (WeBS). Whereas wintering populations of most of the species listed above tend to be increasing, there has been a 40% decline in Mallards on WeBS sites over the past ten years.

Among woodland birds, Redstart, Treecreeper, Nuthatch, and Green and Great Spotted Woodpeckers continue to do well throughout the UK, but the Lesser Spotted Woodpecker is now too rare to be monitored reliably. With the exception of Willow Tit (which has declined by over 40% since 1994) and Marsh Tit (which has declined, non-significantly, by 23%), populations of most tit species are stable or increasing. Widespread resident species such as Goldcrest, Wren, Robin and Dunnock are all increasing, perhaps as a result of recent mild winters. The thrushes (Blackbird, Song Thrush and Mistle Thrush) appear to be holding their own during the 1990s with only Blackbird and Song Thrush showing significant improvement, but none have recovered from the more severe declines during the 1970s and 1980s. The red-listed Spotted Flycatcher continues to decline but the change was significant only in England. Across the UK, Carrion Crows and Jackdaws have continued to increase to numbers significantly higher than in 1994, but Magpie numbers have stabilised and Jays have declined significantly.

UK warblers exhibit mixed fortunes. Of ten warbler species monitored by the BBS, three species (Lesser Whitethroat, Wood Warbler and Chiffchaff) declined significantly, and three species (Willow Warbler, Sedge Warbler and Blackcap) increased significantly between 1994 and 1999. Lesser Whitethroat and Wood Warbler have shown continuing declines over the past five years, but the decline in Chiffchaff is due to a large and

Table 4. UK: Population changes of widespread species 1998-1999 and 1994-1999. The sample size indicated is the mean number of squares occupied each year over the five-year interval (excluding squares where the species was recorded in only one year). The figures presented are the percentage changes in population levels for the respective time periods, marked with an asterisk where significant. For the 1994-1999 period, the lower and upper 95% confidence limits are given. Species in bold are red-listed, and species in italics amber-listed in *Birds of Conservation Concern.*

Species	Sample	Change 98-99	Change 94-99	lcl	ucl
Great Crested Grebe	54	-18	-6	-32	29
Cormorant	130	-13	-5	-21	13
Grey Heron	441	16	14 *	1	28
Mute Swan	159	4	16	-3	38
Greylag Goose	78	47	100 *	46	173
Canada Goose	270	-6	18 *	2	37
Shelduck	110	-13	-40 *	-51	-27
Mallard	874	15	21 *	13	30
Tufted Duck	117	-5	9	-13	36
Sparrowhawk	257	-2	1	-15	18
Buzzard	414	3	29 *	16	44
Kestrel	502	-17	-30 *	-38	-21
Red Grouse	103	-4	31 *	6	61
Red-legged Partridge	363	-1	16 *	4	30
Grey Partridge	222	-39 *	-43 *	-53	-32
Pheasant	1178	2	1	-4	6
Moorhen	478	19	18 *	6	30
Coot	178	19	33 *	14	56
Oystercatcher	227	0	-18 *	-26	-9
Golden Plover	78	-17	-18	-36	6
Lapwing	525	-1	-20 *	-26	-12
Snipe	117	10	7	-15	33
Curlew	420	-1	-12 *	-19	-4
Redshank	63	-30	-36 *	-51	-16
Common Sandpiper	63	-31	-29 *	-46	-7
Black-headed Gull	425	-11	-36 *	-43	-28
Common Gull	123	-19	-4	-21	16
Lesser Black-backed Gull	399	1	46 *	28	67
Herring Gull	432	-17	0	-11	11
Great Black-backed Gull	85	-11	-22 *	-37	-3
Feral Pigeon	513	-1	10	-1	21
Stock Dove	564	-4	10	-1	21
Wood Pigeon	1751	1	0	-3	5
Collared Dove	941	1	18 *	12	25
Turtle Dove	190	-9	-18 *	-31	-2
Cuckoo	744	-13	-27 *	-33	-20
Little Owl	84	15	-8	-31	23
Tawny Owl	76	22	11	-17	49
Swift	824	15	6	-3	15
Green Woodpecker	507	-3	14 *	3	26
Great Spotted Woodpecker	543	4	42 *	28	58
Skylark	1354	-12 *	-16 *	-20	-13
Sand Martin	92	42	15	-11	48
Swallow	1353	8	10 *	5	16
House Martin	688	29 *	29 *	18	41
Tree Pipit	119	-7	21	-1	48
Meadow Pipit	609	-11 *	-7 *	-12	-2
Yellow Wagtail	155	-19	-29 *	-41	-14
Grey Wagtail	138	67 *	40 *	14	73
Pied Wagtail	907	6	18 *	9	27
Wren	1698	15 *	17 *	13	21
Dunnock	1414	5	7 *	2	13
Robin	1641	7	12 *	8	16
Redstart	128	-4	37 *	13	66
Whinchat	82	-23	-9	-28	16
Stonechat	66	30	80 *	32	147
Wheatear	234	-29 *	3	-11	18
Blackbird	1724	9 *	12 *	9	15
Song Thrush	1316	6	6 *	0	11
Mistle Thrush	907	-1	-4	-12	4
Grasshopper Warbler	59	-51 *	-3	-34	41
Sedge Warbler	233	19	14 *	0	31
Reed Warbler	82	-10	15	-7	42
Lesser Whitethroat	195	17	-31 *	-42	-17
Whitethroat	932	-6	6	0	14
Garden Warbler	364	11	13	0	28
Blackcap	971	6	50 *	41	60
Wood Warbler	58	-4	-45 *	-60	-24
Chiffchaff	882	-30 *	-7 *	-13	-1
Willow Warbler	1201	-9 *	14 *	9	19
Goldcrest	490	10	61 *	47	76
Spotted Flycatcher	194	19	-11	-25	6
Pied Flycatcher	42	-3	-13	-38	22
Long-tailed Tit	587	24	15 *	3	29
Marsh Tit	115	5	23	-3	56
Willow Tit	60	-16	-42 *	-58	-18
Coal Tit	510	-18	2	-7	13
Blue Tit	1613	0	7 *	3	11
Great Tit	1460	-2	12 *	7	18
Nuthatch	270	-10	14	-1	32
Treecreeper	260	19	41 *	21	65
Jay	480	4	-15 *	-24	-5
Magpie	1335	1	4	0	9
Jackdaw	1120	10	21 *	14	28
Rook	971	0	8	0	17
Carrion Crow	1639	4	12 *	7	18
Raven	150	-15	15	-9	44
Starling	1420	10	-6 *	-11	0
House Sparrow	1187	0	-7 *	-11	-3
Tree Sparrow	132	21	11	-10	36
Chaffinch	1730	0	3	0	6
Greenfinch	1227	6	20 *	13	27
Goldfinch	962	9	1	-6	9
Siskin	111	-1	6	-16	35
Linnet	982	-3	-14 *	-20	-7
Lesser Redpoll	118	-24	-18	-35	5
Bullfinch	432	-1	-28 *	-37	-19
Yellowhammer	982	0	-16 *	-20	-11
Reed Bunting	322	15	5	-7	18
Corn Bunting	148	28	-26 *	-37	-13

significant decline of 30% in the last year. Grasshopper Warbler, a species prone to population fluctuations, also declined significantly, by 50%, since last year, and numbers are now similar to those in 1994.

Two abundant urban species have declined significantly across the UK. The House Sparrow is showing a decline in England but is stable in Scotland and increasing in Wales. The Starling has declined significantly in England and Wales, but is increasing in Scotland. Populations of another urban species – the Feral Pigeon – appear to be stable across the UK, but this species has also increased in Scotland. Among the other pigeons, Collared Doves have increased significantly across the UK, Stock Dove and Wood Pigeon numbers are stable, and Turtle Dove has declined significantly. Among the finches, only Greenfinch shows a significant increase in the UK over this period. Bullfinch, Corn Bunting, Yellowhammer and Linnet all exhibit significant declines, whereas populations of Reed Bunting, Chaffinch, Goldfinch and Siskin appear to be stable.

England

This is the first time that we report English population trends. A further breakdown of trends within current English government regions follows this section. Of 97 species detected in at least 30 squares in England, 24 species declined significantly and 28 species increased significantly, since 1994 (Table 5). Species showing significant declines over the five-year period between 1994 and 1999 include familiar farmland species such as

Table 5. ENGLAND: Population changes for all species that occurred in at least 30 squares in England over the period 1994 to 1999, as well as figures for some species detected in 20 - 30 squares (in parentheses to encourage caution on the basis of small sample sizes). The figures presented are the percentage changes in population levels for 1998 to 1999, and 1994 to 1999, marked with an asterisk where significant at a 5% level. For the five-year period, the lower and upper 95% confidence limits are given. Species in bold are red-listed, and species in italics amber-listed in *Birds of Conservation Concern.*

Species	Sample	Change 98-99	Change 94-99	lcl	ucl	Species	Sample	Change 98-99	Change 94-99	lcl	ucl
Little Grebe	37	10	89 *	25	184	Grey Wagtail	86	38	24	-5	61
Great Crested Grebe	48	-27	1	-28	40	Pied Wagtail	687	9	20 *	10	30
Cormorant	107	5	-9	-24	10	Wren	1327	24 *	10 *	7	14
Grey Heron	357	27	0	-12	13	*Dunnock*	1169	13 *	5	0	10
Mute Swan	139	-2	-15	-28	1	Robin	1300	12 *	11 *	7	15
Greylag Goose	61	8	46 *	12	90	*Redstart*	69	-11	53 *	17	102
Canada Goose	259	-3	14	-2	32	Whinchat	31	-25	-11	-38	27
Mallard	728	5	16 *	8	25	Wheatear	112	-12	6	-13	30
Tufted Duck	101	-13	18	-6	48	*Blackbird*	1392	11 *	13 *	10	16
Sparrowhawk	214	0	-2	-18	16	**Song Thrush**	1029	5	1	-4	7
Buzzard	225	-2	29 *	12	49	Mistle Thrush	743	2	-4	-12	5
Kestrel	431	-4	-19 *	-28	-8	Sedge Warbler	147	22	0	-16	18
Red Grouse	38	-3	1	-23	34	Reed Warbler	79	-11	14	-8	41
Red-legged Partridge	359	2	16 *	4	30	Lesser Whitethroat	186	19	-31 *	-43	-17
Grey Partridge	194	-30	-45 *	-55	-33	Whitethroat	813	-3	7	0	14
Pheasant	997	7	9 *	4	15	Garden Warbler	298	-6	9	-5	25
Moorhen	438	23	17 *	5	29	Blackcap	856	8	47 *	38	56
Coot	161	24	45 *	24	71	(Wood Warbler	27	-33	63 *	-77	42)
Oystercatcher	99	3	4	-15	27	Chiffchaff	753	-30 *	-7 *	-13	-1
Golden Plover	28	32	15	-18	63	Willow Warbler	852	5	-3	-8	2
Lapwing	417	3	-3	-13	7	Goldcrest	329	36 *	67 *	49	86
Snipe	50	2	-36 *	-54	-12	**Spotted Flycatcher**	143	-3	-24 *	-38	-7
Curlew	237	4	-7	-16	3	Long-tailed Tit	517	17	3	-8	15
Redshank	41	-20	1	-28	43	*Marsh Tit*	103	13	12	-12	43
Black-headed Gull	320	-28 *	-33 *	-41	-23	*Willow Tit*	53	-8	-40 *	-57	-15
Common Gull	50	-25	84 *	20	183	Coal Tit	328	3	8	-3	21
Lesser Black-backed Gull	290	-5	31 *	13	52	Blue Tit	1324	-1	5 *	1	9
Herring Gull	270	-34 *	-18 *	-29	-5	Great Tit	1201	2	9 *	3	14
Great Black-backed Gull	36	9	-51 *	-61	-39	Nuthatch	223	-5	11	-5	30
Common Tern	38	40	86 *	24	177	Treecreeper	195	8	19	0	42
Feral Pigeon	435	-2	3	-7	15	Jay	421	7	-19 *	-28	-9
Stock Dove	521	-1	12 *	1	24	Magpie	1131	3	1	-3	7
Wood Pigeon	1411	1	2	-3	6	Jackdaw	889	13	29 *	21	38
Collared Dove	844	3	20 *	13	28	Rook	770	0	4	-5	13
Turtle Dove	187	-9	-17 *	-31	-1	Carrion Crow	1345	8	17 *	11	23
Cuckoo	607	-4	-30 *	-36	-23	Raven	41	-10	22	-19	83
Little Owl	81	13	-5	-29	29	*Starling*	1182	13	-11 *	-16	-5
Tawny Owl	63	24	29	-6	77	House Sparrow	1002	-2	-11 *	-15	-7
Swift	722	19	6	-2	16	**Tree Sparrow**	112	21	9	-12	36
Kingfisher	34	-4	-32	-57	9	Chaffinch	1342	0	3	0	6
Green Woodpecker	465	1	19 *	7	32	Greenfinch	1045	4	17 *	11	24
Great Spotted Woodpecker	487	4	38 *	24	54	*Goldfinch*	809	8	-4	-12	4
Skylark	1051	-6	-20 *	-24	-17	Siskin	31	12	90 *	26	187
Sand Martin	61	46	17	-14	60	**Linnet**	812	5	-19 *	-25	-13
Swallow	1051	8	6	0	13	Lesser Redpoll	47	-66 *	-60 *	-75	-37
House Martin	555	21	-2	-11	7	**Bullfinch**	340	13	-29 *	-38	-18
Tree Pipit	64	21	-26 *	-43	-3	Yellowhammer	853	2	-15 *	-20	-11
Meadow Pipit	297	16	-6	-12	2	**Reed Bunting**	247	9	-16 *	-26	-4
Yellow Wagtail	153	-19	-27 *	-39	-12	**Corn Bunting**	141	30	-22 *	-34	-8

Grey Partridge, Corn Bunting, Skylark, Linnet, Kestrel, Turtle Dove, Reed Bunting and Yellowhammer. Also declining are woodland species with quite specialised habitat requirements such as Willow Tit, Spotted Flycatcher, and Tree Pipit, as well as species such as Cuckoo, Bullfinch, Jay, Starling and House Sparrow, that occur across a broader range of habitats, including urban areas. English trends for the finches and buntings mirror those for the UK but add Reed Bunting and Lesser Redpoll to the list of species declining. BTO recently issued a high alert for Lesser Redpoll due to population declines of over 90% on CBC plots over the past 25 years. This species is prone to fluctuations in numbers, the 60% decline on English BBS squares since 1994 can be attributed entirely to a 66% decline since the last year.

Terrestrial species that have increased in numbers since 1994 include both common woodpeckers (Green and Great Spotted), Wren, Robin, Redstart, Blackbird, Carrion Crow, Jackdaw, Greenfinch, Siskin, Pied Wagtail, Blackcap, Goldcrest, Collared and Stock Doves, Red-legged Partridge and Buzzard. Waterbirds that have increased significantly in counts on BBS squares since 1994 include Little Grebe, Common Tern, Common Gull, Greylag Goose, Coot, Moorhen, Lesser Black-backed Gull and Mallard. Black-headed Gull, Herring Gull and Great Black-backed Gull appear to have declined in England but, because these species breed colonally in marine as well as inland habitats, these trends may not be representative. Although English populations of six wader species appear to be declining, none of the trends are significant, in contrast to the more severe declines estimated for Scotland.

Table 6. SCOTLAND: Population changes for all species that occurred in at least 30 squares in Scotland over the period 1994 to 1999, as well as figures for some species detected in 20 - 30 squares (in parentheses to encourage caution on the basis of small sample sizes). The figures presented are the percentage changes in population levels for 1998 to 1999, and 1994 to 1999, marked with an asterisk where significant at a 5% level. For the five-year period, the lower and upper 95% confidence limits are given. Species in bold are red-listed, and species in italics amber-listed in *Birds of Conservation Concern.*

Species	*Sample*	*Change 98-99*	*Change 94-99*	*lcl*	*ucl*
Grey Heron	40	10	83 *	17	186
Mallard	85	53	73 *	36	120
Buzzard	89	5	44 *	12	86
Kestrel	42	-55	-61 *	-75	-39
Red Grouse	61	-7	46 *	10	95
Pheasant	99	-16	-27 *	-40	-12
Oystercatcher	118	-1	-22 *	-33	-9
Golden Plover	49	-35	-33 *	-53	-5
Lapwing	87	-8	-34 *	-46	-20
Snipe	55	18	39	0	95
Curlew	125	-6	-18 *	-31	-4
(*Redshank*	21	-36	-61 *	-75	-39)
Common Sandpiper	38	-34	-30	-51	1
Black-headed Gull	75	5	-59 *	-69	-45
Common Gull	69	-18	-16	-35	7
Lesser Black-backed Gull	58	-22	3	-25	43
Herring Gull	98	-14	6	-18	36
Great Black-backed Gull	35	4	41	-10	119
Feral Pigeon	51	19	44 *	2	104
Wood Pigeon	156	13	-7	-20	7
Collared Dove	35	-25	-16	-41	22
Cuckoo	68	-27	-10	-34	23
Swift	40	-3	-28	-50	3
Skylark	194	-19	-13 *	-22	-3
Swallow	128	7	1	-15	19
House Martin	41	112	375 *	198	657
(Tree Pipit	27	-1	86 *	19	190)
Meadow Pipit	205	-24 *	-17 *	-25	-8
(Grey Wagtail	24	109	107 *	24	246)
Pied Wagtail	116	1	23	-1	53
Wren	175	1	60 *	39	85
Dunnock	97	-19	9	-15	38
Robin	150	-6	17 *	1	36
Whinchat	33	-11	2	-34	59
Wheatear	78	-41 *	-2	-24	26
Blackbird	142	7	4	-8	17
Song Thrush	128	21	20	-1	45
Mistle Thrush	57	-9	29	-9	83
Sedge Warbler	49	34	39 *	3	86
Whitethroat	53	-20	3	-27	45
Willow Warbler	176	-16	43 *	26	62
Goldcrest	69	-10	87 *	40	149
Coal Tit	97	-34	-10	-29	14
Blue Tit	118	6	9	-9	29
Great Tit	102	-12	31 *	4	64
Magpie	31	-29	19	-16	69
Jackdaw	90	-3	4	-17	30
Rook	98	-6	-6	-29	23
Carrion Crow	147	0	2	-15	23
Raven	40	-16	19	-26	91
Starling	117	8	22	-3	54
House Sparrow	72	9	9	-10	31
Chaffinch	192	-8	1	-8	11
Greenfinch	79	11	30	0	68
Goldfinch	55	-6	1	-31	47
Siskin	58	-2	-6	-35	37
Linnet	75	-35	1	-24	35
Lesser Redpoll	38	-16	-9	-40	38
(**Bullfinch**	29	-15	73	-3	208)
Yellowhammer	86	-7	-13	-28	6
Reed Bunting	39	23	40	-3	102

Scotland

Of 57 species detected in at least 30 squares in Scotland, nine species showed significant declines and12 showed significant increases over the period 1994 to 1999 (Table 6). Four of the declining species are waders (Oystercatcher, Lapwing, Curlew and Golden Plover), Redshank also declined but the trend is based on only 21 squares, also declined. Reasons for these declines are unclear. Numbers of two open-country species, Meadow Pipit and Skylark, and one farmland species, Kestrel, dropped over the past year, and counts of all three species are significantly lower than in 1994. Pheasant continue to show a decline, but patterns in this species are strongly influenced by stocking. Wood Pigeons appear to have recovered from the low numbers reported last year. Among species showing significant improvement, the increases for small-bodied residents (Robin, Wren, Goldcrest and Great Tit) and several migrant species (Blackcap and Willow Warbler) are similar to trends for the UK. In the uplands, Buzzards and Red Grouse numbers continue to improve, and counts of Grey Heron, Mallard, and Feral Pigeon have also increased since 1994. The most dramatic increases are exhibited by Grey Wagtail and House Martin, both of whose counts doubled since last year, although the sample size is small in the wagtail. Wales is the only other region in which House Martins are increasing, whereas Grey Wagtail appears to have increased throughout its range over this period. Tree Pipits have also increased significantly since 1994 but, again, the sample size should ideally be larger for us to be confident with this result. In 1998 we reported significant increases for Bullfinch and Linnet, but numbers of both species dropped between 1998 and 1999 and the five-year trends are no longer significant.

Wales

Of 52 species detected in at least 30 squares in Wales, seven species declined significantly, and14 increased significantly over the period 1994 to 1999 (Table 7). Lesser Black-backed Gull was the only species whose counts changed significantly since last year, and this species along with the Herring Gull has increased significantly since 1994. We do have to maintain a degree of caution with gull figures since it is likely that some of the birds recorded may be non-breeders. Among species whose numbers have declined are Starling, Bullfinch, Yellowhammer and Cuckoo, all species where a large component of the population occurs on farmland. Starlings appear to be declining more rapidly in Wales than other parts of the UK. Welsh Chaffinch numbers are significantly lower than in 1994, in contrast with stable or increasing populations elsewhere. Declines in Pheasant numbers are likely to be influenced by stocking, and the decline in Mallard mirrors the recent national trend in winter numbers detected by the Wetland Bird Survey. Species that have increased significantly include small-bodied residents that have probably benefited from relatively mild recent winters (e.g. Wren, Great Tit, Goldcrest and Treecreeper), as well as Blackbird and Blackcap. The significant increase in House Sparrows continued, in contrast to moderate declines elsewhere, and Goldfinch counts have increased. The increase in House Martins is similar to the trend for Scotland and trends for two other aerial feeders – Swift and Swallow – are also significantly positive in Wales, mirroring the overall UK trend over the past few years. Unlike the situation in Scotland, Welsh Meadow Pipits are increasing.

Table 7. WALES: Population changes for species that occurred in at least 30 squares, on average, in Wales over the period 1994 to 1999. The figures presented are the percentage changes in population levels for 1998 to 1999, and 1994 to 1999, marked with an asterisk where significant at a 5% level. For the five-year period, the lower and upper 95% confidence limits are given. Species in bold are red-listed, and species in italics amber-listed in *Birds of Conservation Concern*.

Species	*Sample*	*Change 98-99*	*Change 94-99*		*lcl*	*ucl*	*Species*	*Sample*	*Change 98-99*	*Change 94-99*		*lcl*	*ucl*
Grey Heron	31	7	-2		-37	53	Whitethroat	56	-12	7		-18	38
Mallard	45	-18	-49	*	-64	-28	Garden Warbler	49	23	-8		-32	25
Buzzard	92	1	0		-20	26	Blackcap	76	3	59	*	25	102
Pheasant	57	-18	-29	*	-45	-8	Chiffchaff	86	-38	* -15		-31	4
Curlew	35	-6	1		-30	46	Willow Warbler	122	2	-4		-15	8
Lesser Black-backed Gull	40	221	* 465	*	235	854	Goldcrest	61	24	25	*	1	55
Herring Gull	46	8	46	*	6	103	Long-tailed Tit	43	-13	36		-17	120
Wood Pigeon	128	-11	1		-12	15	Coal Tit	50	5	2		-24	38
Collared Dove	45	8	25		-9	73	Blue Tit	120	-3	11		-3	28
Cuckoo	52	-32	-31	*	-51	-3	Great Tit	112	7	21	*	1	44
Swift	49	2	53	*	6	121	Nuthatch	47	-21	26		-13	82
Green Woodpecker	35	-16	23		-22	94	Treecreeper	33	24	75	*	11	178
Great Spotted Woodpecker	39	10	30		-13	95	Jay	46	-5	-3		-33	41
Skylark	78	8	13		-4	32	Magpie	116	-3	16		-1	36
Swallow	115	-11	37	*	14	66	Jackdaw	94	8	19		-3	46
House Martin	67	17	104	*	53	173	Rook	58	3	1		-32	51
Meadow Pipit	62	35	44	*	23	68	Carrion Crow	137	-6	7		-8	25
Pied Wagtail	80	18	9		-15	39	Raven	56	-25	-8		-35	30
Wren	132	14	15	*	3	27	*Starling*	70	9	-41	*	-56	-21
Dunnock	102	2	16		-4	39	House Sparrow	79	1	62	*	31	100
Robin	129	18	11		-1	23	Chaffinch	134	5	-14	*	-23	-3
Redstart	48	-15	1		-22	32	Greenfinch	70	-4	23		-4	57
Wheatear	36	11	7		-26	57	*Goldfinch*	78	34	57	*	20	105
Blackbird	129	4	13	*	2	26	**Linnet**	68	10	17		-13	56
Song Thrush	109	7	12		-6	32	**Bullfinch**	43	-9	-50	*	-66	-26
Mistle Thrush	70	-1	14		-14	53	Yellowhammer	35	-4	-31	*	-52	-2

Table 8. NORTHERN IRELAND: Population changes for all species that occurred in at least 30 squares in Northern Ireland over the period 1994 to 1999, as well as figures for some species detected in 20 - 30 squares (in parentheses to encourage caution on the basis of small sample sizes). The figures presented are the percentage changes in population levels for 1998 to 1999, and 1994 to 1999, marked with an asterisk where significant at a 5% level. For the five-year period, the lower and upper 95% confidence limits are given. Species in bold are red-listed, and species in italics amber-listed in *Birds of Conservation Concern*.

Species	*Sample*	*Change 98-99*	*Change 94-99*		*lcl*	*ucl*	*Species*	*Sample*	*Change 98-99*	*Change 94-99*		*lcl*	*ucl*
Wood Pigeon	47	-9	-3		-30	35	(Goldcrest	26	-7	98	*	4	279)
(Skylark	28	-38	-9		-36	30)	Coal Tit	34	-20	66		-10	206
Swallow	49	23	14		-17	56	Blue Tit	44	-1	35		-5	90
(House Martin	21	-20	68		-15	233)	Great Tit	36	-27	60	*	2	153
Meadow Pipit	41	-1	30	*	1	67	Magpie	49	4	9		-16	43
(Pied Wagtail	21	-8	-23		-64	64)	Jackdaw	42	15	-7		-35	32
Wren	53	-8	48	*	12	95	Rook	42	22	107	*	42	201
Dunnock	37	-5	174	*	58	372	Hooded Crow	43	-9	81	*	19	177
Robin	52	-7	27		-2	63	*Starling*	43	-9	31		-15	101
Blackbird	51	-11	47	*	13	91	(House Sparrow	28	15	-47	*	-68	-12)
Song Thrush	42	-19	9		-27	63	Chaffinch	53	18	64	*	20	123
Mistle Thrush	32	-7	-60	*	-77	-30	(Greenfinch	24	16	83		-12	280)
(Sedge Warbler	20	-16	-7		-42	50)	(**Linnet**	21	3	-10		-52	71)
Willow Warbler	46	-23	68	*	19	138	(**Reed Bunting**	20	11	38		-8	109)

Northern Ireland

Of nineteen species detected in at least 30 BBS squares (on average) in Northern Ireland, only Mistle Thrush showed a significant decline (Table 8). House Sparrows also declined significantly, but this is based on occupancy of only 28 squares. Nine species increased significantly between 1994 and 1999, including species whose numbers are going up almost everywhere (Wren, Great Tit and Goldcrest). The almost threefold increase in Dunnocks is intriguing; this species has shown modest increases in numbers throughout the UK over the last six years. Of the remaining increasing Northern Irish species, Blackbird and Willow Warbler numbers have increased significantly in other parts of the UK, and populations of Chaffinch and Rook are stable elsewhere. However, the increasing trend for Meadow Pipit - also found in Wales - is in opposition to declines of this species in England and Scotland. Hooded Crows are largely replaced by Carrion Crows outside Ireland and both species are continuing to increase.

Table 9. Population changes between 1994 and 1999 for species recorded in at least 20 squares in 1999 in most of the 9 Regional Development Agency (RDA) regions of England. For each region the percentage change is given (marked with an asterisk if significant), and the sample size (in italics) Figures for species detected in fewer than 30 squares on average are in parentheses to encourage caution on the basis of small sample sizes.

Species	*S. West*		*S. East*		*London*		*East Eng*		*E. Mids*		*W. Mids*		*N. West*		*Yorks & Humb*		*N. East*	
Grey Heron	-8	*69*	22	*69*	-	-	-12	*63*	6	*37*	(-48*	*27)*	26	*52*	-	-	-	-
Mute Swan	-	-	33*	*31*	-	-	78*	*35*	-	-	-	-	-	-	-	-	-	-
Canada Goose	82*	*38*	23	*65*	-	-	4	*42*	-	-	-19	*29*	84*	*31*	-	-	-	-
Mallard	62*	*127*	28*	*135*	-	-	1	*150*	-13	*69*	18	*54*	22*	*101*	28	*54*	-	-
Sparrowhawk	-9	*45*	-13	*45*	-	-	9	*38*	-	-	-	-	-	-	-	-	-	-
Buzzard	5	*142*	(200*	*23)*	-	-	-	-	-	-	64*	*31*	-	-	-	-	-	-
Kestrel	-34*	*75*	-19	*90*	-	-	-24*	*92*	13	*43*	(-27	*22)*	-15	*50*	-16	*36*	-	-
Red-legged Partridge	-	-	27	*57*	-	-	8	*157*	6	*59*	-	-	-	-	52	*31*	-	-
Pheasant	14*	*204*	8	*224*	-	-	3	*220*	-18*	*97*	37*	*69*	41*	*75*	32*	*73*	15	*30*
Moorhen	27	*70*	-2	*89*	-	-	12	*104*	-8	*43*	16	*34*	31	*51*	(60*	*29)*	-	-
Coot	-	-	10	*35*	-	-	19	*30*	-	-	-	-	-	-	-	-	-	-
Oystercatcher	-	-	-	-	-	-	-	-	-	-	-	-	-24	*36*	-	-	-	-
Lapwing	-	-	-19	*78*	-	-	-16	*62*	-28	*46*	-	-	-24*	*86*	27*	*60*	-	-
Curlew	-	-	-	-	-	-	-	-	-	-	(-41*	*24)*	-22*	*72*	1	*60*	-	-
Black-headed Gull	-	-	-14	*49*	-	-	-30*	*67*	-	-	-	-	-39*	*69*	-52*	*43*	-	-
Lesser Black-backed Gull	-19	*75*	-	-	-	-	74*	*61*	-	-	-	-	56*	*74*	-	-	-	-
Herring Gull	-42*	*89*	107*	*39*	-	-	-1	*38*	-	-	-	-	1	*49*	-	-	-	-
Feral Pigeon	-15	*68*	3	*81*	9	*42*	17	*68*	-5	*42*	(38	*27)*	-37*	*56*	10	*41*	-	-
Stock Dove	20	*110*	32*	*128*	-	-	-19*	*113*	-43*	*54*	41	*41*	198*	*31*	-	-	-	-
Wood Pigeon	7	*286*	-2	*294*	41*	*46*	0	*264*	-13	*134*	4	*100*	5	*144*	8	*100*	33*	*43*
Collared Dove	14	*168*	33*	*189*	36*	*30*	52*	*165*	6	*80*	11	*65*	28*	*81*	-	-	-	-
Turtle Dove	-	-	-36*	*55*	-	-	-21	*94*	-	-	-	-	-	-	-	-	-	-
Cuckoo	-40*	*121*	-30*	*155*	-	-	-29*	*137*	-26	*63*	-22	*42*	-27	*37*	-36*	*37*	-	-
Swift	-39*	*145*	-38*	*130*	29	*35*	93*	*131*	32*	*71*	48*	*48*	-4	*88*	51*	*55*	-	-
Green Woodpecker	-13	*112*	31*	*175*	-	-	63*	*101*	-	-	(-33	*21)*	-	-	-	-	-	-
Great Spotted Woodpecker	17	*99*	44*	*145*	-	-	54*	*98*	(64	*25)*	59*	*37*	30	*41*	-	-	-	-
Skylark	-14*	*196*	-16*	*209*	-	-	-16*	*231*	-20*	*115*	-48*	*70*	-25*	*96*	-13	88	-39*	36
Swallow	27*	*226*	-10	*193*	-	-	-19*	*182*	-	-	1	*79*	12	*135*	16	*93*	30*	*37*
House Martin	15	*131*	-22*	*111*	-	-	-17	*88*	-20	*41*	-23	*45*	59*	*69*	-3	*41*	-	-
Meadow Pipit	3	*37*	-5	*36*	-	-	-27	*37*	2	*35*	-	-	-7	*60*	12	*56*	-	-
Yellow Wagtail	-	-	-	-	-	-	-20	*52*	-36*	*37*	-	-	-	-	-	-	-	-
Pied Wagtail	-10	*131*	17	*131*	-	-	41*	*120*	33	*68*	49*	*49*	49*	*91*	17	*64*	-	-
Wren	2	*278*	-4	*279*	4	*39*	5	*239*	15*	*125*	13*	*94*	46*	*139*	32*	*98*	22*	*38*
Dunnock	9	*248*	-4	*257*	1	*34*	19*	*212*	-17*	*115*	10	*87*	-1	*111*	14	*80*	29	*27*
Robin	2	*274*	1	*279*	14	*41*	20*	*232*	-6	*118*	20*	*97*	32*	*135*	31*	*88*	64*	*37*
Wheatear	-	-	-	-	-	-	-	-	-	-	-	-	10	*36*	-	-	-	-
Blackbird	12*	*287*	2	*293*	-30*	*46*	2	*257*	7	*132*	20*	*100*	33*	*143*	30*	*99*	59*	*35*
Song Thrush	12	*229*	-9	*252*	-7	*30*	-33*	*180*	-1	*76*	20	*67*	64*	*102*	30	*61*	-8	*31*
Mistle Thrush	-26*	*129*	-18*	*181*	-	-	-10	*138*	23	*63*	-4	*46*	28	*88*	19	*53*	19	*24*
Sedge Warbler	-	-	-	-	-	-	12	*43*	(-11	*20)*	-	-	-	-	-	-	-	-
Reed Warbler	-	-	-	-	-	-	-5	*35*	-	-	-	-	-	-	-	-	-	-
Lesser Whitethroat	-17	*31*	-	-	-	-	-14	*59*	-	-	-	-	-	-	-	-	-	-
Whitethroat	8	*164*	18*	*170*	-	-	8	*196*	28*	*92*	-11	*57*	14	*55*	-34*	*50*	-	-
Garden Warbler	32	*59*	10	*75*	-	-	-	-	-	-	29	*30*	(31	*25)*	-	-	-	-
Blackcap	33*	*199*	46*	*215*	-	-	36*	*177*	55*	*62*	92*	*62*	107*	*62*	38*	*44*	-	-
Chiffchaff	-19*	*228*	-13*	*197*	-	-	-20*	*131*	43	*37*	25	*62*	25	*42*	61*	*30*	-	-
Willow Warbler	-22*	*168*	-29*	*146*	-	-	-28*	*146*	23	*80*	-2	*68*	40*	*112*	-5	*84*	0	*39*
Goldcrest	64*	*92*	42*	*108*	-	-	57*	*48*	-	-	-	-	-	-	-	-	-	-
Spotted Flycatcher	12	*31*	-22	*31*	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long-tailed Tit	-26*	*102*	-19*	*140*	-	-	20	*98*	46	*44*	-2	*45*	14	*43*	-	-	-	-
Marsh Tit	-	-	-17	*33*	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coal Tit	-3	*71*	-4	*85*	-	-	19	*47*	-	-	(16	*22)*	32	*36*	-	-	-	-
Blue Tit	-7	*274*	3	*286*	27*	*44*	27*	*239*	13	*120*	-5	*98*	8	*140*	11	*91*	3	*32*
Great Tit	11	*254*	1	*272*	91*	*37*	11	*224*	6	*101*	-10	*94*	31*	*120*	15	*74*	(2	*26)*
Nuthatch	0	*54*	3	*91*	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Treecreeper	-4	*44*	6	*62*	-•	-	-	-	-	-	-	-	-	-	-	-	-	-
Jay	-24*	*81*	-33*	*133*	-	-	-8	*77*	-	-	-37	*33*	-6	*39*	-	-	-	-
Magpie	-9	*244*	6	*259*	22	*45*	34*	*189*	-3	*98*	-13	*89*	5	*124*	-8	*65*	-	-
Jackdaw	14	*220*	21*	*203*	-	-	53*	*157*	-6	*65*	19	*67*	20	*77*	75*	*65*	51*	*32*
Rook	33*	*185*	-34*	*153*	-	-	54*	*148*	5	*68*	-36*	*53*	-37*	*64*	-3	*71*	-	-
Carrion Crow	-1	*275*	39*	*278*	45*	*46*	22*	*231*	29*	*118*	5	*99*	24*	*154*	15	*104*	10	*42*
Starling	-9	*215*	-32*	*257*	-26*	*46*	-13	*221*	42*	*108*	-31*	*82*	1	*133*	-12	*87*	-1	*34*
House Sparrow	-11	*194*	-17*	*211*	-53*	*45*	-17*	*189*	8	*89*	7	*79*	-1	*109*	-4	*65*	-	-
Chaffinch	-8*	*285*	3	*284*	-	-	16*	*251*	2	*128*	5	*97*	13*	*141*	3	*97*	-	-
Greenfinch	18*	*231*	0	*238*	-	-	19*	*197*	42*	*95*	36*	*69*	36*	*99*	7	*64*	1	*43*
Goldfinch	0	*184*	-15	*177*	-	-	-27*	*149*	4	*66*	-28	*49*	17	*88*	25	*56*	-	-
Linnet	-22*	*156*	-5	*174*	-	-	-16	*161*	-31*	*98*	-33*	*46*	18	*75*	-16	*66*	-	-
Bullfinch	-51*	*89*	-24*	*104*	-	-	-13	*55*	-	-	(-28	*25)*	-	-	-	-	-	-
Yellowhammer	-5	*167*	-29*	*182*	-	-	-13*	*193*	-17*	*105*	-11	*69*	-10	*51*	-15	*57*	-	-
Reed Bunting	-	-	-24	*39*	-	-	4	*64*	-4	*36*	-	-	-26	*40*	-	-	-	-
Corn Bunting	-	-	-	-	-	-	-25*	*46*	-	-	-	-	-	-	-	-	-	-

The nine Regional Development Agency regions are as follows:

RDA 1 (North West) – Cumbria, Lancashire, Greater Manchester and Cheshire (inc. Wirral)
RDA 2 (North East) – Northumberland, County Durham and Cleveland
RDA 3 (Yorkshire & The Humber) – North Yorkshire, West Yorkshire, East Yorkshire, South Yorkshire and North Lincolnshire
RDA 4 (East Midlands) – Lincolnshire, Nottinghamshire, Derbyshire, Leicestershire, Rutland and Northamptionshire
RDA 5 (East of England) – Norfolk, Suffolk, Cambridgeshire, Essex, Bedfordshire and Hertfordshire
RDA 6 (West Midlands) – Staffordshire, Birmingham, Shropshire, Warwickshire, Hereford and Worcestershire
RDA 7 (South East) – Kent, Sussex, Surrey, Hampshire, Berkshire, Buckinghamshire and Oxfordshire
RDA 8 (South West) – Cornwall, Devon, Somerset, Dorset, Wiltshire and Gloucestershire
RDA 9 London

Trends in Regional Development Agency regions

This is the first time we have analysed BBS results by specific regions within one country (Table 9). The excellent coverage in England means that we are able to do this for a good range of species, which we hope will provide a useful source of information for local government. The nine Regional Development Agency regions are made up of the groups of counties listed above. Since the type of farming and habitats vary throughout England, major differences in population trends may point us towards reasons for declines.

Of the 71 species listed in Table 9, 45 were recorded in sufficient numbers for indexing in five or more different regions, and these are the species we have focussed on. Ten species were indexed in all nine regions. Many of the significant increases (e.g. for Collared Dove, Great Spotted Woodpecker and Blackcap) and decreases (e.g. for Kestrel, Jay, Skylark and Cuckoo) are consistent across RDA regions but some species show interesting regional patterns. Lapwing, for example, is declining significantly in the North West of England (-24%) but, curiously, is increasing significantly in Yorkshire and the Humber (27%). Stock Dove is another species with varying regional trends, increasing significantly in the South East and North West but decreasing significantly in the East of England and the East Midlands. There is a north-south divide as far as Swifts are concerned with significant decreases in the South East (-38%) and South West (-39%) but significant increases in the East of England (93%), East (32%) and West Midlands (48%) and Yorkshire and the Humber (51%). Swallow, while increasing by 10% across the UK, is decreasing in Eastern England (-19%) and increasing in the South West (27%) and the North West (30%). Results for Song Thrush back up feeling among birdwatchers that this species may be faring better in the north. There was a significant decrease in the East of England (-33%) and a significant increase in the North West (64%). Willow Warbler is another species declining in the South East (-29%), South West (-22%) and East of England (-28%), but increasing significantly in the North West (40%). Starling has been showing worrying declines across the UK, and this is mirrored in the results from the South East (-32%), London (-26%) and West Midlands (-31%), but it is increasing significantly in the East Midlands (42%). Another urban species, the House Sparrow, has also declined significantly in the southern and eastern parts of England, but populations in the Midlands and North seem to be stable. Among the finches and buntings, most population trends are negative except for Greenfinch and Chaffinch. Yellowhammer continues to show significant declines across most regions.

Conclusions - interpreting population trends

Identifying consistent patterns among population trends for more than 50 species in four different countries and nine different regions is a difficult task, particularly because of regional differences in the species indexed. However, some patterns are beginning to emerge, which will help to assess the biological significance of these population trends.

A number of farmland and upland species appear to be declining in all regions. These include Linnet and Bullfinch (except perhaps in Scotland), Yellowhammer, Skylark (except in Wales), Cuckoo, Kestrel, Black-headed Gull and Golden Plover. Three of these species (Skylark, Linnet and Bullfinch) are red-listed in Birds of Conservation Concern (Gibbons *et al* 1996) on the basis of their long-term population declines. Three other red-listed farmland specialists (Grey Partridge, Turtle Dove and Corn Bunting) also exhibit significant declines, but there are few regional data. These declines are most likely due to agricultural intensification, including use of herbicides and autumn sowing of cereals.

Other birds may be more strongly influenced by annual weather patterns. A number of small resident passerines, and other mainly woodland species show increases throughout their range. These include Goldcrest, Wren, Robin, Dunnock, Blackbird, Great Spotted Woodpecker, Treecreeper, Blue Tit and Great Tit. Others include House Martin (except in parts of England), Blackcap, Jackdaw, Carrion/Hooded Crow, Lesser Black-backed Gull and Buzzard. Widespread species whose populations appear to be broadly stable (i.e. despite some regional variation in some cases) include Wood Pigeon, Collared Dove, Song Thrush, Swallow, Wheatear, Pied Wagtail, Whitethroat, Goldfinch and Greenfinch.

Small-bodied resident species such as Wren, Goldcrest, Treecreeper and Long-tailed Tit, have benefited from the run of relatively mild winters, and counts have improved over the past three breeding seasons. Following harsh winters, the winter of 1995 being the most severe, populations are often considerably reduced, but species may differ in their sensitivity to different climatic effects. Wrens appear to be strongly affected by winter temperatures, whereas Long-tailed Tits and Treecreepers are sensitive to prolonged periods of glazed frost that prevent access to food.

The corvids have always generated interest, much of it negative. Although most species have shown long-term increases on CBC plots, the five-year BBS trends suggest that Jackdaws, Carrion Crows and Rooks are the only species continuing to increase. Jackdaws are doing particularly well, perhaps due to increased breeding performance in recent years. Magpie populations (often blamed for declines in songbirds despite the lack of evidence for this) are relatively stable, whereas Jay numbers have decreased markedly over this five-year period.

In addition to the species showing marked differences in population trends among RDA regions (e.g. Lapwing, Stock Dove, Swift, Swallow, Song Thrush, Starling and House Sparrow), many species exhibit markedly different population trends among countries. Mallards are increasing significantly in most English regions and in Scotland, but declining in Wales. Pheasants are also increasing in England but declining in Scotland

and Wales. Starlings are declining significantly in England and Wales, but populations in Scotland and Northern Ireland are healthy. House Sparrows have declined significantly in England and Northern Ireland, but stable in Scotland and increasing in Wales. Willow Warblers are declining significantly in many regions of England, stable in Wales and increasing in Scotland and NI. Meadow Pipits are increasing in Wales and Northern Ireland, stable in England, but declining in Scotland. Chaffinches are stable in England and Scotland, increasing in Northern Ireland and declining in Wales. Rooks show a similar pattern but are declining significantly in some parts of England and stable in Wales. Reed Bunting numbers are declining in England but healthy in Scotland and NI.

BBS Research and Development

The importance of arable pockets

A recent study on the importance of arable pockets demonstrates the important value of the habitat data collected at the transect section level by BBS observers. Many once-familiar farmland birds have declined dramatically over the past few decades, and there is overwhelming evidence to link these declines to changes in agricultural practices. One profound change related to agricultural intensification and specialisation is the disappearance of mixed farming. Farms in the drier east of Britain are now mainly arable and those in the wetter west mainly pastoral - used for livestock production. In order to assess the impact of these changes on the abundance of farmland birds, Rob Robinson of the BTO recently carried out a series of analyses on BBS data funded by RSPB. Concentrating on farmland squares (defined as those with 50% of the transect sections classified as farmland), the country was split, by county, into three regions dominated by arable, pastoral or both (hence mixed). He then used statistical models to compare the abundance of a selection of seed-eating and insectivorous bird species between squares with no arable habitat to those with different amounts of arable land. Results proved that even a small amount of arable habitat in mainly pastoral landscapes can greatly improve conditions for most seed-eating birds. In the arable east, however, an increase in the number of arable sections had no effect on bird abundance except for arable specialists such as Grey Partridge. See the September 2000 issue of *BTO News* for further details.

Meadow Pipits are found mainly in upland areas - in fact, many of our most northerly squares have only this species! Although they appear to be in overall decline in the UK and Scotland, in Wales they seem to be increasing. (Artwork by Rodney Ingram).

Meadow Pipit densities in upland areas: indicator of heather condition

A familiar and widespread bird of the grass and heather moors and bogs of the uplands, the Meadow Pipit can apparently also be a useful indicator of habitat change. A recent study by Des Vanhinsbergh of the BTO looked at the association between Meadow Pipit abundance and habitat type on upland BBS squares. Densities, which ranged up to 100 individuals per 1km square, were found to vary according to the amount of heather. The highest pipit densities occurred at intermediate levels of heather coverage. Bog and grass moor were also found to be important components of the habitat for Meadow Pipits. Red Grouse prefer pure heather habitat and this study suggests that the loss of heather grassland mosaics, promoted by Red Grouse management, could have a negative impact on numbers of Meadow Pipits as well as a number of other upland species such as Golden Plover and Twite. There is also a link to Hen Harriers, because a reduction in Meadow Pipit density may reduce Hen Harrier abundance, and hence alleviate any potential impact on grouse populations.

Progress on linking the population indices of the BBS to the Common Birds Census

Work is currently under way to link the BBS to the Common Birds Census (CBC). Although JNCC and BTO have continued to fund the CBC throughout the overlap period, the BBS was designed to be the national monitoring scheme for terrestrial wild birds in the UK and it was not intended to run both schemes in parallel indefinitely. Year 2000 is the last official year of the CBC, and it is therefore crucial to be able to relate annual population indices derived from the current BBS to those derived from the CBC. In the first stage in our approach, we selected ten species, from a selection of habitats (woodland, farmland and riparian) and ranging from those with good to relatively sparse data. With six years of overlap data, we carried out analyses to compare population indices from the two surveys, considering factors such as geographical coverage and habitat as well as differences in the survey methods. We found close agreement between BBS and CBC estimates. Only Blackbird and Wren showed significant differences but because annual changes in the two sets of indices were almost parallel, these differences may not be biologically significant. We will be discussing these results with users of the information to ensure this is a good understanding of how the combined indices should be used and interpreted. Combined CBC/BBS indices will provide an important input to the government's wild bird indicators and the Biodiversity Action Plan process. When the final year's data from CBC has been received and input, we will produce combined indices for as many species as possible over the full period of overlap.

Using BBS data to estimate national population sizes of farmland birds

National population estimates of widespread terrestrial birds have been derived in the past from special surveys and from the summed products of territory densities on CBC woodland and farmland plots multiplied by the areas of these land-use categories. Although the main purpose of the BBS, like that of the CBC, is to detect annual and longer-term population changes, it was also designed to derive density estimates (and hence population sizes) by recording birds in distance categories. We used distance analysis of BBS data from the 1998 field season to calculate habitat and region-specific population estimates for twenty bird species, corresponding roughly to the common native species in the government's farmland bird indicator. In the absence of empirical data on proportions of males and females detected during a BBS, our estimates of adult birds were converted to numbers of breeding pairs by dividing by published mean sex ratios. Results were compared to previous estimates, calculated from CBC and land-use data in 1989. On the basis of the trend information discussed elsewhere, most species were expected to have declined over the period 1989 to 1998, but Whitethroat, Greenfinch, Wood Pigeon and Jackdaw were expected to have increased.

This study was aimed at assessing the use of BBS data to estimate population sizes. BBS-derived estimates were similar to those expected by extrapolating population trends from CBC-based estimates, but only for a small group of (mainly sexually-monomorphic) species found on farmland that do not flock extensively. For the remaining species, discrepancies between the estimates are more likely to be related to differences in sampling methodology than population changes. Starling and House Sparrow, which occur mainly in urban areas, have undoubtedly been underestimated by the CBC method, and breeding estimates of species that flock during the breeding season or have overlapping territories (e.g. Greenfinch, Wood Pigeon and Jackdaw) may be unreliable. The assumptions and problems associated with the method, including sexual differences in detectability, will be discussed in a forthcoming paper.

Mammals

It is encouraging to report that 85% of all BBS fieldworkers carried out a mammal survey – the same percentage as last year. On 9% of these, no mammals were seen. The 15 most commonly seen mammals are the same as last year (Table 10). A total of 40 species were recorded including Common Dormouse and Leisler's, Long-eared and Noctule Bats. Many of the records for the more secretive or hard to identify species will originate from the observer's prior knowledge of the square, i.e. by using mammal traps or a bat detector. The behaviour of most mammal species means that few will ever be seen on BBS visits, which is why we include the 'known to be present in square' section on the mammal form.

Table 10. The 15 most frequently recorded mammals during 1999.

Mammal	*Number of squares*	*% of squares*
Rabbit	1429	71
Grey Squirrel	721	36
Red Fox	685	34
Brown Hare	680	34
Mole	508	25
Roe Deer	399	20
Badger	278	14
Hedgehog	247	12
Common Shrew	177	9
Stoat	168	8
Brown Rat	160	8
Weasel	133	7
Muntjac Deer	109	5
Red Deer	97	5
Fallow Deer	85	4

The future of mammal monitoring by the BBS

Although most British mammal species have been surveyed (at least partially) by one of the mammal special interest groups, coverage is generally patchy and restricted to individual species. Based on the recommendations of two recent reports, a partnership of interested conservation organisations is planning to establish a coordinated mammal monitoring network for the UK, similar to the bird surveys organised by the BTO and its partners, and the successful National Bat Monitoring Programme. Mammal monitoring is a key requirement of a number of conservation initiatives including the Convention for Biological Diversity, the European Habitats Directive and the UK Biodiversity Action Plan. Its initial aims are to identify the priority species, assess species coverage by different survey methods and develop methods to integrate data collation. The BBS rated highly as a source of data for visually-detected mammals, and there should be future opportunities to make greater use of these valuable data for conservation purposes. For many UK mammal species, the aim is to monitor changes in distribution. Through the BBS mammal survey, we can provide this for a number of species that cannot be easily surveyed using other methods.

The countryside bird survey - progress report

The Countryside Bird Survey (CBS), which uses the same methods as the BBS, enjoyed a very successful second season in 1999 with enthusiastic support from volunteers, the National Parks and Wildlife and commercial sponsors. A combination of these factors has enabled the CBS to firmly establish itself and indeed to grow.

There has been a substantial increase in the number of squares covered - up from 260 in 1998 to 308 in 1999. Coverage is still rather sparse in parts of the west, southwest and midlands - due to the shortage of volunteer fieldworkers in these areas. National Parks and Wildlife rangers continue to take on a sizeable portion of squares (18%), often in more remote locations. An encouraging 79% of all squares issued were covered. Realistically, it is probable that the coverage figure will level out at between 350 to 400 squares in the coming years.

Eleven workshops were held explaining the survey methods and some basic identification, again proving a useful method for recruiting new observers.

Preliminary results from the 1999 season showed that Wren, Blackbird and Robin were again ranked as the top three most widespread species in the Republic - all being found in 90% or more squares. Song Thrush ranked ninth (81%) and Skylark twentieth (51%). In a sample analysis of 220 squares, a total of 105 species was recorded (104 in 1998) and 22 species occurred in 100 squares or more. As was the case in 1998, Yellowhammers were found almost exclusively in the cereal-growing areas of the east and southeast. Although too early to identify any real trends after only two counting seasons, it is interesting to note that Chiffchaffs were found in 28% less squares than in 1998 and the Spotted Flycatcher figure was down by 54%.

It will be interesting in due course to integrate these data with the BBS in Northern Ireland to produce some all-Ireland results and some new insights about the state of countryside birds in Britain and Ireland. With the foundations now firmly laid, CBS is set to become a major player in monitoring Ireland's wildlife.

Dick Coombes (CBS Field Co-ordinator) - BirdWatch, Ireland.

Further Reading

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The Future

We hope this particular BBS annual report has illustrated some of the exciting developments within the BBS. Thanks to the volunteer in covering nearly 2400 squares in 1999 we have the amount of data necessary to undertake this level of work. Providing country summaries is a great step forward in BBS reporting and we are pleased we are able to do this for England, Scotland, Wales and Northern Ireland. The other main achievement has been the analysis of BBS data based on the RDA regions (see Table 9). Notwithstanding these excellent achievements, it is vital that we ensure that this coverage is maintained at this level so that our analysis can continue to be carried out with the same degree of accuracy. Fortunately, most parts of the UK have excellent coverage with just a few areas where we would like to find more volunteers. Hopefully, we will be able to fill in these last few gaps in coverage in the coming season.

SPECIAL THANKS

We would like to thank all BBS volunteers and ROs for making the survey the success it is today. Space does not permit all observers to be acknowledged individually, but we would like especially to thank the ROs for their efforts. ROs during the 1999 season are:

BBS Regional Organisers:

ENGLAND: Avon – John Tully; Bedfordshire – Phil Cannings; Berkshire – Chris Robinson; **Birmingham & West Midlands – vacant**; Buckinghamshire – Mick A'Court; Cambridgeshire – John Le Gassick; Cheshire (mid) – Paul Miller; Cheshire (north & east) – David Jones; Cheshire (south) – Charles Hull; Cleveland – Russell McAndrew; Cornwall – Paul Stubbs; Cumbria (north) – John Callion; **Cumbria (south) – vacant**; Derbyshire (north) – Oly Biddulph; Derbyshire (south) – Dave Budworth; Devon – John Woodland; Dorset – Catherine Whitby; Durham – David Sowerbutts; Essex (north-east) – Peter Dwyer; Essex (north-west) – Geoff Gibbs; Essex (south) – Jean Stone; Gloucestershire – Mike Smart; 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) – Philip Shearwood; Leicestershire & Rutland – Jim Graham; Lincolnshire (east) – Rob Watson; **Lincolnshire (north) – vacant**; Lincolnshire (south) – Richard and Kay Heath; Lincolnshire (west) –Peter Overton; London & Middlesex – Derek Coleman; Manchester– Judith Smith; Merseyside – Bob Harris; Norfolk (north-east) – Chris Hudson; Norfolk (north-west) – Mike Barrett; Norfolk (south-east) – Graham Coxall; Norfolk (south-west) – Vincent Matthews; Northamptonshire – Phil Richardson; Northumberland – Tom and Muriel Cadwallender; Nottinghamshire – Lynda Milner; Oxfordshire (north) – Roger Evans; Oxfordshire (south) – Peter Abbott; Rugby – Barrington Jackson; Isles of Scilly – Will Wagstaff; Shropshire – Allan Dawes; Somerset – Eve Tigwell; Staffordshire (central & south) – Liz Palmer; Staffordshire (north) – Alan Hancock; Suffolk – Mick Wright; Surrey – Hugh Evans; Sussex – Barrie Watson; Warwickshire - Joe Hardman; Isle of Wight – James Gloyn; Wiltshire (north) – Mark Lang; 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) – Peter Ottaway; Yorkshire (Bradford) – Mike Denton; Yorkshire (York) – Rob Chapman; Yorkshire (Leeds & Wakefield) – Peter Smale; Yorkshire (south-east & south-west) – Chris Falshaw.

SCOTLAND: Aberdeen (north) – Paul Doyle; Aberdeen (south) – Graham Cooper; Angus – Ken Slater; Argyll (north & south inc. Mull) – David Wood; Arran - David Fowler; Ayrshire – Paul Darnbrough; Benbecula & The Uists – Paul Boyer; Borders – Alex Copland; Caithness - Neil Money; Central Scotland – Neil Bielby; Dumfries – Richard Mearns; Fife & Kinross – Norman Elkins; Inverness – Hugh Insley; Islay, Jura & Colonsay – Malcolm Ogilvie; Kirkcudbright - Brian Smith; **Lanark, Renfrew & Dunbarton – vacant**; Lewis & Harris – Tony Pendle; Lothian – Alan Heavisides; Moray & Nairn – Bob Proctor; Orkney – Colin Corse; Perthshire – Andrew Wight; Ross-shire – Dave Butterfield; Shetland – Dave Okill; Skye – Roger and Pat Cottis; Small Isles (Rum, Eigg, Muck, Canna) – Bob Swann; Sutherland - Neil Money; Wigtown – Geoff Sheppard.

WALES: Anglesey – Jim Clark; Caernarfon – John Barnes; Brecon – John Lloyd; Cardigan – Moira Convery; Carmarthen – David Poulter; Clwyd (east) – Anne Brenchley; Clwyd (west) – Peter Wellington; Glamorgan (west) – Dave Hanford; Glamorgan (mid and south) – Rob Nottage; Gwent – Jerry Lewis; Merioneth – Peter Haveland; Montgomery – Brayton Holt; Pembrokeshire – Rod Hadfield; Radnorshire – Pete Jennings.

NORTHERN IRELAND: Co Antrim – Anita Donaghy; Co Armagh – David Knight; Co Down – Alistair McIlwain; Co Fermanagh/Tyrone (south) – Phil Grosse; Co Londonderry – Charles Stewart; Co Tyrone (north) – Mary Mooney.

CHANNEL ISLANDS: Ian Buxton.

ISLE OF MAN: Pat Cullen.

Many thanks also to the following ROs who have retired during the last year and contributed significantly in developing BBS in their respective regions: Simon Burton, Roger Clarke, Andrew Gouldstone, Frank Gribble, Peter Hutchinson, David Jackson, Ian Kinley, Paul Mountain, Rob Purveur, Moss Taylor and Jim Winsper.

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.

The success of the BBS is dependent on volunteer support throughout the UK. The most valuable data are collected from squares covered by the same observer year after year. We greatly appreciate your continued support.

Please spread the word to other birdwatchers you may know, or even consider taking on another square if you have time. Thanks once again for all your hard work.

If you would like to take part in the BBS, we would be pleased to hear from you.

For further information, please contact:
The Census Unit, British Trust for Ornithology, The Nunnery, Thetford, Norfolk IP24 2PU
Tel 01842 750050 • *Fax* 01842 750030 • *E-mail* bbs@bto.org
Registered charity no. 216652